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□□□□□□□□ Benchee □ SMS-C □□□□□□□□□□

□□□□□□□

1. □□ SMS □□□□□ (`raw_sms_bench.exs`)

□□□□ `submit_message_raw` API □□□□□□□□□ SMS PDU□

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- □□□□□ SMS PDU□□□□ PDU □□□□□□□□ `@sample_pdus` □□□□
- □□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□□ HTML □□

□□□

```
mix run benchmarks/raw_sms_bench.exs
```

□□□ `benchmarks/output/raw_sms_benchmark.html`

2. □□ API □□□□□ (`message_api_bench.exs`)

□□□□□□□□□ API □□□□□□□□□□□□□□□□

□□□

- □□ insert_message□□□□□□□□
- □□ get_messages_for_smsc
- □□ list_message_queues
- □□□□□□□□□□□□□□□□□□□□□□

□□□

```
mix run benchmarks/message_api_bench.exs
```

□□□ `benchmarks/output/message_api_benchmark.html`

□□

□□□□□□□□ Benchee□□□□□□□□

- □□□2 □
- □□□10 □
- □□□□□2 □
- □□□□□□
- □□□□ HTML □□

□□

HTML □□□□□□□□□ `benchmarks/output/` □□□□□

- □□□□□□□
- □□□□
- □□□□□□
- □□□□

SMS-C API □□

← □□□□□□

□□ SMS-C REST API □□□□□□□□□□□□□ (`config/config.exs`) □□□□□□□□□□□□□

□□

□□ URL

```
https://<host>:8443/api
```

□□□□: 8443 (□□□ `config :api_ex, api: %{port: ...}` □□) □□: □ `enable_tls` □□ □ true □□□ HTTPS□□□□□□□□□□ □□□ `/api` □□□□

□□□□

□□□□□□□ JSON□

```
Content-Type: application/json
```

□□□□ URL □ API □□□□□□□□□□□□□□□ `/api/schema` □□□□□□□□□□□□□□□

□□□□

□ API □□□□□□□□□□□□□□□□ □□□□□□□□□□ OpenAPI □□□□□□□□□□ API □□□ □□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□□

- **TLS**: □ `enable_tls` □ true □□□□□□□□□□ `tls_cert_path` / `tls_key_path` □□ HTTPS□□□□□□□□□□
- □□□□: □□□□□□□□□□□□□□□ API □□□□□□□□□□□□□□□□□□□□□□□□□□□□ IP □□□ `X-Forwarded-For` □□□□□□□□□□□□□□□□□□□□□□□□□

□□□ API □□□□□□□□□□□□□□□□□

□□□□

□□□□□□□□□□□□□□□□□□ `data` □□□□

□□□□□

```
{ "id": 12345, "status": "queued" }
```

□□□□□ JSON □□□□□

```
[ { "id": 12345 }, { "id": 12346 } ]
```

□□□□□□□□□□□ `error` □□□□

```
{ "error": "payload_hex is required. For plaintext, use POST
/api/messages_plaintext" }
```

□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
{ "status": "error", "response": "Not Found" }
```

□□

□□□□□□□□□□□□□□□□

□□:

```
GET /api/status
```

□□ (200 OK):

```
{
  "status": "ok",
  "application": "OmniMessage",
  "timestamp": "2025-11-01T23:00:00Z"
}
```

□□:

```
curl https://host:8443/api/status
```

□□

□□□□□□□□□□□□□□□□□ `payload_hex`□TP-□□□□□□□□□□ `dcs`□□□□□ □□□□□□□□□□ `udh_hex` □□□□□□□□□□□□□□□□ □□□ Submit Plaintext□□□□□□□□□□ DCS □□□□□□□□□□

□□□□

□□□□□□□□□□ `ApiEx.Schemas.MessageSchema`□□

□□	□□	□□
`id`	integer	□□ ID
`source_msisdn`	string	□□□
`destination_msisdn`	string	□□□□
`payload_hex`	string	□□□□□□□□ TP-□□□□□□□□□□□□□
`dcs`	string	□□□□□□□□□□□□□□□□□□ `00`=GSM7, `08`=UCS2, `04`=8bit, `C8`=MWI□
`udh_hex`	string / null	���□□□□□□□□□□□□□□□
`tp_pid`	string / null	□□□□□□□□□□ TP-□□□□□□□□□ `00`□SME □ SME□□ `7F` = □U□SIM □□□□□SMS-PP □□□ □□SIM OTA□□□□□□□□□□□□□□ 2 □ `dcs`□□ □□□□□□□□ UICC□3GPP TS 23.048 / TS 31.111 □ 7.1.1 □□
`message_text`	string / null	□□□□□□□□ UTF-8 □□□□□□□□□
`source_smsc`	string	□ SMSC □□□
`dest_smsc`	string / null	□□ SMSC □□□
`status`	string	□□□□ `queued`, `backoff`, `sent`, `delivered`, `expired`, `dropped`, `auto_replied`, `balance_rejected`, `deleted`
`send_time`	datetime	

□□	□□	□□
`deliver_time`	datetime / null	
`expires`	datetime	
`delivery_attempts`	integer	
`deadletter`	boolean	
`message_parts`	integer / null	
`message_part_number`	integer / null	
`smsc_node_name`	string	□□□□□□□□□

□□□□

□□:

```
GET /api/messages
```

□□□:

- `smsc: <frontend_name>` - □□□□□□□□□□□□ SMSC □□□□
- `include-unrouted: true|1` - □□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□ `limit` □□□□□□ 100 □□□□□□□□□□□□□□□□□

□□ (200 OK) - □□□□□□ JSON □□□

□□:

```
# □□□□□□□□□
curl -H "smsc: uk_gateway" https://host:8443/api/messages

# □□□□□□□□□□□□
curl -H "smsc: uk_gateway" -H "include-unrouted: true"
https://host:8443/api/messages

# □□□□□□□□□□
curl "https://host:8443/api/messages?status=delivered&limit=50"
```

□□□□

□□:

```
GET /api/messages/:id
```

□□□ `x-decode: true` □□□□□□□□□□□□□□

□□ (200 OK): □□□□□□□□**404** □□□ `{"error": "Message not found"}` □□ ID □□□

```
curl https://host:8443/api/messages/12345
```

□□□□

□□□□□□□□□□□□**`payload_hex`** □□□□□□□□□□□□□□□□□□□□□□ 422□

□□:

```
POST /api/messages
Content-Type: application/json
```

□□:

```
{
  "source_msisdn": "15555551234",
  "destination_msisdn": "15555555678",
  "payload_hex": "c8329bfd06dddf723619",
  "dcs": "00",
  "source_smsc": "api_client"
}
```

□□:

- `source_msisdn`, `destination_msisdn` - □□□
- `payload_hex` - □□□□□□□□□□□□ TP-□□□□□□□□
- `dcs` - □□□□□□□□□□□□□□□□□□□□□□□□□□□□
- `udh_hex` - □□□□□□□□□□□□□□
- `tp_pid` - □□ TP-□□□□□□□□□□□□□□□□ `00`□□□□ `7F` □ □ 2 □ `dcs`□□□ `F6`□□□ SMS-PP □□□□ / SIM OTA□□□□□□□□ □□□□□□□□□□□□□□□□ UICC□□□□□□□□□□□□□□
- `source_smsc` - □□□□□□□□
- `source_type` - □□□□□□□

□□ (201 Created): □□□□□□□□□□□□□ 422 □□□ `error` □□□□□□□□□ `payload_hex`□□

```
curl -X POST https://host:8443/api/messages \
  -H "Content-Type: application/json" \
  -d '{
    "source_msisdn": "15555551234",
    "destination_msisdn": "15555555678",
    "payload_hex": "c8329bfd06dddf723619",
    "dcs": "00",
    "source_smsc": "api_client"
  }'
```

□□□□

□□□□ UTF-8 □□□□□ SMS-C □□□□□GSM7 □ UCS2□□DCS □□□□□□□□□□

□□:

```
POST /api/messages_plaintext
Content-Type: application/json
```

□□:

```
{
  "source_msisdn": "15555551234",
  "destination_msisdn": "15555555678",
  "message": "Hello World",
  "source_smsc": "api_client"
}
```

□□□□□□□□ `message`□`text` □ `body` □□□`source_msisdn` □ `destination_msisdn` □□□□□

□□ (201 Created):

- □□□□□□□□□□□□□
- □□□□`{ "parts": <n>, "messages": [ ... ] }`□

```
curl -X POST https://host:8443/api/messages_plaintext \
  -H "Content-Type: application/json" \
  -d '{
    "source_msisdn": "15555551234",
    "destination_msisdn": "15555555678",
    "message": "Hello World",
    "source_smsc": "api_client"
  }'
```

□□□□ PDU

□□□□□□ SMS PDU□□□□□□□□□□□□□□□□□□□□ SIP □□□

□□:

```
POST /api/messages_raw
Content-Type: application/json
```

□□:

```
{
  "message_body": "0001000B916407007009F0000004D4F29C0E",
  "source_smsc": "legacy_system"
}
```

□□:

- `message_body` - □□□□□□□□□□ SMS PDU□□ TPDU□□□□□□
- `source_msisdn` - □□□
- `source_smsc` / `smsc_node_name` - □□ TPDU □□□□□□
- `rp_originator_address`, `rp_destination_address` - □□□□□□□□□ □ TPDU□RP □□□□□□

□□□ IP □□ `X-Forwarded-For`□□□□□□□□ □□□□□□

□□:

- 201 Created□□□□ `{ "status": "success", "response": { "id": <id> } }` □□□□□□□ `rp_ack` □□□□□□□□
- 200 OK□□□□ `{ "status": "success", "response": { "status": "delivery_report_received" } }` □ PDU □□□□□□□□□□□□□
- 422□□□□□/□□□□□□□□□□□□ `error` □□□□

```
curl -X POST https://host:8443/api/messages_raw \
  -H "Content-Type: application/json" \
  -d '{
    "message_body": "0001000B916407007009F0000004D4F29C0E",
    "source_smsc": "legacy_system"
  }'
```

□□□□ PDU□3GPP TS 23.040□□□□□/□□/DCS□ □□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□

□□□□ (PATCH)

□□□□□□□□□□□□□□

□□:

```
PATCH /api/messages/:id
Content-Type: application/json
```

□□□□□□□□□□□□□□ `dest_smsc`□`deliver_after`□`status`□□□□□□□□□□□□□□□□

□□ (200 OK): □□□□□□□□□□□□□□□□ 404□□□□□□□ 422□

```
curl -X PATCH https://host:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{ "dest_smsc": "backup_gateway" }'
```

□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□ `backoff`□□□□□□□□□□□□□□□□

□□□□□□□□□

```
PUT  /api/messages/:id                  # □□□□□PUT = □□
POST /api/messages_increment_attempt        (id □□□□)
PUT  /api/messages_increment_attempt/:id    (id □ URL □)
```

`PUT /api/messages/:id` □ `PATCH /api/messages/:id` □□□□□PATCH □□□□□□□PUT □□□□□□□□□ `keep_route=true` □□□□□□□□□□ `dest_smsc`□

□□ (200 OK): □□□□□□□□□

```
{ "id": 12345, "status": "backoff", "delivery_attempts": 2 }
```

```
curl -X PUT https://host:8443/api/messages/12345
```

□□□□□□

□□□□□□□□□□□□□□□□□□□□□

```
POST /api/messages_mark_delivered           (id □□□□)
PUT  /api/messages_mark_delivered/:id        (id □ URL □)
```

□□□ `smsc` □□□□□ SMSC□□□□□□□□□□□□

□□ (200 OK): □□□□□□□□□□□□□□□□□□□ 404□

```
curl -X POST https://host:8443/api/messages_mark_delivered \
  -H "Content-Type: application/json" \
  -d '{ "id": 12345 }'
```

□□□□□□

□□□□□□□□□□□□□□□□□□ `dest_smsc`□

□□:

```
POST /api/messages/reroute
Content-Type: application/json
```

□□: `{ "id": 12345 }`

□□ (200 OK):

```
{ "message_id": 12345, "new_dest_smsc": "uk_gateway", "status":
"rerouted" }
```

□□□□□□□□□□□ 404□□□□□□□□□□□□□□□ 422□

□□□□

□□□□□□□□□□ null□

□□:

```
POST /api/messages/clear_field
Content-Type: application/json
```

□□: `{ "id": 12345, "field": "dest_smsc" }`

`field` □□□ `delivery_time`□`dest_smsc` □ `deliver_after` □□□□□□□□□□ 400□□□□□□□□□□□□□

□□ (200 OK): □□□□□□□□

□□□□

□□:

```
DELETE /api/messages/:id
```

□□ (204 No Content)□□□□□□□□□□ 404□□□□□□□□□

```
curl -X DELETE https://host:8443/api/messages/12345
```

□□□□□□

□□ MWI□□□□□□□□□□□□□□□□□ 3GPP TS 23.038 ◆◆◆□ MWI PDU□□□□□□□□□□□□□□□□□□□□□□□ `payload_hex` □ `dcs`□

□□:

```
POST /api/mwi
Content-Type: application/json
```

□□:

```
{
  "source_msisdn": "12345",
  "destination_msisdn": "15555555678",
  "indication_type": "voicemail",
  "indication_active": true,
  "message_body": "You have 1 new voicemail",
  "source_smsc": "IMS_SMSC"
}
```

□□:

- `indication_type` - `voicemail`□□□□□`fax`□`email` □ `other`□
- `indication_active` - `true` □□□□□□`false` □□□□□□ `true`□□
- `message_body` - □□□□□□□□GSM7 □□□□

□□ (201 Created): □□□□□□□□□□□□□ 422□

□□

□□□□□□□□□□□□□□□□□□ REST □□□`:id` □□□□ IMSI□

```
GET    /api/locations           # □□□□□□?limit=&offset=□x-total-
count □□
GET    /api/locations/:id       # □ IMSI □□
POST   /api/locations           # □□□□□□□ IMSI □□□
PATCH  /api/locations/:id       # □□□□
PUT    /api/locations/:id       # □□
DELETE /api/locations/:id       # □□
```

□□/□□□□:

```
{
  "msisdn": "15555551234",
  "imsi": "001001000000001",
  "location": "msc1.region1.example.com",
  "ran_location": "cell_tower_12345",
  "imei": "123456789012345",
  "ims_capable": true,
  "csfb": false,
  "registered": true,
  "expires": "2025-11-01T23:30:00Z",
  "user_agent": "Samsung Galaxy"
}
```

`imsi` □ `msisdn` □□□□□□□□□□□□□□□□□ □□□□□□□200/201□□□□□□□□ 422□□ □□□□□□□□□□□ □□□□□□□□□

□□

□□□□ SMSC □□□□□□□□□□ □□□□□□□ □□□□□□ `active`□`stats`□`history` □ `register` □□ □□□

```
GET  /api/frontends           # □□□□□□□
GET  /api/frontends/:id       # □□□□□□□
POST /api/frontends           # □□□□□□□□
```

□□□□□`POST /api/frontends`□:

```
{
  "frontend_name": "smpp-gateway-1",
  "frontend_type": "SMPP",
  "ip_address": "10.0.1.5",
  "hostname": "smpp-gw-01",
  "uptime_seconds": 3600,
  "configuration": "{\"port\": 2775, \"system_id\":
\"smpp_user\"}"
}
```

`frontend_name` □□□□□□□□□□ `ip_address`□□□□□□□ IP □□□`X-Forwarded-For` □□□□□□□□□ `frontend_name` □□ 90 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□ (201 Created): □□□□□□

□□

□□□□□□□□□□□□□□□□□□□□□ ETS □□□□□□□□ TTL□

□□□□□□□

□□:

```
GET /api/events/:id
```

`:id` □□□□□□ ID□

□□ (200 OK):

```
{
  "message_id": 12345,
  "events": [
    {
      "event_time": "2023-10-30T13:20:00.104211Z",
      "event_time_us": 1698672000104211,
      "event_epoch": 1698672000,
      "seq": -5764607523034231 00,
      "name": "http_request_received",
      "description": "POST /api/messages_raw from
10.0.1.5\nsource_msisdn: 61400000001\nfrontend: ims-frontend-
1\nmessage_body: 46 hex chars",
      "event_source": "smsc-node-1"
    },
    {
      "event_time": "2023-10-30T13:20:00.107950Z",
      "event_time_us": 1698672000107950,
      "event_epoch": 1698672000,
      "seq": -5764607523034228 00,
      "name": "http_response_sent",
      "description": "201 {\"status\":\"success\",\"response\":
{\"id\":12345,\"rp_ack\":\"033b\"}}",
      "event_source": "smsc-node-1"
    }
  ]
}
```


□□□□□□□□□□□□ `event_time_us` □□ Unix □□□□□□□□□UTC□□□□`seq` □□□□□□□□□□ `event_time` □ ISO 8601 □□□□□□`event_epoch` □□□□□□□□□□□□□□□□□□□□ ID □□□□□ □HTTP □□□ PDU □□□□□□□□□□□□□□□□□□□□

□□ `POST /api/messages` □ `POST /api/messages_raw` □□□□□ □ `http_request_received` □□□□□□□□□□□□□ IP □□□□□□□□□□□□□□□□□□ `http_response_sent`□HTTP □□□□□□□□□ 1024 □□□□□

□□ ID □□□□□□□□ 400□

□□□□

□□:

```
POST /api/events
Content-Type: application/json
```

□□:

```
{
  "message_id": 12345,
  "name": "external_delivery_confirmed",
  "description": "Confirmed by downstream system"
}
```

`message_id`□`name` □ `description` □□□□□□□□ □□□□ IP □□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□

□□ `message_id` □□□□□□□□□□□□□□□□□□□□

□□□□□

```
GET    /api/campaign_lists           # □□□□
GET    /api/campaign_lists/:id       # □□□□□□□□ "recipients"
POST   /api/campaign_lists           # □□□□□□□
PATCH  /api/campaign_lists/:id       # □□□□□□
DELETE /api/campaign_lists/:id       # □□□□□□□□□□
```

□□□□□□□□□□□□□□□□□□□□□□`var1`..`var4`□□□□□□□□□ JSON □□□□□ CSV □□□□□□□□□□JSON □□ □□□□□□□□ MSISDN □□□□□□□ `var1`..`var4` □□□□

```
{
  "name": "VIP customers",
  "description": "High value subscribers",
  "recipients": [
    { "msisdn": "12025550101", "var1": "Alice", "var2": "Gold" },
    "12025550102"
  ]
}
```

□□ CSV□□□ `msisdn` / `destination_msisdn` / `number` / `phone` □□□□□□□ MSISDN □ □□□□□□□□□□□□□□□□□□□□

□□

```
GET    /api/campaigns        # □□□□□□□□□□□□□□□
GET    /api/campaigns/:id    # □□□□□□□□□□□□
POST   /api/campaigns        # □□□□□□□□□□□□□□□
DELETE /api/campaigns/:id    # □□□□□□□□□□□
```

□□□□□

```
{
  "name": "□□□□",
  "message": "□□□□□ 02:00-03:00 □□□□□",
  "source_msisdn": "12345",
  "source_smsc": "IMS_SMSC",
  "list_id": 1,
  "audience": "active_only",
  "drip_tps": 50
}
```

□□□

- `name`, `message`, `source_msisdn`, `source_smsc` - □□□`message` □□□□□□□□□□□□□□ (`{{ var1 }}`..`{{ var4 }}`, `{{ msisdn }}`)□
- `list_id` - □□□□□□□□□□□□□□□□□□ □□□□□□□□□
- `audience` - `active_only`□□□□□ `all`□□□ `list_id` □□□□
- `drip_tps` - □□□□□□□□□□□□□□□□□ □□□□
- `validity_hours` - □□□□□□□□□□□□□□□□□□ `expires`□
- `deliver_after` - □□□ ISO 8601 □□□□□□□□□□□□□□□□ □□□□

`DELETE` □□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□200□□□□□□□□ TTL □□□ □□□

□□ (`GET /api/campaigns/:id`)□

```
{
  "id": 7,
  "name": "□□□□",
  "list_id": 1,
  "audience": "active_only",
  "status": "running",
  "drip_tps": 50,
  "total_targets": 1000,
  "stats": {
    "total": 1000, "pending": 600, "queued": 300,
    "delivered": 90, "failed": 10, "skipped_inactive": 0,
    "dispatched": 400, "progress_percent": 40, "delivery_percent":
22
  }
}
```

□□□□

□□□

```
POST /api/campaigns/control
Content-Type: application/json
```

□□□`{ "campaign_id": 7, "action": "start" }`

`action` □ `start`□`pause`□`resume`□`cancel` □□□□□□□□□□ □□□200□□□□□□□□□□□ `404`□□ □□□□□□□□□□□□□□□□ `422`□

□□□□□□□□

```
GET /api/campaign_targets/:id              # :id □□□ ID
GET /api/campaign_targets/:id?state=failed # □□□□□□□
```

□□ `limit`/`offset` □□□□□□□□□□ `state` □□□□□ `x-total-count` □□□□□□□□□□□□□□□□□ `state`□`pending` / `queued` / `delivered` / `failed` / `skipped_inactive`□□

□□□□□□

□□□□□□□□□ API □□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□

□□

```
GET    /api/routes            # □□□□
GET    /api/routes/:id        # □□□□
POST   /api/routes            # □□□□
PATCH  /api/routes/:id        # □□
PUT    /api/routes/:id        # □□
DELETE /api/routes/:id        # □□
GET    /api/routes/export     # □□□□□□
POST   /api/routes/import     # □□□□
POST   /api/routes/simulate   # □□□□□□□
```

□□□ SMS □□□□□

□□□□

```
GET    /api/translations          # □□
GET    /api/translations/:id      # □□
POST   /api/translations          # □□
PATCH  /api/translations/:id      # □□
DELETE /api/translations/:id      # □□
GET    /api/translations/export   # □□
POST   /api/translations/import   # □□□□
POST   /api/translations/simulate  # □□□□□
```

□□□ □□□□□□□

□□

```
GET  /api/operations                    # □□□□
POST /api/operations/clear_messages     # □□□□□□
POST /api/operations/clear_routes       # □□□□
POST /api/operations/clear_translations # □□□□
POST /api/operations/clear_frontends    # □□□□□□
```

□□□□□□□□□□□□□□□□□□ API □□□

□□

```
GET  /api/federation/status          # □□□□
GET  /api/federation/identity        # □□□□□□□□
POST /api/federation/health          # □□□□□□
POST /api/federation/registry        # □□□□
POST /api/federation/notify          # □□□□□□
POST /api/federation/delivery_status # □□□□□□
POST /api/federation/delivery_attempt # □□□□□□□□
POST /api/federation/event           # □□□□□□
GET  /api/federation_messages        # □□□□□□
```

□□□ □□□□□

Diameter□□□□ DNS

```
GET  /api/diameter   # Diameter Sh □□/dip □□
GET  /api/logs       # □□□□□□□□
POST /api/naptr      # NAPTR □□□□
```

Diameter Sh □□□□□□ HSS □□□□□□□ □□□□

HTTP □□□□

□□	□□	□□□□
200	OK	□□□□□□□□
201	□□	□□□□□□
202	□□□	□□□□□□□□□□
204	□□□	□□□□□
400	□□□□	□□□□□□□□□□□□□□□ id□□□□□□□
404	□□□	□□□□□
422	□□□□□□□□	□□□□□
500	□□□□□□□□	□□□□□□□□□

□□□□

□□□□□□□□□□□□□□□□□□□□ `error` □□□□□

```
{ "error": "□□□□□□" }
```

□□□□□□□□□□□□□□□□□□□

□□□□

□□□□

1. □□□□□□□□□□□□□□□□ TPDU □□□□ `payload_hex` □ `/api/messages`□□□□□ `/api/messages_plaintext` □□ SMS-C □□□□□□
2. □□□□ **`source_smsc`** □□□□□□□□□□□□□□□□
3. □□□□□□ **E.164** □□□□□□
4. □□ **422**□□□□□ `error` □□□□□□□□□□□

□□□□

1. □□□□ □ `POST /api/frontends` □□□□□ ~90 □□□□□□□□
2. □□ **`smsc`** □□□□□ □□□□□□□□□□□□□□□□□□□□□□□□ `include-unrouted`□
3. □□ **`/api/messages_mark_delivered`** □□□□□□ □□□□□
4. □□ **`PUT /api/messages/:id`**□□ **`/api/messages_increment_attempt`**□□□□□□□ □□□□□□□□
5. □□□□ □□□□□□□

□□

1. □□□□□□ TLS □□□ API □□□□□□□□□□□□
2. □□ HTTP □□□□□□□□□□□□□□
3. □□ Prometheus □□□□ METRICS.md□□□□□□□ □□□□□□□

ANSSI R226 □□□□□□

□□□□□□ □□□□□□□□□□□□□□□ R226-3 □ R226-7 □□□□□□ ANSSI R226 □□□□□□□□□□□□□□□

- □□□□□□□□ Mnesia □□□□□□□□□□□□□□□
  - □□□□□□RAM□□□□□□□□□□□□□□□
  - □□□□□□`disc_copies` □□□□□□□□□□□□□□□
  - □□□□□□□□□□□□□□□□□□□□
  - □□□□□□□□□□ 24 □□□□□□□□□□□
- □□ **CDR** □□□ MySQL/PostgreSQL □□□□□□□□□□□□□□
  - □□□□□□□□□□□□□□□□□□□□ CDR
  - SQL □□□□□□□ CDR □□/□□□□□□□□□□□□□□□
  - □□□□□□□□□□□□□□□□□□□□
- □□□□□□□□
  - □□□□□□□□□1,750 □□□/□□□□□□ SQL □□
  - CDR □□□□□□□□□□□/□□□□□□□□□□□□□□□
  - □□□□□□□□□□□□□□□ SQL
- □□□□□□□□□□Mnesia □□□□□□□□

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- **REST API**□ HTTPS□□□ 8443□□□□□□□□□
- □□□□□ HTTPS□□□ 8086□□□□□ Web □□□
- □□□□□ SMPP□IMS□SS7/MAP□□□□□□□□□□
- □□□□ MySQL/PostgreSQL □□ CDR □□

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- □□□□□□□□□□□□□□□□□□
- □□□□□□□□□□/□□□□□
- □ SMSC □□□□□
- □□□□□□□□□□□□□□
- □□□□□□□□□
- ENUM□E.164 □□□□□DNS □□□□
- □□□□□□□□□□□
- □□□□□□□□□□□□ Diameter Ro □ OCS □□□

□ □□□□□□□□□ **README.md**

1.2 □□□□

OmniMessage □□□ ETSI TS 103 221 □□□□□□X1□X2□X3□□OmniMessage □□□□□□□□□□□□□□□□□□□ X1 □□□□□□OmniMessage □□ X2 □ 3GPP TS 33.128 xIRI □□□□□□□□□□□□□□□□□□□

- □□ SMSC □□□
- □□□□Erlang □□□□□□□
- □□□□□□□□□□□□□□
- □□□□□□□□□□□□□□

□ □□ **CDR** □□□□ **CDR_SCHEMA.md**

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- □□□□□□□□
- REST API □□□□□□□□
- □□□□□□□□□□□□□□
- □□□□□
  - □□□□□□/□□□
  - SMSC □□
  - □□□□
  - □□□□
  - □□□□

□ □□ **API** □□□ **API_REFERENCE.md**

1.2.2 □□□□□□

□□□□□□□□□□□□□

SMSc □□□□□□□□□□□□□□

- □□□ □□□□□ CDR □□□□□□□ Mnesia □□□
- □□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□ □□□□□/□□□□□□□□□ SQL □□□

□ 2□CDR □□□MySQL/PostgreSQL□

- □□□ □□□□□□□□□□□□□□□□□□
- □□□ □□ SQL □□□□MySQL □ PostgreSQL□
- □□□□□□ □□□□□□□□□□□□□□ CDR□
  - □□□□□□
  - □□□□□□□□□□
  - □□□□□□
  - □□□□□□□□□
- □□□□□ □□□□□□□□□□□□□□□□□□□□
- □□□ □□□□□□□□□□□□□□□□□□□□
- □□□ □□□□□□□□□□□□□□□□
- □□□ SQL □□□REST API□□□□□CSV/JSON □□

□□□□□□□

1. □□□ □□□□ SQL□□□□□□□□
2. □□□□□ Mnesia □□□ SQL □□□□□□□□ 1,750+ □□□/□
3. □□□□ disc_copies □□□□□□□□□□□□
4. □□□□ CDR □□□□□□□□□□
5. □□□□□□ □□□□□□□□□□□□

□□□□□□□□

```
1. □□□□ → □□□ Mnesia□RAM + □□□□□
2. □□□□ → Mnesia □□□□□□
3. □□□□/□□ → CDR □□ SQL□□□
4. 24 □□□ → □□□ Mnesia □□□□□□□□
5. CDR □□□ SQL □ → □□□□□□□□□□□□
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- □□□□□□ SMSC □□□SMPP□IMS□MAP □□□
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□ □□□□□□□ **OPERATIONS_GUIDE.md**
□ □□□□□ **METRICS.md**

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- CDR □□□□□□□□□□□□
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□ □□□□□□□□ **number_translation_guide.md**
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1.3 □□□□

1.3.1 □□□□□□□

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- HTTPS/TLS □□ REST API □□
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- Web UI □□□□
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- CDR □□□□□□□□□□□□□ NULL □□□□□□

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- MySQL □□□□□□□ENCRYPTION='Y'□

- PostgreSQL □□□□□□□□□
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1.4 □□□□□Mnesia + SQL □□□□

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OmniMessage SMSc □□□□□□□□□□□

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- □□□□□□□□□□ `Mnesia.*/` □□

Mnesia □□□□□□□□□□

1. □□□□ REST API □□ → □□□ Mnesia RAM + □□□□
2. □□□□□□□ Mnesia → □□□□□□□□□□□
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6. □□□□□□□□ 24 □□□ → □□□ Mnesia □□□

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- SQL □□□□□□□□□□□□□□□□□□
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□ **2□□□ CDR** □□/□□□ **SQL** □□□

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- □□ MySQL □ PostgreSQL □□□
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# □□□ config/runtime.exs
config :sms_c,
  batch_insert_batch_size: 100,          # CDR □□□□□□□
  batch_insert_flush_interval_ms: 100    # □□□□
```

SQL □□□□□□□

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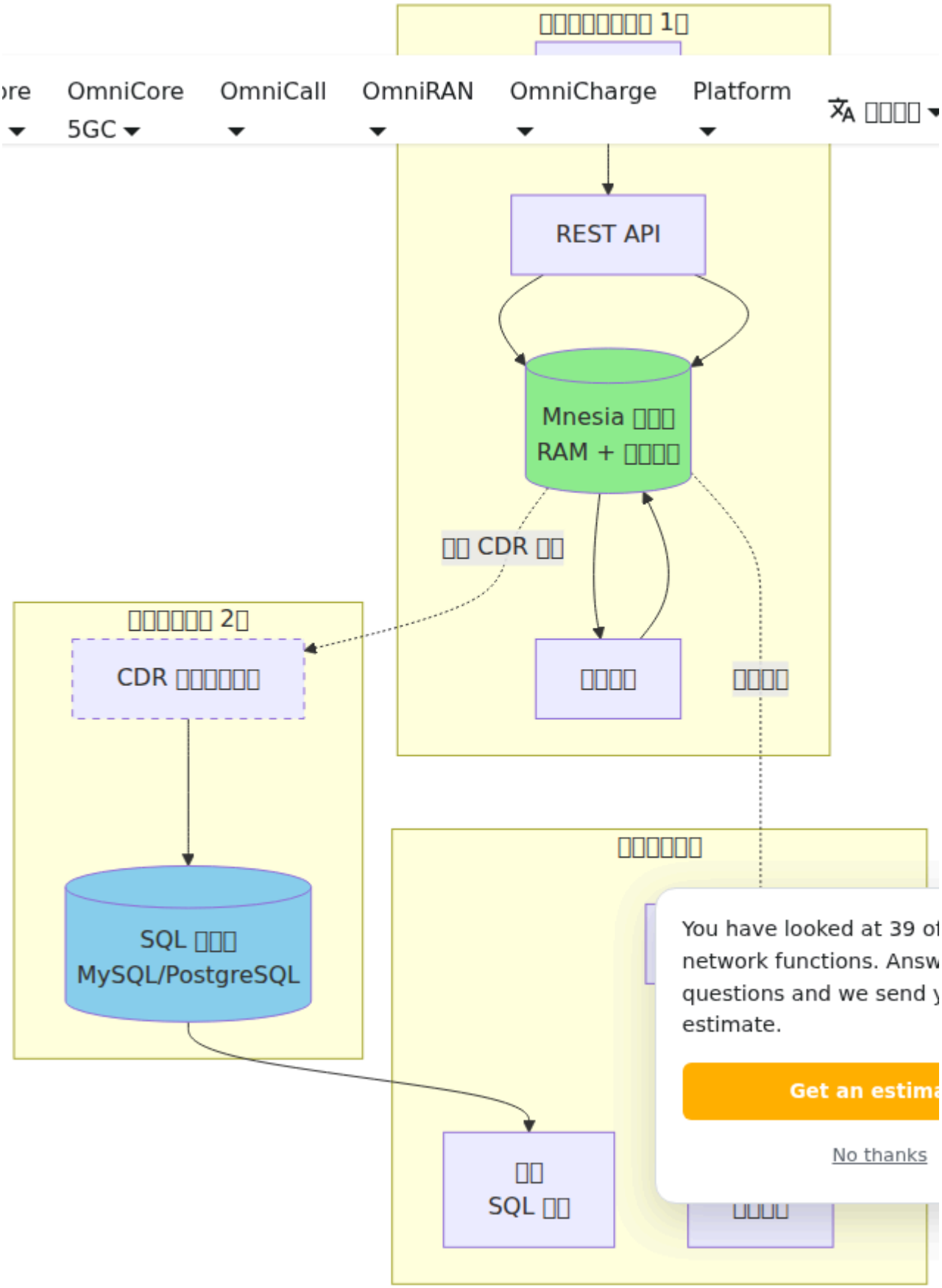
OmniCore
5GC
OmniCall
OmniRAN
OmniCharge
Platform
REST API
Mnesia
RAM +
CDR
CDR
SQL
MySQL/PostgreSQL
SQL
You have looked at 39 of
network functions. Answ
questions and we send y
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Get an estima
No thanks

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- □□ Mnesia □□□REST API □□□
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- □□ SQL □□□□
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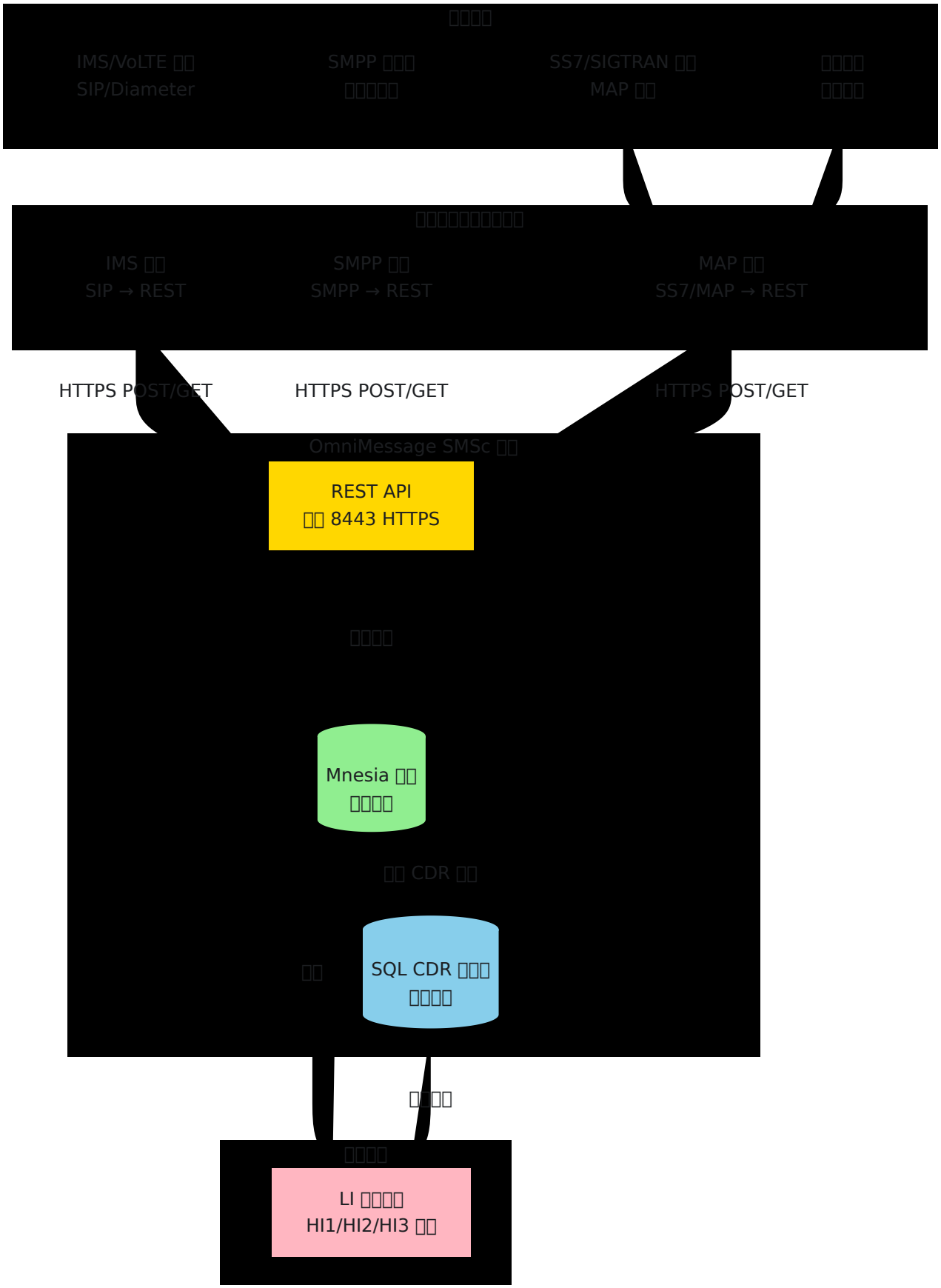
1. □□□□□□□ disc_copies □□□□□□□□□□□□□
2. □□□□□□□□ CDR □ SQL □□□□□□□□□
3. □□□ □□□□□□□□□□□□□□□□
4. □□□□ □□□□□□Mnesia□+ □□□□□□SQL□□□□□

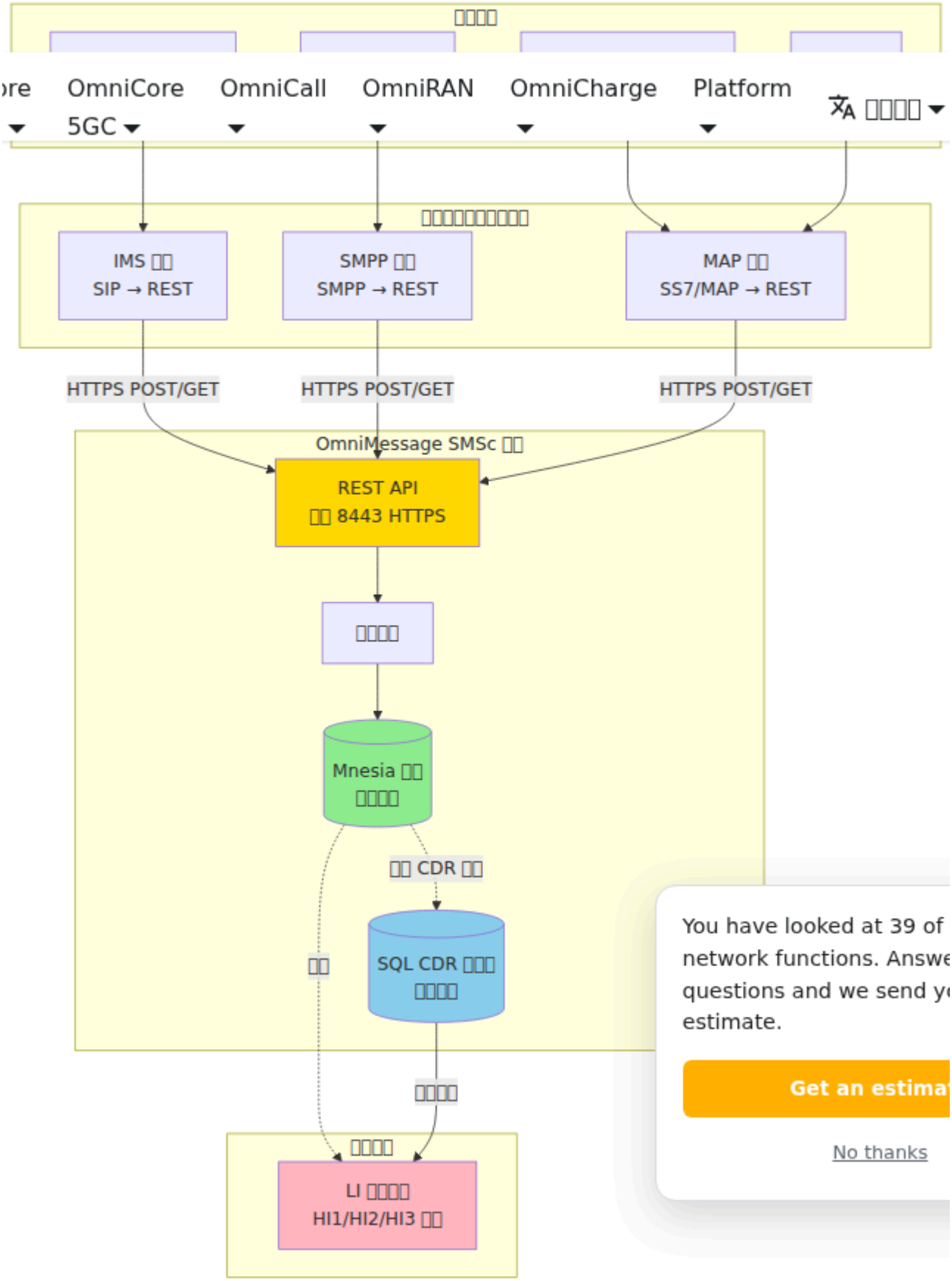
1.5 □□□□□□□□□

OmniMessage SMSc □□□□□□□□□□□□□□□□□□□ REST API □□□□□□□□□□□□□□□□□□□


IMS/VoLTE
SIP/Diameter
SMPP
SS7/SIGTRAN
MAP
IMS
SIP → REST
SMPP
SMPP → REST
MAP
SS7/MAP → REST
HTTPS POST/GET
HTTPS POST/GET
HTTPS POST/GET
OmniMessage SMSc
REST API
8443 HTTPS
Mnesia
SQL CDR
LI
HI1/HI2/HI3

1. IMS/SIP □□□□

IMS □□□□ SIP □□□□ SMS-over-IP □□□□□IMS □□□ SIP □ SMSc REST API □□□□□□□


OmniCore 5GC
OmniCall
OmniRAN
OmniCharge
Platform
IMS □□
SIP → REST
SMPP □□
SMPP → REST
MAP □□
SS7/MAP → REST
HTTPS POST/GET
HTTPS POST/GET
HTTPS POST/GET
OmniMessage SMSc □□
REST API
□□ 8443 HTTPS
Mnesia □□
□□ CDR □□
SQL CDR □□□
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LI □□□□
HI1/HI2/HI3 □□
You have looked at 39 of
network functions. Answe
questions and we send y
estimate.
Get an estima
No thanks

IMS □□□□□□□□

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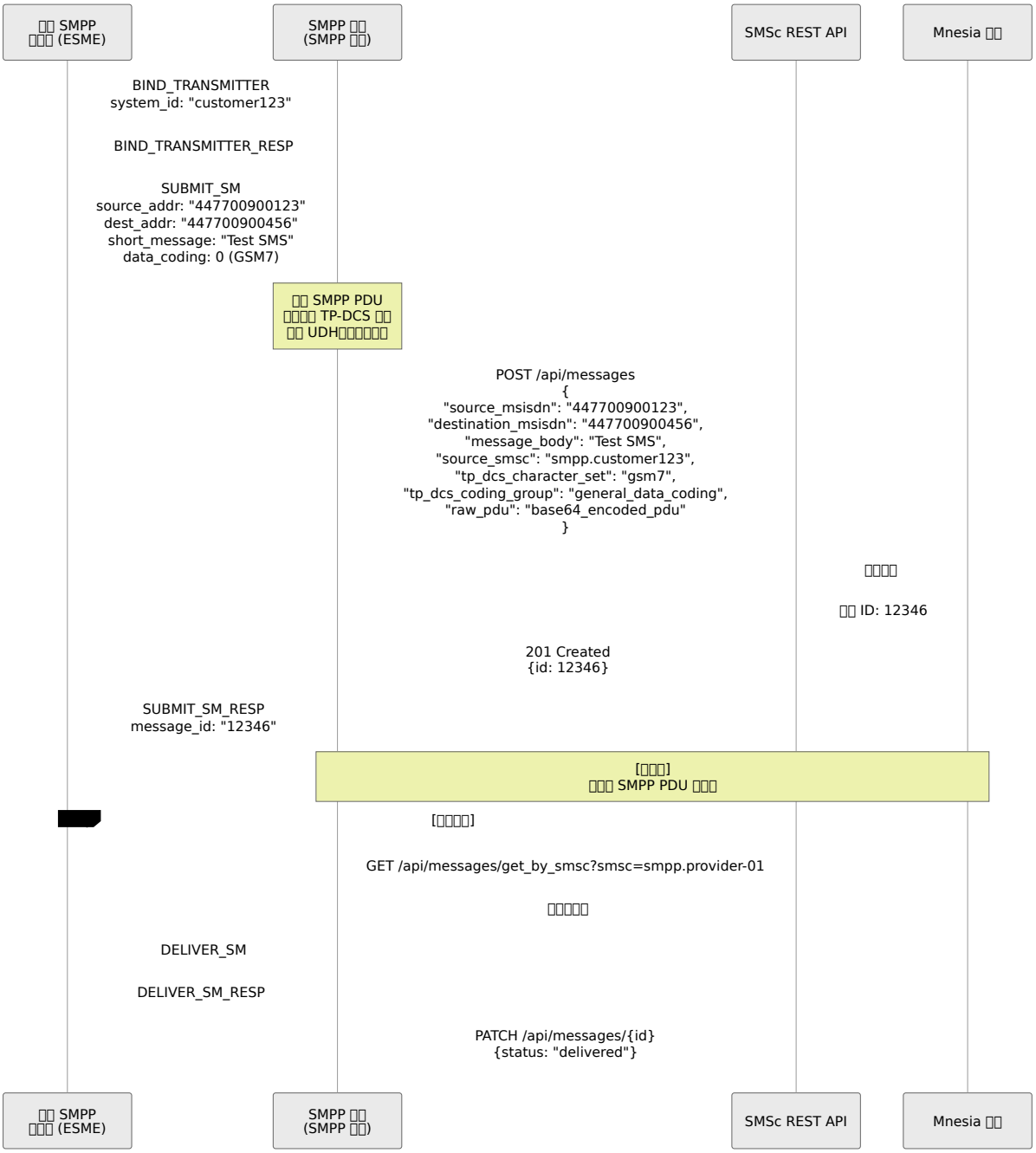
- P-Asserted-Identity SIP □
- SIP Call-ID □□□□
- IMS □□□□□P-Access-Network-Info□
- □□ IMS HSS □□□□□□□

2. SMPP □□□□

SMPP □ SMS □□□□□□□□□□□□□□□□□□□□SMPP □□□□□□ PDU □ SMPP □□□□□□ REST API □□□



SMPP □□□□□□□

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- ESME system_id□□□□□□□
- TON/NPI □□□□□□□
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3. SS7/MAP □□□□

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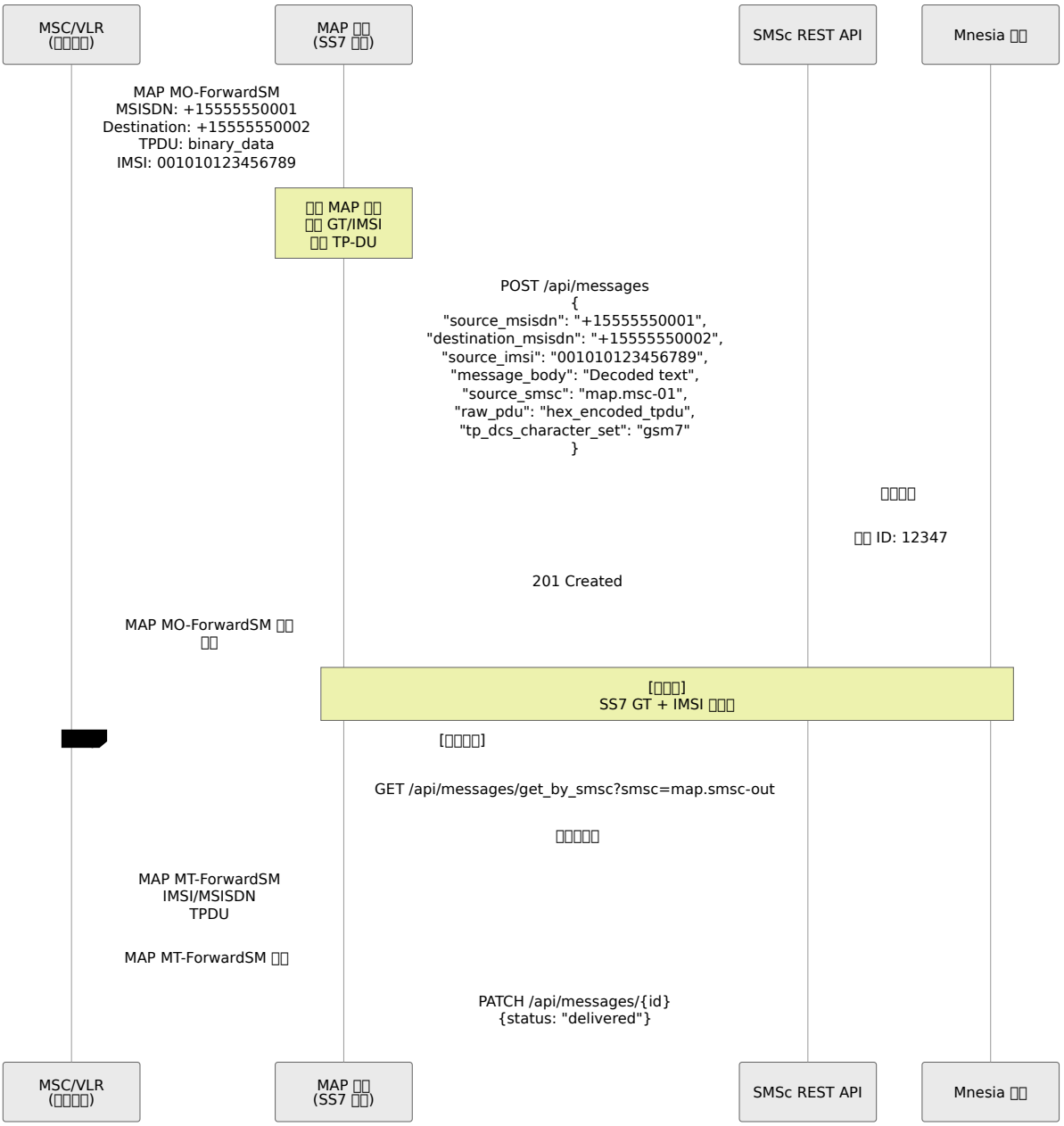

SS7/MAP □□□□□□□

- MAP □□□□ IMSI
- □□□□□GT□□□
- MSC/VLR □□□□□□□□□□
- SCCP □□/□□□□□
- MAP □□□
- TP-□□□□□□□□□

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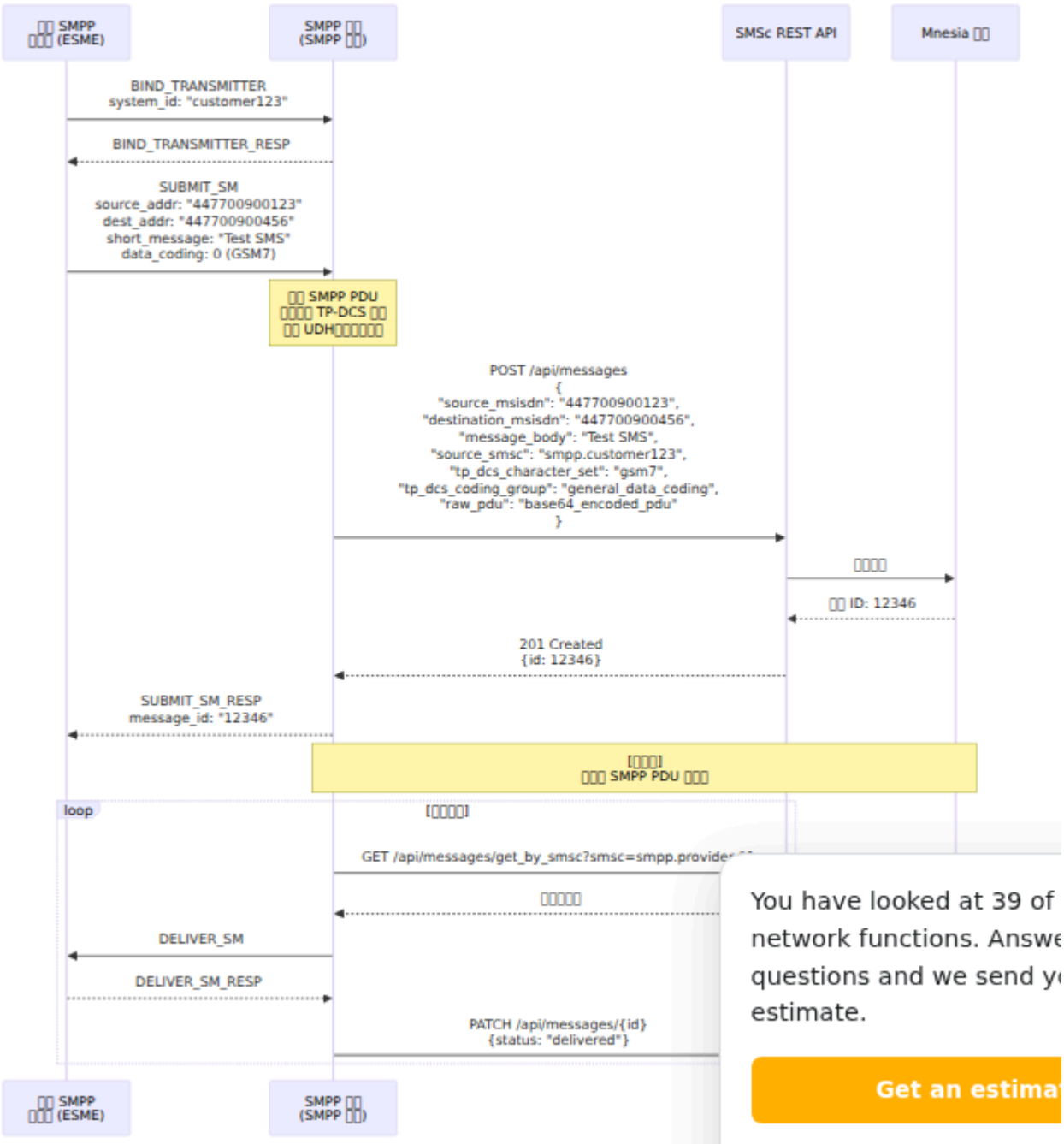

CDR □□□□□□□□

- `source_smsc` □□□□□□□□□□□□□□“ims.gateway-01”□“smpp.customer123”□“map.msc-01”□
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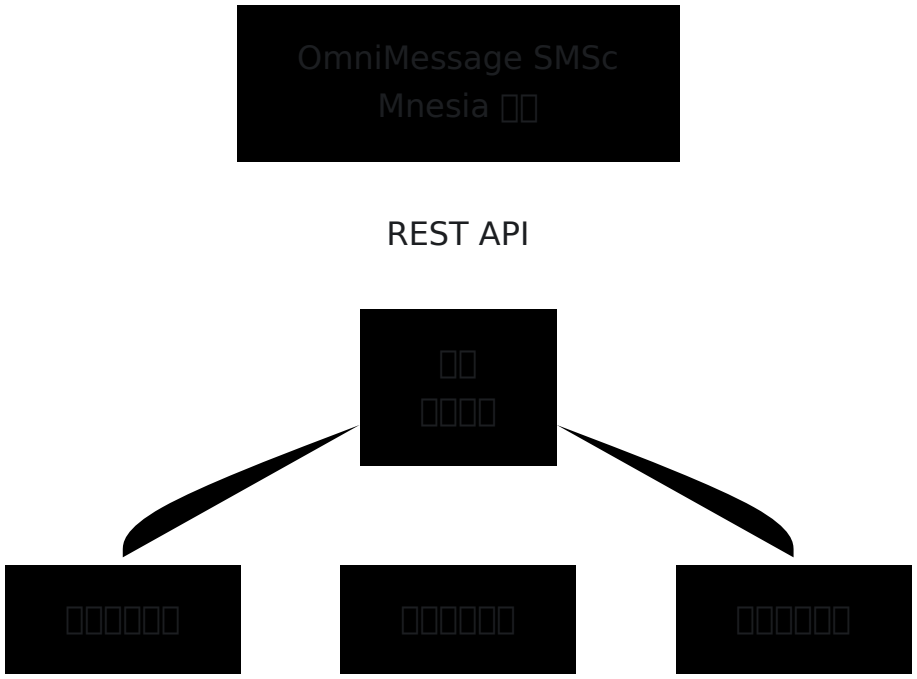
1. REST API □□□□□□□□□□Mnesia□□

□□ Mnesia □□□□□□□□□□□□□□□□ 24 □□□□



□□□□□□ **API** □□□

- `GET /api/messages` - □□□□□□□□□□□□
- `GET /api/messages/{id}` - □□□□□□□□□□□□□□□ Mnesia□
- `GET /api/messages/get_by_smsc?smsc=X` - □□□□□□□□
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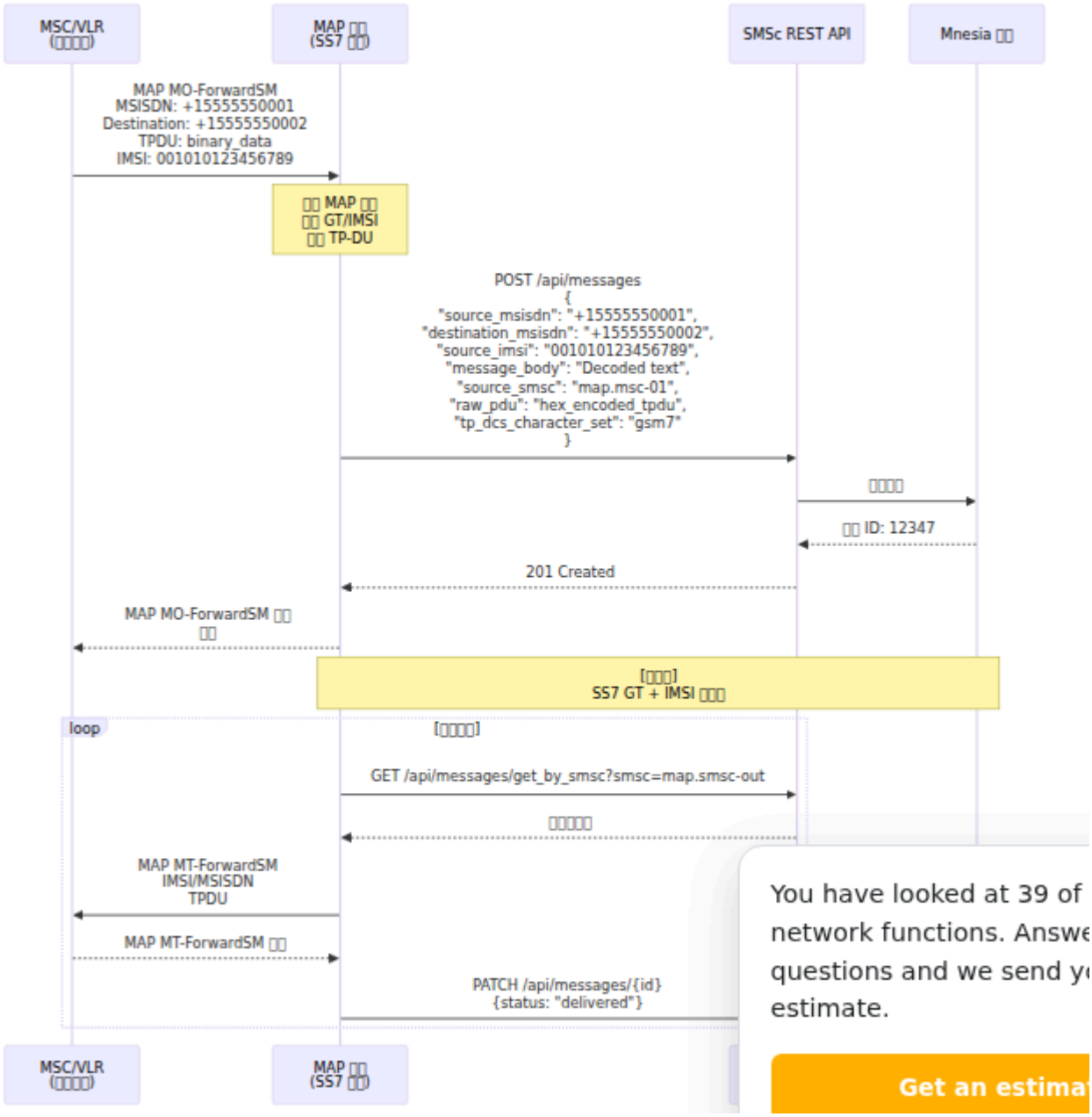
□□ SQL □□□□□□□□□□□□□□□□□/□□/□□□□□□□□



□□ **SQL** □□□

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  - `calling_number`□□□□ - □□□□□
  - `called_number`□□□□ - □□□□□□
  - `message_id`□□□□ - □□□□□□□

- `submission_time`□□□□ - □□□□□□□□□□
- `status`□□□□ - □□□□□□□
- `dest_smsc`□□□□ - □□□□□□□□

□□□ CDR □□□/□□□□□□□□

3. □□□□□□□□PubSub□□

- Phoenix PubSub □□□□□□□
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- WebSocket □□□□□□□

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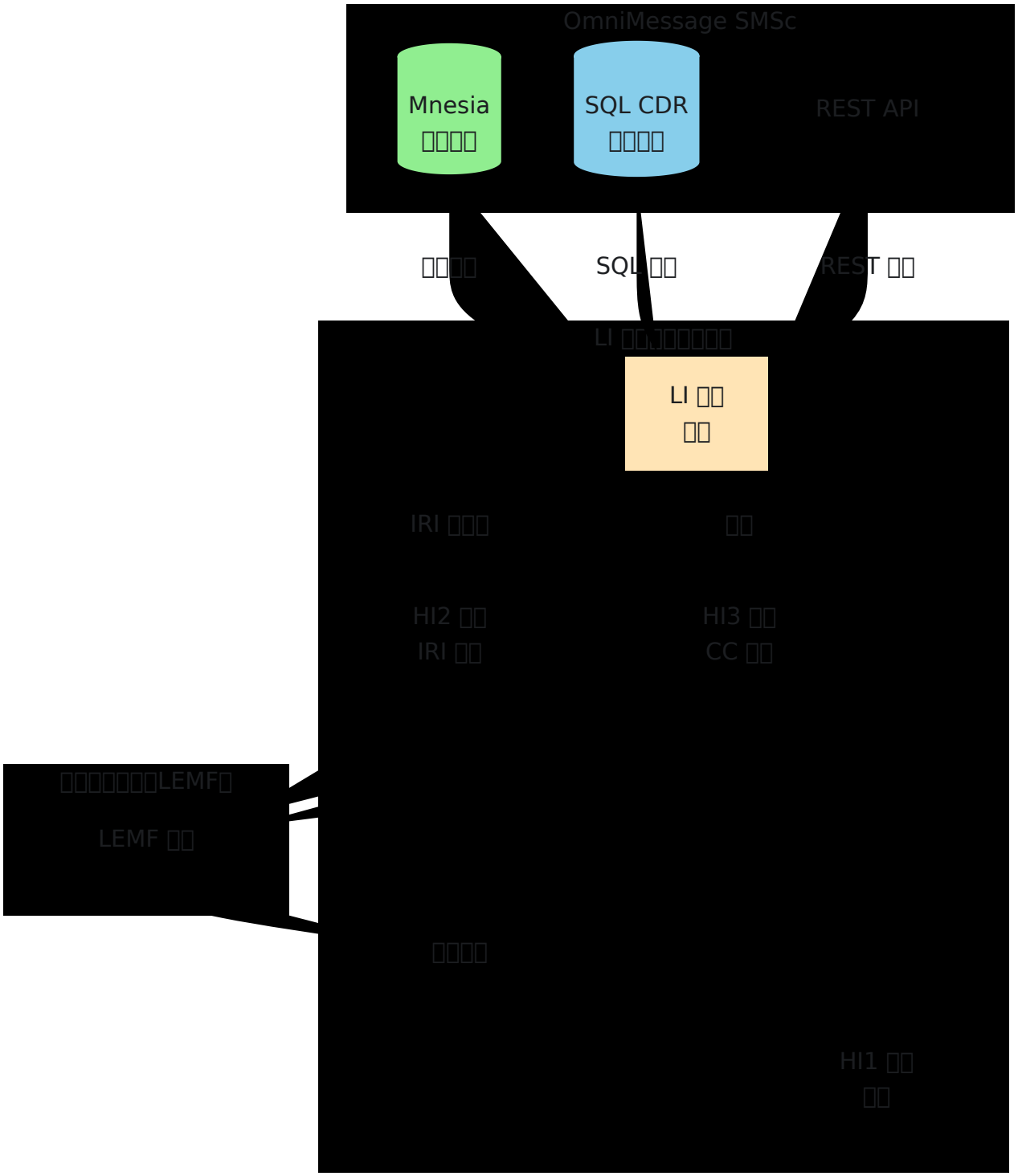
- CDR □□□ CSV □□
- □□□□□□□□ JSON □□
- □□□□□□□□□□
- □□□□□□□□□□
- □□□□□□□□□□□□□□□□□□

ETSI □□□□□□□□□

OmniMessage SMSc □□□□□□ ETSI □□□□□□□□□□□□□□□SMSc □□□□□□□□□ HI1/HI2/HI3 □□□□□□ □□□□□□□□□□□□□□□□□□□□



接口详情

HI1 接口 - 管理接口

- 目的 为订阅者配置和管理拦截
- 协议 LEMF → LIMF（管理）
- 操作
  - 添加/删除拦截（MSISDN、IMSI）

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    - □□□□□□□
- □ **SMSc** □□□□
    - LIMF □□□□□□□□□□□□□□□□
    - LIMF □□ SMSc CDR/API □□□□□
    - LIMF □□ HI1 □□□□□□□□□□

HI2 □□ - IRI□□□□□□□□□□□□□

- □□□ □□□□□□□□□□□□□□
- □□□ LIMF → LEMF□□□□
- □□□□□ □□ ETSI TS 102 232-x □ XML/ASN.1
- □□ **SMSc CDR** □□□□
    - □□ ID
    - □□□□□□ MSISDN□
    - □□□□□□□ MSISDN□
    - IMSI□□□□□□□□□□□□
    - □□□□□
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    - □□□□
    - SMSC □□□□□□/□□□
    - □□□□□□□□□□
- □ **SMSc** □□□□
    - LIMF □□ CDR □□□□□□□□□□□□□
    - LIMF □ CDR □□□□□ ETSI IRI □□
    - LIMF □□ HI2 □ IRI □□□ LEMF

HI3 □□ - CC□□□□□□□□□

- □□□ □□□□□□□□□□□□□□□
- □□□ LIMF → LEMF□□□□
- □□□□□ □□ ETSI TS 102 232-x
- □□ **SMSc** □□□□

- □□□□□□□□□□□□
- □□ PDU□□□□ SMS □□□
- □□□□□□□
- □□□□□□□
- TP-DCS □□
- □□□□□□□UDH□

- □ **SMSc □□□□**
  - LIMF □ CDR `message_body` □□□□□□□□□
  - LIMF □□□□□□□□□□ PDU ��□
  - LIMF □□□□□□□ ETSI CC □□
  - LIMF □□ HI3 □ CC □□□ LEMF

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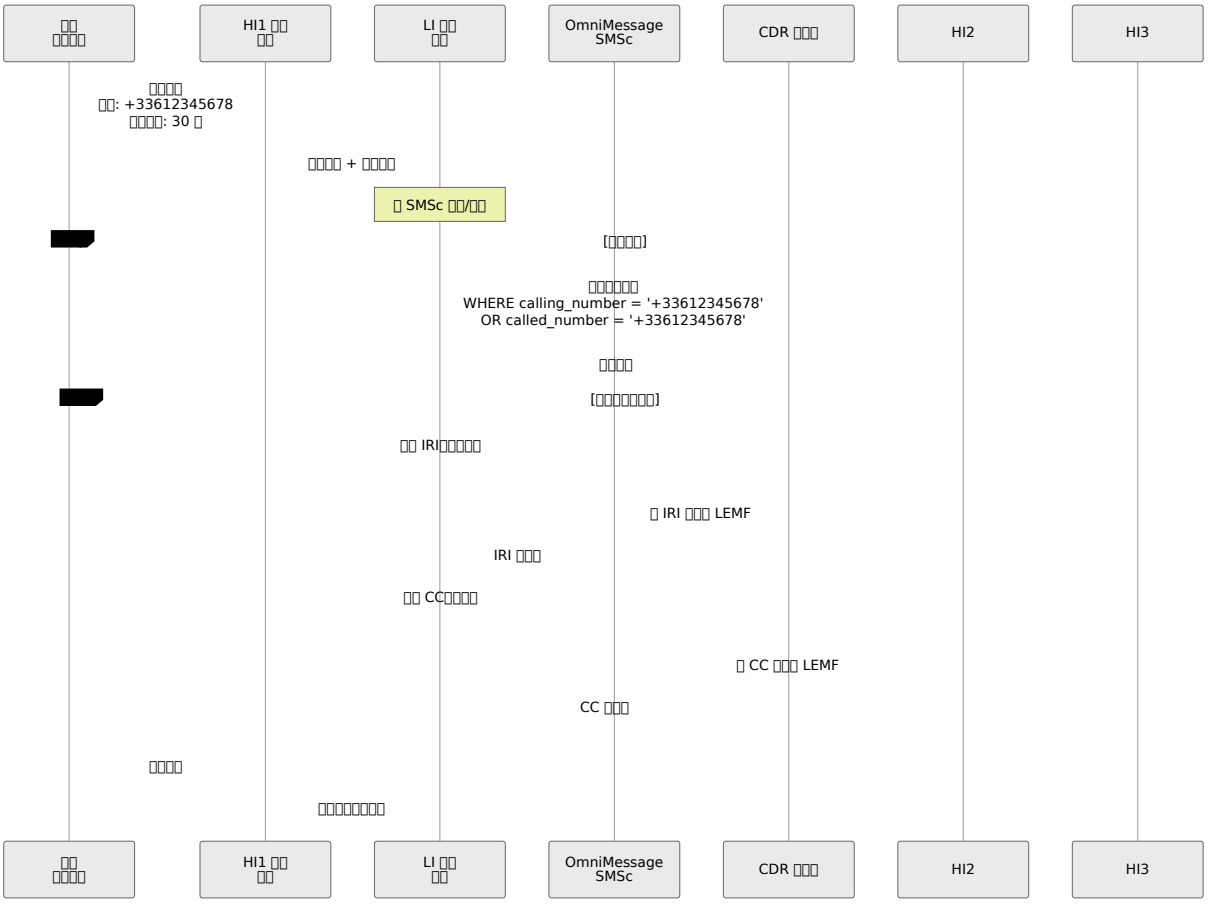

SMSc □□□□□ LI □□□

SMSc □□□□	HI2 (IRI)	HI3 (CC)	CDR □□
□□ ID	□ □□ ID	□ □□	`message_id`
□□□□	□ □□□ A	-	`calling_number`
□□□□	□ □□□ B	-	`called_number`
□□□□	□ □□□	-	`submission_time`
□□□□	□ □□	-	`delivery_time`
□□	□ □□	-	`status`
□□□□	-	□ □□	`message_body`
□□ PDU	-	□ □□□	(Mnesia/CDR)
□ SMSC	□ □□□□	-	`source_smsc`
□□ SMSC	□ □□□□	-	`dest_smsc`
IMSI	□ □□□ ID	-	(□□□□)

LIMF □□□□□

□□ **1**□□□□□

- LIMF □□□□ CDR □□□□□ 1-60 □□
- SQL □□□□ HI1 □□□□□□□□□□□□□□□□□□□□
- □□□□□□□□□□
- □□□□□ LI □□□□□□□□□

□□ **2**□□□□□□□

- SMSc PubSub □□□□□□
- LIMF □□□□□□□

- LIMF □□□□□□□□□□□
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□□ **3**□□□□□

- □□□□□□□□ PubSub □□□< 24 □□□
- □□□□□CDR □□□□□
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- □□□□□□□□MSISDN□
- □□ IMSI □□□□□□□□□
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```sql
-- □□□□□□□□□□□□□
SELECT * FROM cdrs
WHERE calling_number = '+33612345678'
   OR called_number = '+33612345678'
ORDER BY submission_time DESC;

-- □□□□□□□□□□□□□□
SELECT * FROM cdrs
WHERE (calling_number = '+33612345678' OR called_number =
'+33612345678')
  AND submission_time BETWEEN '2025-11-01 00:00:00' AND '2025-11-
30 23:59:59'
ORDER BY submission_time;

-- □□□□□□□□□□
SELECT * FROM cdrs
WHERE (calling_number = '+33612345678' AND called_number =
'+33687654321')
   OR (calling_number = '+33687654321' AND called_number =
'+33612345678')
ORDER BY submission_time;
```

---

2. □□□□□□□□□

2.1 □□□□□□

OmniMessage SMSc □□□□□□□□□□□□□□□□□□□□□□□□□□□□ ANSSI □□□□□□□□□□□□

2.2 □□□□□

2.2.1 TLS/SSL □□

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- TLS 1.2 (RFC 5246)
- TLS 1.3 (RFC 8446) - □□
- SSL 2.0/3.0: □□□□□□□□□

- TLS 1.0/1.1: □□□□□□□□□

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- Erlang/OTP SSL/TLS □□□□□□□□□□□
- □□ TLS □ Cowboy Web □□□
- Phoenix □□ HTTPS □□

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□□□□ Erlang/OTP □□□□□□□□□□□□□□□□□

□□ - TLS 1.3□

- TLS_AES_256_GCM_SHA384
- TLS_AES_128_GCM_SHA256
- TLS_CHACHA20_POLY1305_SHA256

□□ - TLS 1.2□

- ECDHE-RSA-AES256-GCM-SHA384
- ECDHE-RSA-AES128-GCM-SHA256
- DHE-RSA-AES256-GCM-SHA384
- DHE-RSA-AES128-GCM-SHA256

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- □□ ECDHE/DHE □□□□□□□□□□□□□□□PFS□
- □□□ Diffie-Hellman □□2048 □□□□
- □□□□□□□□□□
- □□□□□□□□□□□SNI□

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- □□ X.509 □□
- RSA □□□□□2048 □□□□4096 □□□
- □□ ECDSA
- □□□□□

- □□□□□□□□□□□□□□
- □□ CA □□

TLS □□□□□

```
# config/runtime.exs
config :api_ex,
  api: %{
    enable_tls: true,
    tls_cert_path: "priv/cert/omnitouch.crt",
    tls_key_path: "priv/cert/omnitouch.pem"
  }
```

□ □□□□□□□□ **CONFIGURATION.md**

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- REST API □ HTTPS□□□ 8443□
- Web □□□□□ HTTPS□□□ 8086□
- □□□□□□MySQL/PostgreSQL □□ TLS□

2.3 □□□□□□

2.3.1 □□□□□

MySQL/MariaDB □□□

- □□□□□□□
- AES-256 □□□□
- □□□□□□□□TDE□

```
-- □ CDR □□□□□
ALTER TABLE cdrs ENCRYPTION='Y';
```

PostgreSQL □□□

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- □□□□□□□□
- □□□□□pgcrypto □□□

2.3.2 Mnesia □□□□

Mnesia □□□□

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- □□□□□□□□□□□LUKS□dm-crypt□
- □□ Erlang VM □□□□□□□□□

2.3.3 □□□□□□□

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- CDR □□□□□□□□□□□□□

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- TLS □□□□□□□□□ `priv/cert/`
- □□□□□□□□□□□□□□□□□
- □□□□□□□□□□

2.4 □□□□□□□□□

2.4.1 API □□□□

REST API □□□□

- □□□□ HTTPS/TLS □□□□
- □□□□□□□□□□SMSc □□□□□□□□□
- □□ IP □□□□□□□□□□□□□□□□□
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2.4.2 □□□□□□□□

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- □□□/□□□□□□□
- TLS/SSL □□□□
- □□ IP □□□□□
- □□□□□□□□□□□RBAC□

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```
# config/runtime.exs
config :sms_c, SmsC.Repo,
  username: "omnitouch",
  password: "omnitouch2024",  # □□□□□□□□□□□□
  hostname: "localhost",
  ssl: true  # □□ TLS □□□□□□□
```

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```
-- □□□□□□□□□□□□
CREATE USER 'li_readonly'@'%' IDENTIFIED BY 'secure_password';
GRANT SELECT ON sms_c.cdrs TO 'li_readonly'@'%';

-- □□□□□□□□□□□□□□□□□□
CREATE USER 'analytics'@'%' IDENTIFIED BY 'secure_password';
GRANT SELECT (id, message_id, calling_number, called_number,
              source_smsc, dest_smsc, submission_time,
delivery_time,
              status, delivery_attempts)
ON sms_c.cdrs TO 'analytics'@'%';
```

2.5 □□□□□□□□

2.5.1 □□□□

□ Erlang/OTP □□□□

- SHA-256□SHA-384□SHA-512□□□□
- SHA-1□□□□□□□□□□□□□□□□
- MD5□□□□□□□□□□□□
- BLAKE2□□□□ OTP □□□□□□

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2.5.2 □□□□

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- AES□□□□□□□□
  - AES-128-GCM
  - AES-256-GCM
  - AES-128-CBC
  - AES-256-CBC
- ChaCha20-Poly1305

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- 128 □□□□□
- 256 □□□□□

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- TLS □□□□
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2.5.3 □□□□□

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- RSA□2048 □□□□4096 □□□□
- ECDSA□□□□□□□□□□□□□□
  - P-256□P-384□P-521 □□
- Ed25519□EdDSA□

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- TLS □□□□
- □□□□
- □□□□

2.6 SMS □□□□

2.6.1 SMS □□□□

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- GSM 7 □□□□ SMS □□□
- UCS-2□Unicode□16 □□
- 8 □□□□□□
- Latin-1

TP-DCS□□□□□□□□□□

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□□□□ **SMS** □□□

- SMS □□□□□□□□□□□
- □□□□□ SMSc □□□□
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2.6.2 □□□□□□

SMPP □□□□□□□□□□

- SMPP □□□□□/□□□□
- □□ TLS□SMPP over TLS□
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IMS □□□□□□□□□□

- □□ SIP □□□□□
- SIP □□□□
- □ IMS □□□□□□□□□

SS7/MAP □□□□□□□□□

- SS7 □□□□
- MAP □□□□
- SCCP/TCAP □□□

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2.7 □□□□□□□□□□□

2.7.1 □□□□□□

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- □□□□□
- API □□/□□□□
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- □□□□□ PCAP □□□□

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- Prometheus □□□□

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- SMS □□□□□□□□□□□□□□□□□□□□□□□□□□
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- □□□□□□□□□□
- □□□□□□□□□□Vault□AWS Secrets Manager□
- □□□□ Erlang/OTP □□□□□□□□
- □ API □□□□□□□□□
- □□□□□ IP □□□

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- □□□□□□□□□□
- □□□□□□□
- TLS □□□□
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2.8 □□□□□□□□

2.8.1 □□□□

TLS □□□□□

```
# □□□□□□RSA 4096 □□
openssl genrsa -out omnitouch.pem 4096

# □□□□□□□□□□
openssl req -new -key omnitouch.pem -out omnitouch.csr

# □□□□□□□□□□□
openssl x509 -req -days 365 -in omnitouch.csr -signkey
omnitouch.pem -out omnitouch.crt

# □□□□□□□□□□□□ CA □□□□□
```

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- Erlang/OTP CSPRNG□□□□□□□□□□□□□□□□
- □□□□□□/dev/urandom□
- □□□□□□ID□□□□□□□□□□

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- □□□ `priv/cert/` □□□
- PEM □□□□□□□□□
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- TLS □□□□□□□□□□□□
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- API □□□□□□□□□□□□

2.8.3 □□□□

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- □□□□□□ `priv/cert/`
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- □□□□ ACME □□□Let's Encrypt□

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- □□□□□□□□□□□□□□□
- TLS □□ Diffie-Hellman □□□□
- □□□□□□□□□□

2.9 □□□□□□

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- **ETSI TS 101 671**□ □□□□□LI□□□□□□□□□□□□□□□□
- **ETSI TS 102 232-1**□ □□□□□LI□□□□□□ - □ 1 □□□LI □□□□□□□
- **3GPP TS 33.107**□ 3G □□□□□□□□□□□□

2.9.2 SMS □□ IMS □□□□□□

3GPP IMS □□□

- **3GPP TS 23.228**□ IP □□□□□□□IMS□ - □ 2 □□□□
- **3GPP TS 24.229**□ IP □□□□□□□□□ - SIP □ SDP □□
- **3GPP TS 24.341**□ □□□□ IP □□□ SMS - □ 3 □□□□
- **3GPP TS 23.204**□ □□□□□□ 3GPP IP □□□□□□□□□SMS□ - □ 2 □□
- **3GPP TS 29.228**□ IP □□□□IM□□□□ Cx □ Dx □□

IMS □□□□□

- **3GPP TS 33.203**□ 3G □□□□□ IP □□□□□□□□□IMS AKA□
- **3GPP TS 33.210**□ 3G □□□□□□□□□NDS□□IP □□□□□□IPsec□
- **3GPP TS 33.310**□ □□□□□□NDS□□□□□□□AF□
- **ETSI TS 133 203**□ □□ IP □□□□□□□□

SIP □□□□□

- **RFC 3261**□ SIP□□□□□□□ - □□□□
- **RFC 3428**□ SIP □□□□□□ - MESSAGE □□
- **RFC 3325**□ SIP □□□□□□□□□□
- **RFC 5765**□ □□□□□□□□□□□□□□□□□

IMS □□□□□□

- **ETSI TS 102 232-5**□ □□□□□LI□□□□□□ - □ 5 □□□IP □□□□□□□□□□□□□ LI
- **3GPP TS 33.107**□ □□□□□□□□□
- **3GPP TS 33.108**□ □□□□□LI□□□□□□

2.9.3 SMPP □□□□□

SMPP □□□

- **SMPP v3.4**： □□□□□□□□□□ - □□□□
- **SMPP v5.0**： □□□□□□□□ SMPP □□

SMPP □□□□□

- **SMPP □□ TLS**： SMPP □□□□□□□□□□SMPP over TLS□
- **SMPP** □□□□□ □□ ID □□□□□
- □□ **IP** □□□□□□ □ SMPP □□□□□□□□

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- **GSM 03.40□ETSI TS 100 901**□□ SMS □□□□PP□□□□□□
- **GSM 03.38□ETSI TS 100 900**□□ □□□□□□□□□□
- **GSM 04.11□ETSI TS 100 942**□□ □□□□□□□□□□□ SMS □□

□□□□□□□□

- **ITU-T T.50**： □□□□□ No. 5□IA5□
- **ISO/IEC 8859-1**： Latin-1 □□□□
- **ISO/IEC 10646**： □□□□□□UCS-2/UTF-16□

2.9.4 □□□□□□□

TLS □□□□□□

- **NIST SP 800-52**： TLS □□□□□□□□□□□□□
- **NIST SP 800-131A**： □□□□□□□□□□□□
- **RFC 7525**： TLS □ DTLS □□□□□□□
- **RFC 8446**： □□□□□□TLS□□□□□ 1.3

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- **FIPS 197**： □□□□□□□AES□
- **FIPS 180-4**： □□□□□□□SHA-2 □□□
- **NIST SP 800-38D**： □□□□□□□□□□□GCM □□
- **RFC 7539**： IETF □□□ ChaCha20 □ Poly1305

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- **NIST SP 800-57**□ □□□□□□□
- **RFC 5280**□ □□□ X.509 □□□□□□□□□□ CRL □□□□

2.10 □□□□□□□□

2.10.1 □□□□

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- □□□□□□□□GCM□Poly1305□

2.10.2 □□□□

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- □□□□□□□□□□ TLS □□□
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- □□□□□□□
- TLS □□□□□□
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3. □□□□□□□

3.1 □□□□□□□□□

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- CDR □□□□□□□□□□□
- API □□□ IP/□□□□
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- □□□□□□□□□SQL WHERE □□□
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3.2 □□□□□□□

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- □□□□□□□□□□□□□ 24 □□□ Mnesia □□
- CDR □□□□□□□□□ 6 □□□ 2 □□
- □ Mnesia □ SQL □□□□□
- □□□□□ CDR□□□ cron□

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- □□□□ UI/□□□□□
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```
# config/runtime.exs
config :sms_c,
  # Mnesia □□□□□□□□□□□□
  message_retention_hours: 24,

  # □□□□□□□□□□□□□□
  delete_message_body_after_delivery: false,  # □□□ true □□□□□□□□

  # CDR □□□□
  cdr_enabled: true,

  # □□□□□□□
  batch_insert_batch_size: 100,
  batch_insert_flush_interval_ms: 100
```

□ □□□ **CONFIGURATION.md** □□□□□□□□□□

3.3 □□□□□□□

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1. REST API □□□

- □□□□□□□□ HTTPS □□
- JSON □□□□□□□
- □□□□□
- □□□□□□□□□□□□

2. □□□□□□□□□

- □□ SQL □□
- □□ SQL □□
- CDR □□□
- □□□□□□□

3. □□□□□

- CSV □□□□
- JSON □□□□

- □□□□□□□□□□
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- CDR □□□□□□
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  - SMSC □□□□
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```
# □□□ CSV □□
mysql -u li_readonly -p -D sms_c -e "
SELECT
  message_id,
  calling_number,
  called_number,
  message_body,
  submission_time,
  delivery_time,
  status
FROM cdrs
WHERE (calling_number = '+33612345678' OR called_number =
'+33612345678')
  AND submission_time BETWEEN '2025-11-01' AND '2025-11-30'
ORDER BY submission_time
" --batch --silent | sed 's/\t/,/g' > interception_report.csv
```

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4. □□□□□□□□

4.1 □□□□

Elixir/Erlang □□□

- Erlang VM □□□□□
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4.2 □□□□

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  - 8443□HTTPS REST API□
  - 8086□HTTPS □□□□□
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- □□□□□□ IP □□□
- □□□□□□□□□□ DMZ □□

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- □□□□□□□□□
- □□□□□□□□Erlang □□□

4.3 □□□□□□□□

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- Syslog □□□□
- □□□□□□□□□□□ ELK □□□

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- □□□□□□□□
- TLS □□□□
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- Prometheus □□□□
- □□□□□□□□
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- □□□□□□□□

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4.4 □□□□□□□□□□

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- Erlang □□□□□□□□
- Mnesia □□□□□□□□□
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- □□□□□□□□□ Mnesia disc_copies
- SQL □□□□□□□MySQL/PostgreSQL □□□
- CDR □□□□
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- Mnesia □□□
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5.1 □□□□

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- **README.md** - □□□□□□□□□□□
- **CONFIGURATION.md** - □□□□□□□
- **API_REFERENCE.md** - REST API □□
- **OPERATIONS_GUIDE.md** - □□□□□□□□
- **CDR_SCHEMA.md** - □□□□□□□□□□□□
- **sms_routing_guide.md** - SMS □□□□
- **number_translation_guide.md** - □□□□□
- **METRICS.md** - Prometheus □□□□□
- **TROUBLESHOOTING.md** - □□□□□□□□□

5.2 □□□□

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- □□□□□□ [□□□□□□□]
- **Erlang/OTP** □□□□□ □□□□□□□□

5.3 □□□□□

- **ANSSI R226** □□□□□ □□□
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6. □□□□

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- □□□□□Omnitouch Network Services Pty Ltd
- □□□PO BOX 296, QUINNS ROCKS WA 6030, AUSTRALIA
- □□□□□□□□□
- □□□□□compliance@omnitouch.com.au

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- □□□□□compliance@omnitouch.com.au

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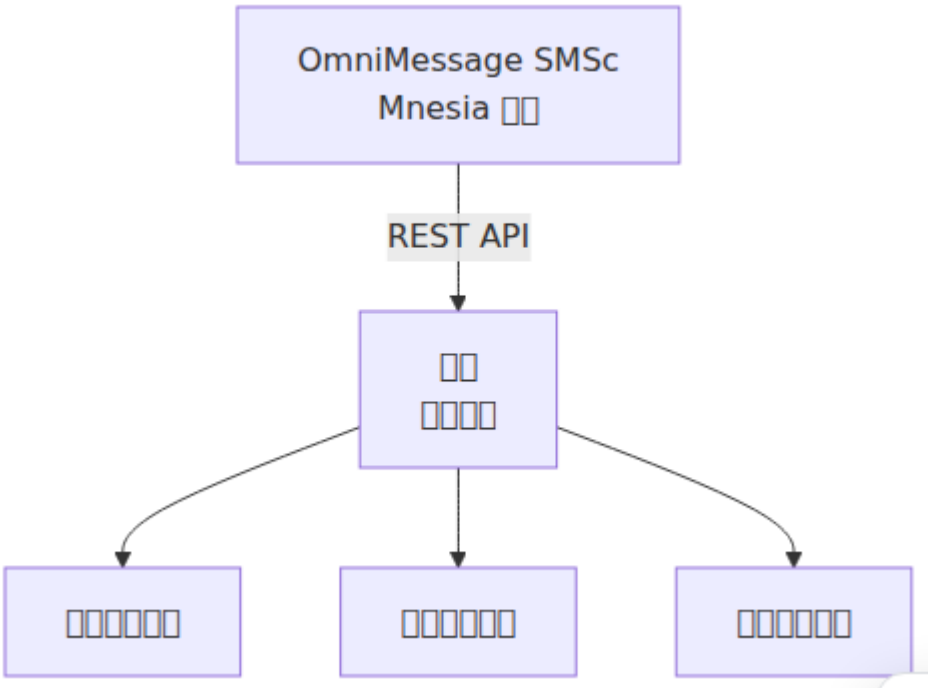
□□ A□□□□□□□ SMS □□□

A.1 □□ SMS □□□□□□□□



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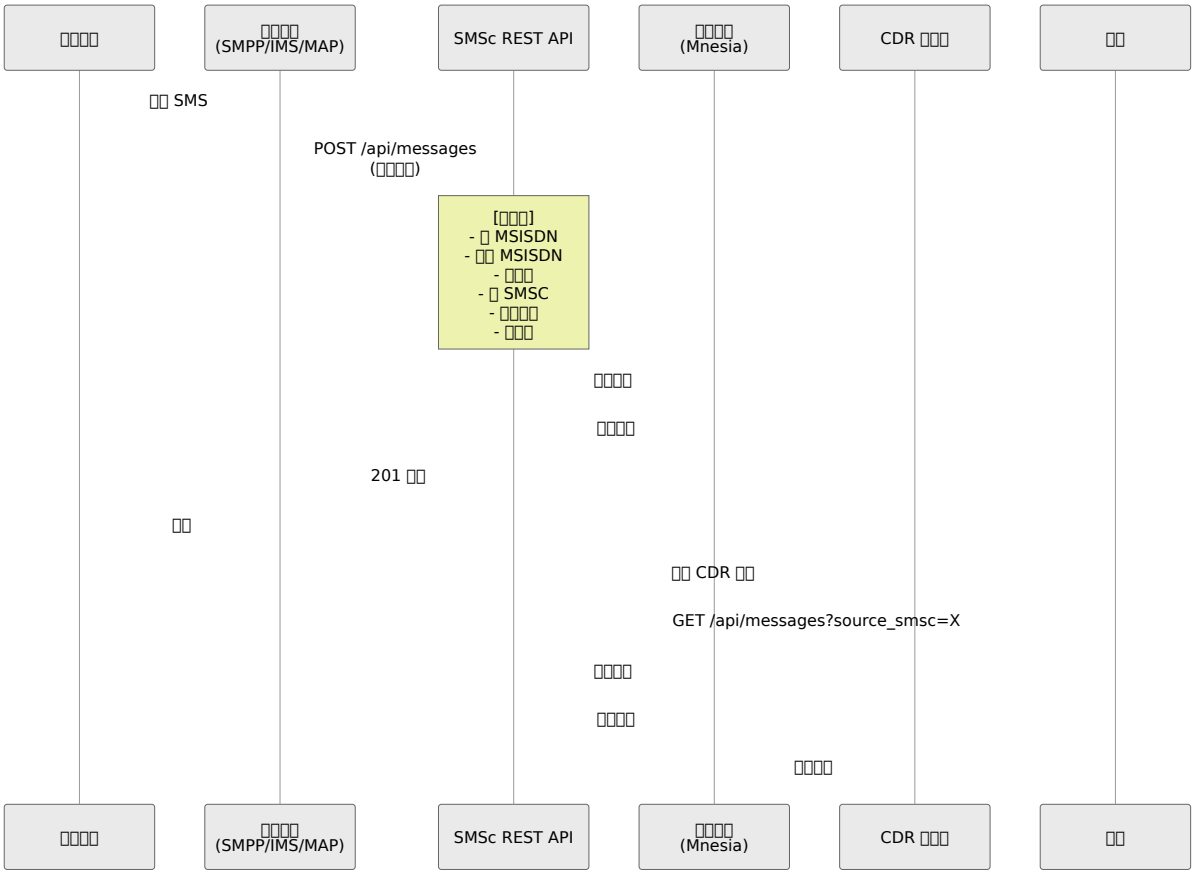
A.2 □□ SMS □□□□□□□



□□ B□□□□□□□ CDR □□

OmniMessage SMSc □ SQL □□□□□MySQL □ PostgreSQL□□□□□□□

□□□□	□□	□□	□□□□□
id	BIGINT	□□□□	□□□□□
message_id	BIGINT	□□□□□□□	□□□□
calling_number	VARCHAR(255)	□ MSISDN	□□□□□□□□□□
called_number	VARCHAR(255)	□□ MSISDN	□□□□□□□
source_smsc	VARCHAR(255)	□□□□□□	□□/□□□□
dest_smsc	VARCHAR(255)	□□□□□□□	□□□□
origin_node	VARCHAR(255)	Erlang □□□□□□□□	□□□□
destination_node	VARCHAR(255)	Erlang □□□□□□□□	□□□□
submission_time	DATETIME	□□□□□□□	□□□□□
delivery_time	DATETIME	□□□□□□□	□□□□
expiry_time	DATETIME	□□□□□□□	□□□□□□
status	VARCHAR(50)	□□□□□□□□/□□/□□/□□□	□□□□
delivery_attempts	INT	□□□□□□	□□□□
message_parts	INT	SMS □□	□□□□□□
deadletter	BOOLEAN	□□□□□□	□□□□□□
message_body	TEXT	SMS □□□□	□□□□□□□□
inserted_at	DATETIME	CDR □□□□□	□□□□
updated_at	DATETIME	CDR □□□□□	□□□□

□ □□□□□□□□□ **SQL** □□□ **CDR_SCHEMA.md**

B.2 CDR □□□□□□□□□□□

□□□□□□□□□□□□□

```
SELECT * FROM cdrs
WHERE calling_number = '+33612345678'
   OR called_number = '+33612345678'
ORDER BY submission_time DESC;
```

□□□□□□□□□□□□

```
SELECT * FROM cdrs
WHERE (calling_number = '+33612345678' OR called_number =
'+33612345678')
  AND submission_time BETWEEN '2025-11-01 00:00:00' AND '2025-11-
30 23:59:59'
ORDER BY submission_time;
```

□□□ **CSV** □□□□□□

```
.mode csv
.output /tmp/interception_report.csv
SELECT message_id, calling_number, called_number, message_body,
       submission_time, delivery_time, status
FROM cdrs
WHERE calling_number = '+33612345678'
ORDER BY submission_time DESC;
```

B.3 CDR □□□□□□□

1. □□ SQL □□□

- □□□□□□□
- □□ SQL □□
- JDBC/ODBC □□
- □□□□□□□□□MySQL Workbench□pgAdmin□

2. REST API □□□

- □□□□□□□ CDR □□□ REST API
- JSON □□□□
- □□□□□
- □□□□□□

3. □□□□□

- □□ mysql/psql □□□□□ CSV
- □□□□□□□
- □□ cron □□□□

B.4 CDR □□□□□

□□□□□

```
# config/runtime.exs
config :sms_c,
  # □□□□□□□□□□□□□□□□□
  delete_message_body_after_delivery: false,  # true □□□□

  # □□/□□ CDR □□
  cdr_enabled: true,

  # Mnesia □ CDR □□□□
  message_retention_hours: 24
```

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- □□□□□□□□□□□□□□□ NULL
- □□□□□□□□MySQL ENCRYPTION='Y'□
- □□□□□□□
- □□□□□□□□□□

□□ C□□□□ REST API □□

C.1 □□□□□□□

□□□□□□□□

```
GET /api/messages
Authorization: Bearer <token>
```

□ **SMSC** □□□□□

```
GET /api/messages/get_by_smsc?smsc=gateway-name
```

□□□□□□□□

```
GET /api/messages/{id}
```

□□□□□

```
{
  "status": "success",
  "data": [
    {
      "id": 12345,
      "message_id": 12345,
      "source_msisdn": "+33612345678",
      "destination_msisdn": "+33687654321",
      "message_body": "□□□□□□□□",
      "source_smsc": "ims.gateway",
      "dest_smsc": "smpp.provider",
      "status": "delivered",
      "delivery_attempts": 1,
      "inserted_at": "2025-11-29T10:30:00Z",
      "deliver_time": "2025-11-29T10:30:05Z",
      "expires": "2025-11-30T10:30:00Z"
    }
  ]
}
```

□ □□□ **API** □□□ **API_REFERENCE.md**

C.2 □□□□□

□□□□□

- `source_smsc` - □□□□□□
- `dest_smsc` - □□□□□□□
- □□□□□□□□□ CDR □□□□□□
- □□□□□□□ CDR □□□□□□

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- □□ CDR □□□ REST API
- □□□□□□□□□□
- □□□□□□
- □□□□□□□□□□

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D.1 TLS □□□

□□ **TLS** □□□

```
# □□ 4096 □ RSA □□
openssl genrsa -out priv/cert/omnitouch.pem 4096

# □□□□□□□□□
openssl req -new -key priv/cert/omnitouch.pem -out
priv/cert/omnitouch.csr \
  -subj "/C=FR/ST=IDF/L=Paris/O=Omnitouch/CN=smsc.example.com"

# □□□□□□□□/□□□
openssl x509 -req -days 365 -in priv/cert/omnitouch.csr \
  -signkey priv/cert/omnitouch.pem -out priv/cert/omnitouch.crt

# □□□□ CSR □□□□□□□ CA □□□□
```

□□□□□□□

```
# config/runtime.exs
config :api_ex,
  api: %{
    enable_tls: true,
    tls_cert_path: "priv/cert/omnitouch.crt",
    tls_key_path: "priv/cert/omnitouch.pem"
  }
```

D.2 □□□□□□□□

MySQL □□□□

```
-- □ CDR □□□□□
ALTER TABLE cdrs ENCRYPTION='Y';

-- □□□□□□□
SELECT TABLE_NAME, CREATE_OPTIONS
FROM information_schema.TABLES
WHERE TABLE_SCHEMA = 'sms_c' AND TABLE_NAME = 'cdrs';
```

PostgreSQL □□□□□

```
# config/runtime.exs
config :sms_c, SmsC.Repo,
  username: "omnitouch",
  password: "secure_password",
  hostname: "localhost",
  database: "sms_c",
  ssl: true,
  ssl_opts: [
    verify: :verify_peer,
    cacertfile: "/path/to/ca.crt",
    certfile: "/path/to/client.crt",
    keyfile: "/path/to/client.key"
  ]
```

D.3 □□□□

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```
# config/runtime.exs
config :sms_c,
  # □□□□□□□□□□□□□□
  delete_message_body_after_delivery: true,

  # □ UI □□□□□□□□
  hide_message_body_in_ui: true,

  # □□□□□□□□□□□
  hide_message_body_in_export: true
```

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```
-- □□□□□□□□□□□□□□□□□□□□□
CREATE VIEW cdrs_metadata AS
SELECT
  id, message_id, calling_number, called_number,
  source_smsc, dest_smsc, origin_node, destination_node,
  submission_time, delivery_time, expiry_time,
  status, delivery_attempts, message_parts, deadletter,
  inserted_at, updated_at
FROM cdrs;

-- □□□□□□□□□□
GRANT SELECT ON cdrs_metadata TO 'analytics'@'%';
```

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- **ANSSI:** □□□□□□□□□□□
- **ETSI:** □□□□□□□□□
- **3GPP:** □□□□□□□□□ - □□□□□□
- **IETF:** □□□□□□□□ - □□□□□□□

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- **SMSc:** □□□□□□ - □□□□□□□□□□□□□□
- **SMPP:** □□□□□□□ - □□□□□□□□□

- **ESME:** □□□□□□□□ - SMPP □□□□□□
- **IMS:** IP □□□□□□□ - □□□□□□□□□□ IP □□□□
- **SIP:** □□□□□□□ - IMS □□□□□□□□
- **P-CSCF:** □□□□□□□□□□□ - IMS □□□□□□
- **S-CSCF:** □□□□□□□□□□□ - IMS □□□□□
- **HSS:** □□□□□□□□ - IMS □□□□□□
- **SS7/MAP:** □□□□ 7 / □□□□□□□ - □□□□□□□□□
- **MSC:** □□□□□□□ - □□□□□□□□□
- **VLR:** □□□□□□□ - □□□□□□□□
- **GT:** □□□□ - SS7 □□□□
- **SCCP:** □□□□□□□□□ - SS7 □□□
- **TCAP:** □□□□□□□□□ - SS7 □□□
- **MSISDN:** □□□□□□□□□□□□□ - □□□□
- **IMSI:** □□□□□□□□□ - □□□□□□□□
- **E.164:** □□□□□□□□□□□□□
- **ENUM:** E.164 □□□□ - □□ DNS □□□□□□ URI □□
- **PDU:** □□□□□□□ - □□□□□□□□□□□
- **TP-DCS:** □□□□□□□□□□□ - □□□□□□□
- **TP-DU:** □□□□□□□□□ - □□□□□ PDU □□
- **UDH:** □□□□□ - □□□□/□□□□□□□
- **TON/NPI:** □□□□ / □□□□□□□ - □□□□□□
- **GSM7:** GSM 7 □□□□□□ - □□□□□□□□□
- **UCS-2:** □□□□□ 2 □□ - □□□ Unicode □□

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- **Mnesia:** Erlang □□□□□□□□ - □□/□□□□
- **CDR:** □□□□□□ - □□□□□□□□□□
- **REST API:** □□□□□□□ - □□ HTTP □ API □□
- **Phoenix:** Elixir □□□□
- **Cowboy:** Erlang HTTP □□□
- **Ecto:** Elixir □□□□□□□□□□
- **PubSub:** □□-□□□□□□

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- **LI:** □□□□ - □□□□□□□□□
- **LIMF:** □□□□□□□□□ - □□□□□□□□□□□□□□□□
- **LEMF:** □□□□□□□ - □□□□□□□□□□□□
- **IRI:** □□□□□□□ - □□□□□□□□/□��□□□
- **CC:** □□□□ - □□□□□□□
- **HI1 □□:** ETSI LI □□□□□□□ - □□□□□□□□□□□
- **HI2 □□:** ETSI LI □□□□□□□ IRI □□ - □□□□□□□□□
- **HI3 □□:** ETSI LI □□□□□□□ CC □□ - □□□□□□□□
- **R226:** □□□□□□ R226-3 □ R226-7 □□□□□□□□□□
- **ETSI:** □□□□□□□□□□ - □□ LI □□
- **ETSI TS 102 232:** □□□□□□□□□□□□□□□

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- **MT:** □□□□ - □□□□□□□□□□□□□
- **MO:** □□□□ - □□□□□□□□□□□□□
- **DLR:** □□□□ - □□□□□□□
- **□□:** □□□□□□□□□□□□□□□□□
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- **TLS:** □□□□□□□ - □□□□
- **PFS:** □□□□□□□ - □□□□□□□□□□□□□
- **AES:** □□□□□□□
- **RSA:** Rivest-Shamir-Adleman - □□□□□
- **ECDSA:** □□□□□□□□□□□
- **SHA:** □□□□□□□
- **X.509:** □□□□
- **CA:** □□□□□□□
- **CSPRNG:** □□□□□□□□□□□□

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- **MySQL:** □□□□□□□□
- **PostgreSQL:** □□□□□□□□□□
- **TDE:** □□□□□□□
- **RBAC:** □□□□□□□□□□

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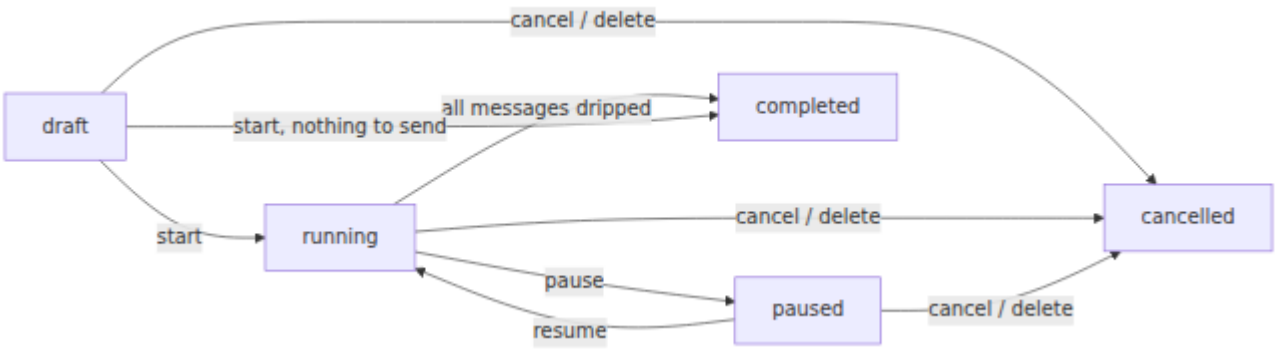

1. **draft** - □□□□□□□□□
2. **start** - □□□□□□□□□□□□□□□□□□□

□□	□□
`total`	□□□□□□□□□□
`pending`	□□□□□□□
`queued`	□□□□□□□□□□□
`delivered`	□□□□□
`failed`	□□□□/□□
`skipped_inactive`	□□□□□□□□□□□□□□
`dispatched`	`queued + delivered + failed`
`progress_percent`	□□ `pending` □□□□□□
`delivery_percent`	□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□ SMSC □□□□□□□□□□□□□□□□□□□□

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- **`validity_hours`** - □□□□□□□□□□□□□□□□□ `expires` □□□□□□□□□□□□□□□□□

□□□□□□

```
# 1. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□CSV □ JSON□
curl -k -X POST https://smsc:8443/api/campaign_lists \
  -H 'Content-Type: application/json' \
  -d '{"name":"VIP customers",

"csv":"msisdn,first,plan\n12025550101,Alice,Gold\n12025550102,Bob,Sil
# => {"id": 1, "recipient_count": 2, ...}

# 2. □□□□□□□□□□□□□□□□□□□□□
curl -k -X POST https://smsc:8443/api/campaigns \
  -H 'Content-Type: application/json' \
  -d '{"name":"Renewal notice","message":"Hi {{ var1 }}, your {{ var2
renews soon.",
       "source_msisdn":"12345","source_smsc":"IMS_SMSC",
       "list_id":1,"audience":"active_only","drip_tps":50}'
# => {"id": 7, "status": "draft", ...}

# 3. □□□
curl -k -X POST https://smsc:8443/api/campaigns/control \
  -H 'Content-Type: application/json' \
  -d '{"campaign_id":7,"action":"start"}'

# 4. □□□□ / □□□□
curl -k https://smsc:8443/api/campaigns/7
# => {... "stats":
{"total":..,"delivered":..,"failed":..,"progress_percent":..}}
```

□□ □□□□□□□ □□□□□□□□□ 2 □□□ `list_id`□□□□□□□□ 1□□

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- □□ API □□
- SMS □□□□ - □□□□/□□□□□□□
- □□□□

CDR□□□□□□□□□□

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`cdrs` □□□□□□□□□□SMS□□□□□□□□□□□□□□□□□□□□□□CDR□`delivered`□`expired`□`failed`□`rejected`□□□□□□□□`balance_rejected`□□□`rejected`□□□□□□□□□□□□Mnesia□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ CDR□□□□□□□

CDR□□□□□Mnesia□□□□□□□□□□□□□□□

- □□□□□
- □□□□□
- □□□□□
- □□Mnesia□□□□□□□□

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MySQL / MariaDB

```
CREATE TABLE cdrs (
  id BIGINT AUTO_INCREMENT PRIMARY KEY,

  -- □□□□
  message_id BIGINT NOT NULL,

  -- □□□□
  calling_number VARCHAR(255) NOT NULL,
  called_number VARCHAR(255) NOT NULL,

  -- SMSC□□
  source_smsc VARCHAR(255),
  dest_smsc VARCHAR(255),

  -- □□□□□□□□□□□□□
  origin_node VARCHAR(255),
  destination_node VARCHAR(255),

  -- □□□
  submission_time DATETIME NOT NULL,
  delivery_time DATETIME,
  expiry_time DATETIME,

  -- □□□□□□
  status VARCHAR(50) NOT NULL,
  delivery_attempts INT DEFAULT 0,
  message_parts INT,
  deadletter BOOLEAN DEFAULT FALSE,

  -- □□□□□□□□□□□□
  message_body TEXT,

  -- □□□□□
  inserted_at DATETIME NOT NULL,
  updated_at DATETIME NOT NULL,

  -- □□
  UNIQUE KEY cdrs_origin_node_message_id_index (origin_node,
```

```
message_id),
  INDEX idx_cdrs_message_id (message_id),
  INDEX idx_cdrs_calling_number (calling_number),
  INDEX idx_cdrs_called_number (called_number),
  INDEX idx_cdrs_status (status),
  INDEX idx_cdrs_submission_time (submission_time),
  INDEX idx_cdrs_dest_smsc (dest_smsc)
);
```

> `(origin_node, message_id)` □□□□□□CDR□□□□□□□□□□□□□□□□□□□□□CDR□□□□□□ ���□□□□□□□□□□□□□□□□□□□□□□□□□□□□ `ON CONFLICT DO NOTHING` □□□□□□□□

PostgreSQL

```
CREATE TABLE cdrs (
  id BIGSERIAL PRIMARY KEY,

  -- □□□□
  message_id BIGINT NOT NULL,

  -- □□□□
  calling_number VARCHAR(255) NOT NULL,
  called_number VARCHAR(255) NOT NULL,

  -- SMSC□□
  source_smsc VARCHAR(255),
  dest_smsc VARCHAR(255),

  -- □□□□□□□□□□□□□□
  origin_node VARCHAR(255),
  destination_node VARCHAR(255),

  -- □□□
  submission_time TIMESTAMP NOT NULL,
  delivery_time TIMESTAMP,
  expiry_time TIMESTAMP,

  -- □□□□□□□
  status VARCHAR(50) NOT NULL,
  delivery_attempts INTEGER DEFAULT 0,
  message_parts INTEGER,
  deadletter BOOLEAN DEFAULT FALSE,

  -- □□□□□□□□□□□□□
  message_body TEXT,

  -- □□□□□□
  inserted_at TIMESTAMP NOT NULL,
  updated_at TIMESTAMP NOT NULL
);

-- □□
CREATE UNIQUE INDEX cdrs_origin_node_message_id_index ON
cdrs(origin_node, message_id);
CREATE INDEX idx_cdrs_message_id ON cdrs(message_id);
```

```
CREATE INDEX idx_cdrs_calling_number ON cdrs(calling_number);
CREATE INDEX idx_cdrs_called_number ON cdrs(called_number);
CREATE INDEX idx_cdrs_status ON cdrs(status);
CREATE INDEX idx_cdrs_submission_time ON cdrs(submission_time);
CREATE INDEX idx_cdrs_dest_smsc ON cdrs(dest_smsc);
```

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`id`	BIGINT	NO	CDR□□□□□□□

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`message_id`	BIGINT	NO	□□SMS-C□□□□□□□

SMSC□□

□□	□□	□□	□□
`source_smsc`	VARCHAR(255)	YES	□□□□□□SMSC□□□□□□□□□□□□API□□□□SMSC□□□□□□□NULL□
`dest_smsc`	VARCHAR(255)	YES	□□□□□□□□□□□□□□SMSC□□□□□□□□□□□□□□□□□□□□NULL□

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□□	□□	□□	□□
`origin_node`	VARCHAR(255)	YES	□□□□□□□□Erlang□□□□□□□□□“sms@node1.example.com”□□□□□□□□□□□□□□□□□□□□
`destination_node`	VARCHAR(255)	YES	□□□□□Erlang□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□NULL□

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□□□□□□UTC□□□

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`submission_time`	DATETIME	NO	□□□□□□□SMS-C□□□□□□□□□□□□□□□□□□
`delivery_time`	DATETIME	YES	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ NULL□
`expiry_time`	DATETIME	YES	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□□□NULL□

□□□□□□□□□□

```
TIMESTAMPDIFF(SECOND, submission_time, delivery_time) AS
delivery_duration_seconds
```

□□□□□□

□□	□□	□□	□□
`status`	VARCHAR(50)	NO	□□□□□□□□□□□□`delivered`□ `expired`□`failed`□`rejected`
`delivery_attempts`	INT	NO	□□□□□□□□□□□□□□□□□□□□□□□□0□□ □□□□□0-255□
`message_parts`	INT	YES	□□□□□SMS□□□□□□□□□1□□□□□□ 2□□□□□□□□□□NULL□
`deadletter`	BOOLEAN	NO	□□□□□□□□□□□□□□□□TRUE□□□□□□ □□□□□□□□□□□□□□□□□□FALSE

□□□□

□□	□□	□□□	□□□□
`delivered`	□□□□□□□□□	□	□□□
`expired`	□□□□□□□□□	□□□□□□□□	NULL
`failed`	□□□□□□□□□□□□□□□	□□□□□□□□	NULL
`rejected`	□□□□□□□□□□□	□	NULL

□□□

□□	□□	□□	□□
`message_body`	TEXT	YES	□□□SMS□□□□□□□□□□□ `delete_message_body_after_delivery`□□□□ □□□□□□NULL□□□□□□□□□□□□□□□TEXT□□□ 65,535□□□□□

□□□□□

- □□□□□ □□□□□□□CDR□□□□□/□
- □□□□□ □`delete_message_body_after_delivery: true`□□□□□□□□NULL
- □□□□□ □□□□□□□□□□□□□□□□□□□□□□□□□

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`inserted_at`	DATETIME	NO	CDR□□□□□□□□□□□□□□□□□ delivery_time/expiry_time□□□□□
`updated_at`	DATETIME	NO	CDR□□□□□□□□□□□□□□□□□□□□inserted_at□ □□

SQL□□

□□□□

□□□□□□□□□□□□**CDR**□

```
SELECT * FROM cdrs
WHERE calling_number = '+15551234567'
   OR called_number = '+15551234567'
ORDER BY submission_time DESC
LIMIT 100;
```

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```
SELECT status, COUNT(*) as count
FROM cdrs
GROUP BY status;
```

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```
SELECT AVG(TIMESTAMPDIFF(SECOND, submission_time, delivery_time))
AS avg_delivery_seconds
FROM cdrs
WHERE status = 'delivered'
  AND delivery_time IS NOT NULL;
```

□□□□

□□□**SMSC**□□□□□□□

```sql
SELECT
  DATE(submission_time) AS date,
  dest_smsc,
  COUNT(*) AS message_count,
  SUM(CASE WHEN status = 'delivered' THEN 1 ELSE 0 END) AS
delivered_count,
  SUM(message_parts) AS total_segments
FROM cdrs
WHERE submission_time >= DATE_SUB(NOW(), INTERVAL 30 DAY)
GROUP BY DATE(submission_time), dest_smsc
ORDER BY date DESC, message_count DESC;
```

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```sql
SELECT
  DATE(submission_time) AS date,
  COUNT(*) AS message_count,
  SUM(message_parts) AS total_segments,
  SUM(message_parts) * 0.01 AS total_cost
FROM cdrs
WHERE calling_number LIKE '+1555%'
  AND status = 'delivered'
  AND submission_time >= '2025-10-01'
  AND submission_time < '2025-11-01'
GROUP BY DATE(submission_time);
```

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```sql
SELECT
  dest_smsc,
  COUNT(*) AS total_messages,
  SUM(CASE WHEN status = 'delivered' THEN 1 ELSE 0 END) AS
delivered,
  ROUND(100.0 * SUM(CASE WHEN status = 'delivered' THEN 1 ELSE 0
END) / COUNT(*), 2) AS delivery_rate_pct,
  AVG(delivery_attempts) AS avg_attempts,
  AVG(TIMESTAMPDIFF(SECOND, submission_time, delivery_time)) AS
avg_delivery_seconds
FROM cdrs
WHERE submission_time >= DATE_SUB(NOW(), INTERVAL 7 DAY)
  AND dest_smsc IS NOT NULL
GROUP BY dest_smsc
ORDER BY delivery_rate_pct DESC;
```

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```sql
SELECT
  HOUR(submission_time) AS hour,
  COUNT(*) AS message_count
FROM cdrs
WHERE submission_time >= DATE_SUB(NOW(), INTERVAL 7 DAY)
GROUP BY HOUR(submission_time)
ORDER BY hour;
```

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```
SELECT
  message_parts,
  COUNT(*) AS message_count,
  AVG(TIMESTAMPDIFF(SECOND, submission_time, delivery_time)) AS
avg_delivery_seconds
FROM cdrs
WHERE message_parts IS NOT NULL
  AND status = 'delivered'
GROUP BY message_parts
ORDER BY message_parts;
```

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```
SELECT
  called_number,
  COUNT(*) AS failure_count,
  AVG(delivery_attempts) AS avg_attempts,
  MAX(submission_time) AS last_failure
FROM cdrs
WHERE status IN ('failed', 'expired')
  AND submission_time >= DATE_SUB(NOW(), INTERVAL 7 DAY)
GROUP BY called_number
HAVING failure_count >= 5
ORDER BY failure_count DESC;
```

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```
SELECT
  submission_time,
  calling_number,
  called_number,
  status,
  message_body,
  delivery_time
FROM cdrs
WHERE (
    (calling_number = '+15551234567' AND called_number =
'+15559876543')
    OR
    (calling_number = '+15559876543' AND called_number =
'+15551234567')
  )
  AND submission_time >= '2025-10-01'
  AND submission_time < '2025-11-01'
ORDER BY submission_time;
```

□□□□□□□□□□**CDR**□□

```
-- □□□□□□□□□□□□□□□2□□
SELECT COUNT(*) FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL 2 YEAR);

-- □□□□□□□□□□□□
DELETE FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL 2 YEAR)
LIMIT 10000;  -- □□□□□□□□□
```

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```sql
SELECT
  origin_node,
  COUNT(*) AS message_count,
  SUM(CASE WHEN status = 'delivered' THEN 1 ELSE 0 END) AS
delivered_count
FROM cdrs
WHERE submission_time >= DATE_SUB(NOW(), INTERVAL 1 DAY)
GROUP BY origin_node;
```

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□□□□	□	□□
`PRIMARY`	`id`	□□□□□□□□□□
`cdrs_origin_node_message_id_index`	`origin_node, message_id`	□□□ □□□□□□□ □□□CDR□□□ □□□□□□□□□
`idx_cdrs_message_id`	`message_id`	□□□□□ID□□ CDR
`idx_cdrs_calling_number`	`calling_number`	□□□□□□□□□□
`idx_cdrs_called_number`	`called_number`	□□□□□□□□□□
`idx_cdrs_status`	`status`	□□□□□□□
`idx_cdrs_submission_time`	`submission_time`	□□□□□□□□□□ □□
`idx_cdrs_dest_smsc`	`dest_smsc`	□□□□□□

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```
CREATE INDEX idx_cdrs_billing ON cdrs(calling_number,
submission_time, status);
```

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```
CREATE INDEX idx_cdrs_route_perf ON cdrs(dest_smsc,
submission_time, status);
```

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```
CREATE INDEX idx_cdrs_party_time ON cdrs(calling_number,
called_number, submission_time);
```

□□□□□□□□□□□□**MySQL**□□

```
ALTER TABLE cdrs ADD FULLTEXT INDEX idx_cdrs_message_body_ft
(message_body);

-- □□□
SELECT * FROM cdrs
WHERE MATCH(message_body) AGAINST('keyword' IN NATURAL LANGUAGE
MODE);
```

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□□	**MySQL/MariaDB**	**PostgreSQL**	□□
`id`	BIGINT AUTO_INCREMENT	BIGSERIAL	64□□□□□□
`message_id`	BIGINT	BIGINT	64□□□
□□□□□	VARCHAR(255)	VARCHAR(255)	□□□□□□□□□□255□□
`message_body`	TEXT	TEXT	□□□□MySQL□□65,535□□□PostgreSQL□□
□□□	DATETIME	TIMESTAMP	□□□□UTC□□□
□□	INT	INTEGER	32□□□□□□
□□□	BOOLEAN (TINYINT(1))	BOOLEAN	MySQL□□□0/1

□□□□

CDR□□□□□□□□□

```
config :sms_c,
  # □□□□□□□□□□□□
  delete_message_body_after_delivery: true,

  # □UI□□□□□□□
  hide_message_body_in_ui: true,

  # □□□□□□□□□□□
  hide_message_body_in_export: true
```

2. □□□□□□

□□□□□□□□□□□□□□□□

```
-- □□□□□□□□□□4□
SELECT
  CONCAT(SUBSTRING(calling_number, 1, LENGTH(calling_number) - 4),
'XXXX') AS masked_calling,
  CONCAT(SUBSTRING(called_number, 1, LENGTH(called_number) - 4),
'XXXX') AS masked_called,
  COUNT(*) AS message_count
FROM cdrs
GROUP BY masked_calling, masked_called;
```

3. □□□□□

□□□□□□□□□□□□□□□□

MySQL□

```
-- □□□□□
ALTER TABLE cdrs ENCRYPTION='Y';
```

PostgreSQL□ □□PostgreSQL□□□□□□□TDE□□□□□□□□□□□□

4. □□□□

□□CDR□□□□□

```
-- □□□□□□□□□
CREATE USER 'billing_ro'@'%' IDENTIFIED BY 'secure_password';
GRANT SELECT ON sms_c.cdrs TO 'billing_ro'@'%';

-- □□□□□□□□□□□□□□□□□□
CREATE USER 'analytics'@'%' IDENTIFIED BY 'secure_password';
GRANT SELECT (id, message_id, calling_number, called_number,
source_smsc,
              dest_smsc, submission_time, delivery_time, status,
              delivery_attempts, message_parts)
ON sms_c.cdrs TO 'analytics'@'%';
```

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□□	□□□□	□□□
□□□□□	18-24□□	FCC□□□
□□□□□	6□□ - 2□	GDPR□□□□
□□	5-7□	SOX□SEC
□□□	6□	HIPAA

□□□

1. □□□□□□MySQL 8.0+□PostgreSQL 11+□

```sql
-- MySQL□□□□
ALTER TABLE cdrs PARTITION BY RANGE (TO_DAYS(submission_time)) (
  PARTITION p202510 VALUES LESS THAN (TO_DAYS('2025-11-01')),
  PARTITION p202511 VALUES LESS THAN (TO_DAYS('2025-12-01')),
  PARTITION p202512 VALUES LESS THAN (TO_DAYS('2026-01-01')),
  PARTITION p_future VALUES LESS THAN MAXVALUE
);

-- □□□□□□□□□□□□
ALTER TABLE cdrs DROP PARTITION p202510;
```

2. □□□□□□

```sql
-- □□CDR□□□□□□
CREATE TABLE cdrs_archive LIKE cdrs;

INSERT INTO cdrs_archive
SELECT * FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL 2 YEAR);

-- □□□□□□□□□□
DELETE FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL 2 YEAR);
```

3. □□□□□□

```
#!/bin/bash
# cleanup_old_cdrs.sh - □□cron□□

MYSQL_USER="cleanup_user"
MYSQL_PASS="secure_password"
MYSQL_DB="sms_c"
RETENTION_DAYS=730  # 2□

# □□□□□
mysql -u"$MYSQL_USER" -p"$MYSQL_PASS" "$MYSQL_DB" <<EOF
INSERT INTO cdrs_archive
SELECT * FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL $RETENTION_DAYS
DAY)
LIMIT 100000;

DELETE FROM cdrs
WHERE submission_time < DATE_SUB(NOW(), INTERVAL $RETENTION_DAYS
DAY)
LIMIT 100000;
EOF
```

Cron□□□

```
# □□□□2□□□
0 2 * * * /usr/local/bin/cleanup_old_cdrs.sh >>
/var/log/sms_c/cleanup.log 2>&1
```

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```sql
CREATE TABLE billing_rates (
  id INT AUTO_INCREMENT PRIMARY KEY,
  destination_prefix VARCHAR(20) NOT NULL,
  description VARCHAR(255),
  rate_per_message DECIMAL(10, 6) NOT NULL,
  rate_per_segment DECIMAL(10, 6) NOT NULL,
  currency VARCHAR(3) DEFAULT 'USD',
  effective_date DATE NOT NULL,
  expiry_date DATE,
  INDEX idx_prefix (destination_prefix),
  INDEX idx_dates (effective_date, expiry_date)
);

-- □□□□
INSERT INTO billing_rates (destination_prefix, description,
rate_per_message, rate_per_segment, effective_date) VALUES
('+1', '□□/□□□', 0.0050, 0.0050, '2025-01-01'),
('+44', '□□', 0.0080, 0.0080, '2025-01-01'),
('+61', '□□□□', 0.0100, 0.0100, '2025-01-01'),
('+', '□□□□', 0.0150, 0.0150, '2025-01-01');
```

□□□□

□CDR□□□□□□□□□□□□

```
SELECT
  DATE(c.submission_time) AS date,
  c.dest_smsc AS route,
  LEFT(c.called_number,
    CASE
      WHEN c.called_number LIKE '+1%' THEN 2
      WHEN c.called_number LIKE '+%' THEN
LENGTH(SUBSTRING_INDEX(c.called_number, '', 4))
      ELSE 0
    END
  ) AS destination_prefix,
  COUNT(*) AS message_count,
  SUM(c.message_parts) AS segment_count,
  COALESCE(r.rate_per_segment, 0.015) AS rate,
  SUM(c.message_parts) * COALESCE(r.rate_per_segment, 0.015) AS
total_cost
FROM cdrs c
LEFT JOIN billing_rates r ON c.called_number LIKE
CONCAT(r.destination_prefix, '%')
  AND c.submission_time >= r.effective_date
  AND (r.expiry_date IS NULL OR c.submission_time < r.expiry_date)
WHERE c.status = 'delivered'
  AND c.submission_time >= '2025-10-01'
  AND c.submission_time < '2025-11-01'
GROUP BY date, route, destination_prefix
ORDER BY date DESC, total_cost DESC;
```

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□□CSV□□□□□□□

SMS-C□□□□□CDR□□□RFC 4180 CSV□□□□□□□□SQL□□□□□□□□□□□□□□□□□□□□

```
bin/omnimessage rpc
'SmsC.Messaging.CDR.export_csv_to_file("/tmp/cdrs-202607.csv",
since: ~U[2026-07-01 00:00:00Z], until: ~U[2026-08-01 00:00:00Z],
status: :delivered)'
```

□□□`:since`□`:until`□□□`DateTime`□□`:status`□□□/□□□□□□□□□`[:delivered, :failed]`□□`:limit`□□□□□ `{:ok, {path, row_count}}`□`message_body` □□□

`hide_message_body_in_export` □□ - □□□□□ `true` □□□ `[REDACTED]` □□□□□

SMS-C □□□□

← □□□□□□□

□□ SMS-C □□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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- □□□□□
- API □□
- Web UI □□
- □□□□
- □□□□□□
- □□□□
- Diameter Sh (HSS) □□
- ENUM □□
- □□□□□□
- □□□□ (X1/X2/X3)
- □□□□
- □□□□□□
- □□□□
- □□□□□□

□□□□

SMS-C □□□□□□□□□□□□

config/config.exs

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- □□□□□□□
- □□/□□□□
- □□□□□□□

config/runtime.exs

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- □□□□□□□□
- □□□□
- □□□□□□□ (OCS, ENUM)
- □□□□□□□□□□
- □□□□□□□

config/prod.exs (□□)

□□□□□□□□□□

□□□□□□□ `runtime.exs` □□□□□□□□□□□□□□□□□□□□□ API □□□

SQL CDR □□□□

SMS-C □□ **Mnesia** □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ **SQL** □□□ □□□□ CDR□□□□□□□ □□□□□□□□□□

□□□ SQL □□□

□□□□□□□ SQL □□□□□ CDR □□□

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MySQL	8.0+	`Ecto.Adapters.MyXQL`	3306	□□□□□□□□□□□
MariaDB	10.5+	`Ecto.Adapters.MyXQL`	3306	□ MySQL □□□□□
PostgreSQL	13+	`Ecto.Adapters.Postgres`	5432	□□□□□□□ JSON

□□□Mnesia □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□SQL □□□ □ □□ CDR □□□□□□□□□

CDR □□□□

CDR □□□□□□□ SQL □□□□

1. □□□□□□□□□□ - □□□□□□□□□□□`delivered`□`expired`□`failed`□`rejected` □ `balance_rejected`□□□CDR □□
2. □□□□□□□ - □□□□□□□□ Mnesia □□□□□□□□□□□□□□□□ CDR□□□□□□□□□□□□□□□□□□□□□□□□□□□ `expired`□□□□□□□ CDR □□□□□□□□□□□□□□□□ CDR □□□□□□□□□□□□□□□□□□□□

□□□□□□□`:since`□`:until`□□□ `DateTime`□□`:status`□□□/□□□□□□□□□ `:limit`□ `message_body` □□□ `hide_message_body_in_export` □□□□□□□□□□ `[REDACTED]`□□

MySQL / MariaDB □□

```
# config/runtime.exs
config :sms_c, SmsC.Repo,
  adapter: Ecto.Adapters.MyXQL,
  username: System.get_env("DB_USERNAME") || "sms_user",
  password: System.get_env("DB_PASSWORD") || "secure_password",
  hostname: System.get_env("DB_HOSTNAME") || "localhost",
  port: String.to_integer(System.get_env("DB_PORT") || "3306"),
  database: System.get_env("DB_NAME") || "sms_c_prod",
  pool_size: String.to_integer(System.get_env("DB_POOL_SIZE") ||
"20")
```

PostgreSQL □□

```
# config/runtime.exs
config :sms_c, SmsC.Repo,
  adapter: Ecto.Adapters.Postgres,
  username: System.get_env("DB_USERNAME") || "sms_user",
  password: System.get_env("DB_PASSWORD") || "secure_password",
  hostname: System.get_env("DB_HOSTNAME") || "localhost",
  port: String.to_integer(System.get_env("DB_PORT") || "5432"),
  database: System.get_env("DB_NAME") || "sms_c_prod",
  pool_size: String.to_integer(System.get_env("DB_POOL_SIZE") ||
"20")
```

□□ SQL □□□

MySQL/MariaDB - □□□□□□□□□□□

- □ CDR □□□□□□□
- □□□□□□□□□□□□□□□
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- □□□□□□

PostgreSQL - □□□□□□□

- □□□□□□□□ JSON/JSONB □□
- □ CDR □□□□□□□□
- □□□ PostgreSQL □□□□
- □□□□□□□□ PostGIS

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□□□SQL CDR □□□□□□□□□ SMS-C □□□ □□□□□□ □□□□□□□□□□□□□□□□□□

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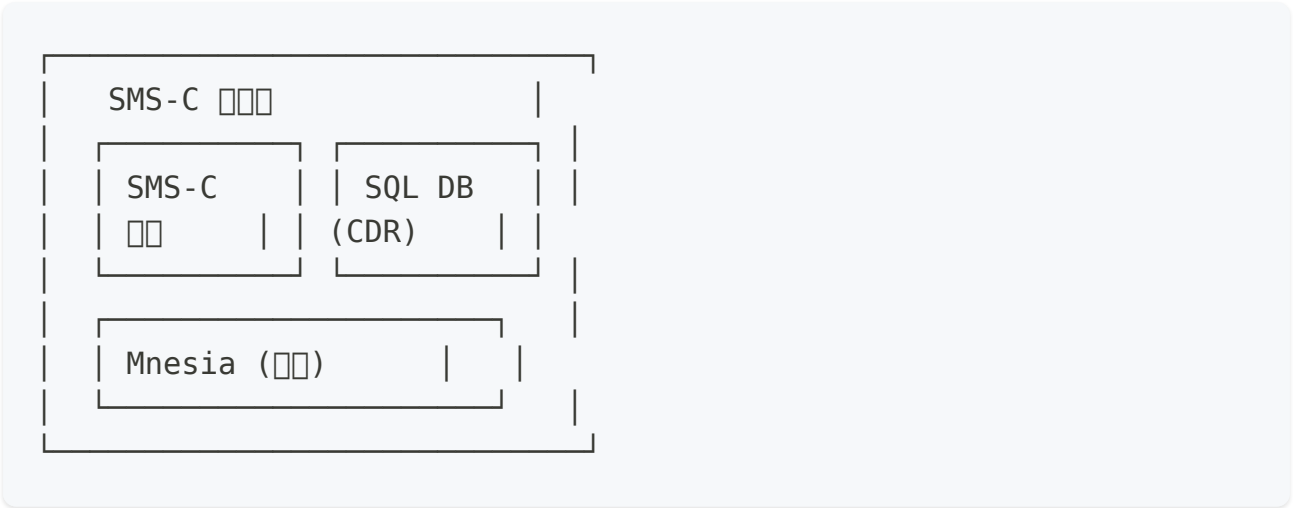
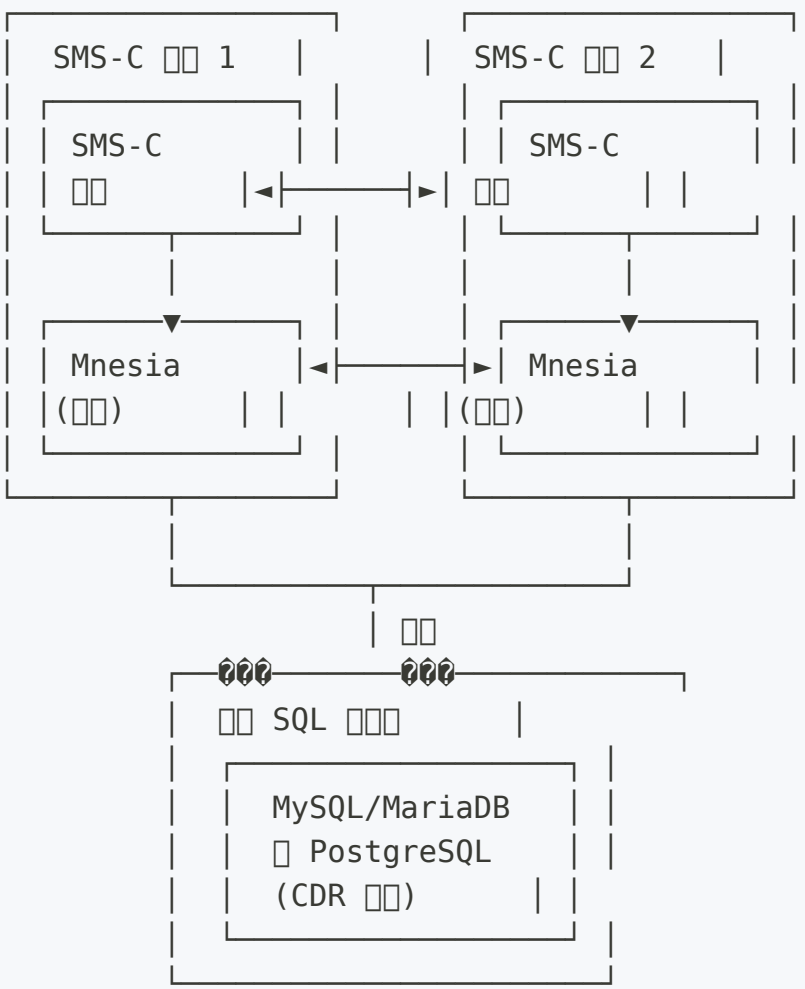


□□



□□ SQL □□□□□□□□

- □□□□□CDR □□□□□□□□□□□
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- □□□□□□□□□□□□□□□ SMS-C □□□□□
- □□□□□□□□ SMS-C □□□□□ CDR □□
- □□□□□□□□□□□□□□□□□□□□□

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□□□□□	□□□	□□
□□	5-10	□□□□
□□□ (< 100 msg/sec)	10-15	□□□□
□□□□ (100-1000 msg/sec)	20-30	□□□□
□□□ (> 1000 msg/sec)	40-100	□□□□□□

□□□`pool_size = (□□□□ DB □□) * 1.5`

□□□□□□□

□□□□□□□□□□□□□□□□□□

```
# □□□□□□□
export DB_USERNAME=sms_prod_user
export DB_PASSWORD=strong_password_here
export DB_HOSTNAME=db-primary.internal.example.com
export DB_PORT=3306
export DB_NAME=sms_c_production
export DB_POOL_SIZE=30
```

□□□□□□□□□□□□

```
config :sms_c, SmsC.Repo,
  username: "dev_user",
  password: "dev_password",
  hostname: "localhost",
  database: "sms_c_dev",
  pool_size: 5
```

□□□□□

□□ Prometheus □□□□□□□□□□

- `ecto_pools_queue_time` - □□□□□□□□
- `ecto_pools_query_time` - □□□□□□□
- `ecto_pools_connected_count` - □□□□□

□□□□□□□□□□ 100ms□□□□□□ - □□□□□□□□□□

API □□

REST API □□□□□□□□□□□□□

□□ API □□

```
# config/runtime.exs
config :api_ex,
  api: %{
    port: 8443,
    listen_ip: "0.0.0.0",
    enable_tls: true,
    tls_cert_path: "priv/cert/omnitouch.crt",
    tls_key_path: "priv/cert/omnitouch.pem"
  }
```

API □□□□ `:api_ex` □□□□□ `:api` □□□□□□□□`routes:`□□ `config/config.exs` □□□□□ □□□□□□□□□□

□□	□□	□□	□□	□□
`port`	□□	□	`8443`	REST API □ TCP □□□
`listen_ip`	□□□	□	`0.0.0.0`	API □□□□ □□□□ `0.0.0.0` □□□□□□□
`enable_tls`	□□	□	`true`	□□ HTTPS □ □ API□
`tls_cert_path`	□□□	□□ `enable_tls`	`priv/cert/omnitouch.crt`	TLS □□□ □□□
`tls_key_path`	□□□	□□ `enable_tls`	`priv/cert/omnitouch.pem`	TLS □□□ □□□

TLS/SSL □□

□ **TLS** □□□□□□□□□□□

```
config :api_ex,
  api: %{
    port: 8443,
    listen_ip: "0.0.0.0",
    enable_tls: true,
    tls_cert_path: "priv/cert/omnitouch.crt",
    tls_key_path: "priv/cert/omnitouch.pem"
  }
```

□□ **TLS** □□□□□□□

```
config :api_ex,
  api: %{
    port: 8080,
    listen_ip: "127.0.0.1",
    enable_tls: false
  }
```

API □□□□

□□□□□□□□□□□□□□

```
# □□□□□□□
mkdir -p priv/cert

# □□□□□
openssl genrsa -out priv/cert/server.key 2048

# □□□□□□□□□
openssl req -new -key priv/cert/server.key -out
priv/cert/server.csr \
  -subj "/C=US/ST=State/L=City/O=Organization/CN=sms-
api.example.com"

# □□□□□□□□□□□□ 365 □□
openssl x509 -req -days 365 -in priv/cert/server.csr \
  -signkey priv/cert/server.key -out priv/cert/server.crt

# □□□□□
chmod 600 priv/cert/server.key
chmod 644 priv/cert/server.crt
```

□□□□□□□□□□□□□□ CA□Let's Encrypt□□□ CA □□□□□□□□□

API □□□□

IP □□□□□□□□□□□

```
# □□ iptables□Linux□
iptables -A INPUT -p tcp --dport 8443 -s 10.0.0.0/8 -j ACCEPT
iptables -A INPUT -p tcp --dport 8443 -j DROP

# □□ firewalld□Red Hat/CentOS□
firewall-cmd --permanent --add-rich-rule='rule family="ipv4"
source address="10.0.0.0/8" port protocol="tcp" port="8443"
accept'
firewall-cmd --reload
```

API □□□□□□□□□□□□

□□□□□□□□□□□□□□□ - □□□□□□□□□□□□□□□□□

Web UI □□

Web □□□□□□□□□□□□□□□□□□□

□□ Web UI □□

```
# config/runtime.exs
config :control_panel, ControlPanelWeb.Endpoint,
  https: [
    port: 443,
    keyfile: "priv/cert/omnitouch.pem",
    certfile: "priv/cert/omnitouch.crt"
  ]
```

Web UI □□□ Phoenix □□□TLS □□□□□ `https:` □□□□□□□□□□□□ `tls_cert_path`/`tls_key_path`□□□□□ `config/config.exs` □□ `force_ssl` □□□□ HTTPS□

□□	□□	□□	□□	□□
`port`	□□	□	`443`	□□��□□ HTTPS □□□
`keyfile`	□□□	□	`priv/cert/omnitouch.pem`	TLS □□□□□□
`certfile`	□□□	□	`priv/cert/omnitouch.crt`	TLS □□□□□□

□□ Web UI □□

```
config :control_panel, ControlPanelWeb.Endpoint,
  url: [host: "sms-admin.example.com", path: "/"],
  https: [
    port: 443,
    keyfile: "priv/cert/web.pem",
    certfile: "priv/cert/web.crt"
  ]
```

□□□□□□□□□□

□□ Nginx □ Apache □□□□□□□□□□□□□□□□□□

Nginx □□□□□

```
upstream sms_web {
  server 127.0.0.1:4000;
  keepalive 32;
}

server {
  listen 80;
  server_name sms-admin.example.com;
  return 301 https://$server_name$request_uri;
}

server {
  listen 443 ssl http2;
  server_name sms-admin.example.com;

  ssl_certificate /etc/letsencrypt/live/sms-
admin.example.com/fullchain.pem;
  ssl_certificate_key /etc/letsencrypt/live/sms-
admin.example.com/privkey.pem;
  ssl_protocols TLSv1.2 TLSv1.3;
  ssl_ciphers HIGH:!aNULL:!MD5;

  # □□□□□□□□□□
  auth_basic "SMS-C Admin";
  auth_basic_user_file /etc/nginx/.htpasswd;

  location / {
    proxy_pass http://sms_web;
    proxy_http_version 1.1;
    proxy_set_header Upgrade $http_upgrade;
    proxy_set_header Connection "upgrade";
    proxy_set_header Host $host;
    proxy_set_header X-Real-IP $remote_addr;
    proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
    proxy_set_header X-Forwarded-Proto $scheme;
  }

  # □□ WebSocket □□□ LiveView
  location /live {
    proxy_pass http://sms_web;
    proxy_http_version 1.1;
    proxy_set_header Upgrade $http_upgrade;
    proxy_set_header Connection "upgrade";
```

```
    proxy_read_timeout 86400;
  }
}
```

□□□□

OmniMessage □□□□ HTTP □□□□□□□□□□□□□□□□□□□□ DNS SRV □□□□□□□□□□□□□□□□□□ HTTPS □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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□□□□

```
# config/runtime.exs
config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "_smsc._tcp.smsc.example.com"
```

□□□□□□

□□	□□	□□	□□
`enabled`	□□	`false`	□□□□□□□□
`dns_srv_domain`	□□□	`""`	□□□□□□□□ DNS SRV □□
`dns_poll_interval_ms`	□□	`30000`	DNS □□□□□□□□
`health_check_interval_ms`	□□	`10000`	□□□□□□□□□□
`registry_sync_interval_ms`	□□	`15000`	□□□□□□□□□□
`forward_retry_interval_ms`	□□	`5000`	□□□□□□□□□□
`forward_max_retries`	□□	`50`	□□□□□□□□□□□□□□□□□□
`http_timeout_ms`	□□	`5000`	□□□□ HTTP □□□□□□
`api_port`	□□	`8443`	□□□□□□ URL □ API □□□
`static_peers`	□□	`[]`	□□□□□□□□□□ DNS SRV□□

□□□□

□□□□□□□□□□□□□□□□ **8443**□HTTPS□□□□□□□□Erlang □□□□□□□□ 4369 + 9100-9200□

```
# □□□□□□□□□□□□□□□□
iptables -A INPUT -p tcp -s 10.0.1.0/24 --dport 8443 -j ACCEPT
iptables -A INPUT -p tcp -s 10.0.2.0/24 --dport 8443 -j ACCEPT
```

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```
# config/runtime.exs
config :sms_c,
  dead_letter_time_minutes: 1440  # 24 □□
```

□□□□

- **60** - 1 □□□□□/□□□
- **1440** - 24 □□□□□□□□
- **4320** - 3 □□□□□□□
- **10080** - 7 □□□□□□□

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```
□□□□ = 2^(□□□□) □□
```

□□	□□
1	2 □□
2	4 □□
3	8 □□
4	16 □□
5	32 □□
6	64 □□
7	128 □□
8	256 □□

□□□□□□□□□□□□□□ `dead_letter_time_minutes` □□□

□□□□

```
# config/config.exs
config :sms_c,
  cleanup_interval_minutes: 10,
  fingerprint_ttl_minutes: 5,
  event_ttl_days: 7
```

□□□□□

- **cleanup_interval_minutes**□□□□□□□□□□□□□□□□□10□
- **fingerprint_ttl_minutes**□□□□□□□□□□□□5□
- **event_ttl_days**□□□□□□□□□□□□7□

□□□□

□□□□□□□ **Diameter Ro** □□□□□□□□□□□RFC 4006□□□□□□□□□□□□□□□SMS-C □ OCS □□□□□□ □□□□□□□□□□□`CC-Request-Type 4`□□□□□□□□ □□□□OCS □□□□□□□□□□□□□□□□□□□□□□□□□□ Diameter □□□□□□□□□□ Diameter Sh□ - `:ro` □□□□□□□□□□

□□□□

```
# config/runtime.exs
config :sms_c,
  default_charging_enabled: true

config :sms_c, :charging,
  # □□□□□□□□□□□□□□□□□□
  #   :reject     - □□□□□□□□ :balance_rejected □□□□
  #   :auto_reply - □□□ SMS out_of_balance_reply_text □□□□□□□
  out_of_balance_action: :reject,
  out_of_balance_reply_text: "□□□□□□□□□□□□□□□□□□□□",
  # □ OCS □□□□ Diameter □□□□□□□□□□□□□
  # □□□□□□□□□□□□□□□□□□
  #   :allow  - □□□□□□□□□□□□□□□□
  #   :reject - □□□□□□□□□□□□□□
  on_charging_error: :allow,
  # □□□□□□□□□□ OCS □□□□□□□□□□□□□□ CCR
  # Service-Context-Id □□□□
  rating_profile: "sms@sms-c"
```

□□□□□□□□ Diameter □□□□□□□ `:ro` □□□□□□□□□□□ IETF □□□□□□□ 0□□

```
config :sms_c,
  diameter_enabled: true

config :diameter_ex,
  diameter: %{
    service_name: :omnimessage,
    host: "smsc01",
    realm: "epc.mnc001.mcc001.3gppnetwork.org",
    # ... □□□ Diameter Sh □□□□□□□□□□/□□ ...
    applications: [
      %{
        application_name: :ro,
        application_dictionary: :diameter_gen_3gpp_ro,
        vendor_specific_application_ids: [
          %{vendor_id: 0, auth_application_id: 4,
acct_application_id: nil}
        ]
      }
    ]
  }
```

□□□□□□

□□□□□ `charged` □□□□□□□□□□□□□□□□□

`charged`	□□
`:yes`	□□□□ OCS □□□□□□
`:no`	□□□□
`:default`	□□ `default_charging_enabled`

□□□□

```
config :sms_c,
  default_charging_enabled: false
```

□□□□□□□□□□default □□□□□□□□ OCS □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ charged: :yes□

□□□□□□□□□

config :sms_c, :charging □□□□□□ - □□□□□□□□□□□□□□□□□out_of_balance_action: :reject□□□□□□□□□□□□ rating_profile: "sms@sms-c"□□□□ default_charging_enabled □□□□□ false□

□□□□□□□□□□ □□□□□□on_charging_error: :allow□□□□□□□ HTTP □□□□□□□□□□□□□□□□□□□□

```
# □□□□□□□□□ HSS dip
config :sms_c,
  diameter_enabled: true

# Diameter □□□□
config :diameter_ex,
  diameter: %{
    service_name: :omnimessage,
    listen_ip: "0.0.0.0",
    listen_port: 3868,
    decode_format: :map,
    host: "smsc01",
    realm: "epc.mnc001.mcc001.3gppnetwork.org",
    product_name: "OmniMessage",
    request_timeout: 5000,
    control_module: SmsC.Diameter.Control,
    processor_module: DiameterEx.Processor,
    vendor_id: 10415,
    supported_vendor_ids: [10415],
    applications: [
      %{
        application_name: :sh,
        application_dictionary: :diameter_gen_3gpp_sh,
        vendor_specific_application_ids: [
          %{vendor_id: 10415, auth_application_id: 16_777_217,
acct_application_id: nil}
        ]
      }
    ],
    peers: [
      %{
        host: "dra01.epc.mnc001.mcc001.3gppnetwork.org",
        ip: "10.0.0.1",
        port: 3868,
        realm: "epc.mnc001.mcc001.3gppnetwork.org",
        tls: false,
        transport: :diameter_tcp,
        initiate_connection: true
      }
    ]
  }
```

□□	□□	□□	□□	□□
`diameter_enabled`	□□	□	`false`	□□□□□□□□□ HSS □□□ dip□□□□□ `:on_net`/`:off_net` □□□□□□□□ □ `false` □□□□□□□□□□
`hss_cache_ttl_seconds`	□□	□	`7200`	□□ HSS □□□□□ TTL□□□
`mock_sh`	□□	□	`false`	□□□□ HSS □□□□□□□□□□ Diameter □□□
`mock_sh_on_net_numbers`	□□	□	`[]`	□□□□□□□□□□ MSISDN

□□□□□ Diameter □□□□□□□□□□

□□□□ DNS □□ ENUM

```
config :sms_c,
  enum_enabled: true,
  enum_domains: ["e164.arpa", "e164.org"],
  enum_dns_servers: [],  # □□□□□□ DNS
  enum_timeout: 5000  # 5 □
```

□□□□ DNS □□□□□ ENUM

```
config :sms_c,
  enum_enabled: true,
  enum_domains: ["e164.internal.example.com", "e164.arpa"],
  enum_dns_servers: [
    {"10.0.1.53", 53},  # □□ DNS □□□
    {"8.8.8.8", 53},    # Google □□ DNS□□□□□
    {"1.1.1.1", 53}     # Cloudflare DNS□□□□
  ],
  enum_timeout: 3000  # 3 □□□□□□□□□□
```

ENUM □□□□

□□□□□□□□□□□□□□□□

```
config :sms_c,
  enum_domains: [
    "e164.internal.example.com",  # □□□□□□
    "e164.carrier.net",            # □□□□□□
    "e164.arpa"                    # □□□□□□□
  ]
```

ENUM □□□□

□□□□□□□□

```
enum_timeout: 2000  # 2 □
```

□□□□□/□□□□□

```
enum_timeout: 10000  # 10 □
```

ENUM DNS □□□□

□□□□ **ENUM** □□□BIND9 □□□□

```
; e164.internal.example.com □□□□□
$ORIGIN e164.internal.example.com.
$TTL 300

; □□□ +1-555-0100 □□ 0.0.1.0.5.5.5.1.e164.internal.example.com
0.0.1.0.5.5.5.1.e164.internal.example.com. IN NAPTR 100 10 "u"
"E2U+sip" "!^.*$!sip:15550100@voip-gateway.example.com!" .
0.0.1.0.5.5.5.1.e164.internal.example.com. IN NAPTR 100 20 "u"
"E2U+pstn" "!^.*$!pstn:gateway-a.example.com!" .

; □□□ +1-555-0200
0.0.2.0.5.5.5.1.e164.internal.example.com. IN NAPTR 100 10 "u"
"E2U+sip" "!^.*$!sip:15550200@voip-gateway.example.com!" .
```

□□ **ENUM** □□□

```
# □□ ENUM □
dig @10.0.1.53 NAPTR 0.0.1.0.5.5.5.1.e164.internal.example.com

# □□□□□□ NAPTR □□□
# 0.0.1.0.5.5.5.1.e164.internal.example.com. 300 IN NAPTR 100 10
"u" "E2U+sip" "!^.*$!sip:15550100@voip-gateway.example.com!" .
```

□□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□□□□□

```
# config/runtime.exs
config :sms_c,
  translation_rules: []
```

□□□□□□□□□

□□□□□□□□□□□□□□

```
config :sms_c,
  translation_rules: [
    %{
      calling_prefix: nil,
      called_prefix: "",
      source_smsc: nil,
      calling_match: "^(\d{10})$",           # □□ 10 □□□
      calling_replace: "+1\1",                # □□ +1
      called_match: "^(\d{10})$",
      called_replace: "+1\1",
      priority: 100,
      description: "□ 10 □□□□□□□ +1",
      enabled: true
    }
  ]
```

□□□□□□□□

```
%{
  calling_prefix: nil,
  called_prefix: nil,
  source_smsc: nil,
  calling_match: "^00(\d+)$",                # □□ 00 □□
  calling_replace: "+\1",                    # □□□ +
  called_match: "^00(\d+)$",
  called_replace: "+\1",
  priority: 10,
  description: "□ 00 □□□□□□□ +",
  enabled: true
}
```

□□□□□□□

```
%{
  calling_prefix: nil,
  called_prefix: nil,
  source_smsc: nil,
  calling_match: "^\+?1?[\s\-\.\(\)]*(\d{3})[\s\-\.\)\(]*(\d{3})
[\s\-\.\(\)]*(\d{4})$",
  calling_replace: "+1\1\2\3",
  called_match: "^\+?1?[\s\-\.\(\)]*(\d{3})[\s\-\.\)\(]*(\d{3})
[\s\-\.\(\)]*(\d{4})$",
  called_replace: "+1\1\2\3",
  priority: 50,
  description: "□□□□□□□□□□□□□□",
  enabled: true
}
```

□□□□□□□

□□□□□□□

```
%{
  calling_prefix: nil,
  called_prefix: "101",                          # □□□□ 101 □□
  source_smsc: "carrier_a",                      # □□□□□□□□
  calling_match: nil,                            # □□□□□□
  calling_replace: nil,
  called_match: "^101(\d+)$",                   # □□ 101 □□□□
  called_replace: "\1",
  priority: 5,
  description: "□□□□□□□□□□□□□□□□□□□□",
  enabled: true
}
```

□□□□□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
config :sms_c,
  translation_rules: [
    # □□□ 1□□□□□□□□□
    %{
      calling_prefix: "1555",
      called_prefix: nil,
      source_smsc: nil,
      calling_match: "^(1555\d{7})$",
      calling_replace: "+\1",
      called_match: nil,
      called_replace: nil,
      priority: 1,
      description: "□□□□□□□",
      enabled: true
    },

    # □□□ 50□□□□□
    %{
      calling_prefix: nil,
      called_prefix: nil,
      source_smsc: nil,
      calling_match: "^(\d{10})$",
      calling_replace: "+1\1",
      called_match: "^(\d{10})$",
      called_replace: "+1\1",
      priority: 50,
      description: "□□ 10 □□□□□□",
      enabled: true
    }
  ]
```

□□□□ (X1/X2/X3)

OmniMessage □□□□□□□□□□ (POI)□OmniMessage □□□ ETSI TS 103 221 □□□□□□ OmniMessage □□□□□□ (NE) □□□□□□□□□ (LEMF) □□ X1 □□□□□□□□□□□□□□□□□□□□□□ OmniMessage □□□□□□ 3GPP TS 33.128 xIRI □□□□□□□OmniMessage □□ X2 □□□□□□□ LEMF□

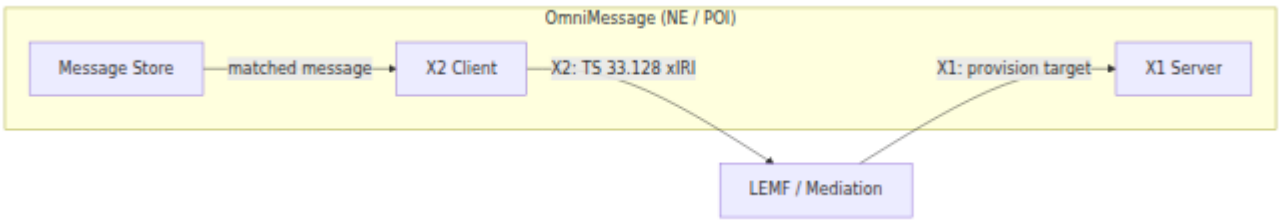
□□□□

□□	□□	**OmniMessage** □□	□□	□□
X1	□□□□□□□□□□□□□□	□□□	HTTPS □□ □ TLS	□
X2	□□□□□□□□□□□□□□□□ SMS □ □ TS 33.128 xIRI□	□□□	TCP□□□ TLS	□
X3	□□□□□□□□□□	□□□	TCP	□□SMS □□ □□□□□

□□□□□

□□	□□
ETSI TS 103 221-1	□□□□□□ X1□□□□
ETSI TS 103 221-2	□□□□□□ X2/X3□□□□
3GPP TS 33.128	□□□□□□□□□□

□□



□□

□ `config :sms_c, :li` □□□□□□□□□□□□ `config/runtime.exs` □□□□□□□□□□□□□□□□□□ □□□□□□ `enabled: true` □□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
config :sms_c, :li,
  enabled: true,
  ne_identifier: "smsc-poi-01",
  x1: [
    enabled: true,
    port: 8443,
    tls: [
      certfile: "/etc/omnimessage/li/x1-cert.pem",
      keyfile: "/etc/omnimessage/li/x1-key.pem",
      cacertfile: "/etc/omnimessage/li/lemf-ca.pem"
    ]
  ],
  x2: [enabled: true, address: "192.0.2.10", port: 12345, tls:
false]
```

□□□□

□□	□□	□□	□□	□□
`enabled`	□□	□	`false`	□□□□□□ `false` □□□□□□□□□□□□□□
`ne_identifier`	□□□	□	`"smsc-01"`	□□□□□□□□TS 103 221-2 □□ 18□□ OmniMessage □□□ X2 □□□□□□□□ LEMF □□□□□□□□□□□□□□□ IP □□□
`x1`	□□□□□	□	`[]`	X1 □□□□□□□□□ X1 □□□
`x2`	□□□□□	□	`[]`	X2 □□□□□□□□□ X2 □□□
`x3`	□□□□□	□	`[]`	□□□□□□□□□□□OmniMessage □□□ X3□ □□□□□ `[enabled: false]`□

X1 □□

OmniMessage □□ X1 □□□□LEMF □□□□□□□□□□□□□TLS □□□□□□□TS 103 221-1 □□ 7.2.2.1□□□□□□□□ `allow_insecure: true`□□□□□□□□□□□□□□□□□□□

□□	□□	□□	□□	□□
`enabled`	□□	□	`false`	□□ X1 □□□□
`port`	□□	□	`8443`	X1 □□□□ TCP □□□
`tls`	□□□□	□	-	X1 □□□□ TLS □□□□□□ X1 TLS □□□
`allow_insecure`	□□	□	`false`	□□□□ HTTP □□ X1 □□□□□□□□□□□□□□□□□□□□

□□	□□	□□	□□	□□
`enabled`	□□	□	`false`	□□ X2 □□□□
`address`	□□□	□	-	LEMF X2 □□□ IP □□□□□□□
`port`	□□	□	-	LEMF X2 □□□ TCP □□□
`tls`	□□□□□□□□□	□	`false`	□□□ `true` □ TLS □□□□□□□□□□□□□ TLS □□ X2□□□□ `false` □□□□□ TCP□

□□□

OmniMessage □□□□□□□□□□□□□

□□□□□□□

```
# config/runtime.exs
config :sms_c,
  sms_routes: [
    # □□□□□□
    %{
      calling_regex: nil,
      called_regex: ~r/^\+1/,
      source_smsc: nil,
      dest_smsc: "north_america_gateway",
      source_type: nil,
      enum_domain: nil,
      enum_result_domain: nil,
      action: :route,
      auto_reply_message: nil,
      charged: :default,
      originating_network: :any,
      terminating_network: :any,
      weight: 100,
      priority: 50,
      description: "□□□□",
      enabled: true
    },

    # □□□□□□□□
    %{
      calling_regex: nil,
      called_regex: ~r/^\+44/,
      source_smsc: nil,
      dest_smsc: "uk_gateway_1",
      source_type: nil,
      enum_domain: nil,
      enum_result_domain: nil,
      action: :route,
      auto_reply_message: nil,
      charged: :default,
      originating_network: :any,
      terminating_network: :any,
      weight: 70,
      priority: 50,
      description: "□□□□□□70%□",
      enabled: true
```

```
    },
    %{
      calling_regex: nil,
      called_regex: ~r/^\+44/,
      source_smsc: nil,
      dest_smsc: "uk_gateway_2",
      source_type: nil,
      enum_domain: nil,
      enum_result_domain: nil,
      action: :route,
      auto_reply_message: nil,
      charged: :default,
      originating_network: :any,
      terminating_network: :any,
      weight: 30,
      priority: 50,
      description: "□□□□□□□□30%□",
      enabled: true
    },

    # □□□□□ - □ SMPP □□□□□□□□□□□□
    %{
      calling_regex: nil,
      called_regex: nil,
      source_smsc: "carrier_smpp_bind",
      dest_smsc: "local_msc",
      source_type: :smpp,
      enum_domain: nil,
      enum_result_domain: nil,
      action: :route,
      auto_reply_message: nil,
      charged: :default,
      originating_network: :any,
      terminating_network: :on_net,
      weight: 100,
      priority: 50,
      description: "□□□□ X - □□□□□□□□",
      enabled: true
    }
  ]
```

��□□□□□□□

```
# □□□□□□□□□□□□□□ Web UI □□□
config :sms_c,
  sms_routes: []
```

□□□

□□□□□□

□□□□□□□□

```
# config/config.exs
config :sms_c,
  batch_insert_batch_size: 100,           # □□□□□□
  batch_insert_flush_interval_ms: 100     # □□□□□□□□□□□□
```

□□□□□□□□

□□□□	□□□□	□□	□□□	□□
□□□	200	200ms	~5,000 msg/sec	□□ 200ms
□□	100	100ms	~4,500 msg/sec	□□ 100ms
□□□	50	20ms	~3,000 msg/sec	□□ 20ms
□□	10	10ms	~1,500 msg/sec	□□ 10ms

□□□□

□□□□

```
# config/config.exs
config :logger, :console,
  level: :info,  # :debug, :info, :warning, :error
  format: "$time $metadata[$level] $message\n",
  metadata: [:request_id, :message_id, :route_id]
```

□□□□□ `:info` □ `:warning` □□□□□ `:debug`

□□□□□□

□□□□□□□□□□

```
config :logger,
  backends: [:console]
```

□□□□□□□□□□

```
config :logger,
  backends: [:console, {LoggerFileBackend, :file_log}]

config :logger, :file_log,
  path: "/var/log/sms_c/application.log",
  level: :info,
  format: "$time $metadata[$level] $message\n",
  metadata: [:request_id, :message_id]
```

□□□□

□□ **logrotate**□Linux□□

```
# /etc/logrotate.d/sms_c
/var/log/sms_c/*.log {
    daily
    rotate 30
    compress
    delaycompress
    notifempty
    create 0644 sms_user sms_group
    sharedscripts
    postrotate
        # □□□□□□□□□□□□□□□□
        systemctl reload omnimessage
    endscript
}
```

□□□□□□

□□□□□□

□□□□□□□□□□□□5,000+ □□/□□□

```
# □□□
config :sms_c, SmsC.Repo,
  pool_size: 50

# □□□□□
config :sms_c,
  batch_insert_batch_size: 200,
  batch_insert_flush_interval_ms: 200

# □□□□
config :sms_c,
  dead_letter_time_minutes: 1440  # 24 □□

# □□□□□□□□□□
config :sms_c,
  default_charging_enabled: false

# □□□□□□□□□
config :sms_c,
  cleanup_interval_minutes: 30
```

□□□□□□□□

□□□□□□□□□□< 20ms□□

```
# □□□
config :sms_c, SmsC.Repo,
  pool_size: 20

# □□□□□□□□□□□□
config :sms_c,
  batch_insert_batch_size: 20,
  batch_insert_flush_interval_ms: 10

# □□□□
config :sms_c,
  dead_letter_time_minutes: 4320  # 3 □

# □□□□□□ - □□ Diameter Ro □□□□□□
# □□□□□□□□□□□□ :charging + :diameter_ex □□
config :sms_c,
  default_charging_enabled: true
```

□□□□□□□□

□□□□□□□□□

```
# □□ 1 □□
export DB_NAME=sms_c_tenant1
export NODE_NAME=sms_tenant1@node1.example.com
# □□□□□ OCS □□□□ :charging rating_profile □□□□

# □□ 2 □□
export DB_NAME=sms_c_tenant2
export NODE_NAME=sms_tenant2@node1.example.com
```

□□□□

□□□□□□

```
# □□□□□□□
config :sms_c,
  cluster_nodes: [
    :"sms@us-east-1a.example.com",
    :"sms@us-east-1b.example.com",
    :"sms@us-west-1a.example.com"  # □□□□□ DR
  ],
  smsc_node_name: "us-east-1a"
```

□□□□

□□□□□□□□□□□□

```
# □□□□□□□
mix compile

# □□□□□□□□
mix ecto.create
mix ecto.migrate

# □□ Diameter Ro □ OCS □□□□□□□□□□□□□□□□□□□□□□□□□□□□
#   :diameter.service_info(:omnimessage, :connections)

# □□□□□□□□□□□□
iex -S mix phx.server
```

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`DB_USERNAME`	□□□□□□□	`sms_prod_user`
`DB_PASSWORD`	□□□□□□	`strong_password`
`DB_HOSTNAME`	□□□□□□	`db.internal.example.com`
`DB_PORT`	□□□□□□	`3306`
`DB_NAME`	□□□□□□	`sms_c_production`
`DB_POOL_SIZE`	□□□□□□	`30`
`API_PORT`	API □□□□	`8443`
`API_LISTEN_IP`	API □□ IP	`0.0.0.0`
`WEB_PORT`	Web UI □□	`443`
`NODE_NAME`	Erlang □□□□	`sms@node1.example.com`
`ERLANG_COOKIE`	□□□□	`shared_cookie_value`

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2. □□□□□□□□□□□□□ □□□□□□□□
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API □□□□	□□/IP □□□□	□□ API_PORT □ listen_ip
□□□□□□□□□	Cookie □□□□□□□□	□□ ERLANG_COOKIE□□□□□ 4369, 9100-9200
□□□□	OCS/DRA □□□□	□□ Diameter Ro □□□□□□□□□□
ENUM □□□□	DNS □□□□□□□	□□ DNS □□□□□□□
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□□□□□	□□□□□	□□ sms_routes □□□ Web UI

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□□□□□□□Mnesia□

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□□□□□ Mnesia □□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
config :sms_c,
  # □ Mnesia □□□□□□□□□□□□□□□
  # □□□□□□□□□□□□ 24□□□□ runtime.exs □□□ 168□7 □□□
  message_retention_hours: 168,

  # □□□□□□□□□□□□□□□
  retention_check_interval_minutes: 60
```

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- □□□□□ 24-72 □□□□□□□□□□□□□□□
- □□□□□ 4-8 □□□□□□□□□□□□□□□□
- □□□□ 12-24 □□□□□□□□□

□□□□□

- □□□□□~1KB
- 10,000 □□□~10MB
- 100,000 □□□~100MB

CDR□□□□□□□□□□

□□□□□□□□□□□□CDR □□□□□□□□□ Ecto □□□□□□□□□□□□□□□□□□

```
config :sms_c,
  # □□/□□ CDR □□□□□□□□□false□
  cdr_enabled: true
```

CDR □□□□□

- □□ ID□□□/□□□□□
- □/□□□ SMSC
- □/□□□□□□□□□□□
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- □□□□□□□□□ CDR
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```
config :sms_c,
  # □□□□□□□ Mnesia □□□□□□□
  delete_message_body_after_delivery: false,

  # □ Web UI □□□□□□□
  hide_message_body_in_ui: false,

  # □ CSV □□□□□□□□□
  hide_message_body_in_export: false
```

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□□	□□
`delete_message_body_after_delivery: true`	□□ Mnesia □□□□□□□□
`hide_message_body_in_ui: true`	□□□□□□□□□□□□
`hide_message_body_in_export: true`	□□□□□□□□□□□□

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```
config :sms_c,
  delete_message_body_after_delivery: true,
  hide_message_body_in_ui: true,
  hide_message_body_in_export: true,
  cdr_enabled: true  # □□□□□□□□ CDR
```

□□□□□□□□□□

```
config :sms_c,
  delete_message_body_after_delivery: false,
  hide_message_body_in_ui: false,
  hide_message_body_in_export: false,
  cdr_enabled: true
```

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```
[info] □□□□□□Mnesia□□□□□24h□
[info] CDR □□□□□□□□
[info] □□□□□□□□□□□□□□□□
[info] OCS □□□□□□□□□url: http://..., tenant: ...□
```

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OmniMessage □□ □□ **HTTP** □□□ □ □□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ - □□□□ □□□□□□□□□□□□□□□□□□□□□□□□ DNS SRV □□□□□□□□□□□□□□□□□□ HTTPS □□□□□□□□□□□□□□

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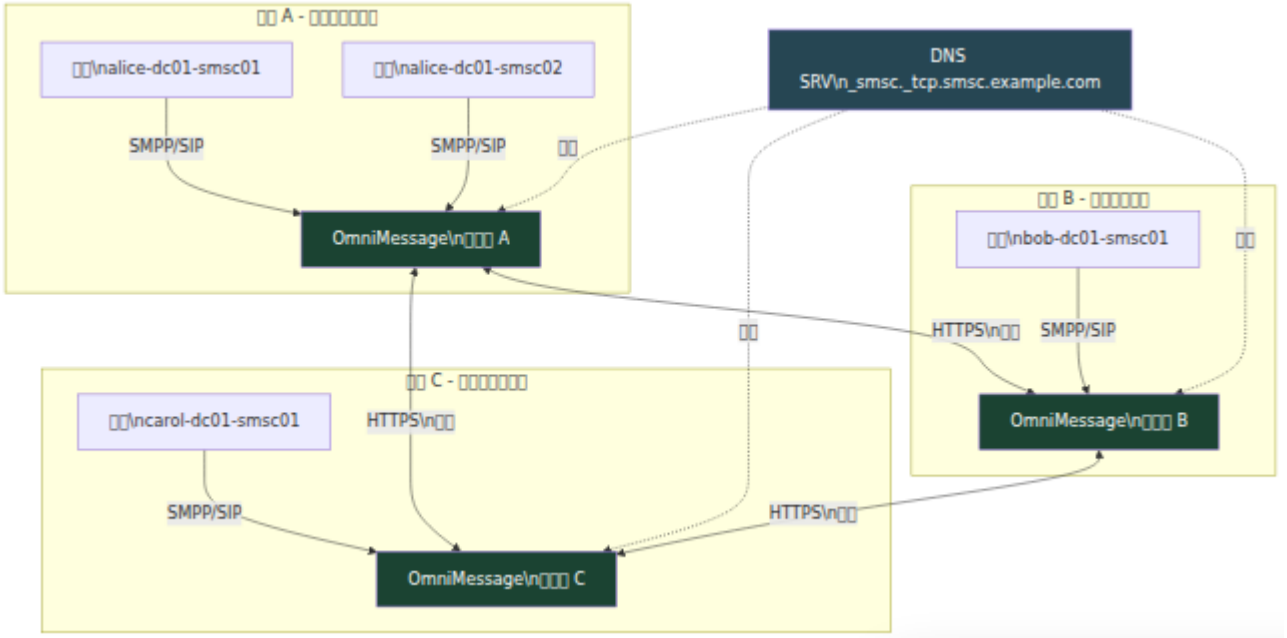
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□□\nalice-dc01-smsc01
□□\nalice-dc01-smsc02
SMPP/SIP
SMPP/SIP
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OmniMessage\n□□□ A
DNS
SRV\n_smsc._tcp.smsc.example.com
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□□\nbob-dc01-smsc01
□□
HTTPS\n□□
SMPP/SIP
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□□ C - □□□□□□□□
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HTTPS\n□□
SMPP/SIP
HTTPS\n□□
OmniMessage\n□□□ B
OmniMessage\n□□□ C

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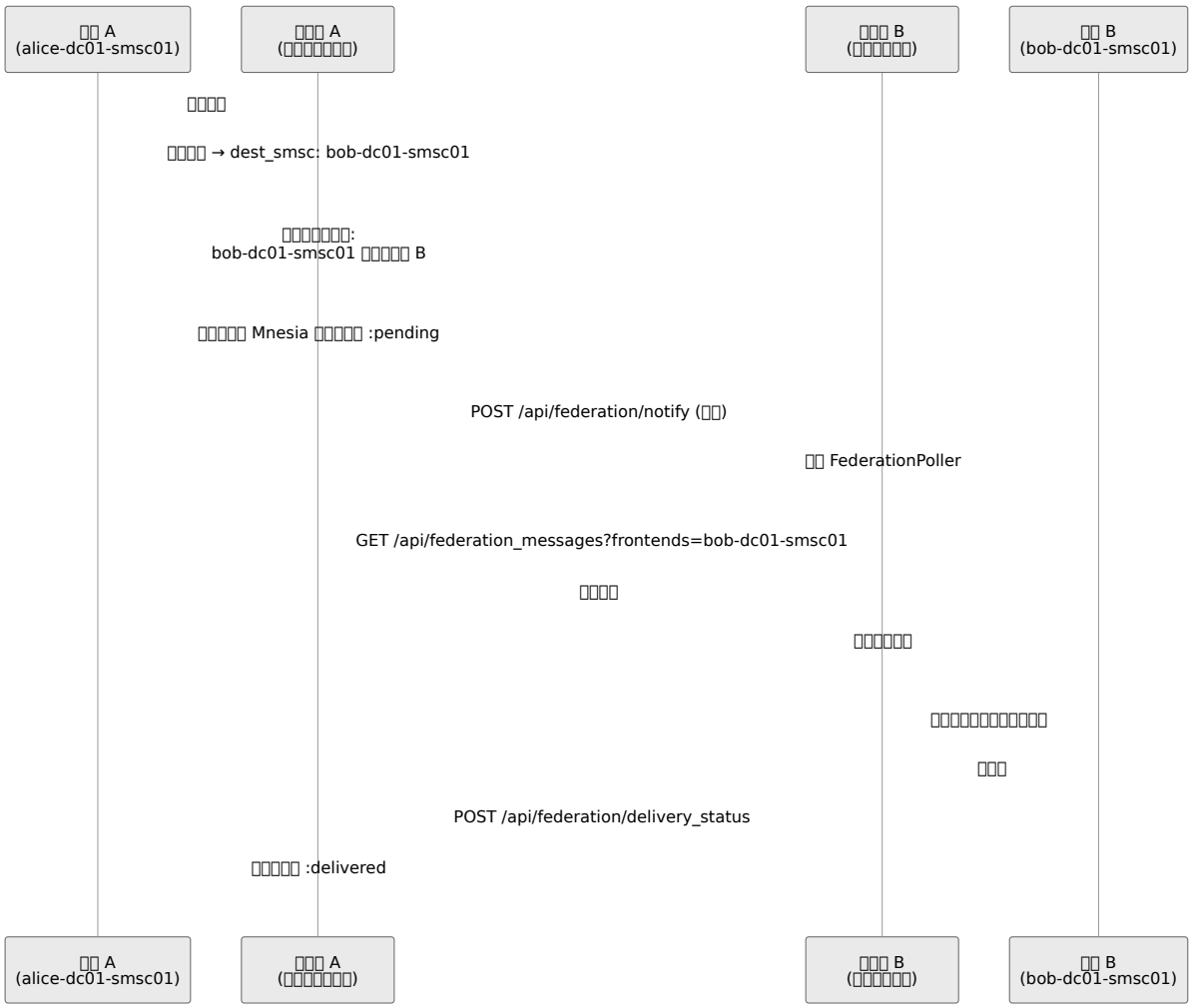

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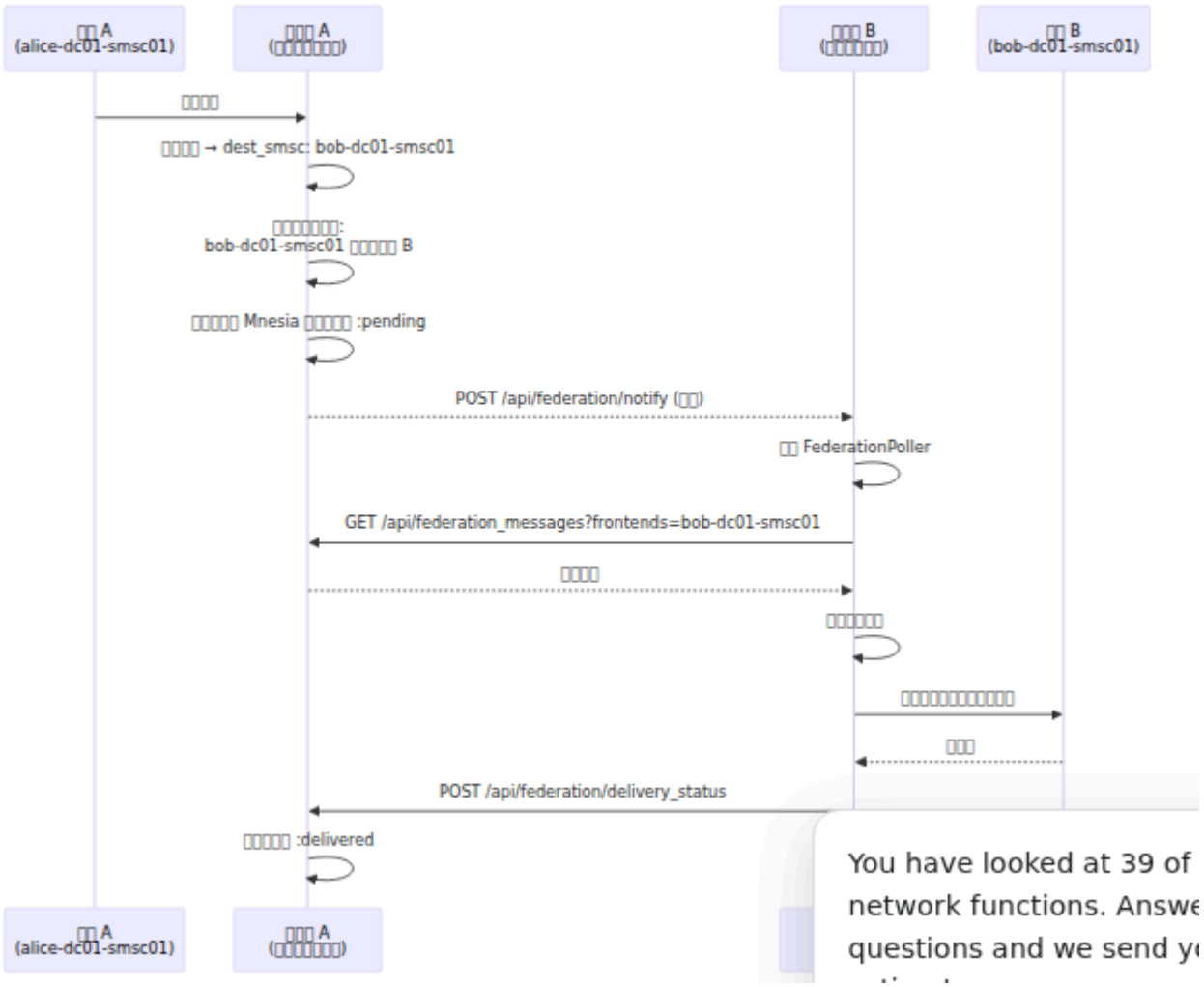
□□□ `:pending` □□□□□□□□□□□□□□□□□□ FederationPoller □□□□□□□□□□□□□□□□□□□□□□□□□□□ 5 □□□□□□□□□□□□□□□□□


POST /api/federation/notify
FederationPoller
GET /api/federation_messages?frontends=bob-dc01-smsc01
POST /api/federation/delivery_status
:pending
:delivered
You have looked at 39 of
network functions. Answe
questions and we send y

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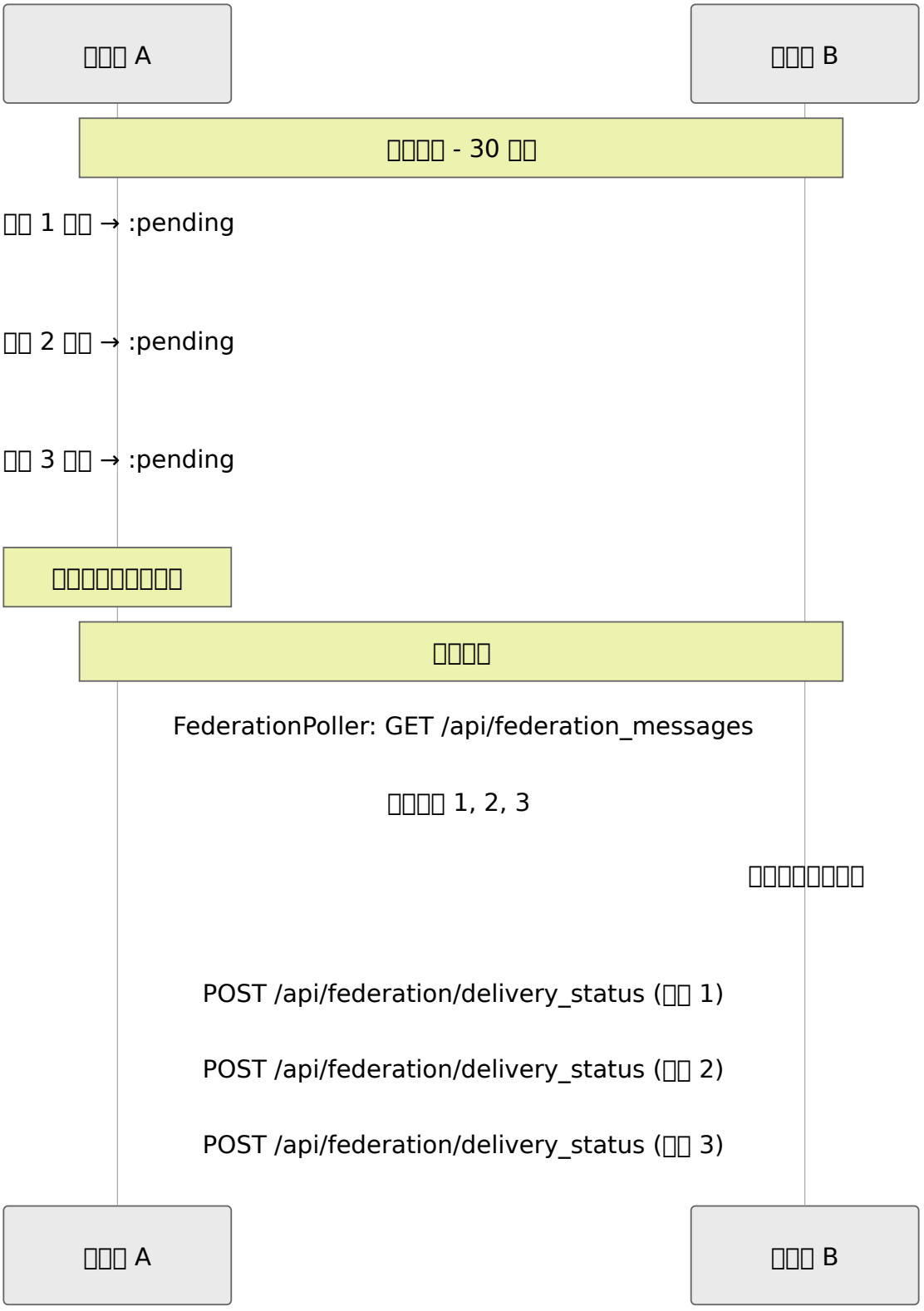
□□□ A
□□□ B
□□□□ - 30 □□
□□ 1 □□ → :pending
□□ 2 □□ → :pending
□□ 3 □□ → :pending
□□□□□□□□□□
□□□□
FederationPoller: GET /api/federation_messages
□□□□ 1, 2, 3
□□□□□□□□□
POST /api/federation/delivery_status (□□ 1)
POST /api/federation/delivery_status (□□ 2)
POST /api/federation/delivery_status (□□ 3)
□□□ A
□□□ B

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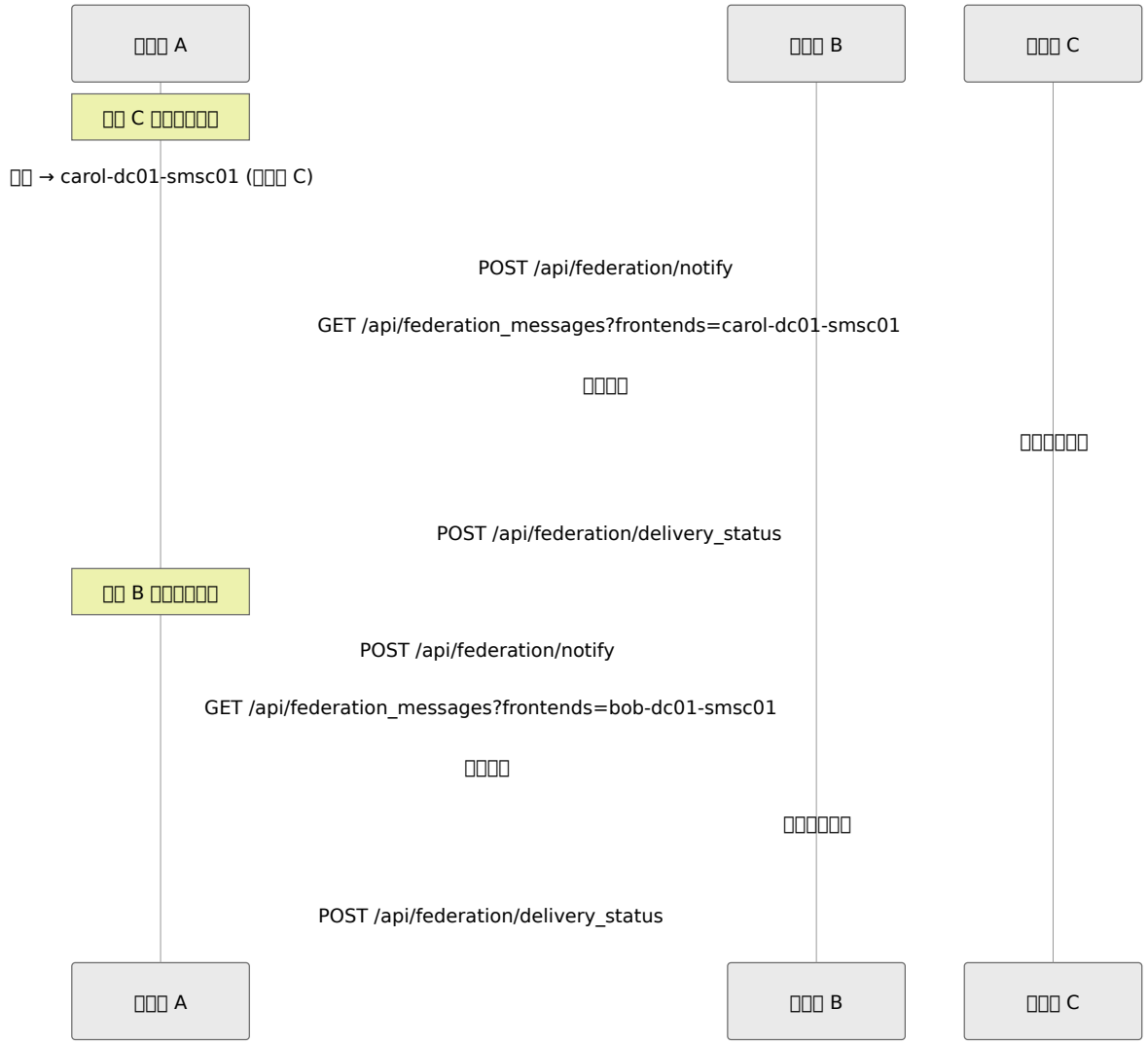

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□ 10 □□□□□□□□□□□□□□□□□□□□□□□□□□□□ `POST /api/federation/health`□□□□□□□□□ - □□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ 3 □□□□□□□□ □□□□

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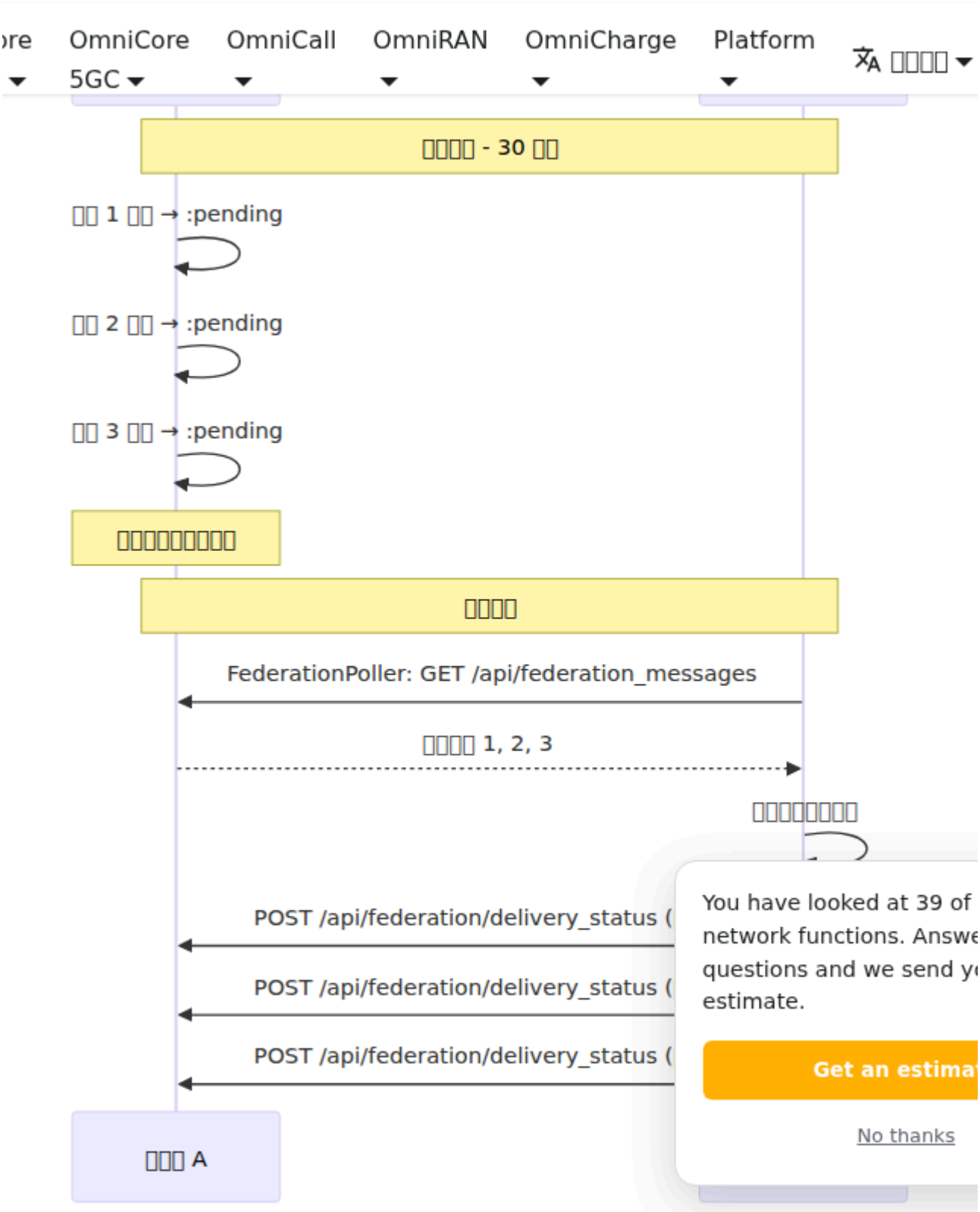
□ 15 □□□□□□□□□□□□□□□□□□□□□□□□□□□□ `POST /api/federation/registry`□□□□□□□□□□ - □□□


ore
OmniCore 5GC
OmniCall
OmniRAN
OmniCharge
Platform
□□□□□ - 30 □□
□□ 1 □□ → :pending
□□ 2 □□ → :pending
□□ 3 □□ → :pending
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FederationPoller: GET /api/federation_messages
□□□□ 1, 2, 3
□□□□□□□□□
POST /api/federation/delivery_status (
POST /api/federation/delivery_status (
POST /api/federation/delivery_status (
You have looked at 39 of
network functions. Answe
questions and we send y
estimate.
Get an estima
No thanks
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□□	□□□□	**FederationPoller**	□□□□
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□□	1-2 □□□	□□□	□□□
□□□	3 □□□□□	□□□	□□□

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□□□ `config/runtime.exs` □□ `:federation` □□□□□□□□□□□□□□ □□□□□□□□□□□□

□□□□□DNS SRV □□□

```
# config/runtime.exs
config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "_smsc._tcp.smsc.example.com"
```

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```
# config/runtime.exs
config :sms_c, :federation,
  # □□□ - □□ false □□□□□□□□□□
  enabled: true,

  # □□□□□□□□□ DNS SRV □□□□□□□□ static_peers□
  dns_srv_domain: "_smsc._tcp.smsc.example.com",

  # □□□□ DNS SRV □□□□□□□□□
  dns_poll_interval_ms: 30_000,

  # □□□□□□□□□□□□□□□□□□□□□□□□□□□
  health_check_interval_ms: 10_000,

  # □□□□□□□□□□□□□□□□□□□□□□□
  registry_sync_interval_ms: 15_000,

  # FederationPoller □□□□□□□□□□□□□□□□□□□□□□
  poll_interval_ms: 5_000,

  # □□□□□ API □□□ HTTP □□□□□□
  http_timeout_ms: 5_000,

  # □ DNS SRV □□□□□□□ URL □□□□ API □□
  api_port: 8443,

  # □□□□□□□ - □ dns_srv_domain □□□□□
  static_peers: []
```

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`enabled`	□□	□	`false`	□□□□□□□ `false` □□□□□□□□□□□□□□□□□□□□□□□□
`dns_srv_domain`	□□□□□	□	`""`	□□□□□□□□□□□ DNS SRV □□□□□□□□ `static_peers`□
`dns_poll_interval_ms`	□□	□	`30000`	DNS SRV □□□□□□□□□□□□□□□□□□□□

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□□□□ DNS SRV □□□□□□□□□□□□□

```
config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "",
  static_peers: [
    %{host: "10.0.1.2", port: 8443},
    %{host: "10.0.2.2", port: 8443},
    %{host: "10.0.3.2", port: 8443}
  ]
```

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`host`	□□□	□	-	□□□□□□ IP □□□□□□□
`port`	□□	□	`8443`	□□□□□□ HTTPS API □□□

DNS SRV □□□□

DNS SRV □□□□□□□□□□□□□

□□□□□□□□ DNS □□□□ SRV □□□□□□□□□□□□□□□ `dns_poll_interval_ms` □□□□□□□□□□□□□□□□□ 30 □□□

□□□□□□□ DNS □□□ SRV □□□□□□□□□□□□□□□□□

□□	□□	□□
`/api/federation/identity`	GET	□□□□□□□□□□□□□□□□□□
`/api/federation/health`	POST	□□□□□□□ - □□□□□□□□□□□□□□□□□□□□□□□□
`/api/federation/registry`	POST	□□□□□□□□□
`/api/federation/notify`	POST	□□□□□□□□□□□□□□□□□□□□□□□□
`/api/federation/delivery_status`	POST	□□□□□□□□□□□□□□□□
`/api/federation/delivery_attempt`	POST	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
`/api/federation/event`	POST	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
`/api/federation_messages`	GET	□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ FederationPoller □□□

□□□□□□□□□□ JSON□□□□□□□□□ `X-Federation-Node` □□□□□

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□□ 1□□□ DNS SRV □□□□□□□

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```
# □□ A - □□□□□□□□ (config/runtime.exs)
config :sms_c,
  smsc_node_name: "alice-dc01-smsc01"

config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "_smsc._tcp.smsc.example.com"
```

```
# □□ B - □□□□□□□ (config/runtime.exs)
config :sms_c,
  smsc_node_name: "bob-dc01-smsc01"

config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "_smsc._tcp.smsc.example.com"
```

```
# □□ C - □□□□□□□□ (config/runtime.exs)
config :sms_c,
  smsc_node_name: "carol-dc01-smsc01"

config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "_smsc._tcp.smsc.example.com"
```

□□□□□□□□□□□□□□□□□□□ SRV □□□□□□□□□□□□□□□□□□□□

```
# □□□□□□ (config/runtime.exs)
config :sms_c,
  smsc_node_name: "primary-smsc01"

config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "",
  static_peers: [
    %{host: "10.200.1.5", port: 8443}
  ]
```

```
# □□□□□□□ (config/runtime.exs)
config :sms_c,
  smsc_node_name: "secondary-smsc01"

config :sms_c, :federation,
  enabled: true,
  dns_srv_domain: "",
  static_peers: [
    %{host: "10.100.1.5", port: 8443}
  ]
```

□□□□□□□□□□□□□□□□□□□□ IP □□□□□□□□□□□□□□□□□□□□

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□□□□□□□□□□ Prometheus □ 9568 □□□□□□□□□□□□

□□: `sms_c_federation_message_received_count` □□: □□□ □□: □□□□□□□□□□□□□□□□ □□:

- `origin_node` - □□□□□□□□□

□□: `sms_c_federation_health_check_count` □□: □□□ □□: □□□□□□□□□□□□□□ □□:

- `peer` - □□□□□□□
- `result` - `ok` □ `failed`

□□□□:

```
# □□□□□□□
rate(sms_c_federation_message_received_count[5m]) * 60

# □□□□□□□□□□□□□
sum by (peer)
(rate(sms_c_federation_health_check_count{result="failed"}[5m]))
```

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□□□□	□□	□□□□
□□□□□□□□	`GET /api/federation/status` □ Web UI	□□□□□□□□□□□□□□
□□□□□□□□	`GET /api/federation/identity` □□□□□□□□	□□□□□□□□□ > 5 □□
□□□□□□□	□□□□	> 2 □□□□□□□□

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4. □□□□□□□□□□□□

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□□□□□□□□□□□□□□ `:pending` □□□□□□□□□□□□□□□□□ 0□

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- □□□□□□□□□□FederationPoller □□□□□□□□□□
- FederationPoller □□□
- □□□□□□□□□□□□□□□□□□□□□□□□□□□□

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1. □□□□□□□□□□□□□□□
2. □□ FederationPoller □□□□□□□□□□□□□□□□□□□“Federation poller started”□
3. □□□□□□□□□□□□□□□`GET /api/federation/status` - □□□□□□□□
4. □□□□ federation_messages □□□ `curl -k 'https://<origin>:8443/api/federation_messages?frontends=<frontend_name>&include_unrouted=false'`

HSS □□□□□ (Diameter Sh)

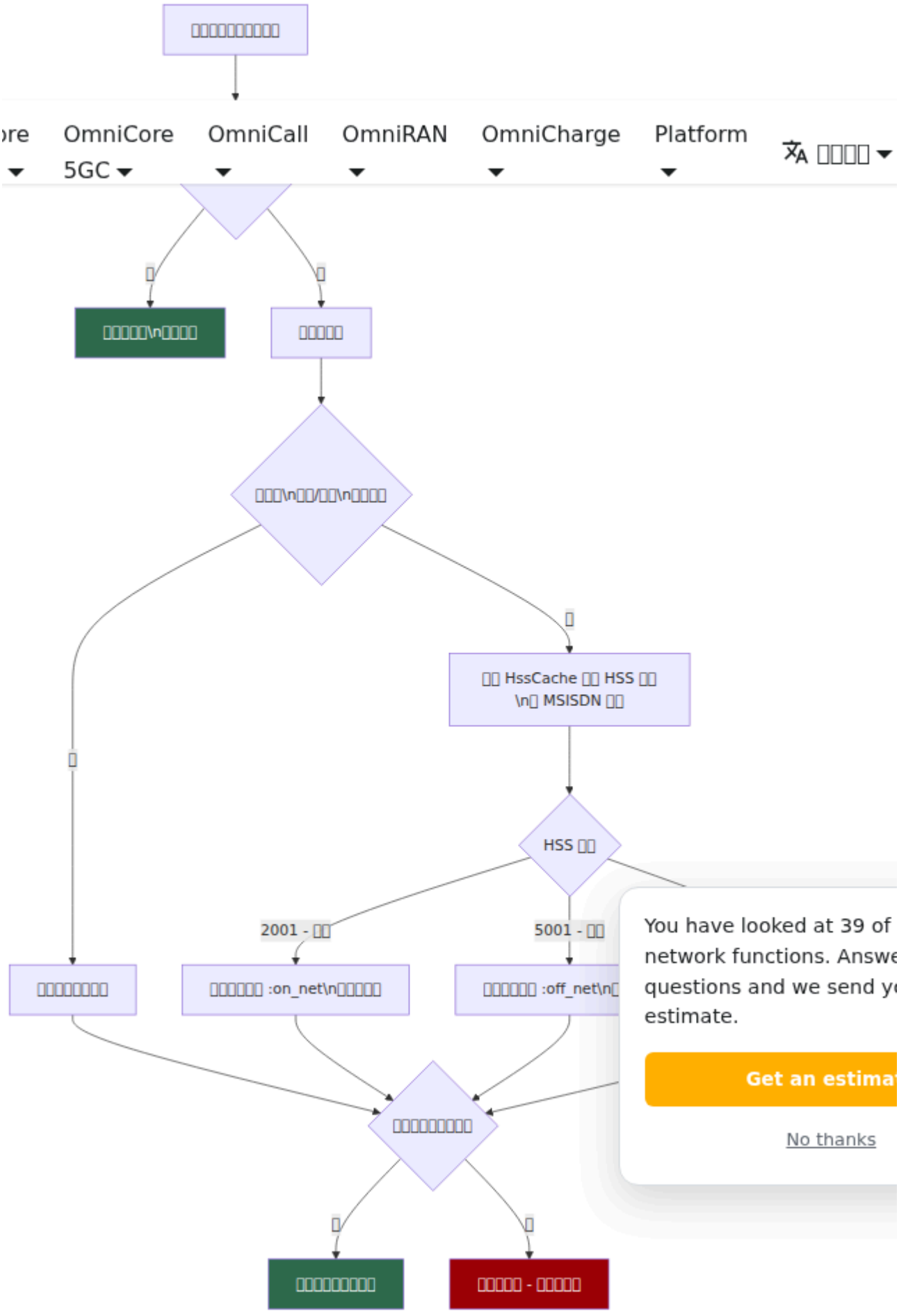
← □□□□□□□ | **SMS □□□□**

□□

OmniMessage □□□□ Diameter Sh □□□□□□□□□□□□ (HSS)□□□□□□□ MSISDN □□□□□□□□□ □□□□□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□

HSS □□□□□□□

OmniMessage □□□□□□□□□□


OmniCore
5GC
OmniCall
OmniRAN
OmniCharge
Platform
HSS
2001 -
5001 -
You have looked at 39 of
network functions. Answe
questions and we send y
estimate.
Get an estima
No thanks

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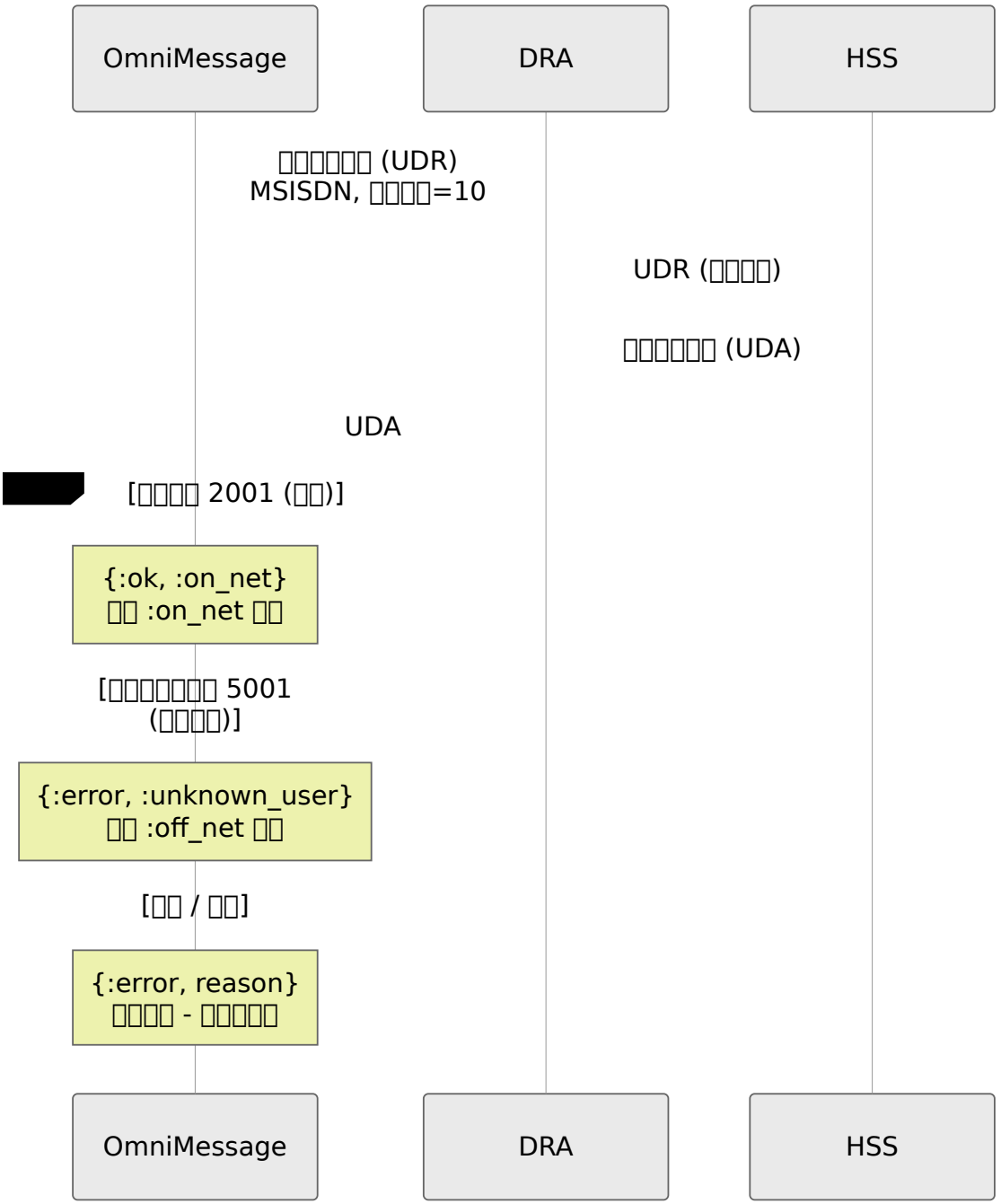
□□□□□□/□□□□□□□□□ MSISDN□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ HSS □□□□□□□□□□□□□□□□ □□□□□□□

□□□ + □□ HSS □□

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ `originating_network`/`terminating_network` □ `:on_net` □ `:off_net` □□□□□□□□□□□□□□□□□□□□ HSS □□□□□□□□□□□□□□□□□□□□

Diameter Sh □□□


OmniMessage
DRA
HSS
□□□□□□□ (UDR)
MSISDN, □□□□=10
UDR (□□□□)
□□□□□□□ (UDA)
UDA
[□□□□ 2001 (□□)]
{:ok, :on_net}
□□ :on_net □□
[□□□□□□□□ 5001
(□□□□)]
{:error, :unknown_user}
□□ :off_net □□
[□□ / □□]
{:error, reason}
□□□□ - □□□□□
OmniMessage
DRA
HSS

UDR □□

AVP	□	□□
Session-Id	□□□□	□□□□□□□□
Auth-Session-State	1 (NO_STATE_MAINTAINED)	□□□□□□□□□□
Data-Reference	10	□□□□□□□□
Origin-Host	□□□□□ + □	OmniMessage □ Diameter □□
Origin-Realm	□□□□	OmniMessage □ Diameter □
Destination-Realm	□□□□	HSS □□□□ DRA □□□
User-Identity	TBCD □□□ MSISDN	□□□□□□
Server-Name	"OmniMessage"	□□□□□□□
Vendor-Specific-Application-Id	Auth: 16777217, Vendor: 10415	□□ 3GPP TS 29.329 □ Sh □□□□□

UDA □□□□

□□□□□□□□□ UDA □□□□□□□□□□

□□	□□	□□	□□□□□□□□□□
2001	□□□□	`{:ok, :on_net}`	□□ - □□ `:on_net`□□□□ `:off_net`
5001	□□□□□ □□	`{:error, :unknown_user}`	□□ - □□ `:off_net`□□□□ `:on_net`
□□ / □□ / □□ □□	-	`{:error, reason}`	□□□□ - □□□□□□□□□□□□□□

□□

□□ HSS □□

`config/runtime.exs` □□□□□□□□□□ HSS □□□

1. `:sms_c` □□ `diameter_enabled` □□ - □□□□□□□□□□□□□□□ HSS □□□□□□ `false` □□□□□□ □ `:on_net`/`:off_net` □□□□□□□□□□□□□□□□□□□□□□
2. `:diameter_ex` □□ - □□ Diameter □□□□□□□□□□□□□□□□□□□□□

□□□□

```
# □□□□□□□□□□ HSS □□
config :sms_c,
  diameter_enabled: true

# Diameter □□□□
config :diameter_ex,
  diameter: %{
    service_name: :omnimessage,
    listen_ip: "0.0.0.0",
    listen_port: 3868,
    decode_format: :map,
    host: "smsc01",
    realm: "epc.mnc001.mcc001.3gppnetwork.org",
    product_name: "OmniMessage",
    request_timeout: 5000,
    peer_selection_algorithm: :random,
    allow_undefined_peers_to_connect: true,
    log_unauthorized_peer_connection_attempts: true,
    control_module: SmsC.Diameter.Control,
    processor_module: DiameterEx.Processor,
    auth_application_ids: [],
    acct_application_ids: [],
    vendor_id: 10415,
    supported_vendor_ids: [10415],
    applications: [
      %{
        application_name: :sh,
        application_dictionary: :diameter_gen_3gpp_sh,
        vendor_specific_application_ids: [
          %{
            vendor_id: 10415,
            auth_application_id: 16_777_217,
            acct_application_id: nil
          }
        ]
      }
    ],
    peers: [
      %{
        port: 3868,
        host: "dra01.epc.mnc001.mcc001.3gppnetwork.org",
```

```
        ip: "10.0.0.1",
        realm: "epc.mnc001.mcc001.3gppnetwork.org",
        tls: false,
        transport: :diameter_tcp,
        initiate_connection: true
      }
    ]
  }
```

OmniMessage □□

□□	□□	□□	□□	□□
`diameter_enabled`	□□	□	`false`	□□□□□□□□□□ HSS □□□□□□ `false` □□□□ `:on_net`/`:off_net` □□□□□□□□□□□□
`hss_cache_ttl_seconds`	□□	□	`7200`	□□□ HSS □□□□□□ TTL□□□□□□ `runtime.exs` □□□□□□□□□ YAML □□□□□□□□□
`mock_sh`	□□	□	`false`	□□□□ HSS □□□□□□□□□ Diameter □□□□□□□□□□
`mock_sh_on_net_numbers`	□□	□	`[]`	□ `mock_sh` □ `true` □□□□□□□ MSISDN □□□

Diameter □□□□

□□	□□	□□	□□	
`service_name`	□□□	□	-	Diam
`listen_ip`	□□□□	□	`"0.0.0.0"`	□□□□□
`listen_port`	□□□	□	3868	□□□□ 6733
`decode_format`	□□□	□	-	Diam
`host`	□□□□	□	-	Omni □□□□□
`realm`	□□□□	□	-	Omni 3GPP `epc.r`
`product_name`	□□□□	□	-	□ Dia
`request_timeout`	□□□	□	5000	□□ HS
`peer_selection_algorithm`	□□□	□	`:random`	□□□□□ `:rou`

□□	□□	□□	□□	
`allow_undefined_peers_to_connect`	□□	□	`true`	□□□□□□□□□□
`log_unauthorized_peer_connection_attempts`	□□	□	`true`	□□□□□□□□□□
`control_module`	□□	□	-	Diam `SmsC`
`processor_module`	□□	□	-	Diam `Diame`
`auth_application_ids`	□□	□	`[]`	□□□□□□□□□□ ID□
`acct_application_ids`	□□	□	`[]`	□□□□□□□□□□
`vendor_id`	□□	□	-	3GPP
`supported_vendor_ids`	□□	□	-	□□□□□□□□□□

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`applications` ��□□□□□□□ Diameter □□□□□□□□ HSS □□□□□□□ Sh □□□□□□

□□	□□	□□	□□
`application_name`	□□	□	-	□□□□□□□□□□ HSS □□□□□□□ `:sh`□
`application_dictionary`	□□	□	-	Erlang Diameter □□□□□□□□ □ `:diameter_gen_3gpp_sh`□
`vendor_specific_application_ids`	□□	□	-	□□□□□□□□□□□□□□□□□□□□

□□□□□□□□□□ **ID (Sh)**□

□□	□□	□	□□
`vendor_id`	□□	`10415`	3GPP □□□ ID
`auth_application_id`	□□	`16_777_217`	□□ 3GPP TS 29.329 □ Sh □□ ID
`acct_application_id`	-	`nil`	□□ Sh □□□

□□□□□

`peers` □□□□ OmniMessage □□□ Diameter □□□□□□□ DRA □ HSS □□□□

□□	□□	□□	□□	□□
`host`	□□□	□	-	□□□□ Diameter □□□□□FQDN□□□□□□□□□□□□□□□□□□
`ip`	□□□	□	-	□□□□ TCP □□ IP □□□
`port`	��□	□	3868	□□□□ Diameter □□□
`realm`	□□□	□	-	□□□□ Diameter □□
`tls`	□□	□	`false`	□□□□□□□□□ TLS□
`transport`	□□	□	`:diameter_tcp`	□□□□□□ `:diameter_tcp` □ `:diameter_sctp`□
`initiate_connection`	□□	□	`true`	□□□ `true`□ OmniMessage □□□□□□□□ TCP □□□□□□ `false`□ OmniMessage □□□□□□□

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□□□□□□□□□□□□□□□OmniMessage □□ `peer_selection_algorithm` □□□□□□□□□□□□□□□

```
peers: [
  %{
    port: 3868,
    host: "dra01.epc.mnc001.mcc001.3gppnetwork.org",
    ip: "10.0.0.1",
    realm: "epc.mnc001.mcc001.3gppnetwork.org",
    tls: false,
    transport: :diameter_tcp,
    initiate_connection: true
  },
  %{
    port: 3868,
    host: "dra02.epc.mnc001.mcc001.3gppnetwork.org",
    ip: "10.0.0.2",
    realm: "epc.mnc001.mcc001.3gppnetwork.org",
    tls: false,
    transport: :diameter_tcp,
    initiate_connection: true
  }
]
```

□□□□

□□□□□□□ HSS □□□□□□□□□□□□□□□□

```
config :sms_c,
  diameter_enabled: true,
  mock_sh: true,
  mock_sh_on_net_numbers: [
    "15555550001",
    "15555550002"
  ]
```

□□□□□□□□`mock_sh_on_net_numbers` □□□□□□□ MSISDN □□□□ `{:ok, :on_net}`□□□□□□□□ 2001□□□□□□□ MSISDN □□□□ `{:error, :unknown_user}`□□□□□□□□ 5001□□□□□□ Diameter □□□□□□□□□□□□□□□

HSS □□□□

HSS □□□□ `SmsC.Diameter.HssCache` □ MSISDN □□□□□□□□□ Diameter □□□

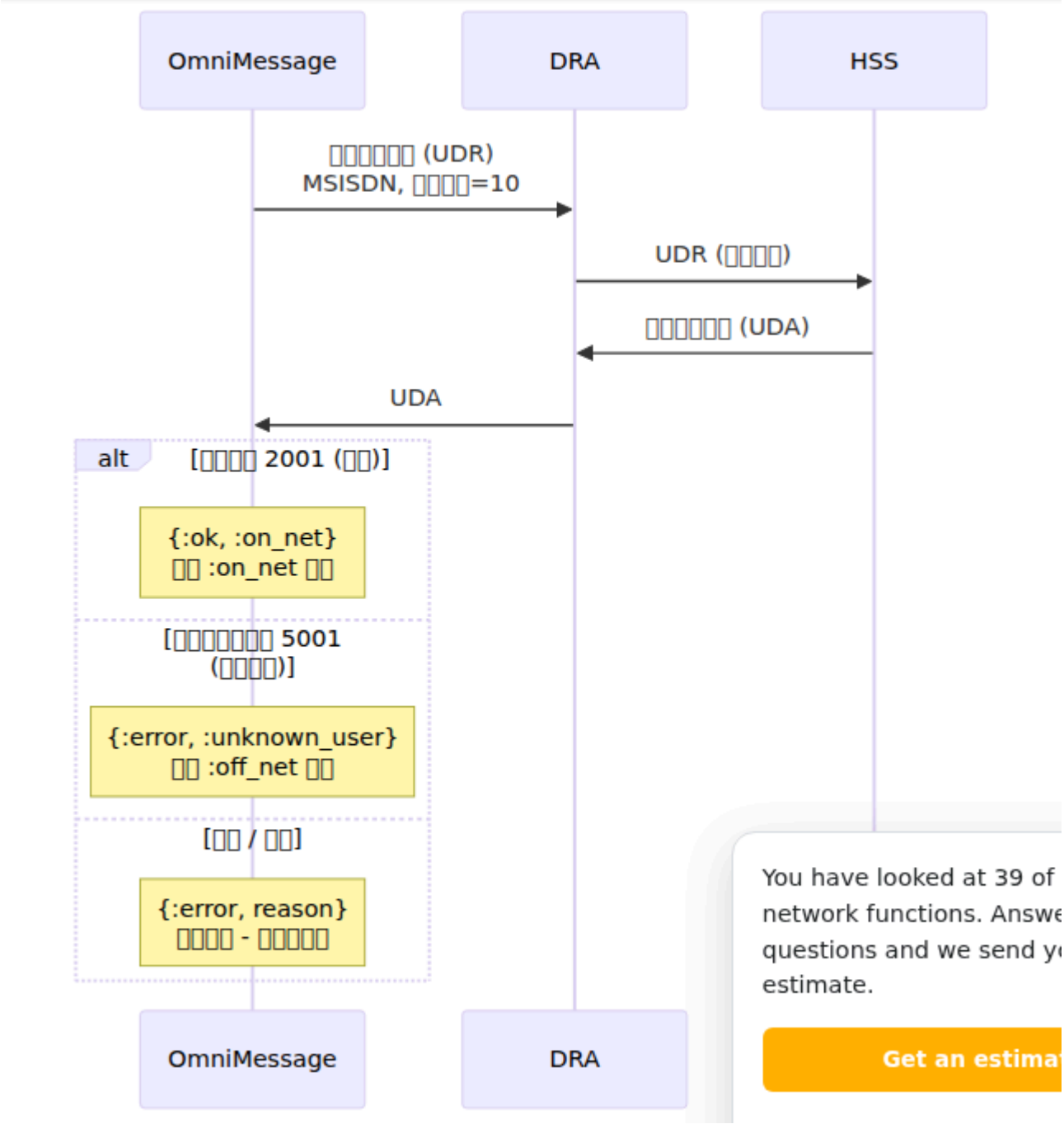
- **TTL**□`hss_cache_ttl_seconds`□□□ 7200 = 2 □□□
- □□□□□□□□□□□□□□ MSISDN □□□□□□□□□□□□□□
- □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□□□ `{:ok, :on_net}` □□□□□□□□ `{:error, :unknown_user}` □□□□□□□□□□ □□□□□ Diameter □□□□□ `nil`□□□□□□□ - □□□□□□□□□□□□□□□□

□□□□□□

`:saf` □□ □□ □□□□□□□□□□ HSS □□□□□ `action: :saf` □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ `:saf` □ `terminating_network: :on_net` □□□□□□□□□□□□□□□□□ SMS □□□□ → `saf`□□

□□□□□□□□□ SAF □□□□□□□ Mnesia ���□□□□`dest_smsc` □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ MSISDN □□□□□□□□□□□□□□□□□□□

□□ `dead_letter_time_minutes` □□□□□□□□



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OmniMessage □□□□□□ Diameter Sh □□□

- □□□`Diameter Sh (HSS): ENABLED (host: smsc01, realm: epc.mnc001.mcc001.3gppnetwork.org, peers: 2)`

- □□□`Diameter Sh (HSS): DISABLED`

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□□ HSS □□□□□□□□□□ - □□□□□□□□□□□□□□□□□□□□□□□□□□□□□ - `subscriber_exists?/1` □□ `{:error, reason}`□□□□□ `:on_net` □ `:off_net` □□□□□□□□ □ □□□□□□□□ □□□□□□□□□□□□□□□□□□□□

□□	□	□□	□□
`originating_network`	`:any` | `:on_net` | `:off_net`	□□ □□	□□□ MSISDN □ HSS □□□ □□□□□□□□□□□□□□
`terminating_network`	`:any` | `:on_net` | `:off_net`	□□ □□	□□□□ MSISDN □ HSS □□ □□□□□□□□□□□□□□□

□□□□□□□□ `:any`□□ HSS □□□□`:on_net` □□□□□□□□ 2001□`:off_net` □□ 5001□□□□□□□□□□□□□□□□□□□□

□□□□

```
config :sms_c, :sms_routes, [
  # □□□□□□□ - □□□□□□□□
  %{
    calling_regex: nil,
    called_regex: ~r/^1555/,
    source_smsc: nil,
    dest_smsc: "local-gateway",
    source_type: nil,
    action: :route,
    charged: :default,
    weight: 100,
    priority: 10,
    description: "□□□□ - □□□□□□□",
    originating_network: :any,
    terminating_network: :on_net,
    enabled: true
  },

  # □□□□ - □□□□□□□□□□□□□□□□□□
  %{
    calling_regex: nil,
    called_regex: nil,
    source_smsc: nil,
    dest_smsc: "external-gateway",
    source_type: :ims,
    action: :route,
    charged: :default,
    weight: 100,
    priority: 255,
    description: "□□□□ - □□",
    originating_network: :any,
    terminating_network: :any,
    enabled: true
  }
]
```

□□□□□ □□□□□□□□□□□□□□□□□

1. □□□□ - □□□□□□□□
2. □□□□ - □□□□□□□□□□

3. P10 "local-gateway" □□□□ `terminating_network: :on_net`□□□□□□□□□□ HSS □□□□□ HSS □□ 2001□□□□□□□□□□□□□□□□□□□ `local-gateway`□□□□□ 5001□□□□□□□□□□□□□□□□□□□□
4. P255 "external-gateway" □□□□ `terminating_network: :any`□□□□□□ HSS □□ □□□□□□□□□

□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□HSS□□□□□□□□□□□□□□□□□□□

- □□□□□□□MSISDN□□□□□□□`destination_msisdn`□□□
- □□□□□□□□□□□□□□□□

□□□□□

1. □□□□/□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
2. □□□□□□□□□□□□□□MSISDN□□□□
3. □□`dead_letter_time_minutes` - □□□□□□□□□□□□□□□□□□□□□□

Diameter□□□□□□

□□□□□□□□□□□□□□Diameter□□□□□□

□□□□□□

- □□□□□□□□IP□□□□□□□
- □□□□□□□□3868
- □□□□□□□□□□□□□□□□`host`□□□□□□□□Diameter□□□□□□□□
- OmniMessage□□□□□□□□□□□□

□□□□□□

1. □□□□□IP□□□□□□□□□□
2. □□□□□□□□□□□□□□□□□□□□□□□□TCP□□
3. □□□□□□□`host`□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
4. □□OmniMessage□□□□□□□□□□`realm`□□

SMS-C Prometheus □□□□

← □□□□□□□

□□

□□□□□□□ SMS-C □□□□□□□□ Prometheus □□□□□□□□

- `frontend` - □□□□□□
- `location` - □□/□□□□
- `phoenix.endpoint` - HTTP API □□□□
- `vm` - Erlang VM □□□□

□□□□□

sms_c_license_status

□□: Gauge

□□: OmniMessage SMS-C □□□□□□□□□□□□

□□:

- `1` - □□□□□
- `0` - □□/□□□□□

□□: □

□□□□: `omnimessage`

□□: □□□□□□□□□□□□

```yaml
- alert: SMS_C_License_Invalid
  expr: sms_c_license_status == 0
  for: 1m
  labels:
    severity: critical
  annotations:
    summary: "SMS-C □□□□□□□□□"
    description: "□□□□□□□□ - □□□□□□□ NOLICENCE"
```

□□ **Prometheus** □□:

```
# □□□□□□□□□□
sms_c_license_status == 1

# □□□□□□□□□□□
sms_c_license_status == 0

# □□□□□ NOLICENCE □□□□□□□□□□□□□□□
sms_c_routing_route_matched_count{dest_smsc="NOLICENCE"}
```

□□□□□□

sms_c_message_received_count

□□: Counter

□□: SMS-C □□□□□□□□□□□□□□□

□□:

- `source_smsc`: □□□□□□ SMSC □□
- `source_type`: □□□□□ (ims, circuit_switched, smpp)
- `message_type`: □□□□ (sms, mms)

□□: □□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□/□□□□□□□□□□□□

---

sms_c_message_validated_count

□□: Counter

□□: □□□□□□□□□□□□

□□:

- `valid`: □□□□□□□□true □ false□

□□: □□□□□□□/□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□> 5% □□□□

---

sms_c_message_processing_stop_duration

□□: Histogram

□□: □□

□□: □□

□: 10, 50, 100, 250, 500, 1000, 2500, 5000 ms

□□:

- `success`: □□□□□□□□true □ false□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □ p95 □ p99 □□□□ SLA □□□□□□□□□

□□□□

sms_c_routing_route_matched_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `route_id`: □□□□□□□□□□□□
- `dest_smsc`: □□□□□□□□ SMSC
- `priority`: □□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□

□□:

- `action`: □□□□□drop, auto_reply, forward□
- `route_id`: □□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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---

sms_c_routing_stop_duration

□□: Histogram

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□

□: 1, 5, 10, 25, 50, 100, 250, 500 ms

□□:

- `dest_smsc`: □□□□□ SMSC

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□p95 > 50ms□□

ENUM/NAPTR □□□□

sms_c_enum_cache_hit_count

□□: Counter

□□: □□□□□□□□ ENUM □□□□□□□□□ DNS □□□□

□□:

- `domain`: □□□ ENUM □

□□: □□□□□□□□□□□□□□□□□ DNS □□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

---

sms_c_enum_cache_miss_count

□□: Counter

□□: □□ DNS □□□ ENUM □□□□□□□□□□□□□

□□:

- `domain`: □□□ ENUM □

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: `cache_hit_rate = hits / (hits + misses)`

---

sms_c_enum_cache_size_size

□□: Gauge

□□: ENUM □□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□ TTL □□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

---

sms_c_enum_lookup_stop_duration

□□: Histogram

□□: □□ ENUM □□□□□□□□□□□□□□□□□ DNS □□□□

□□: □□

□: 10, 50, 100, 250, 500, 1000, 2500, 5000 ms

□□:

- `domain`: □□□ ENUM □
- `success`: □□□□□□□true □ false□
- `cache_hit`: □□□□□□□□□true □ false□

□□: □□ ENUM □□□□□□□□□□ DNS □□□□□□□□□

□□: □ p95 □□□□□□□□□□□□□□□□□

---

sms_c_enum_naptr_records_record_count

□□: Histogram

□□: □□□ ENUM □□□□□ NAPTR □□□□□

□: 0, 1, 2, 3, 5, 10

□□:

- `domain`: □□□ ENUM □

□□: □□ ENUM □□□□□□□□□□□□□ 1-3 □□□□

□□: □□□□□□ 0 □□□□□□□□DNS □□□□□□

□□□

sms_c_delivery_queued_count

□□: Counter

□□: □□□□□□□□ SMSC □□□□□□

□□:

- `dest_smsc`: □□ SMSC □□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□/□□□□□□□□□□□□□□□□□

---

sms_c_delivery_attempted_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□

□□:

- `dest_smsc`: □□ SMSC □□

□□: □□

---

sms_c_delivery_succeeded_count

□□: Counter

□□: □□□□□□□□ SMSC □□□□□□□

□□:

- `dest_smsc`: □□ SMSC □□

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□ SLA □□□□□□□□

□□: `success_rate = succeeded / queued`

---

sms_c_delivery_failed_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `dest_smsc`: □□ SMSC □□
- `reason`: □□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□

---

sms_c_delivery_dead_letter_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `reason`: □□□□□□□□□`max_retries_exceeded`, `expired`□

□□: □□□□□□□□□□□□□□□□□□□□□□□□

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---

sms_c_delivery_succeeded_attempt_count

□□: Histogram

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□: 1, 2, 3, 5, 10

□□:

- `dest_smsc`: □□ SMSC □□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□ 2 □□□□□□□□□□□□□□□□□□

---

sms_c_delivery_failed_attempt_count

□□: Histogram

□□: □□□□□□□□□□□□□□□□□□□

□: 1, 2, 3, 5, 10

□□:

- `dest_smsc`: □□ SMSC □□

□□: □□□□□□□□□□□□□□□□□

---

sms_c_delivery_time_delta_delta_ms

□□: Histogram

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□ SMS-C □□□□□□□□□□□□□□□□□□□□

- □ p95 □□□□□/□□□□□ SLA □□□□□□□
- □□□□□□□□□□□□□□□□□

□□ **Prometheus □□**:

```
# □□□□□□ SMSC □ P95 □□□□
histogram_quantile(0.95,
  sum by (source_smsc, dest_smsc, le) (
    rate(sms_c_delivery_time_delta_delta_ms_bucket[5m])
  )
)

# P99 □□□□□□□
histogram_quantile(0.99,
  sum by (le) (
    rate(sms_c_delivery_time_delta_delta_ms_bucket[5m])
  )
)

# □□ SMSC □□□□□□□□
sum by (source_smsc) (rate(sms_c_delivery_time_delta_delta_ms_sum[5m]
/
sum by (source_smsc)
(rate(sms_c_delivery_time_delta_delta_ms_count[5m]))

# □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
histogram_quantile(0.95,
  sum by (le)
(rate(sms_c_delivery_time_delta_delta_ms_bucket{delivery_attempts="0"
[5m]))
)
histogram_quantile(0.95,
  sum by (le)
(rate(sms_c_delivery_time_delta_delta_ms_bucket{delivery_attempts!="0
[5m]))
)

# □□□□-□□□□□□ p95□
topk(10,
  histogram_quantile(0.95,
    sum by (source_smsc, dest_smsc, le) (
      rate(sms_c_delivery_time_delta_delta_ms_bucket[1h])
    )
  )
)

# □ 2 □□□□□□□□□□□
sum(rate(sms_c_delivery_time_delta_delta_ms_bucket{le="2000"}[5m])) /
```

```
sum(rate(sms_c_delivery_time_delta_delta_ms_count[5m])) * 100

# □□□□□□□ 2 □□□□□□□□
sum by (dest_smsc)
(rate(sms_c_delivery_time_delta_delta_ms_bucket{le="2000"}[5m])) /
sum by (dest_smsc) (rate(sms_c_delivery_time_delta_delta_ms_count[5m])
* 100
```

---

sms_c_delivery_time_by_smsc_delta_ms

□□: Histogram

□□: □□□□□□□□□□□□□□□□□□□□□□□□ SMSC □□□□□□ `sms_c_delivery_time_delta_delta_ms` □□□□□□□□□ - □□□□ `delivery_attempts` □ □□□□□□□□□□□□□□□/□□ `[:sms_c, :delivery, :time_delta]` □□□□□□□

□□: □□

□: 50, 100, 250, 500, 1000, 2000, 5000, 10000, 20000, 60000, 600000 ms (50ms □ 10 □□)

□□:

- `source_smsc`: □□□□□□□ SMSC
- `dest_smsc`: □□□□□□□□ SMSC

□□: □□□□□□□□□/□□□□□□□□□□□□□□□□□□□□/SLA □□□□□□□□□□□□□□□□□□ `sms_c_delivery_time_delta_delta_ms`□□□□□□□□□□□□□□□□□□□

```
# □□/□□ SMSC □□□□□□□□□□□□
sum by (source_smsc, dest_smsc)
(rate(sms_c_delivery_time_by_smsc_delta_ms_sum[5m])) /
sum by (source_smsc, dest_smsc)
(rate(sms_c_delivery_time_by_smsc_delta_ms_count[5m]))

# □□□□□□□□□
sum(rate(sms_c_delivery_time_by_smsc_delta_ms_sum[5m])) /
sum(rate(sms_c_delivery_time_by_smsc_delta_ms_count[5m]))

# □□/□□ SMSC □ P95 □□□□
histogram_quantile(0.95,
  sum by (source_smsc, dest_smsc, le) (
    rate(sms_c_delivery_time_by_smsc_delta_ms_bucket[5m])
  )
)
```

□□□□

sms_c_queue_size_size

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `queue_type`: □□□□□□message_queue, dead_letter□

□□: □□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□

---

sms_c_queue_size_pending

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□□□

□□:

- `queue_type`: □□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□

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---

sms_c_queue_size_failed

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `queue_type`: □□□□

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---

sms_c_queue_size_delivered

□□: Gauge

□□: □□□□□□□/□□□□□□□□□□□□□□□□□□

□□:

- `queue_type`: □□□□

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---

sms_c_queue_oldest_message_age_seconds

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□:

- `queue_type`: □□□□

□□: □□□□□□□□□□□□□□□ SLA □□□□□□□□

□□: □□□□□□□□□□□ SLA □□□□□□□□□□□□> 300 □□□

□□□□

□□□□ **Diameter Ro** □□□□□□□□□□□□`account` □□□□□□□□□□□ MSISDN□□□□□□□□□□□□□□□□□□□□□`reason: :no_credit`□□ OCS □□□□□□/□□□□□□□□□ `charging_failed` □□□□□ `:no_credit` □□□□□□□□□□□ `:balance_rejected`□□OCS □□□□□□□□□□□□□□□□□

sms_c_charging_requested_count

□□: Counter

□□: □□□ OCS □□□□□□□□□Diameter Ro CCR □□□□□□□

□□:

- `account`: □□□□□□□ MSISDN□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□

---

sms_c_charging_succeeded_count

□□: Counter

□□: □□□□□□□□□□□

□□:

- `account`: □□□□□□□□□□

□□: □□□□□□□□□□□□□□□

□□: `success_rate = succeeded / requested`

---

sms_c_charging_failed_count

□□: Counter

□□: □□□□□□□□□□□

□□:

- `account`: □□□□□
- `reason`: □□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□

---

sms_c_charging_succeeded_duration

□□: Histogram

□□: □□□□□□□□□□□□□□□

□□: □□

□: 10, 50, 100, 250, 500, 1000, 2500, 5000 ms

□□:

- `account`: □□□□□

□□: □□□□□□□□□□□□□□□□□□□□

□□: □ p95 □□□□□□□□□□□□□□□□

□□□□□□

sms_c_mnesia_table_size_record_count

□□: Gauge

□□: □□ Mnesia □□□□□□□□□□□□□□□□ 10 □□□□□□□

□□:

- `table`: □□

□□□□:

- `sms_route` - SMS □□□□
- `message_store` - □□□□□□□□□□□□□□□□□□□□□□□□
- `location_store` - □□□□/□□□□
- `frontend_store` - □□/SMSC □□
- `translation_rule` - □□□□□□
- `cell_tower_store` - □□□□□□
- `message_events` - □□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□

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□□ **Prometheus** □□:

```
# □□□□□□□
sms_c_mnesia_table_size_record_count

# □□□□□□□
sms_c_mnesia_table_size_record_count{table="message_store"}

# □□□□□□□
sms_c_mnesia_table_size_record_count{table="location_store"}

# □□□□□□□
sms_c_mnesia_table_size_record_count{table="sms_route"}
```

---

sms_c_frontend_status_count

□□: Gauge

□□: □□□□□□□□□□□□□□

□□:

- `frontend_name`: □□□□□
- `status`: □□□□□connected, disconnected□

□□: □□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□

---

sms_c_location_registered_count

□□: Counter

□□: □□□□□□□□□□□/□□□□□□□□□

□□:

- `location`: □□□□□□□/SMSC □□
- `ims_capable`: □□□□□□ IMS□true/false□

□□: □□□□□□□□□□□□ IMS □□ IMS □□□□□□□□□□□□□□

□□: □□□□□□□□

- □□□□□□□□□□□□□□□□□
- □□□□□□□□
- □ IMS □□□□□□□□□□□□□□□

□□□□:

```
# □□□□□□□
rate(sms_c_location_registered_count[1m])

# IMS □□ IMS □□□□
sum(rate(sms_c_location_registered_count{ims_capable="true"}[5m]))
/
sum(rate(sms_c_location_registered_count[5m]))
```

---

sms_c_location_active_registrations_count

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□□□□/SMSC□□ IMS □□□□□□□□□□ 10 □□□□□□□□□□□□□□□□□□□□

□□:

- `location`: □□□□□□□□/SMSC □□
- `ims_capable`: □□□□□□ IMS□true/false□

□□: □□□□□□□□□□□□□□□□□ IMS □□□□□□□□□□□□□□□□□□□□□□□□□□□□ SMSC □□□□□□□□□□

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- □□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□□□□□□□
- □□□□□□□□□□□

□□ **Prometheus** □□:

```
# □□□□□□
sum(sms_c_location_active_registrations_count)

# □□□□□□□□□□
sum by (location) (sms_c_location_active_registrations_count)

# □□□□□□□ IMS □□□□
sum by (location)
(sms_c_location_active_registrations_count{ims_capable="true"})

# □□□□□□ IMS □□□
sum by (location)
(sms_c_location_active_registrations_count{ims_capable="true"}) /
sum by (location) (sms_c_location_active_registrations_count) *
100

# □ IMS □□ IMS □□
sum by (ims_capable) (sms_c_location_active_registrations_count)

# □□□□□□□□
topk(10, sum by (location)
(sms_c_location_active_registrations_count))

# □□□□□□□□□□□□□
sum by (location) (sms_c_location_active_registrations_count) /
sum(sms_c_location_active_registrations_count) * 100
```

HTTP API □□□□

phoenix_endpoint_stop_duration

□□: Distribution (Histogram)

□□: HTTP □□□□□□□□□□□□□

- `path`: □□□□□□□□□□□UUID□□□ ID□□□□ `/:id`□□□□`/api/messages`, `/api/messages/:id`□

□: 10ms, 50ms, 100ms, 250ms, 500ms, 1s, 2.5s, 5s

□□: □□ API □□□□□□□□□□□□□□□□ SLA□

□□: □□□□□□□□□

- □□□□□ P95 □□ > 500ms
- □□□□□ P99 □□ > 1s
- □□□□□□

□□□□:

```
# □□□□ P95 □□□□
histogram_quantile(0.95,
  rate(phoenix_endpoint_stop_duration_bucket[5m]))

# □□ 1 □□□□
sum(rate(phoenix_endpoint_stop_duration_bucket{le="1000"}[5m]))
```

---

phoenix_endpoint_stop_count

□□: Counter

□□: □□□□□□□ HTTP □□□□□□□□□ HTTP □□□□□

□□:

- `method`: HTTP □□□□□□`GET`, `POST`□
- `path`: □□□□□□□□□□□□ `/:id`□
- `status`: HTTP □□□□200, 201, 400, 404, 500 □□

□□: □□ API □□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□

- □□□□□□□□□ > 5%
- □□□□□ 5xx □□
- □□□□□□□□□

□□□□:

```
# □□□□□□□□□
sum by (path) (rate(phoenix_endpoint_stop_count[5m]))

# □□□□□□□□
sum by (path) (rate(phoenix_endpoint_stop_count{status=~"5.."}
[5m])) /
sum by (path) (rate(phoenix_endpoint_stop_count[5m]))

# □□□
sum(rate(phoenix_endpoint_stop_count{status=~"2.."}[5m])) /
sum(rate(phoenix_endpoint_stop_count[5m]))
```

---

phoenix_router_dispatch_exception_count

□□: Counter

□□: □ HTTP □□□□□□□□□□□□□/□□□□□□

□□:

- `route`: □□□□□ API □□□□
- `kind`: □□□□□error, exit, throw□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□

□□□□:

```
# □□□□□□□□
rate(phoenix_router_dispatch_exception_count[5m])

# □□□□□□□□□□
increase(phoenix_router_dispatch_exception_count[1h])
```

Diameter Sh □□

SMS-C □□ **Diameter Sh** □□□3GPP TS 29.329□□□ HSS□□□□□□□□□

sms_c_diameter_sh_response_count

□□: Counter

□□: □□□□□□□ Diameter Sh □□□□□□□□UDA□□

□□:

- `result`: □□□□□□□□□`on_net`, `unknown_user`, `error`□
- `result_code`: Diameter Experimental-Result / Result-Code□□□□`2001`, `5001`□

□□□□:

```
# Sh □□□□□□□
sum(rate(sms_c_diameter_sh_response_count{result="error"}[5m]))
  / sum(rate(sms_c_diameter_sh_response_count[5m]))
```

---

sms_c_diameter_sh_response_duration_ms

□□: Distribution (Histogram)

□□: Diameter Sh □□□□□□□□□□□□

□□:

- `result`: □□□□

□: 5, 10, 25, 50, 100, 250, 500, 1000, 2500 ms

□□□□:

```
# P95 Sh □□□□
histogram_quantile(0.95,
rate(sms_c_diameter_sh_response_duration_ms_bucket[5m]))
```

---

sms_c_diameter_sh_error_count

□□: Counter

□□: Diameter Sh □□□□□□□□□□/□□/□□□□□□□□ UDA □□□□

□□:

- `reason`: □□□□

□□□□

□□□ SMS-C □□□□□□□□□□□□□□□□□□□□□□□□□□ □□□

sms_c_federation_forward_attempted_count

□□: Counter

□□: □□□□□□□□□□□□□□□□

□□:

- `dest_controller`: □□□□□□□□

---

sms_c_federation_forward_completed_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□

□□:

- `dest_controller`: □□□□□□□□

---

sms_c_federation_forward_queued_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□□□

□□:

- `dest_controller`: □□□□□□□

---

sms_c_federation_forward_failed_count

□□: Counter

□□: □□□□□□□□□□□□□□□

□□:

- `dest_controller`: □□□□□□□

---

sms_c_federation_message_received_count

□□: Counter

□□: □□□□□□□□□□□□□□□□

□□:

- `origin_node`: □□□□□□

---

sms_c_federation_health_check_count

□□: Counter

□□: □□□□□□□□□□□□□□□□□□

□□:

- `peer`: □□□□□
- `result`: □□□���□□□□□□`healthy`, `unhealthy`□

---

sms_c_federation_peer_status_count

□□: Gauge

□□: □□□□□□□□□□□□□□□□□□

□□:

- `status`: □□□□□□□□□`healthy`, `degraded`, `unhealthy`□

---

sms_c_federation_queue_depth_count

□□: Gauge

□□: □□□□□□□□□□□□

□□□□:

```
# □□□□□□□□□□□□□□□
sms_c_federation_queue_depth_count > 1000
```

Erlang VM □□

vm_memory_total

□□: Gauge

□□: Erlang VM □□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□ > 80% □□□□□□□□□□□□□□□

---

vm_memory_processes

□□: Gauge

□□: Erlang □□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□

---

vm_total_run_queue_lengths_total

□□: Gauge

□□: □□ CPU □□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□□□ CPU □□□

□□: □□□ > 10 * CPU □□□□□□□□□□□

---

vm_system_counts_process_count

□□: Gauge

□□: □□□ VM □□□□□□□□□□

□□: □□□□□□□□□□□□□□□□□□□□

□□: □□□□□□□□□□□ 262,144□□□□□□□

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- □□□□□□□
- Mnesia □□□
- ENUM □□□□

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□□□□□□ SMSC □□□□□□□□□

□□: `(sms_c_delivery_succeeded_count) / (sms_c_delivery_queued_count)`

□□: □□ > 95% □□□□□□□□□□□□□□□□□□□□□□

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□□:

- `sms_c_message_processing_stop_duration` (□□)
- `sms_c_delivery_time_delta_delta_ms` (□□)

□□: □□□□□□□□□□□□□

ENUM □□□□□

□□ ENUM □□□□□□

□□: `(sms_c_enum_cache_hit_count) / (sms_c_enum_cache_hit_count + sms_c_enum_cache_miss_count)`

□□: □□ > 80% □□□□□□□□□□□□□□□□ TTL □□□□□□□□

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□□: `sms_c_routing_route_matched_count` □ `route_id` □□

□□: □□□□□□□□□□□□□□□□□□□□

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□□:

- `sms_c_queue_size_pending` (□□□□□)
- `sms_c_queue_oldest_message_age_seconds` (□□□□)

□□: □□□□□□□□ + □□□□□ = □□□□□

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□□: `sms_c_delivery_succeeded_attempt_count` □□□□□□□

□□: □□ p95 > 1□□□□□□□□□□□□□□□□□□□□□□□□

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□□	□□	□□□	□□
□□□□□□ □□	`routing_failed_count` □□	Critical	□□□□ □□□
□□□□	`queue_size_pending` > □□	Warning	□□□□ □
□□□□□ □□□	`queue_oldest_message_age_seconds` > 300	Critical	SLA □□
□□□□□ □□	`delivery_failed_count` □□	High	□□□□ □
□□□□	`delivery_dead_letter_count` > 0	High	□□□ □□□□ □
ENUM □□□□	`enum_lookup_stop_duration` p95 > 5000ms	Warning	DNS □□
□□□□□ □□	ENUM □□□□□ < 0.7	Warning	□□□□ □
□□□□□ □□	`frontend_status_count{status="disconnected"}` > 0	High	□□□□ □
□□□□	`charging_failed_count` > □□	High	□□□□ □
□□□□□ □□	`message_processing_stop_duration` p95 > 1000ms	Warning	□□□□ □

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3. □□□□□□□□□□
4. p95 □□□□□□□□
5. □□□□□□□
6. □□□□

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2. □□□□□□□□□□
3. ENUM □□□□□□□□□□
4. □□□□□□□□□□
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1. □□ SMSC □□□
2. □□□ SMSC □□□
3. □□□□□□□
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5. ENUM □□□□
6. □□□□□□□

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□□□ Prometheus □□□□□

- □□□□: 15 □
- **5** □□□□: 90 □
- **1** □□□□: 2 □

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1. □□ `sms_c_message_processing_stop_duration` □□□ - □□□□□□□
2. □□ `sms_c_routing_stop_duration` - □□□□□□□□
3. □□ `sms_c_enum_lookup_stop_duration` - ENUM □□□□□□□□
4. □□ `sms_c_charging_succeeded_duration` - □□□□□□□□
5. □□□□□□□□□□□□

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1. □□ `sms_c_queue_size_pending` □□ - □□□□□□□□
2. □□ `sms_c_delivery_attempted_count` - □□□□□□□□□□□
3. □□ `sms_c_delivery_failed_count` - □□□□□□□□
4. □□ `sms_c_delivery_time_delta_delta_ms` - □□□□□□□□□□□□
5. □□ `dest_smsc` □□□□□□□□□□

Prometheus □□□□

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□□□□□□□□□**5** □□□□□:

```
rate(sms_c_message_received_count[5m])
```

□□□□□□□□□□**1** □□□□□:

```
rate(sms_c_message_received_count[1h]) * 60
```

□□□□□□□:

```
increase(sms_c_message_received_count[24h])
```

□□□□□□□□□:

```
sum by (source_type) (rate(sms_c_message_received_count[5m]))
```

□□ **SMSC** □□□:

```
sum by (source_smsc) (rate(sms_c_message_received_count[5m]))
```

□□□□

□□□□□□□□□□□□:

```
(rate(sms_c_delivery_succeeded_count[5m]) /
rate(sms_c_delivery_queued_count[5m])) * 100
```

□□□□□□□□□□□□:

```
(rate(sms_c_delivery_failed_count[5m]) /
rate(sms_c_delivery_queued_count[5m])) * 100
```

□□□□□□□□**p95**□:

```
histogram_quantile(0.95,
sms_c_delivery_succeeded_attempt_count_bucket)
```

□□□□□□□□□:

```
sum by (dest_smsc) (rate(sms_c_delivery_succeeded_count[5m]))
```

□□□□□□:

```
sum by (reason) (rate(sms_c_delivery_failed_count[5m]))
```

□□□□□**p95**□:

```
histogram_quantile(0.95,
sms_c_delivery_time_delta_delta_ms_bucket)
```

□□□□□**p99**□:

```
histogram_quantile(0.99,
sms_c_delivery_time_delta_delta_ms_bucket)
```

□□□□

□□□□□□□:

```
sms_c_queue_size_pending
```

□□□□□□□□□□:

```
sms_c_queue_size_failed
```

□□□□□□□□□□□□□:

```
sms_c_queue_oldest_message_age_seconds / 60
```

□□□□□□□□□□□□□:

```
rate(sms_c_queue_size_size[1h]) * 3600
```

□□□□□□□□:

```
rate(sms_c_delivery_queued_count[5m])
```

□□□□□□□□:

```
rate(sms_c_delivery_succeeded_count[5m]) +
rate(sms_c_delivery_failed_count[5m])
```

□□□□□□□□ **-** □□□:

```
rate(sms_c_delivery_queued_count[5m]) -
(rate(sms_c_delivery_succeeded_count[5m]) +
rate(sms_c_delivery_failed_count[5m]))
```

□□□□

□□□□□:

```
(1 - (rate(sms_c_routing_failed_count[5m]) /
(rate(sms_c_routing_route_matched_count[5m]) +
rate(sms_c_routing_failed_count[5m])))) * 100
```

□□□□□□□□:

```
topk(10, sum by (route_id, dest_smsc)
(rate(sms_c_routing_route_matched_count[1h])))
```

□□□□□**p50, p95, p99**□:

```
histogram_quantile(0.50, sms_c_routing_stop_duration_bucket)
histogram_quantile(0.95, sms_c_routing_stop_duration_bucket)
histogram_quantile(0.99, sms_c_routing_stop_duration_bucket)
```

□□□□□□□□□:

```
rate(sms_c_routing_failed_count[5m]) * 60
```

□□□□□□□□□:

```
increase(sms_c_routing_action_count{action="drop"}[1h])
```

□□□□□□□□□□□:

```
increase(sms_c_routing_action_count{action="auto_reply"}[1h])
```

ENUM □□

ENUM □□□□□:

```
rate(sms_c_enum_cache_hit_count[5m]) /
(rate(sms_c_enum_cache_hit_count[5m]) +
rate(sms_c_enum_cache_miss_count[5m]))
```

ENUM □□□□□□□:

```
(rate(sms_c_enum_cache_hit_count[5m]) /
(rate(sms_c_enum_cache_hit_count[5m]) +
rate(sms_c_enum_cache_miss_count[5m]))) * 100
```

ENUM □□□□□**p95**□:

```
histogram_quantile(0.95, sms_c_enum_lookup_stop_duration_bucket)
```

□□ **ENUM** □□□□□□□□□□:

```
# □□□□□□□
rate(sms_c_enum_cache_hit_count[5m])

# □□□□□□□ DNS □□□
rate(sms_c_enum_cache_miss_count[5m])
```

□□□ **NAPTR** □□□□□□□:

```
rate(sms_c_enum_naptr_records_record_count_sum[5m]) /
rate(sms_c_enum_naptr_records_record_count_count[5m])
```

ENUM □□□□:

```
sms_c_enum_cache_size_size
```

□□□□

□□□□□□□**p95**□:

```
histogram_quantile(0.95,
sms_c_message_processing_stop_duration_bucket)
```

□□□□□□□**p99**□:

```
histogram_quantile(0.99,
sms_c_message_processing_stop_duration_bucket)
```

□□□□:

```
rate(sms_c_message_processing_stop_duration_count{success="false"}
[5m])
```

□□□□□:

```
rate(sms_c_message_validated_count{valid="false"}[5m]) /
rate(sms_c_message_validated_count[5m])
```

□□□□

□□□□□:

```
rate(sms_c_charging_succeeded_count[5m]) /
rate(sms_c_charging_requested_count[5m])
```

□□□□□□□□□:

```
rate(sms_c_charging_failed_count[5m]) * 60
```

□□□□□**p95**□:

```
histogram_quantile(0.95, sms_c_charging_succeeded_duration_bucket)
```

□□□□□□□□:

```
sum by (account) (rate(sms_c_charging_requested_count[1h]))
```

□□□□

□□□□:

```
sum(sms_c_frontend_status_count{status="connected"})
```

□□□□□□□□:

```
sum(sms_c_frontend_status_count{status="disconnected"})
```

□□□□□□:

```
sum by (frontend_name)
(sms_c_frontend_status_count{status="connected"})
```

□□□□

Mnesia □□□:

```
sms_c_mnesia_table_size_record_count
```

□□□□:

```
sms_c_mnesia_table_size_record_count{table="sms_route"}
```

□□□□□□:

```
sms_c_mnesia_table_size_record_count{table="translation_rule"}
```

Grafana □□□□□

□□□ 1: □□□□

□□: □□□□□□□□□□□□□□

□□:

1. □□□□□□□□□□

   - □□: `rate(sms_c_message_received_count[5m])`
   - □□: `rate(sms_c_delivery_succeeded_count[5m])`
   - □□: □□/□
   - □□: {{source_type}}

2. □□□□□□□□□□

   - □□: `(rate(sms_c_delivery_succeeded_count[5m]) / rate(sms_c_delivery_queued_count[5m])) * 100`
   - □□: □□□□0-100□
   - □□:
     - □□: < 90
     - □□: 90-95
     - □□: > 95

3. □□□□□□□□□

   - □□: `sms_c_queue_size_pending`
   - □□: `sms_c_queue_size_failed`
   - □□: □□
   - □□: {{queue_type}}

4. □□□□□□□□□□□

   - □□: `sms_c_queue_oldest_message_age_seconds / 60`
   - □□: □□
   - □□:
     - □□: < 5
     - □□: 5-10
     - □□: > 10

5. □□□□□□□□□

   - □□: `sum(sms_c_frontend_status_count{status="connected"})`
   - □□: □□
   - □□: □□

6. □□□□□□□□□

   - □□: `rate(sms_c_routing_failed_count[5m]) * 60`
   - □□: □□/□□
   - □□□□: > 0

□□□ 2: ���□□□

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□□:

1. □□□□□□□□□□

   - □□: `histogram_quantile(0.50, sms_c_message_processing_stop_duration_bucket)` (p50)
   - □□: `histogram_quantile(0.95, sms_c_message_processing_stop_duration_bucket)` (p95)
   - □□: `histogram_quantile(0.99, sms_c_message_processing_stop_duration_bucket)` (p99)
   - □□: □□
   - □□: □□□□

2. □□□□□□□□□□

   - □□: `histogram_quantile(0.95, sms_c_routing_stop_duration_bucket)`
   - ENUM: `histogram_quantile(0.95, sms_c_enum_lookup_stop_duration_bucket)`
   - □□: `histogram_quantile(0.95, sms_c_charging_succeeded_duration_bucket)`
   - □□: `histogram_quantile(0.95, sms_c_delivery_time_delta_delta_ms_bucket)`
   - □□: □□
   - □□□

3. □□□□□□□□□□

   - □□: `sms_c_delivery_succeeded_attempt_count_bucket`
   - □□□□□□□□□□□□
   - □□□□: □□□1 □□□□□□□□□□□□□□□

4. **ENUM** □□□□□□□□

- □□□: `rate(sms_c_enum_cache_hit_count[5m]) / (rate(sms_c_enum_cache_hit_count[5m]) + rate(sms_c_enum_cache_miss_count[5m]))`
- □□□□: `sms_c_enum_cache_size_size`
- □ Y □□□□□□□□

5. □□□□□□□□□

- □□: `(rate(sms_c_message_processing_stop_duration_count{success="true"}[5m]) / rate(sms_c_message_processing_stop_duration_count[5m])) * 100`
- □□: □□□
- □□:
  - □□: < 95
  - □□: 95-99
  - □□: > 99

□□□ 3: □□□□

□□: □□□□□□□□□□□□□□□□

□□:

1. □□□□□□□□□□□

- □□: `sum by (source_type) (increase(sms_c_message_received_count[1h]))`
- □□□□: IMS □ CS □ SMPP

2. □□ **SMSC** □□□□□□□□

- □□: `sum by (source_smsc) (rate(sms_c_message_received_count[1h]))`
- □ 10 □□
- □□□

3. □□□□□□□□□

- □□
  - □□ ID
  - □□ SMSC
  - □□□1h□: `sum by (route_id, dest_smsc) (increase(sms_c_routing_route_matched_count[1h]))`
  - □□□
  - □□□
- □□□□□□□

4. □□□□□□□□□□□

   - □□: `sum by (dest_smsc) (rate(sms_c_delivery_succeeded_count[5m]))`
   - □□: □□/□
   - □□□□□
   - □□: {{dest_smsc}}

5. □□/□□□□□□□□□□

   - □□: `increase(sms_c_routing_action_count{action="drop"}[1h])`
   - □□□□: `increase(sms_c_routing_action_count{action="auto_reply"}[1h])`
   - □□□□

6. □□□□□□□□□□□

   - □□: `rate(sms_c_message_received_count[1h]) * 3600`
   - □□□□: □□ 7 □
   - □□□□□□

□□□ 4: □□□□□

□□: □□□□□□□□□□□□□□□□

□□:

1. □□□□□□□□

- □□: `sms_c_queue_size_size`
- □□□: □□□□□□□□□□□
- □□□□□□□

2. □□□□□□□□□□

- □□: `sms_c_mnesia_table_size_record_count{table="sms_route"}`
- □□: `sms_c_mnesia_table_size_record_count{table="translation_rule"}`
- □□ 30 □□□□

3. □□□□□□□□□□

- □□: `rate(sms_c_delivery_queued_count[5m]) - (rate(sms_c_delivery_succeeded_count[5m]) + rate(sms_c_delivery_failed_count[5m]))`
- □□ = □□□□
- □□ = □□

4. □□□□□□□□

- □□: `max_over_time(rate(sms_c_message_received_count[5m])[24h:])`
- □□□□ 24 □□□□□□ 5m □□
- □□: □□/□

5. □□□□□□□□□

- □□: `(rate(sms_c_message_received_count[5m]) / MAX_CAPACITY) * 100`
- □ MAX_CAPACITY □□□□□□□□□
- □□: □□□
- □□:
  - □□: < 70
  - □□: 70-85
  - □□: > 85

□□□ 5: SLA □□□

□□: □□ SLA □□□□□□□

□□:

1. **SLA □□□□□□□**
   - □□□□: `(rate(sms_c_delivery_succeeded_count[1h]) / rate(sms_c_delivery_queued_count[1h])) * 100`
   - □□□□ 99%
   - □□:
     - □□: < 95
     - □□: 95-99
     - □□: >= 99
2. □ **SLA** □□□□□□□□□□
   - □□: `count(sms_c_delivery_time_delta_delta_ms_bucket{le="5000"}) / count(sms_c_delivery_time_delta_delta_ms_bucket)`
   - □□□ 5 □□□□□□□□
   - □□: □□□
3. **SLA** □□□□□□□
   - □□ 5 □□□□□: `increase(sms_c_queue_oldest_message_age_seconds{} > 300)[24h:]`
   - □□ 0
4. □□□□□□□□□□
   - □□: `up{job="sms-c"}`
   - □□□: 1 = □□□0 = □□
   - □□□□□□
5. □□□□□□□□□□□
   - □□: `avg_over_time((rate(sms_c_delivery_succeeded_count[1h]) / rate(sms_c_delivery_queued_count[1h]))[24h:1h])`

- □□□□: □□ 30 □
- SLA □□ 99%

□□□□□□

□□□□

□□□□:

```
alert: RoutingFailuresDetected
expr: increase(sms_c_routing_failed_count[5m]) > 0
for: 2m
labels:
  severity: critical
annotations:
  summary: "{{ $value }} □□□□□□□□ 5 □□□"
  description: "□□□□□□□□□□□□□□□□□"
```

□□□□:

```
alert: MessageQueueBacklog
expr: sms_c_queue_size_pending > 10000
for: 5m
labels:
  severity: critical
annotations:
  summary: "□□□□□□ {{ $value }} □□□□□□□"
  description: "□□□□□□□□□□□□□□□□□"
```

□□□□□□□□:

```
alert: OldMessagesInQueue
expr: sms_c_queue_oldest_message_age_seconds > 300
for: 2m
labels:
  severity: critical
annotations:
  summary: "□□□□□□□□□ {{ $value }} □"
  description: "□□□□□□□□□□□□□□□"
```

□□□□□□□□□:

```
alert: NoActiveFrontends
expr: sum(sms_c_frontend_status_count{status="connected"}) == 0
for: 1m
labels:
  severity: critical
annotations:
  summary: "□□□□□□□"
  description: "□□□□□□□□□□□□□□□□□□□□□□"
```

□□□□□□□:

```
alert: DeadLetterMessagesIncreasing
expr: rate(sms_c_delivery_dead_letter_count[10m]) > 0
for: 5m
labels:
  severity: critical
annotations:
  summary: "{{ $value }} □□□□□□□□□□"
  description: "□□□□□□□□□□□□□□□□□"
```

□□□□

□□□□□□□:

```yaml
alert: LowDeliverySuccessRate
expr: (rate(sms_c_delivery_succeeded_count[10m]) /
rate(sms_c_delivery_queued_count[10m])) < 0.95
for: 10m
labels:
  severity: warning
annotations:
  summary: "□□□□□□□ {{ $value | humanizePercentage }}"
  description: "□□□□□□ 95%□□□□□□□□□"
```

□□□□□:

```yaml
alert: HighDeliveryRetryRate
expr: histogram_quantile(0.95,
sms_c_delivery_succeeded_attempt_count_bucket) > 2
for: 15m
labels:
  severity: warning
annotations:
  summary: "95th □□□□□□□□□□: {{ $value }}"
  description: "□□□□□□□□□□□□□□□□□□□□"
```

□□□□□□□:

```yaml
alert: SlowMessageProcessing
expr: histogram_quantile(0.95,
sms_c_message_processing_stop_duration_bucket) > 1000
for: 10m
labels:
  severity: warning
annotations:
  summary: "95th □□□□□□□□: {{ $value }}ms"
  description: "□□□□□□□□□□□□□□□□□"
```

ENUM □□□□:

```
alert: HighEnumFailureRate
expr: rate(sms_c_enum_lookup_stop_duration_count{success="false"}
[10m]) > 0.1
for: 10m
labels:
  severity: warning
annotations:
  summary: "ENUM □□□□□: {{ $value }}"
  description: "DNS □□□□□□□ DNS □□□□"
```

□ **ENUM** □□□□□:

```
alert: LowEnumCacheHitRate
expr: rate(sms_c_enum_cache_hit_count[10m]) /
(rate(sms_c_enum_cache_hit_count[10m]) +
rate(sms_c_enum_cache_miss_count[10m])) < 0.70
for: 30m
labels:
  severity: warning
annotations:
  summary: "ENUM □□□□□: {{ $value | humanizePercentage }}"
  description: "□□□□□□□□□□□□□□□□□□□□"
```

□□□□:

```
alert: ChargingFailuresDetected
expr: rate(sms_c_charging_failed_count[10m]) > 0.05
for: 10m
labels:
  severity: warning
annotations:
  summary: "□□□□□: {{ $value }}"
  description: "□□□□□□□□□□ OCS □□□□"
```

□□□

- □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

- □□□□□□□□□□□□□ Prometheus □□□□□ `rate()` □ `increase()` □□
- Gauge □□□□□□□□□□□□□
- Histogram □□□□□□□□□□□□p50, p95, p99□□□□□□□□□□
- □□□□□□□ Prometheus □□□□□□□□□□□□□□□□
- □□□□□□□□□□□□□□□□□□□□5m □□□□□1h □□□□□24h+ □□□□□□
- □ Prometheus □□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □ Grafana □□□□□□□□□□□□□□□□□□ dest_smsc□source_smsc □□

MMS □□ (MMSc)

← □□□□□□□ | □□□□ | **API** □□

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- □□□□□
- MMS □□
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OmniMessage □□□□□□□□ **MMS □□ (MMSc)**□□□□□□□□□□□□□□□□□□□□□□□□□□□□ 3GPP TS 23.140 □□□□□□ MMS □□□□□□**MM1** □□□□□□□□□□ (HTTP/WAP) □ **MM4** □□□□□□□□□□ (SMTP)□

MMSc □□□□ OmniMessage □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ Web □□□□□□□□□□□□□□□□□□□□ MMS □□MMSc□

1. □□□□ MMS □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ Mnesia □□
2. □□□□□ **MMS** □□□□□□□□□□□□□□□□□□□□ SMS □□□□□□□□□□□□□□□□□□□□□□ `notify_api_url` □□□□ SMS-C□□□□□SMS-C □□□□□□□□□□□□□□□□ SMS □□□□□□
3. □□□□□□□□□□□ URL □□□□□ MM1 □□□□□ MMS □□□□□□

□□□□□□□□□ SMS □□□MMS □□□□□□□□□ SMS □□□□□□□□□□□□□□□□□□□□□□□□ HTTP □□□

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□□	□□
3GPP TS 23.140	□□□□□□□□ (MMS)□□□□□□
3GPP TS 26.140	MMS□□□□□□□□□□□□
OMA MMS □□□□	MM1 WAP □□□□□□

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MM1 (□□ HTTP) □ MM4 (□□□□ SMTP) □□□□□□□□□□□□□□ OmniMessage API □□□MMS □□□□□□□ Mnesia □□□ SMS □□□□□□□□MMSc □□□ MMS □□□□□□□□□□□□□□

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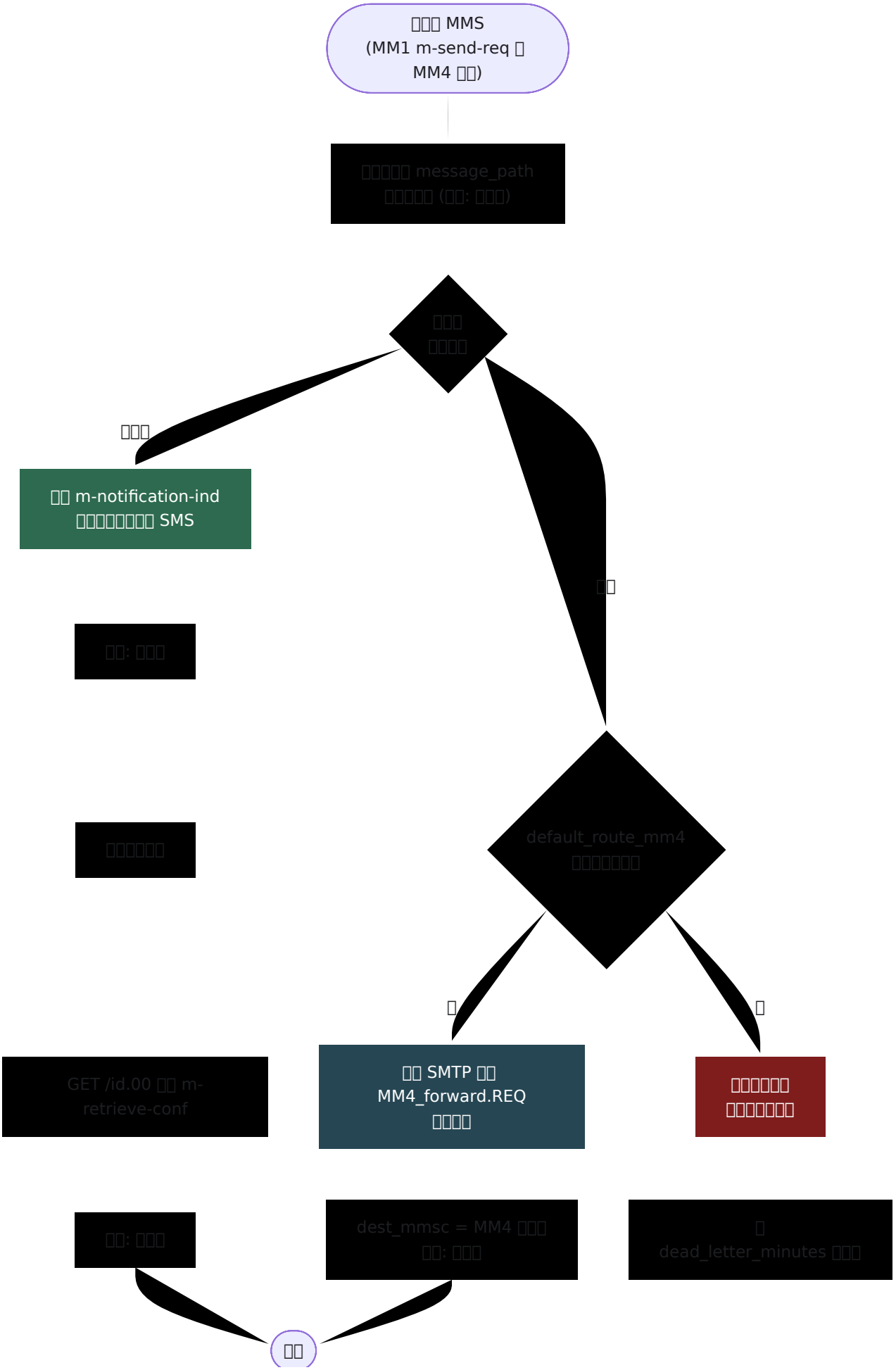
□□□□□ MMS□□□□□□□ MM1□□□□□□□□ MM4□□□□□□□□


□□□ MMS
(MM1 m-send-req □
MM4 □□)
□□□□□ message_path
□□□□□ (□□: □□□)
□□□
□□□□
□□
□□ m-notification-ind
□□□□□□□□ SMS
□□: □□□
default_route_mm4
□□□□□□□□
□□□□□□□
□
□
GET /id.00 □□ m-
retrieve-conf
□□ SMTP □□
MM4_forward.REQ
□□□□
□□□□□□□
□□□□□□□□
□□: □□□
dest_mmsc = MM4 □□□
□□: □□□
□
dead_letter_minutes □□□
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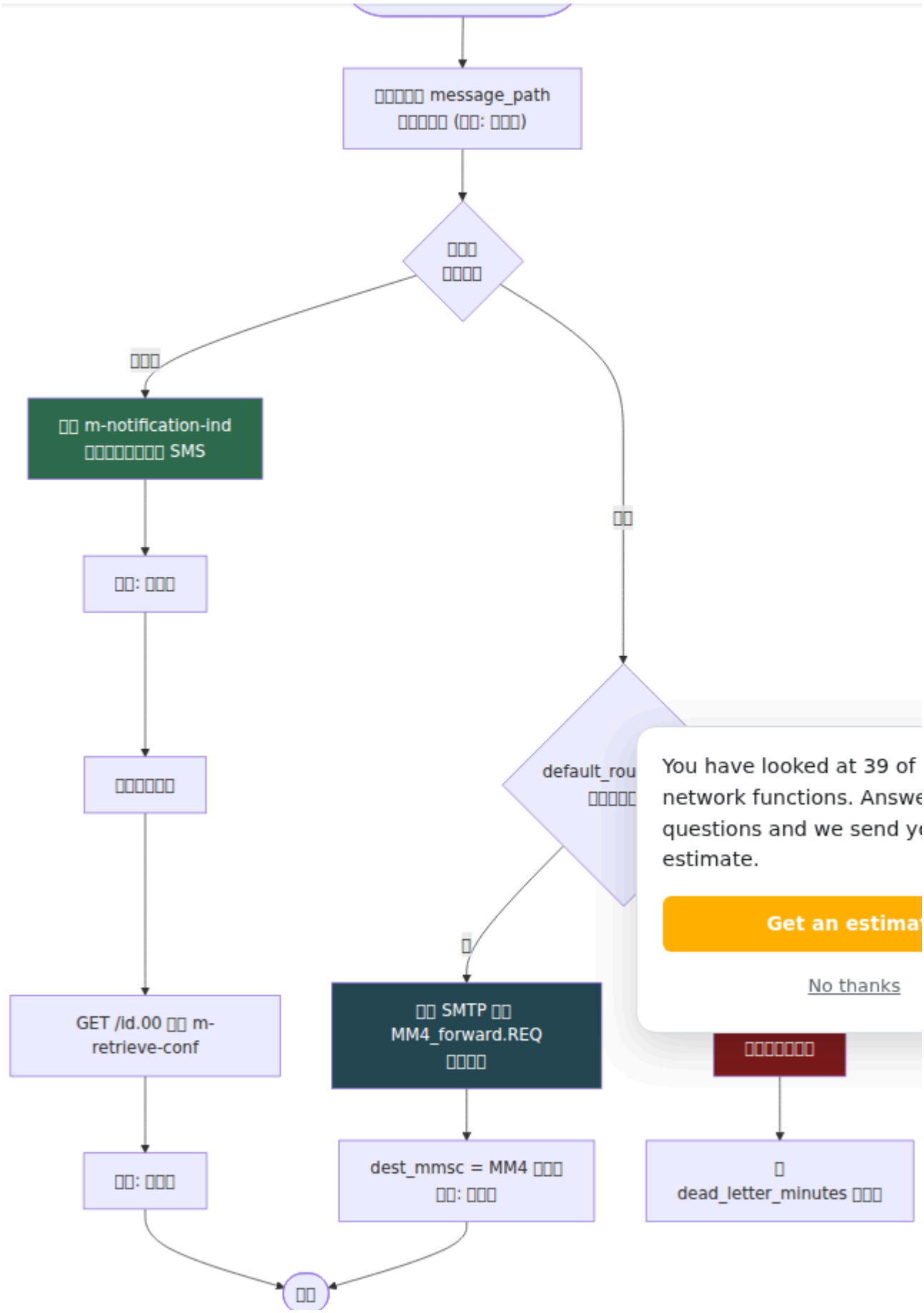
□□□□ (MM1)

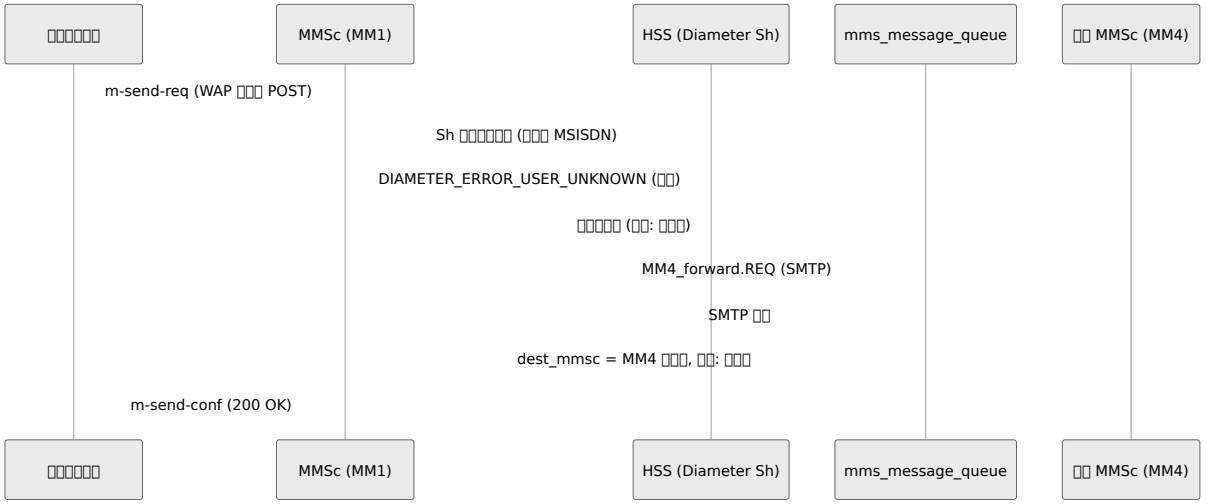
□□□□□□□□□□□□□□□ MMS□



You have looked at 39 of
network functions. Answe
questions and we send y
estimate.
Get an estima
No thanks

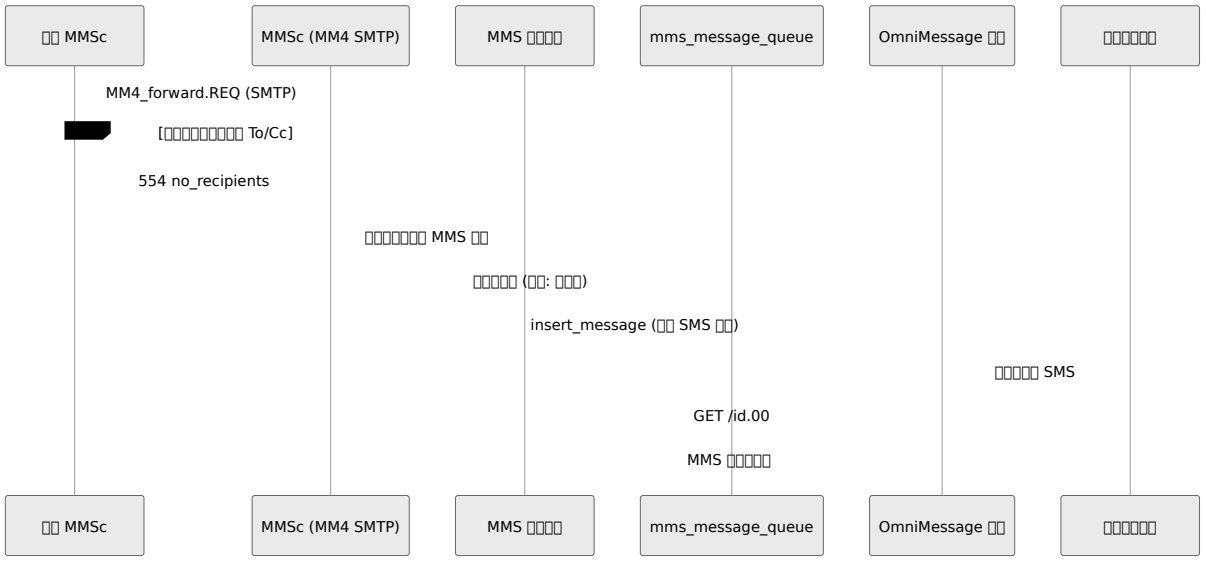
□□□□ (MM4)

□□□□□□□□□□□□□□□□ MMS□



□□ MM4 (□□□□□□□□)

□□□□□□□□□□□□□□□□ MMS□



- □□ □□□ SMTP □□□□□ (`RCPT TO`); □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□`To`/`Cc` □□□ □□□
- □□□: `To` + `Cc` □□□□□□□□ `recipient_list` □□□□□□□□□□ `m-retrieve-conf` □□□□ □□□□□□□□□□□□□□□□□□ MMS□
- □□: MIME □□□□□□ SMIL □□□□□□□□□□□□□□□□□□□□□□□□□□□□ WSP □□□□□□□□□□□□□□□□□□□□ UTF-8□

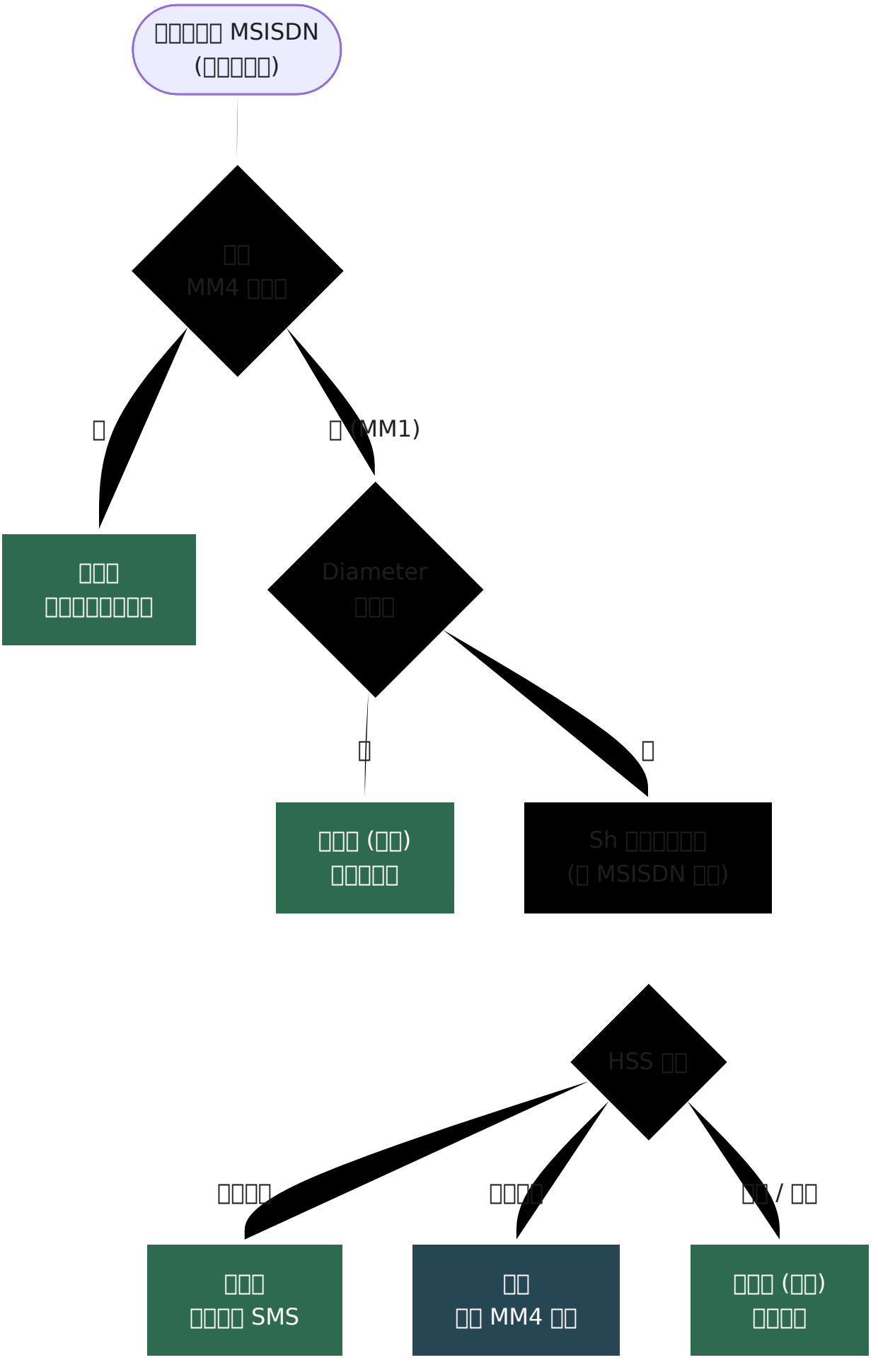
- □□□□□ `To`/`Cc` □□□□□□□□□□□□□□□□ `554` □□□□□□□□□

MMS □□

MMS □□□□□□□□ SMS□□□ **WSP** □□□ `m-notification-ind` PDU□□□□□ 8 □□□□□ (DCS `0x44`)□□□□□□□□ SMS □□□□□□□ MT SMS □□□□□□□□□□□□□□□□

□□/□□□□

□ MMSc □□□□□□□□□□□ MM4 □□□□□□□□□ **Diameter Sh** □ HSS □□□□□□□□□□□□□□□□□□□□□□ SMS-C □□ `terminating_network` □□□□□□□□□ Sh □□□□□ MMS □ SMS □□□□□□□□□□□□□


□□□□□□ MSISDN
(□□□□□□)
□□
MM4 □□□
□
□ (MM1)
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□□□□□□□□□
Diameter
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(□ MSISDN □□)
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□□□ (□□)
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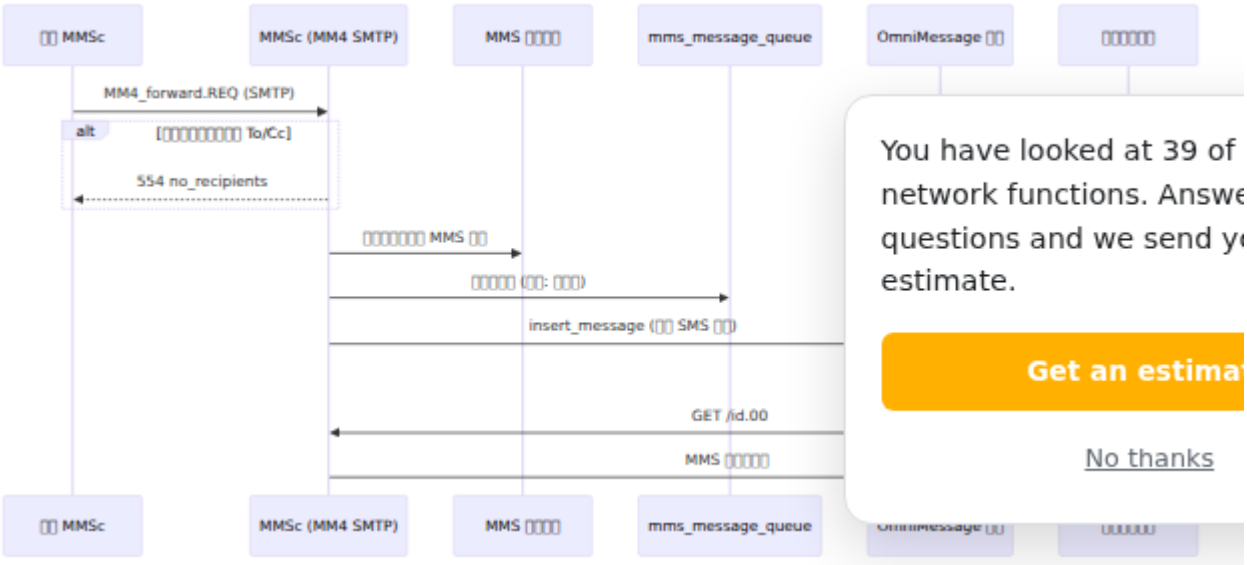
□□	□□	□□
MMS □□ MM4 □□	□□□	□□□□□□□□□□ SMS□□□□□□ MM4 □□
HSS □□□□	□□□	□□□□□□□□□□ SMS
HSS □□ `DIAMETER_ERROR_USER_UNKNOWN`	□□	□□□□□□□□ MM4 □□□□□□□
Sh □□□□□□□□	□□□ (□□)	□□□□□□□□□□□□□□□□
Diameter □□□	□□□ (□□)	□□□□□□□□□□ SMS□□□□□□

MM4 □□□□ HSS □□□□□□□□□□□□□□□□Diameter Sh □□□ SMS-C □□□ (`diameter_enabled` □ `:diameter_ex` □□□)□MMSc □□□□□□□□□□□

□□

□□□□ `runtime.exs` □□ `:sms_c` □□□□□ `:mmsc` □□□□ MMSc□□ □□□□□□□□□□□□□□□□ `:mmsc` □□□□□□□□□□□□□□□□□MMSc □□□□□□□□□□□□□□□□□



□□□□

```
# config/runtime.exs
config :sms_c, :mmsc,
  # □□
  enabled: true,
  port: 8080,
  host: "0.0.0.0",
  mms_domain: "mms.example.com",
  message_path: "/var/lib/omnimessage/stored_mms",
  notify_source_msisdn: "6675",
  dead_letter_minutes: 1440,

  # □□ MMSc: □□□ SMS □□□ SMS-C □□□□ API
  # (□□□ = □□□□□□□□□□□□□□□)
  notify_api_url: nil,

  # □□□□□ (MM1 □□□ IP □ MSISDN)
  subscriber_ip_api_urls: ["https://10.0.0.10:8443",
"https://10.0.0.11:8443"],

  # □□/□□ MM4 (□□□□)
  mm4_enabled: false,
  mm4_smtp_host: "0.0.0.0",
  mm4_smtp_port: 25,
  mm4_domain: "mms.example.com",
  default_route_mm4: nil
```

`:mmsc` □□

□□	□□	□□	□□	
`enabled`	□□□□	□	`false`	□□
`port`	□□	□	`8080`	MM A
`host`	□□□□	□	`0.0.0.0`	MM □
`mms_domain`	□□□□	□□□□□□	-	□ s
`message_path`	□□□□	□	`/var/lib/omnimessage/stored_mms`	□ □
`notify_source_msisdn`	□□□□	□	`6675`	□
`dead_letter_minutes`	□□	□	`1440`	□
`notify_api_url`	□□□□	□	`nil`	S h □ □ □

□□	□□	□□	□□	
`subscriber_ip_api_urls`	□□□□□□□□	□□□□□□□□	`[]`	□ □ □ □
`mm4_enabled`	□□□□	□	`false`	□ □
`mm4_smtp_host`	□□□□	□	`0.0.0.0`	□
`mm4_smtp_port`	□□□	□	`25`	□
`mm4_domain`	□□□□	□	□□□ `mms_domain`	□ □
`default_route_mm4`	□□□□	□	`nil`	□ □

MM4 □□□

□□ MM4 □□□□□□□□□□□□□□□□□□□□□□□□□□□□□/□□/□□□□□□□□□□□□□□□□

```
# config/runtime.exs
config :sms_c, :mmsc_mm4_peers, %{
  "carrier-a" => [
    %{host: "mm4.carrier-a.example.net", port: 25, mms_domain:
"mms.carrier-a.example.net"}
  ]
}
```

`mmsc.default_route_mm4` □□□□

□□	□□ **MMSc** □□□
`mmsc.notify_api_url`	SMS-C □ API □□ URL□□□ SMS □□□□□□ SMS-C □□□
`mmsc.host` / `mmsc.mm4_smtp_host`	□□□□□□□□□□□□□□□□□□ MM1 □ MM4 □□□□ □□□□□□
`cdr_enabled`	`false`□□□□□ Mnesia □□□ MMS □□□□□□ □□□□□□□□ SQL □□□□
`enum_enabled`	`false`□□□ SMS □□□□□□□□□ SMS□
Diameter (`diameter_enabled` + `:diameter_ex` □□□)	□□□□ Sh □□□□□□□□□ HSS □□□ DRA□□□□ □/□□□□□□□□□ Origin-Host □□□□□□□□□□
API / □□□□	□□□□□□□□□□□□□□□□□□□□□□□□□□

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- SMS-C API□□□□□□
- HSS API (`subscriber_ip_api_urls`)□□□□□□□□□
- □□ Diameter □□□ HSS □ DRA□□□□□/□□□

□□□□□□□□□□□□□□□□□`notifications` □□□ `error`□MM1 □□□□□ `511`□□□□□□ `sh_error`□

□□

MMS □□□ □□□ Mnesia □ `:mms_message_queue` □□□□□□□□□□□□□□ SMS □□□□□□□□□□ □□□□□□□□□□□□□ MMS □□ □□□ `.mms` □□□ `message_path` □□□□□□□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□ MMS □□□□□□□□□□□□□□□□□□□□□□□□ `unique_id`□□□□□□□□□□□ □□□□□□□□□□□□

`mms_message_queue` □□

□□	□□
`mms_id`	□□ Mnesia □□□□□□□□□□
`unique_id`	□□□□□□□□□□□□□□□□ URL □□ (`<unique_id>.00`)□
`source_msisdn`	□□□□□□ MSISDN□
`destination_msisdn`	□□□□□ MSISDN□
`recipient_list`	□□ MMS □□□□□□□□ To/Cc □□ (CSV)□
`subject`	MMS □□□□
`file_path`	□□□ `.mms` □□□ `message_path` □□□□□
`source_mmsc`	□□□□□ MMSc □ MM4 □□□□□□□
`dest_mmsc`	□□□□□□□□□ `MM4_<peer>`□□□□□□□□□□□□□□□
`on_net`	MMSc □□□□□□□□□□□□
`notify_message_ids`	□□□□□□ SMS □□ ID□□□□ SMS □□□□□□
`send_time`	□ MMSc □□□ MMS □□□□
`notify_time`	□□□□□□ SMS □□□□
`retrieve_time`	□□□□□ MMS □□□□
`expires`	MMS □□□□□□□□□□
`status`	□□□□□□□□□□□□
`deadletter`	□□□□□□□□□□□□□

□□	□□
`inserted_at` / `updated_at`	□□□□□□□□□□

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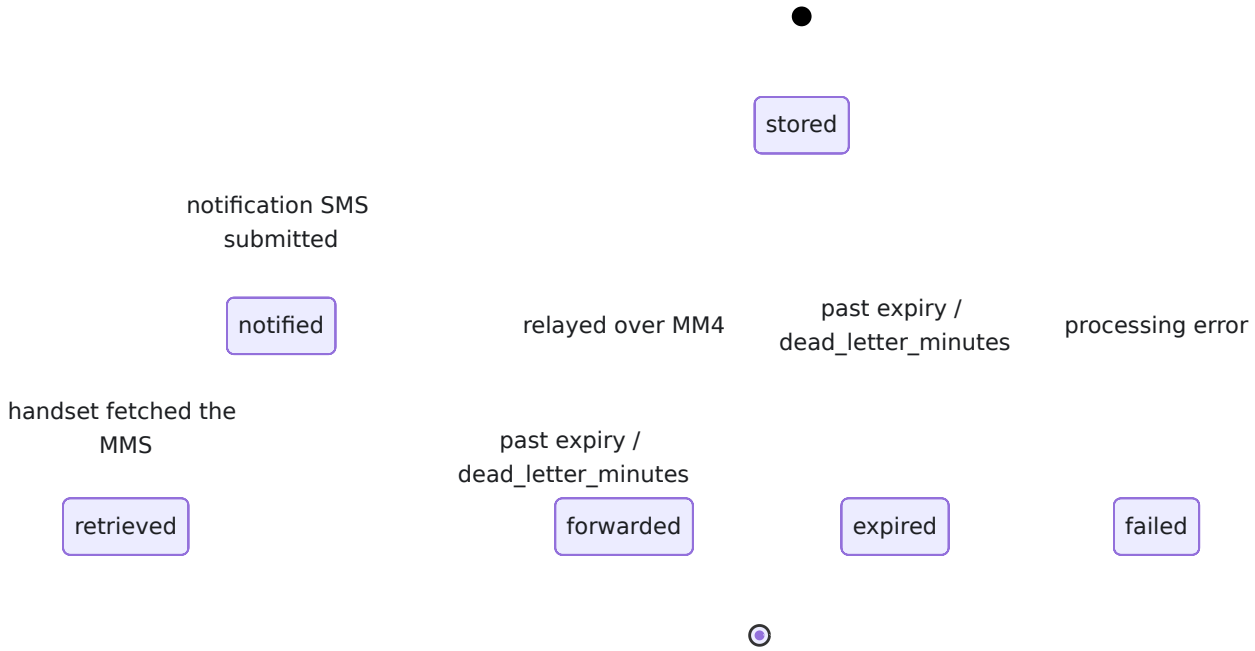

□□	□□
`stored`	□□□□□□□□□□□□□□□□□□□□□□□□□□
`notified`	□□ SMS □□□□□□□□□□□□□□□□
`retrieved`	□□□□□ MM1 □□□ MMS□
`forwarded`	□□ MM4 □□□□□□□□□
`expired`	□□□□□□□□ `dead_letter_minutes` □□□□□
`failed`	□□□□□□□□

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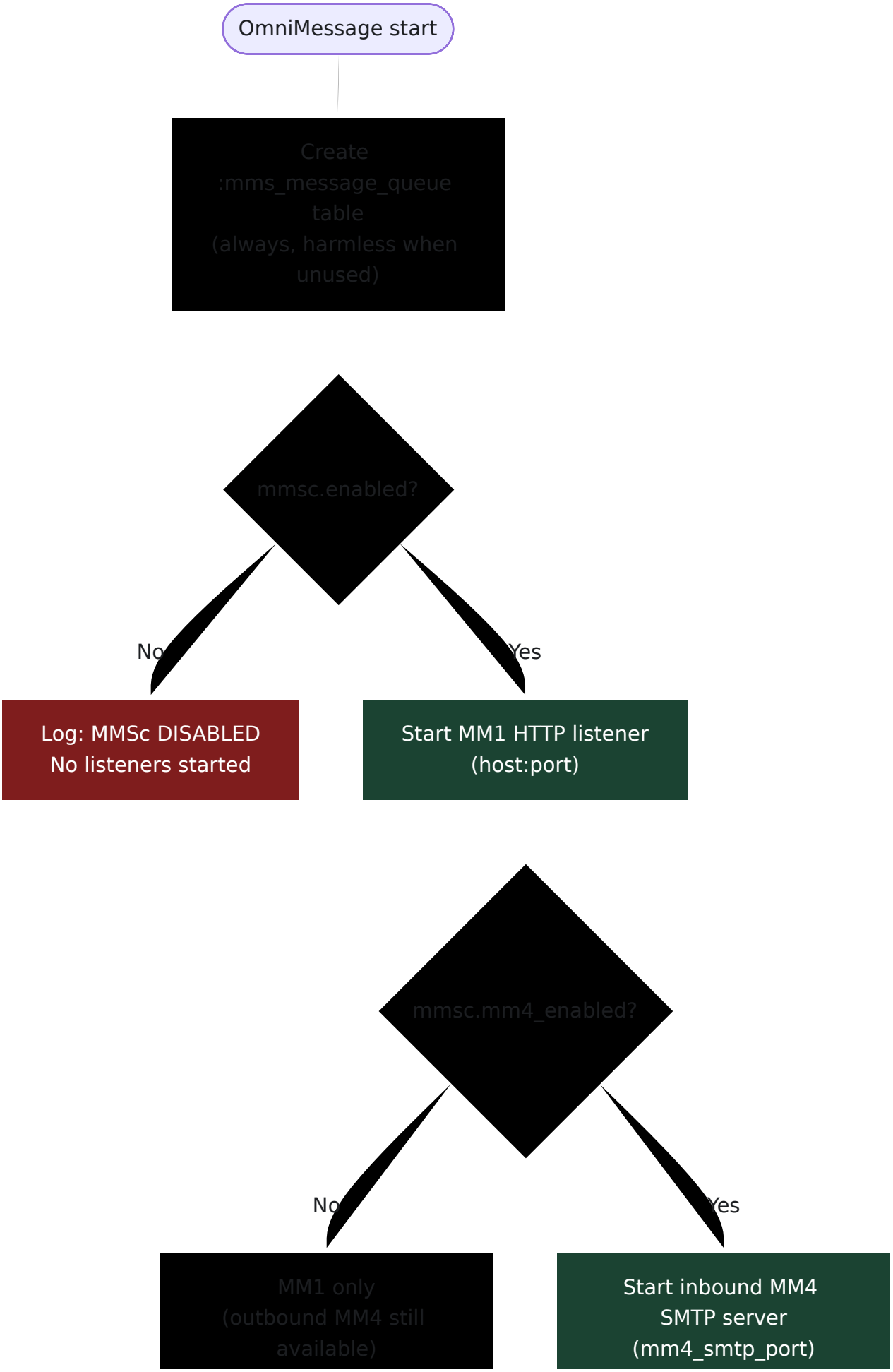
MMSc □□□□□□□□□ OmniMessage □□□□□□□□□


OmniMessage start
Create :mms_message_queue table (always, harmless when unused)
mmsc.enabled?
No
Yes
Log: MMSc DISABLED
No listeners started
Start MM1 HTTP listener (host:port)
mmsc.mm4_enabled?
No
Yes
MM1 only (outbound MM4 still available)
Start inbound MM4 SMTP server (mm4_smtp_port)

- **MM1 HTTP** □□□ □□ `mmsc.enabled` □ `true` □□□□□□□ `mmsc.host:mmsc.port` □ □□□□□□□□□□ `m-send-req` □□□□□□□□ `m-notifyresp-ind` □□□□□ `m-acknowledge-ind` □□□□□ `GET /<unique_id>.00` □□
- **MM4 SMTP** □□□ □□ `mmsc.enabled` □ `mmsc.mm4_enabled` □□ `true` □□□□□□□□ `mmsc.mm4_smtp_port` □□□□□□□□□□□□□□□ `MM4_forward.REQ` □□□
- □□ **MM4** □□ □□□□□□□□□□□□□□□□□□□□□□□□□□□ SMTP □□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□ □□□□□□□□□□□ MMSc □□□□□□□□□□□□□□□ `:mms_message_queue` □□□□□□□□□

□□□□□ □□ MM4 □□□25□□□□□□□□OmniMessage □□□□□□□□□□□□□□□□□□□□

□□	□□
`GET /api/mms_message_queues`	□□ MMS□□□□□□□□□□□□□ `status`□ `destination_msisdn`□ `limit`□□□ 100□□
`GET /api/mms_message_queues/<mms_id>`	□□ MMS □□□□□□□□□□□□□□□ □□□□□□□□□□□MM4 □□□□□□□ □□□□□□□□
`PATCH /api/mms_message_queues/<mms_id>`	□□ `status`□`dest_mmsc` □ `deadletter`□
`DELETE /api/mms_message_queues/<mms_id>`	□□□□□□□□□□□□□□□

□□	□□
`sender_lookup`	□□□□□□□□□□ IP □ OmniHSS □□□□□ URL□□□□□□□ MSISDN□
`received`	MM1□□□□ IP □ HTTP □□User-Agent□X-Forwarded-For□Host□□□□□□□□ `m-send-req` □□□□MM4□SMTP □□□□□□HELO □□□`MAIL FROM` / `RCPT TO`□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
`routing`	□□□□□□□□□□□Sh □□□□□□□ HSS□Sh □□□ Diameter □□□□□ MM4 □□□
`notify_part_submitted` / `notify_part_failed`	□□□□ SMS □□□□□□□□ UDH□SMS-C □□□□□ ID□□ □□□□□□□□□HTTP □□□ URL□□□□□□□□
`notify_submitted`	□□□□□□□□□□□□ ID□
`mm4_forwarded` / `mm4_failed`	□□□□□EHLO □□□`MAIL FROM` / `RCPT TO`□□ □□□□□□□□□□□□□□□□□□□□□□□□
`retrieved` / `retrieve_refused`	□□□□□□□□□□□□□□□□□□□□□□□□410 □□□□□□□□□□□□ □ IP □ HTTP □□□□□ IP □□□ MSISDN □□□□□□□□□ □□□□□□□□□□□□□□□□□□
`notifyresp` / `acknowledged`	□□□□□ `m-notifyresp-ind` / `m-acknowledge-ind`□□□□□□□□□□□□□□□

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MMSc □□□□ Prometheus □□□□□ 9568□□□□□□□□

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`sms_c_mmsc_mm1_requests_count`	□□□	`type`, `status`	□ PDU □□ □`m_send_req`□ `m_notifyresp_in` `m_acknowledge_i` `retrieve`□□ HTTP □ MM1 □□□□□ `511` □□□□□□□□□□□□□
`sms_c_mmsc_notifications_count`	□□□	`result`, `transport`	□□□□□ SMS □□ □`transport`□`loca` □□□□□□ `api`□□
`sms_c_mmsc_mm4_forward_count`	□□□	`peer`, `result`	□□□□□ MMSc □ MM
`sms_c_mmsc_mm4_forward_duration_ms`	□□□	`peer`	□□□□□□□□□□□□
`sms_c_mmsc_mm4_inbound_count`	□□□	`result`	□□ MM4 □□□ `accepted`□ `no_recipients` □ `mm4_parse_faile`
`sms_c_mmsc_routing_decisions_count`	□□□	`decision`	□□□□□□□□□`on_net` `off_net`□`sh_erro` `diameter_disabl` `sh_error` □□□□□□ □□□□□□□□□□□□□□
`sms_c_mmsc_store_messages`	□□	`status`	□□□□□□ MMS□

□□ SMS □□□□□□ SMS-C □□□□□□□□□□□□ CDR □□□□□□ SMS □□□□□□□ □□□□□

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MMSc □□□

□□□ □□□□□□□□ MM1 □□□□□□□□□□□ `MMSc: DISABLED`□

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- `runtime.exs` □□□ `:mmsc` □□
- `mmsc.enabled` □ `false`□

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1. □□ `:mmsc` □□□□□□□ `enabled: true`□
2. □□□□□□□□□□□□□□□□□□ `MMSc: ENABLED`□□□□□□□□□□□□□□□

□□□□□□□□□ MMS

□□□ □□ SMS □□□□□□□□□□□□□□□□□□□□

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- `mms_domain` □□□□□□□□□□□□ MMS APN □□□□□□□
- □□□□□□□□□□□□ `mmsc.port`□
- □□□ `.mms` □□□ `message_path` □□□□

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1. □□□□ URL □□□`mms_domain`□□□□□□□□□□ MMS APN □□□
2. □□□ `mmsc.host:mmsc.port` □□□□□□□□□□ TLS □□□□□□□
3. □□□□ `status` □□□ `.mms` □□□□□□ `file_path`□

□□ MMS □□□

□□□ MMS □□□□□□□□□□□□□□□□□`status` □□□ `stored`□

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- `default_route_mm4` □□□□□□□□□□□□□□□
- `:mmsc_mm4_peers` □□□□□□□□□□□□□□□/□□□
- □□□□□□□□□□HSS □□□□□□□Sh □□□□□□□ Diameter □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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1. □ `default_route_mm4` □□□ `:mmsc_mm4_peers` □□□□□□□
2. □□□□□□□ `host`/`port` □□□□□□□□ SMTP□
3. □□ `diameter_enabled` □□□ Sh □□□□HSS □ DRA□□□□□□□□□□□□□□□□□□□□□□□□

□□ MM4 □□□□□□□□

□□□ □□□□□□□□□□ MM4 □□□

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- `mm4_enabled` □ `false`□□□ SMTP □□□□□□□□
- □□□ SMTP □□□ `To`/`Cc` □□□□□□□□□□□□□□□□□□□□ `554 no_recipients`□
- □□□□□□□□□□□□□ 25□
- □□□□□□□□□ SMTP□

□□□□□

1. □□ `mm4_enabled: true` □□□□□□□
2. □□ `CAP_NET_BIND_SERVICE` □□□□□□□□ `mm4_smtp_port`□□□□□□□□□□
3. □□□□□□□□□□□□□□□□□□□□ `mm4_smtp_port`□

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- `subscriber_ip_api_urls` □□□□□□□□□□□□□□□□□□□□ MSISDN□
- □□□□□□ HSS □□□□□□□□□□ IP □□□UE □□□□□□□□□ HSS □□□□
- OmniHSS API □□□□□□□□□□ 200 □□□

□□□□□

1. □□□□ OmniHSS □□□□ `subscriber_ip_api_urls` □□□□□□□□□□□□
2. □□□□□□□□□□□□□□□□□□□□/MSISDN □□□

SMS-C□□□□□□

← □□□□□□

□□

SMS-C□□□□□□

□□	□□	□□	□□
`rule_id`	□□	□□□□□□□□	□□□□□□
`calling_prefix`	□□□/nil	□□□□□□□□□□□□nil = □□□□□	□
`called_prefix`	□□□/nil	□□□□□□□□□□□□nil = □□□□□	□
`source_smsc`	□□□/nil	□SMSC□□□nil = □□□□□	□
`calling_match`	□□□/nil	□□□□□□□□□□□□□□□□□□□□□□□□□□□□TON/NPI□□	□
`calling_replace`	□□□/nil	□□□□□□□□□□	□
`called_match`	□□□/nil	□□□□□□□□□□□□□□□□	□
`called_replace`	□□□/nil	□□□□□□□□□□	□
`source_ton`	□□□/nil	□□□□□□□□□□□□□□□/□□ = □□□□□	□
`source_npi`	□□□/nil	□□□□□□□□□□□□□□□□□□□□/□□ = □□□□□	□
`priority`	□□	□□□□□□□1-255□□□□□□□□□□□□□	□
`description`	□□□	□□□□□□□□	□
`enabled`	□□□	□□/□□□□	□
`continue`	□□□	□□□□□□□□□□□□□□□□false□	□

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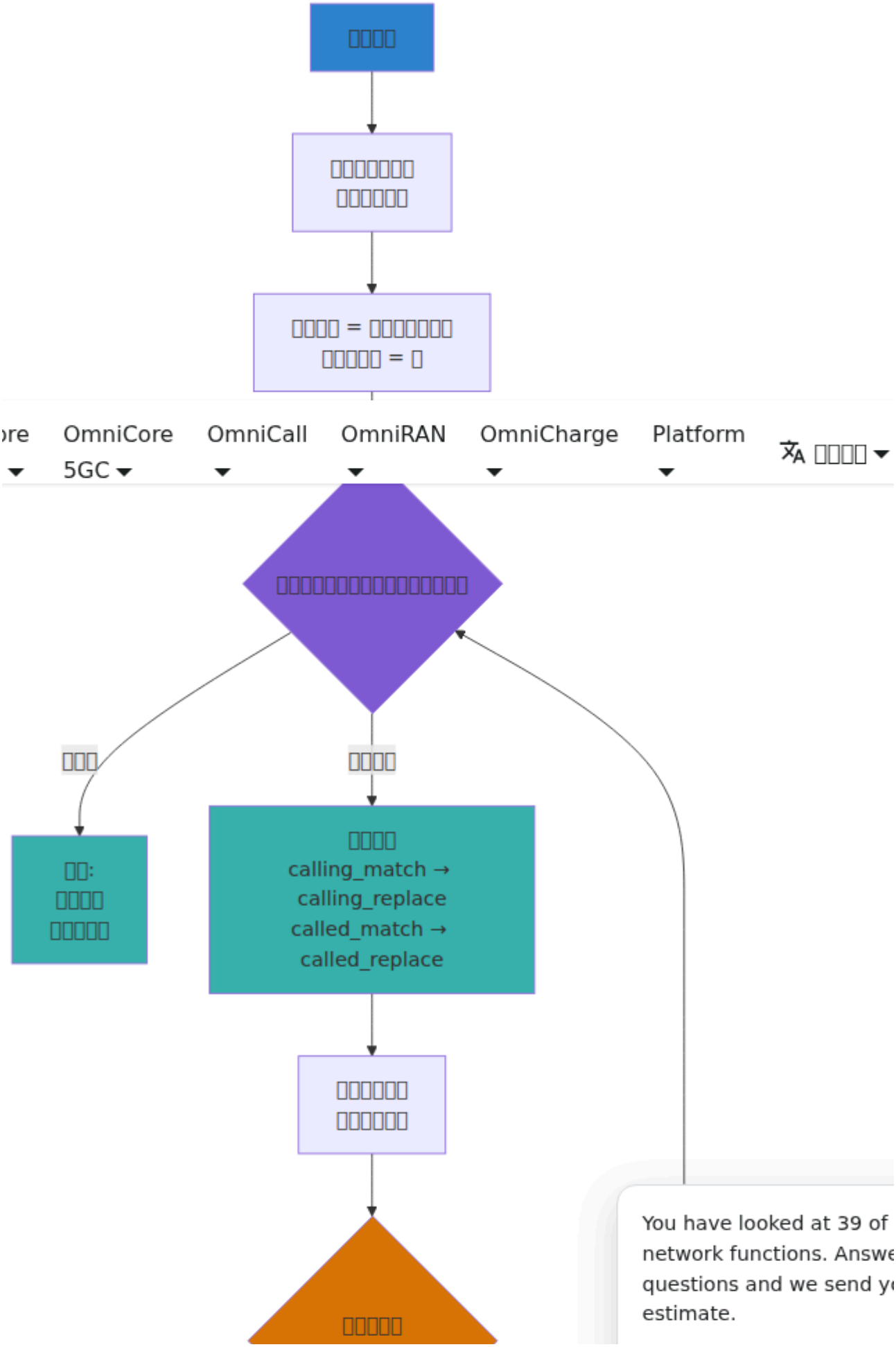
1. □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
2. □□□□□□□□□□□□□□□□□□
   - □□`calling_prefix`□□□□□□□
   - □□`called_prefix`□□□□□□□
   - □□`source_smsc`□□□□□□□
3. □□□□□□□□□□□□□□
   - □□`calling_match`□`calling_replace`□□□□□□□
   - □□`called_match`□`called_replace`□□□□□□□
4. □□□□□□□□
   - □□`continue: false` → □□□□□□□□□□□
   - □□`continue: true` → □□□□□□□□□□□□□□□□□□□□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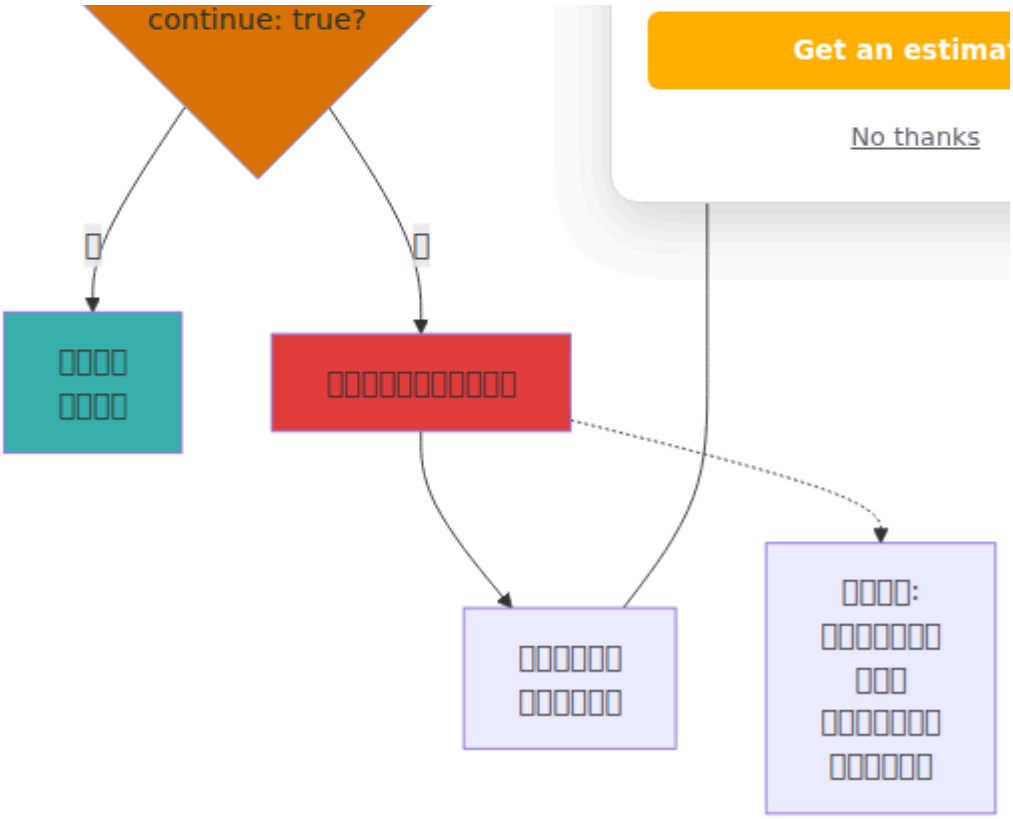

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- `nil`□□□□□□□□□□□□□□□□
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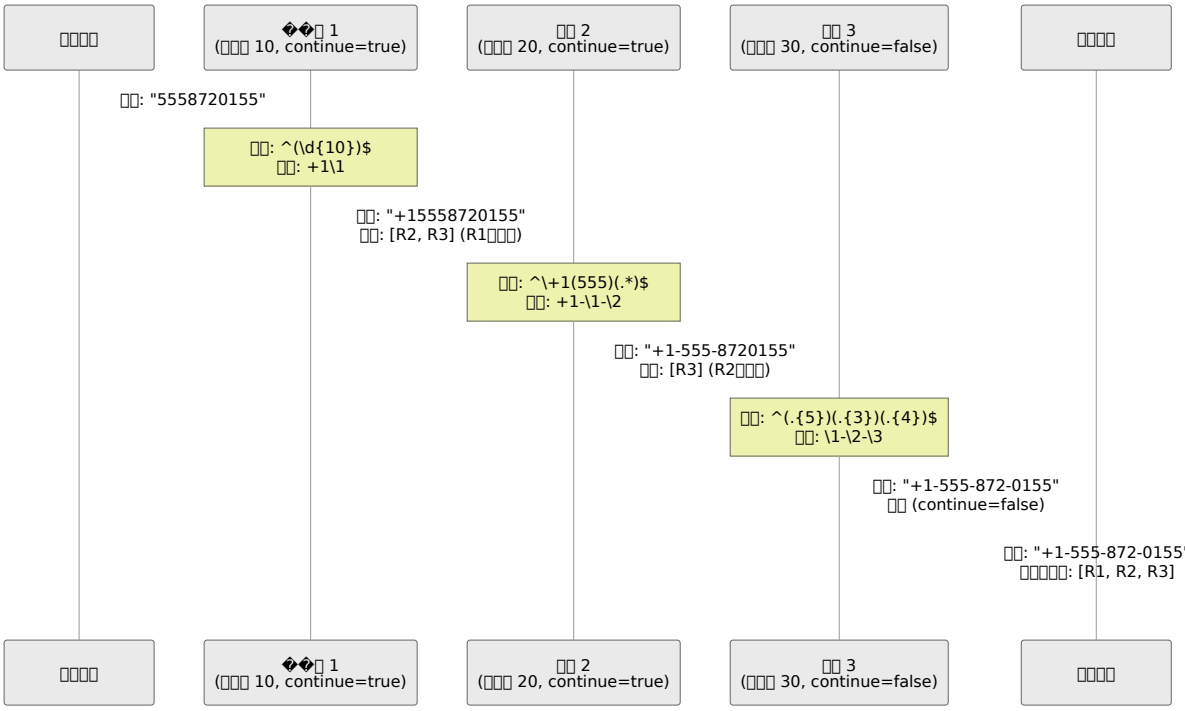
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□□: +1-\1-\2
□□: "+1-555-8720155"
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□□: \1-\2-\3
□□: "+1-555-872-0155"
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(□□□ 20, continue=true)
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`national`	□□□□□□□□□
`network_specific`	□□□□□□
`subscriber`	□��□□□
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`data`	□□□□□□□X.121□
`telex`	Telex□□□□
`land_mobile`	□□□□□□□□□E.212□
`national`	□□□□□□
`private`	□□□□□□
`ermes`	ERMES□□□□

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□□□□□□□□**□□□□□□□□`calling_match`□**□□□

- □□□□□□□`calling_match`□□□□□□□□□□□□□□□□□□□□`source_ton`/`source_npi`□□□□□□□□
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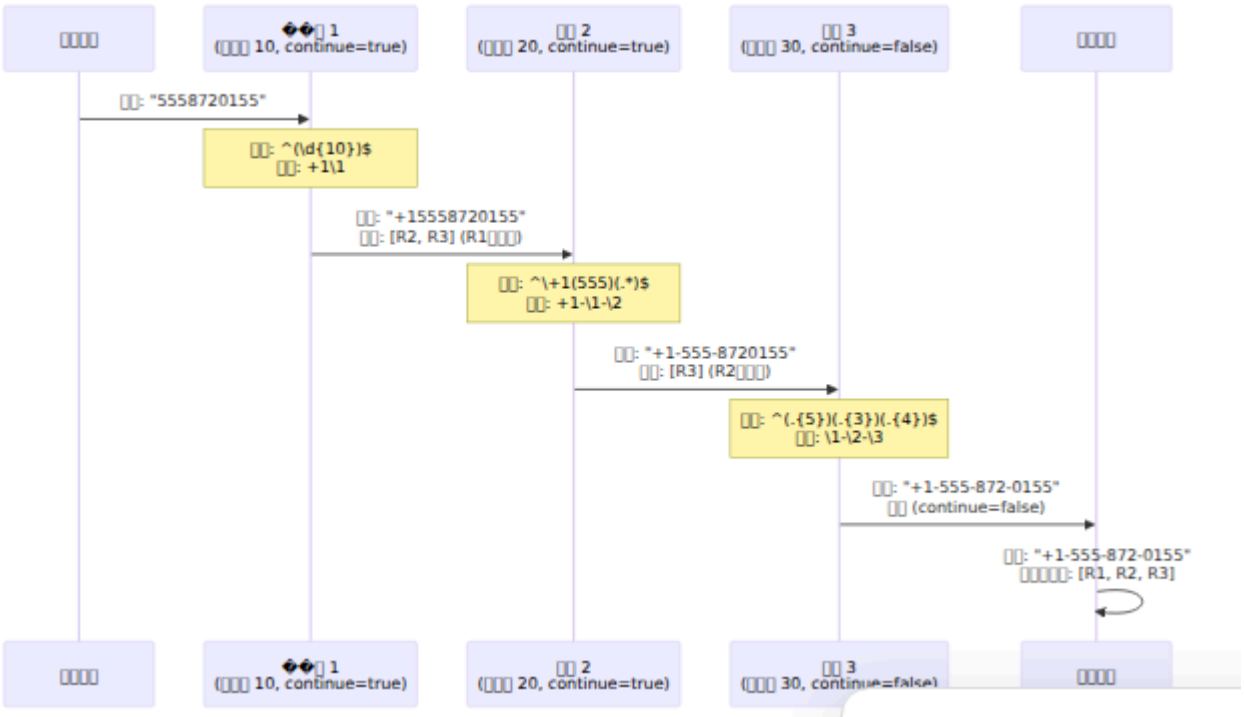
□□□□□□□□□`calling_match`□□□□□□□□`calling_replace`□□□□□□□□□□□□□□□□□□□



□`continue: true`□□□□□□□□□□TON/NPI□□□□□□□□□□

- **REST API** - `/api/translations`□□□□`source_ton`□`source_npi`□□□□□□□□□□□□
- □□ - `config :sms_c, :translation_rules`□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

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□□3-6□□□□□□□□□□□□□□TON/NPI `unknown`/`unknown`□□□□□□□□□□□□`calling_match`□□□□□□□`calling_replace`□□

□□□`config/runtime.exs`□□

```
config :sms_c, :translation_rules, [
  %{
    calling_match: "^\d{3,6}$",
    calling_replace: nil,
    source_ton: "unknown",
    source_npi: "unknown",
    priority: 5,
    continue: true,
    description: "□□□□3-6□□=> unknown/unknown TON/NPI",
    enabled: true
  }
]
```

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□□□**REST API**□□ - `POST /api/translations`□

```
{
  "calling_match": "^\d{3,6}$",
  "calling_replace": null,
  "source_ton": "unknown",
  "source_npi": "unknown",
  "priority": 5,
  "continue": true,
  "description": "□□□□□□□□3-6□□=> unknown/unknown TON/NPI",
  "enabled": true
}
```

API□□□□□□□□□□□□□□□□□□ `rule_id` □□TON/NPI□□□□□□□□□□

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□□□□□□□□□□□□□□□□□□ `national` / `isdn` □□□□□□□□

□□□ **`config/runtime.exs`** □□

```
%{
  calling_prefix: "07",
  calling_match: "^07\d{8}$",
  calling_replace: nil,
  source_ton: "national",
  source_npi: "isdn",
  priority: 20,
  continue: false,
  description: "□□07xxxxxxxx□□ => national/isdn",
  enabled: true
}
```

□□□□□□ `calling_prefix: "07"` □□□□□□□□ `07` □□□□□□□ `calling_match` □□□□□□□□□□□□□□□□ `07` □□8□□□□□□□□□□□□□□□□□□□□ `national` / `isdn` □□□□□□□□ `international` / `isdn` □□□□□□□□□□□□□≥ 5□□□□□□□□□□□□

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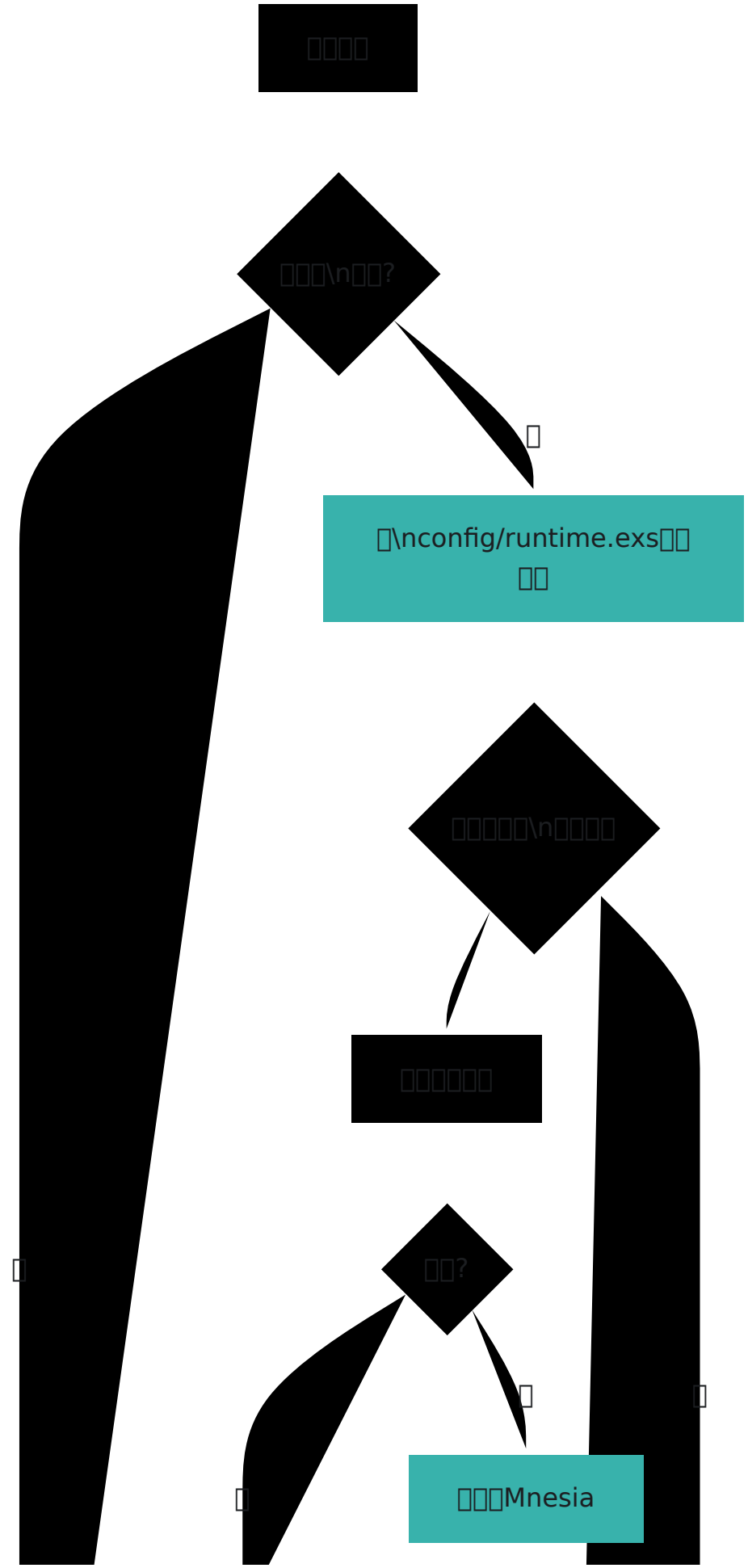
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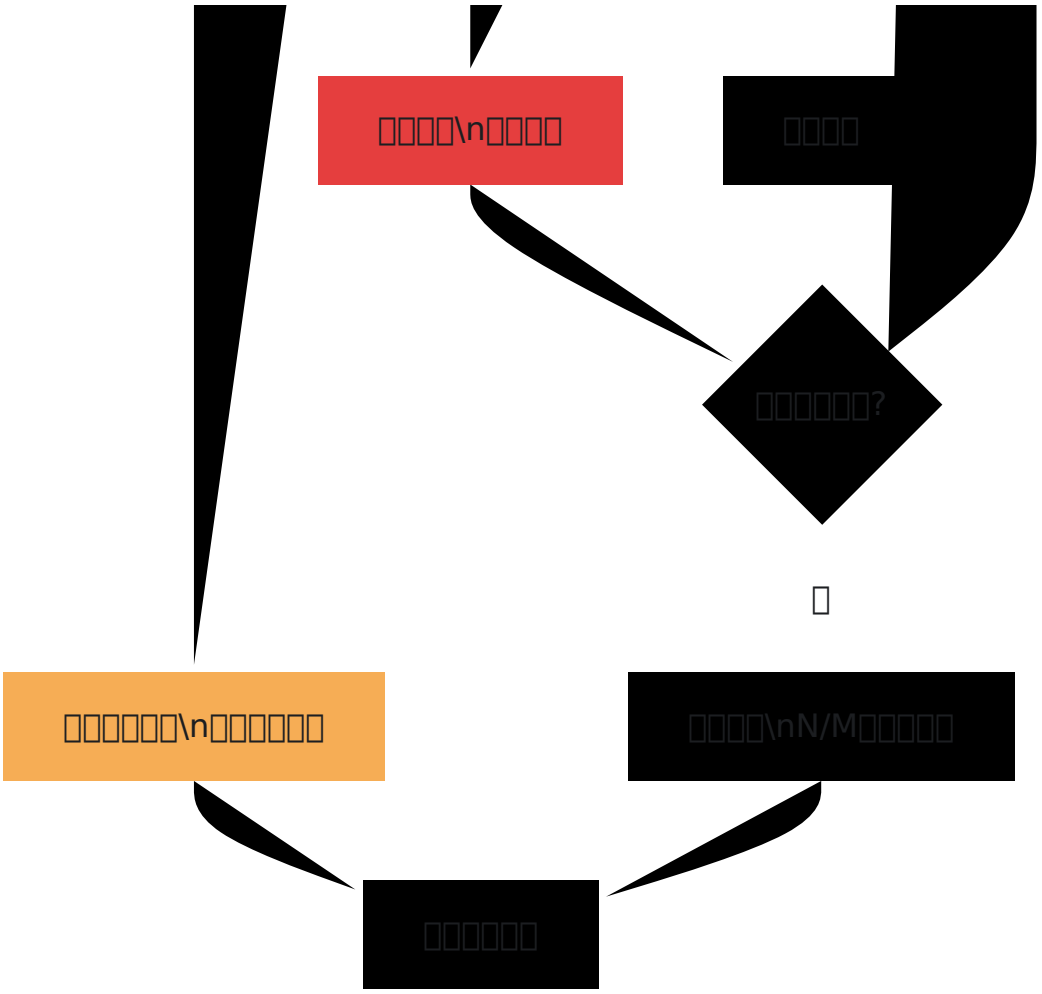
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```
# config/runtime.exs
config :sms_c, :translation_rules, [
  # □10□□□□□□□□+1
  %{
    calling_prefix: nil,
    called_prefix: nil,
    source_smsc: "us_domestic_smsc",
    calling_match: "^(\d{10})$",
    calling_replace: "+1\1",
    called_match: "^(\d{10})$",
    called_replace: "+1\1",
    priority: 10,
    description: "□□□□□SMSC□10□□□□□□□+1",
    enabled: true,
    continue: false
  },

  # □□□□□□□□□□□□
  %{
    calling_prefix: "00",
    called_prefix: nil,
    source_smsc: nil,
    calling_match: "^00(.+)$",
    calling_replace: "+\1",
    called_match: nil,
    called_replace: nil,
    priority: 5,
    description: "□00□□□□□□□+",
    enabled: true,
    continue: true  # □□□□□□□□
  },

  # □□□□□□□□□unknown/unknown TON/NPI□□□□□□□□□
  %{
    calling_match: "^\d{3,6}$",
    calling_replace: nil,
    source_ton: "unknown",
    source_npi: "unknown",
    priority: 6,
    description: "□□□□3-6□□=> unknown/unknown TON/NPI",
    enabled: true,
    continue: true
  },
```

```
  # □□□□□□□□□□□□□□
  %{
    calling_prefix: "+44",
    called_prefix: "+44",
    source_smsc: nil,
    calling_match: "^\+44(.*)$",
    calling_replace: "0044\1",
    called_match: "^\+44(.*)$",
    called_replace: "0044\1",
    priority: 20,
    description: "□□□□□□□□□□□□□□",
    enabled: true,
    continue: false
  }
]
```

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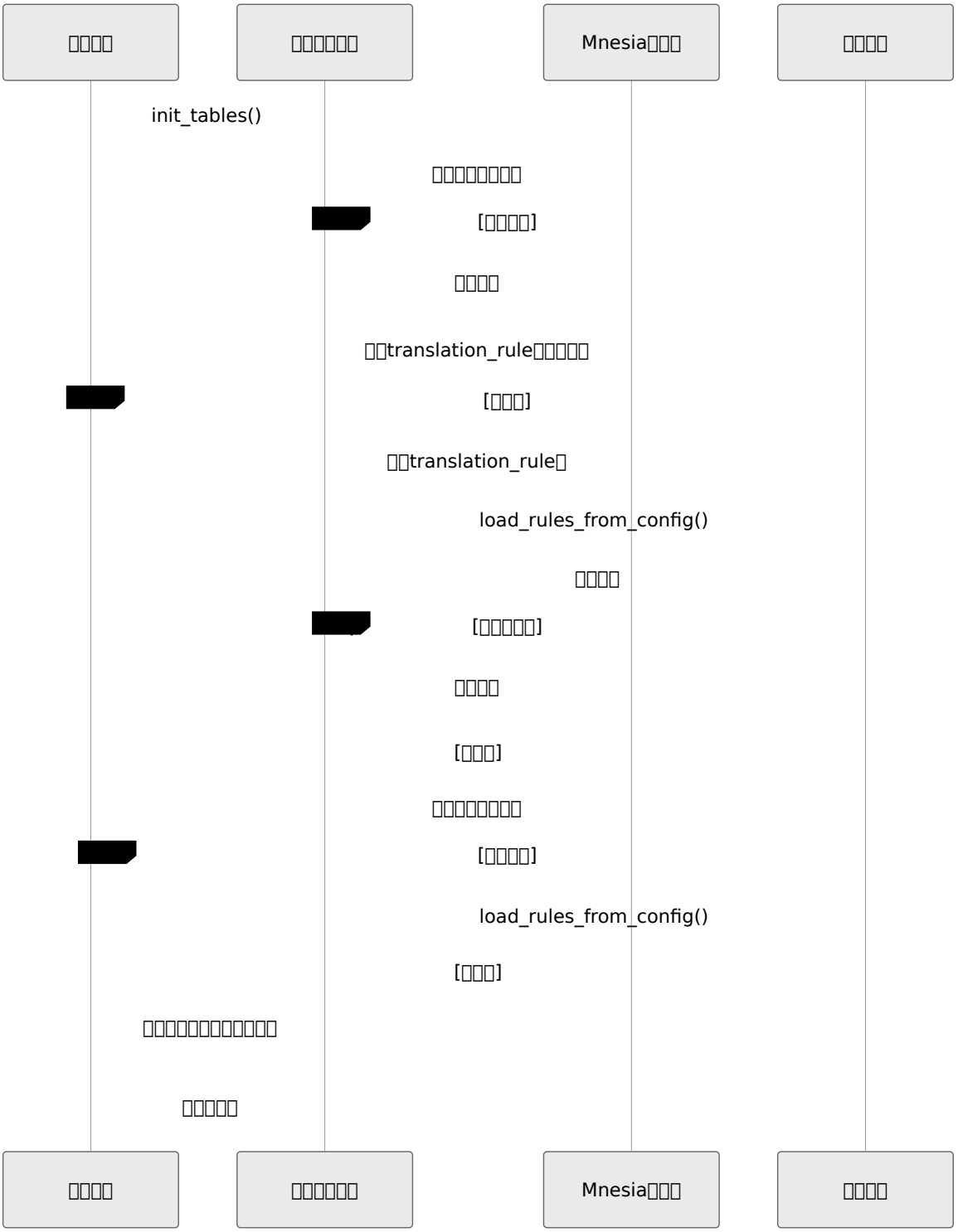
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init_tables()
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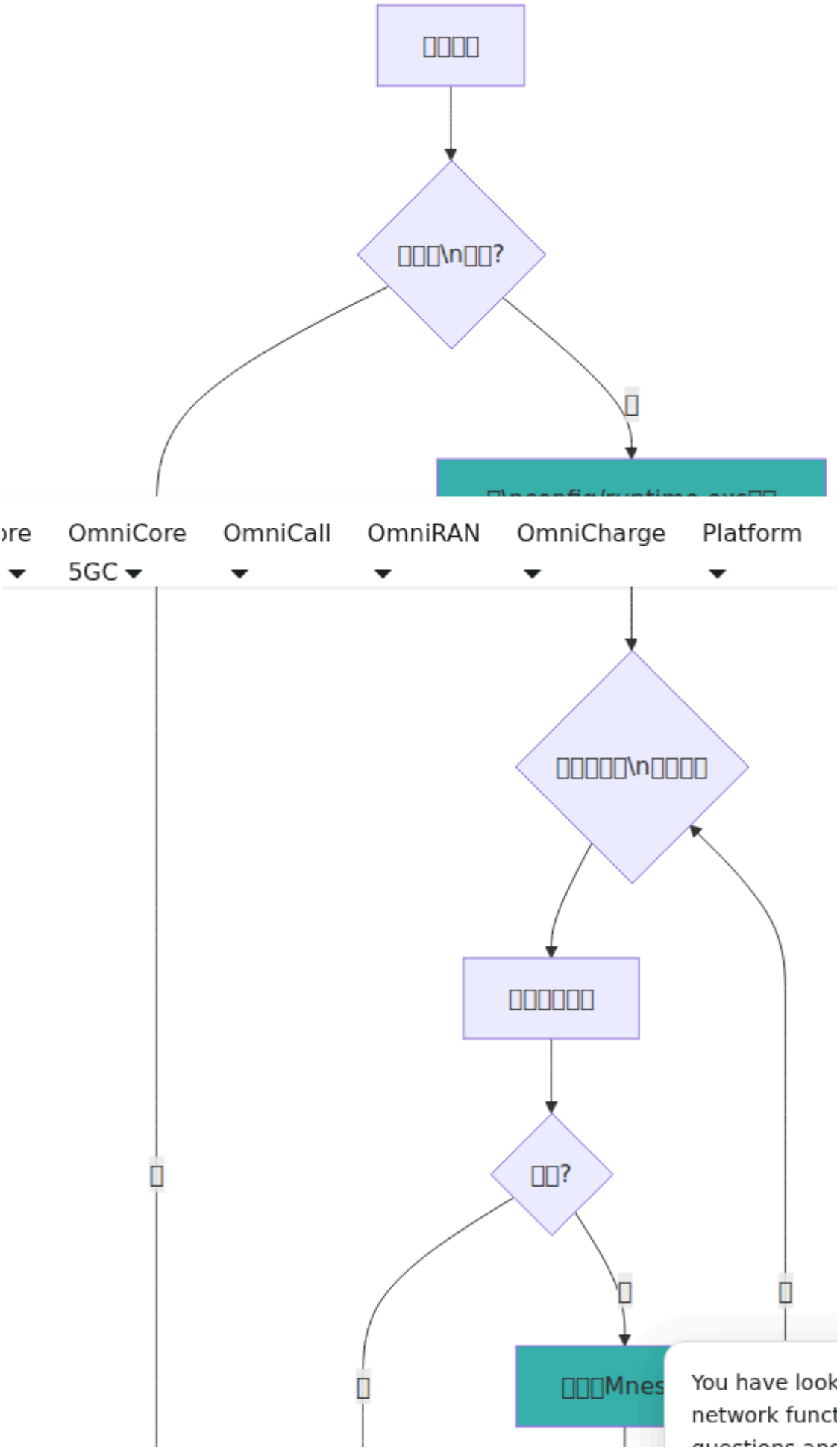
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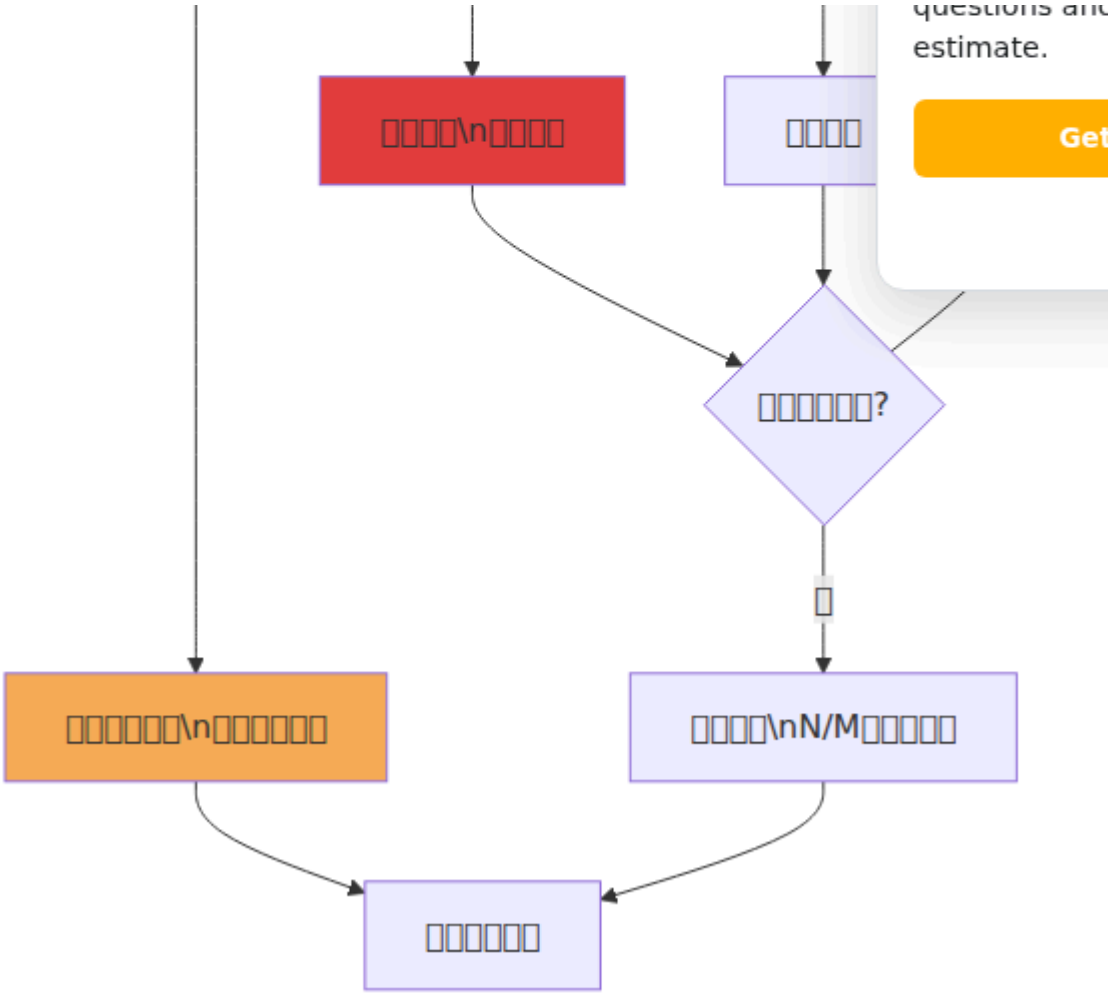

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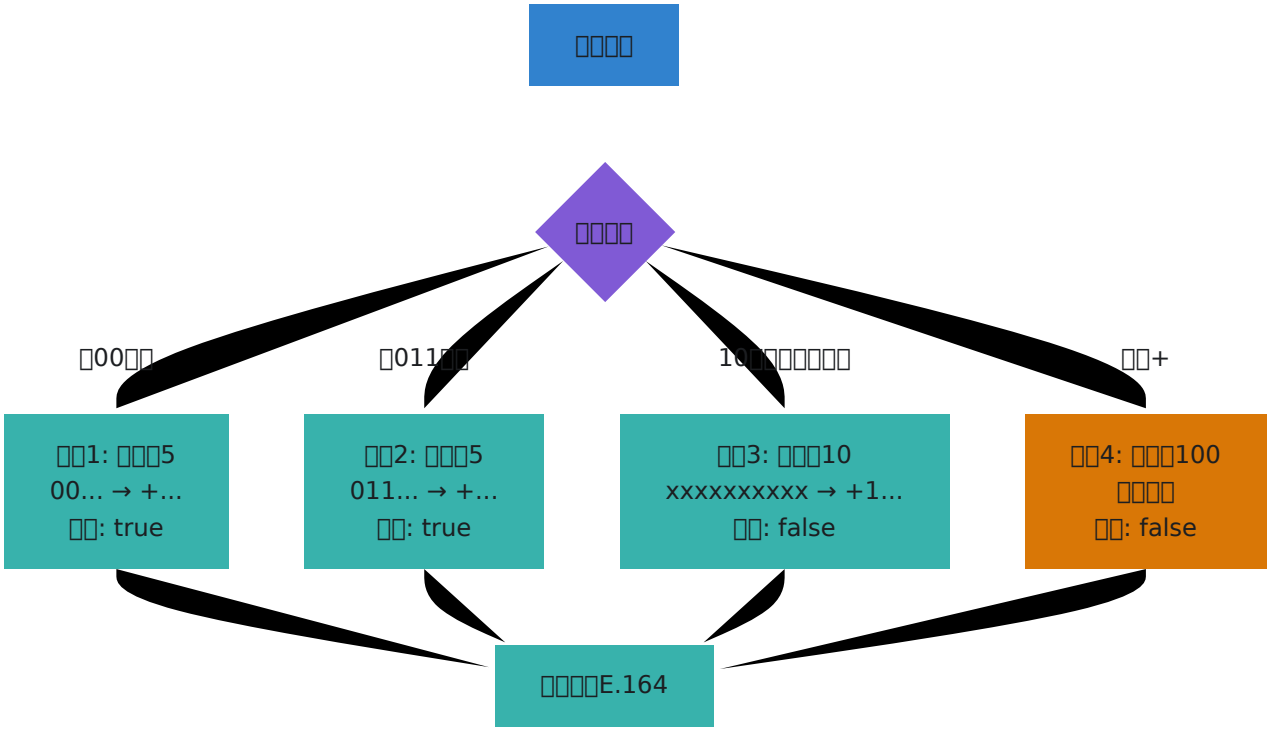
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□□2: □□□5
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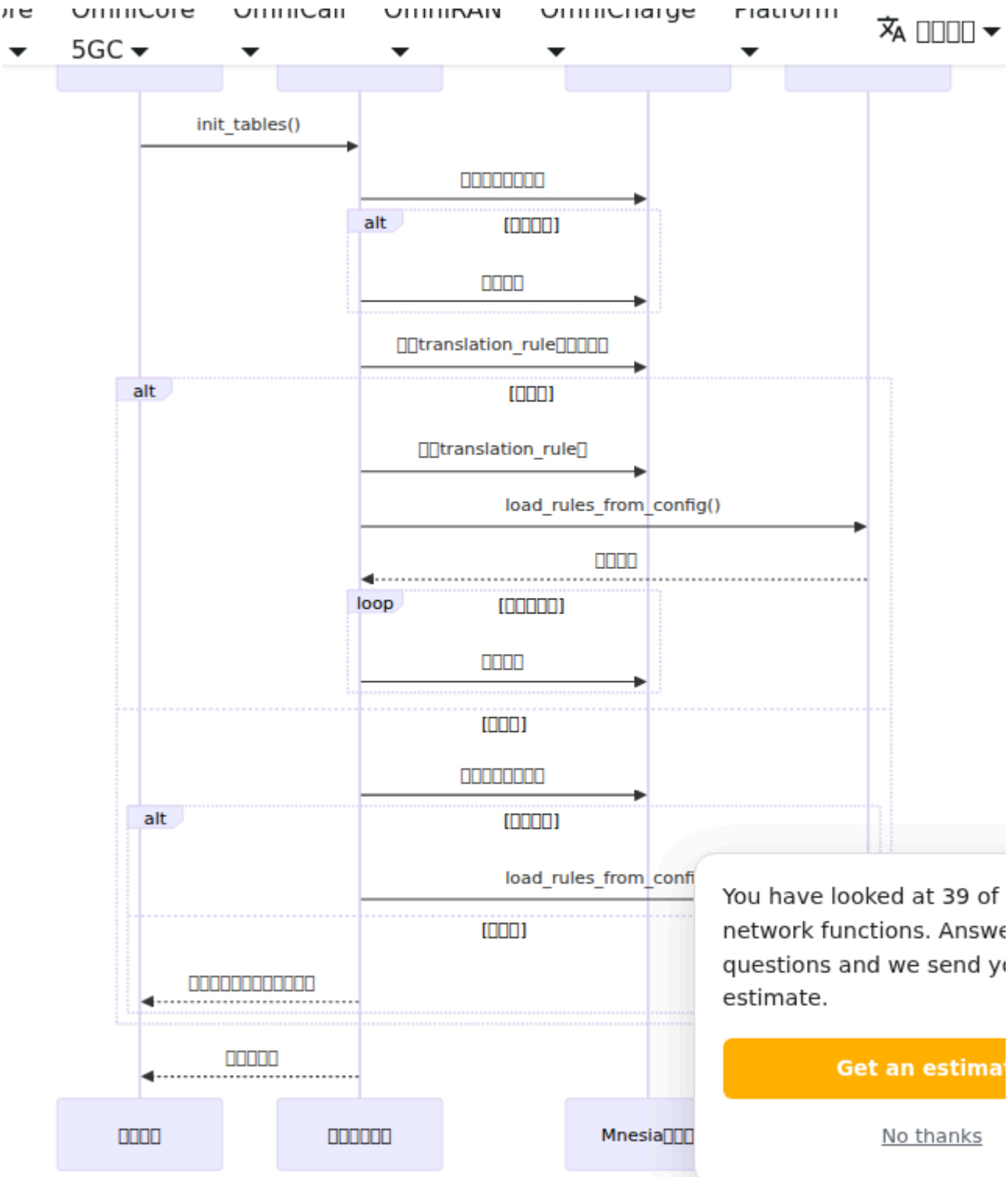
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init_tables()
alt
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Mnesia□□□
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network functions. Answe
questions and we send y
estimate.
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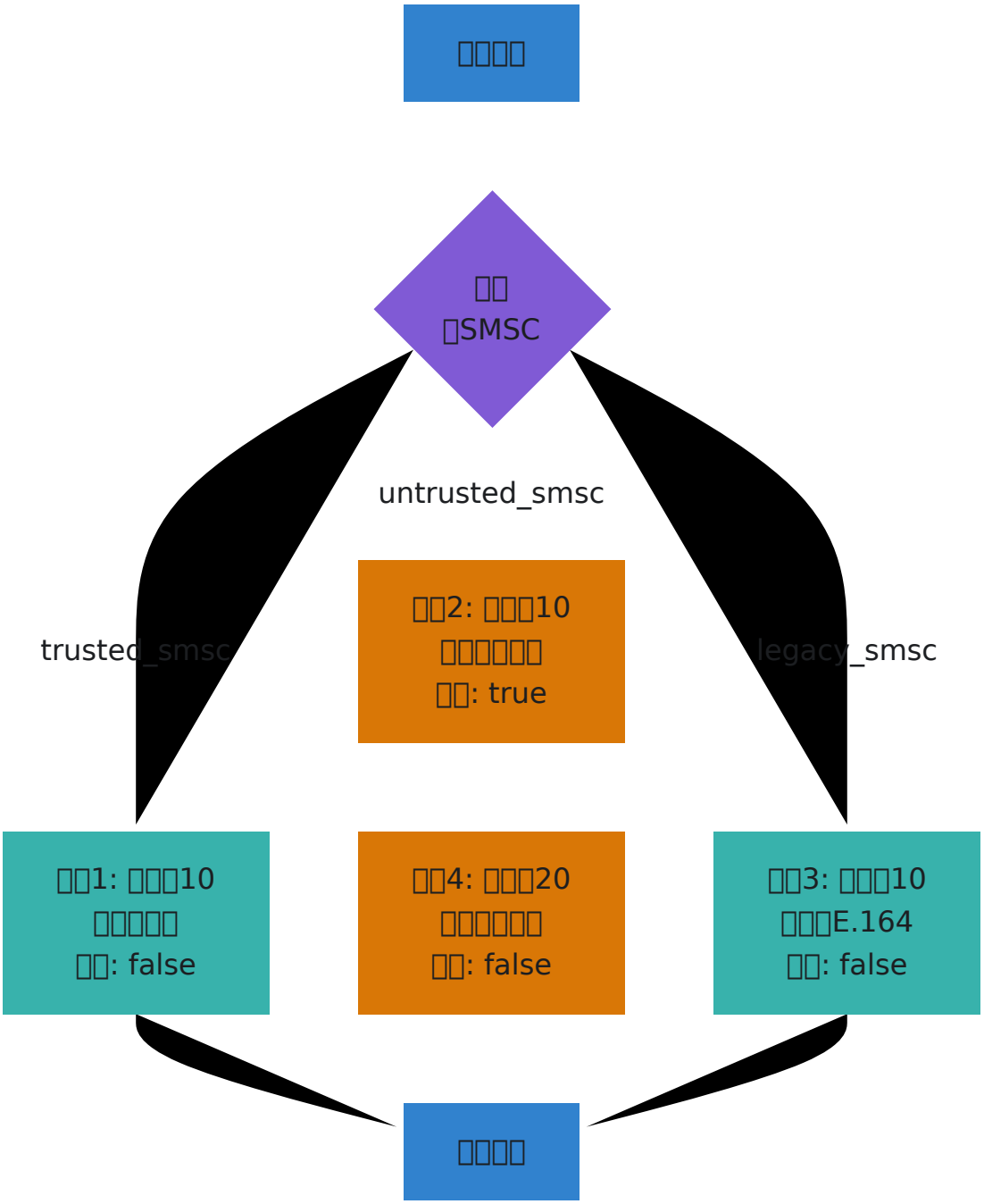
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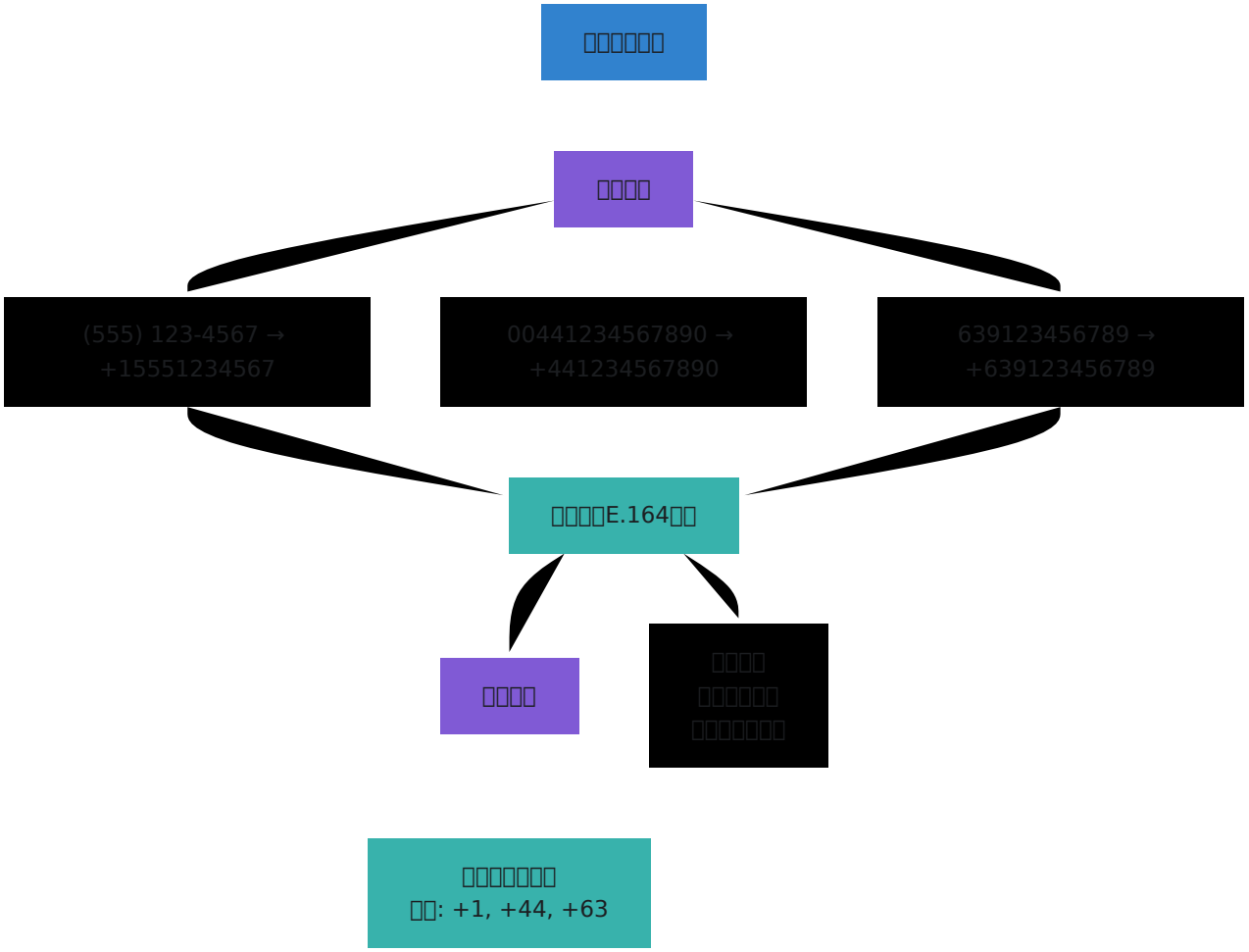
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00441234567890 →
+441234567890
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+639123456789
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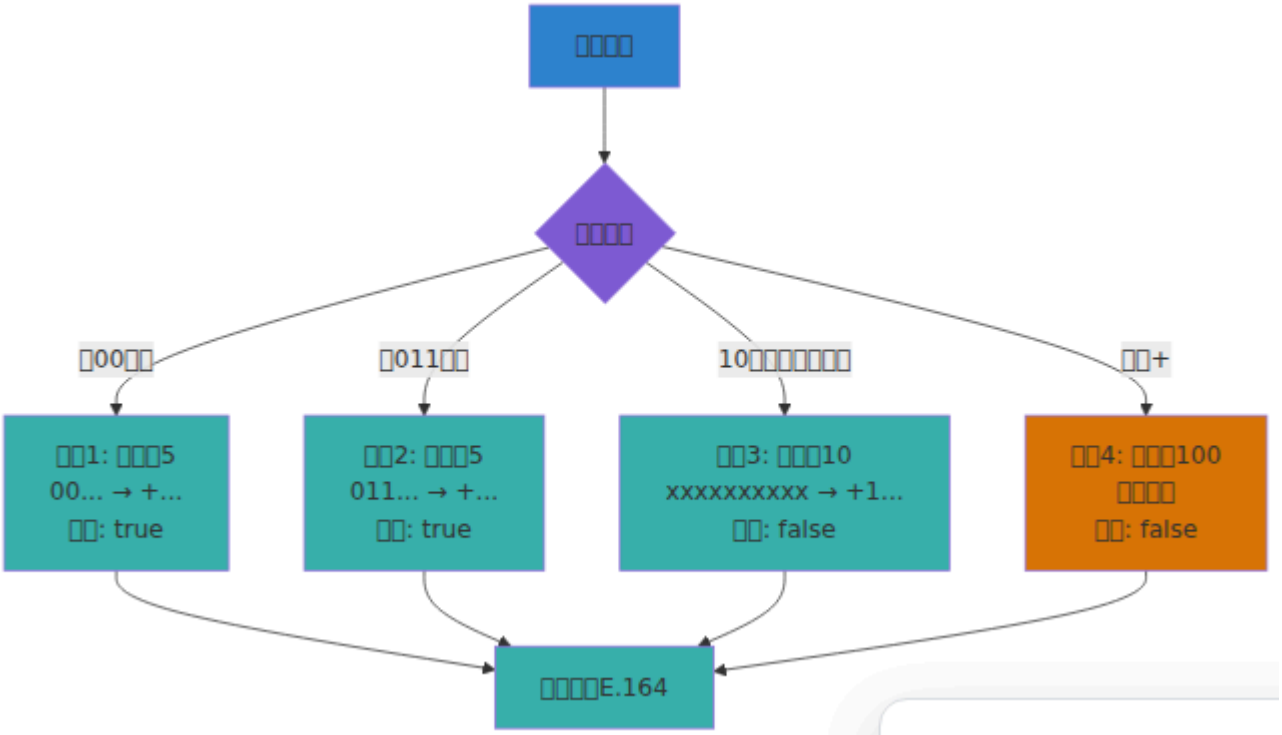

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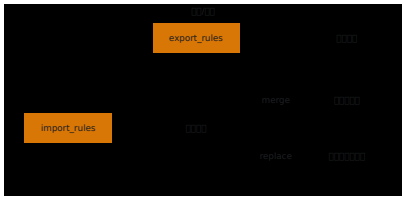





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translate_numbers□□□□□□□

- `calling_number`□□□□□□□□□□□□
- `called_number`□□□□□□□□□□□□
- `source_smsc`□□□□□□SMSC□□□
- `message_id`□□□□□□□□□□□

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- `{:ok, translated_calling, translated_called, overrides, [rules_applied]}` - □□□□
- `overrides`□□□□□□`%{source_ton:, source_npi:}`□□□□□□□□□□□□□□□□□`nil`□□□□□□□□□□□□□□□□□□
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```
# □□□□
{:ok, new_calling, new_called, _overrides, rules} =
  NumberTranslation.translate_numbers(
    calling_number: "5551234567",
    called_number: "5558720155",
    source_smsc: "domestic_gateway",
    message_id: "msg_123"
  )

# □□□□□□□□□□□□
if rules != [] do
  Logger.info("□□□ #{length(rules)} □□□□□")
  Enum.each(rules, fn rule ->
    Logger.info("  - □□ ##{rule.rule_id}: #{rule.description}")
  end)
end
```

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```
# □□□□□□
{:ok, rule} = NumberTranslation.add_rule(%{
  calling_prefix: nil,
  called_prefix: nil,
  source_smsc: "gateway1",
  calling_match: "^(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^(\d{10})$",
  called_replace: "+1\1",
  priority: 10,
  description: "□10□□□□□+1",
  enabled: true,
  continue: false
})

# □□□□
{:ok, updated_rule} = NumberTranslation.update_rule(rule_id, %{
  enabled: false,
  description: "□□□□□"
})

# □□□□
:ok = NumberTranslation.delete_rule(rule_id)

# □□□□□□
rule = NumberTranslation.get_rule(rule_id)

# □□□□□□
all_rules = NumberTranslation.list_rules()

# □□□□□□□□□□□□□□□□□□
enabled_rules = NumberTranslation.list_enabled_rules()
```

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```
# □□□□□□□
backup = NumberTranslation.export_rules()
# □□: %{
#   version: "1.0",
#   exported_at: ~U[2024-01-15 10:30:00Z],
#   count: 5,
#   rules: [...]
# }

# □□□JSON□□
json = Jason.encode!(backup, pretty: true)
File.write!("translation_rules_backup.json", json)

# □□□□□□□□□□□□□□□□
{:ok, %{imported: 3, failed: 0}} =
  NumberTranslation.import_rules(backup, mode: :merge)

# □□□□□□□□□□□□□□□□
{:ok, %{imported: 5, failed: 0}} =
  NumberTranslation.import_rules(backup, mode: :replace)
```

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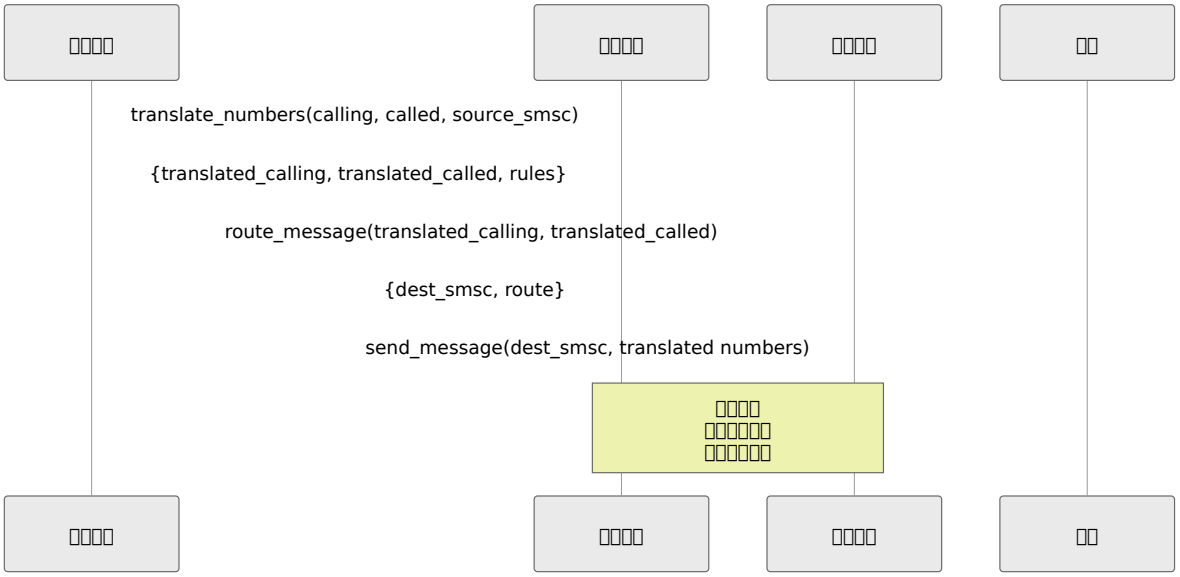

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- `translation_started`: □□□□
- `translation_candidates`: □□□□□□□□
- `translation_matched`: □□□□□□□□□
- `translation_calling`: □□□□□□□
- `translation_called`: □□□□□□□
- `translation_continue`: □□□□continue=true□□□□□
- `translation_none`: □□□□□□□

□□□`message_id`□□□`translate_numbers/1`□□□□□

Telemetry□□

□□Telemetry□□□□□□□□

```
:telemetry.attach(
  "number-translation-handler",
  [:sms_c, :number_translation, :translate, :stop],
  fn _event_name, measurements, metadata, _config ->
    # measurements: %{duration: □□}
    # metadata: %{rules_applied: □□, ...}
  end,
  nil
)
```

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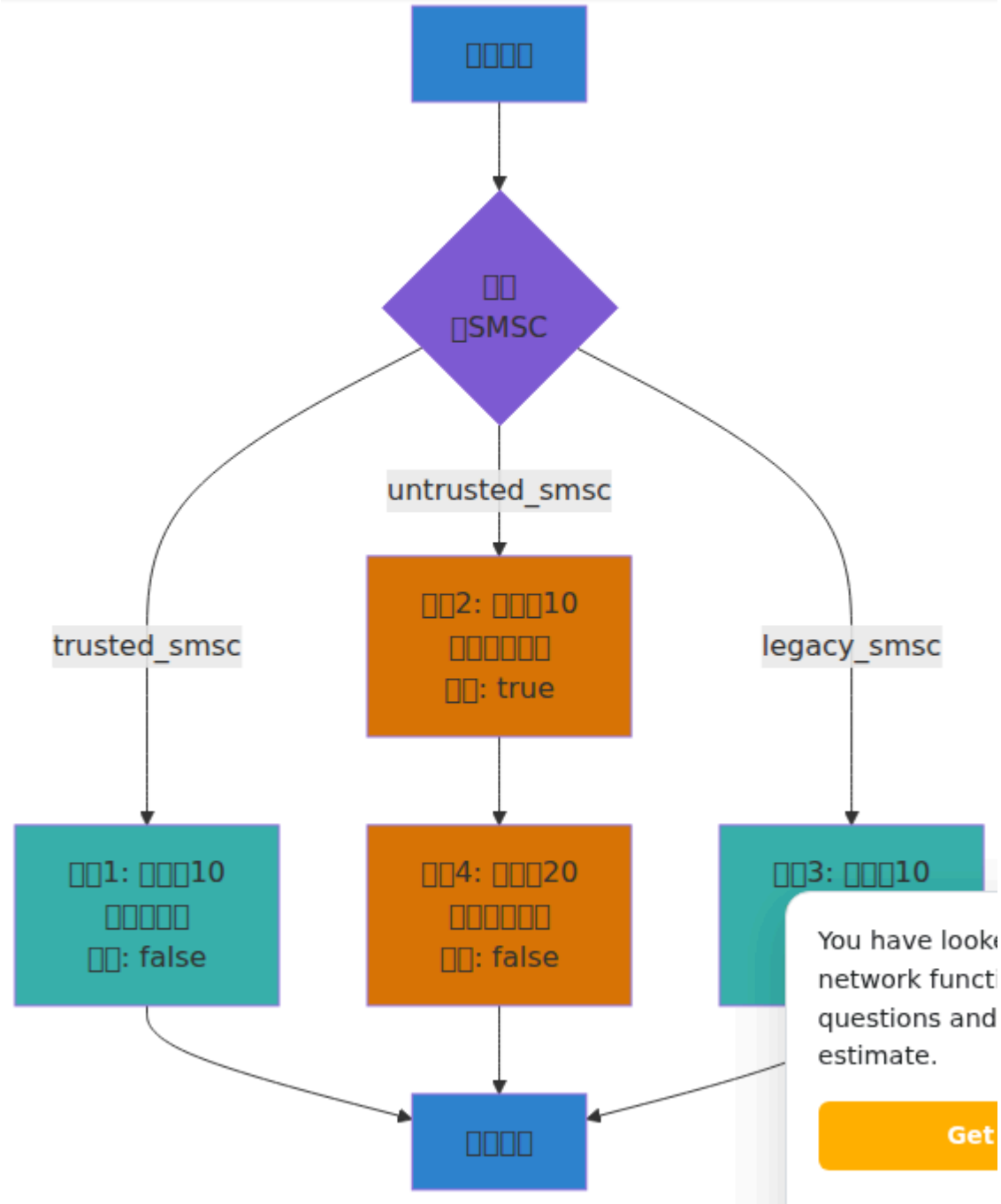
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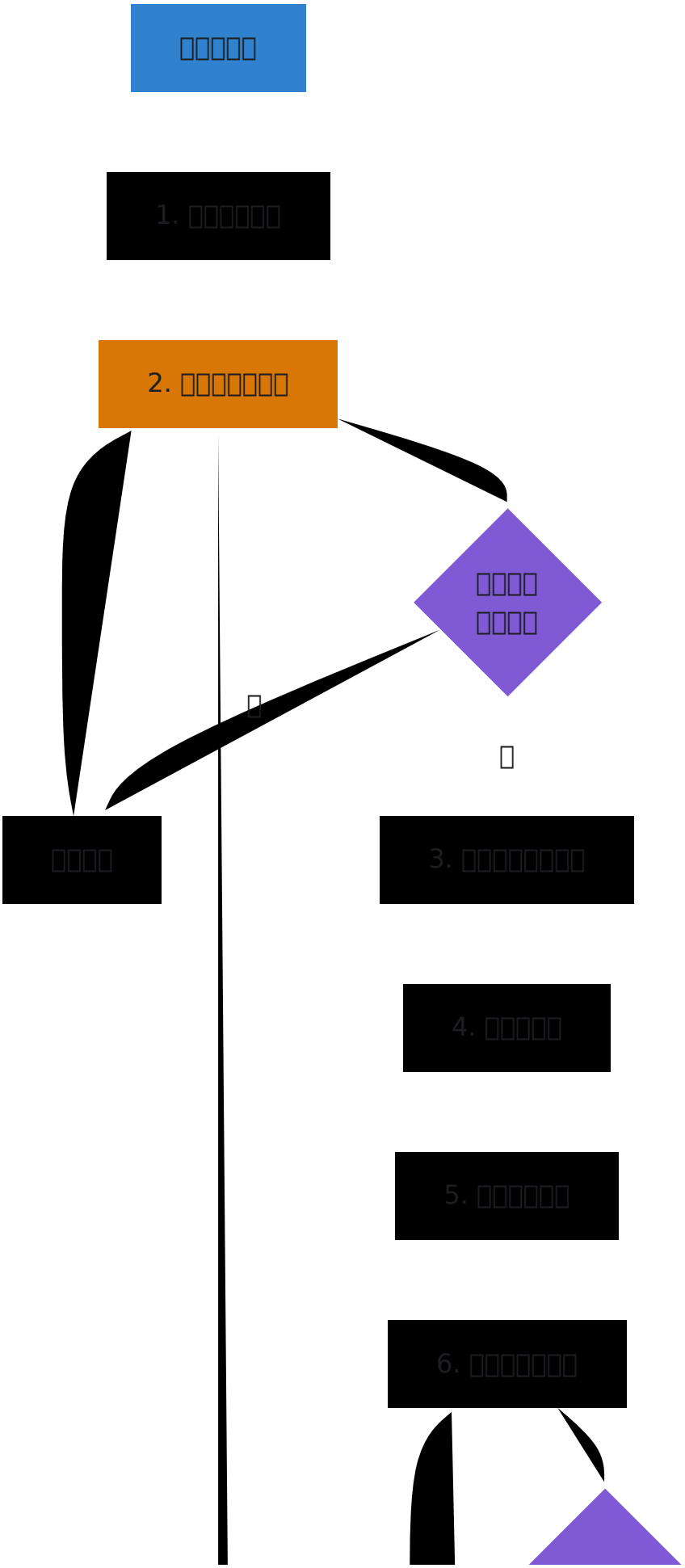
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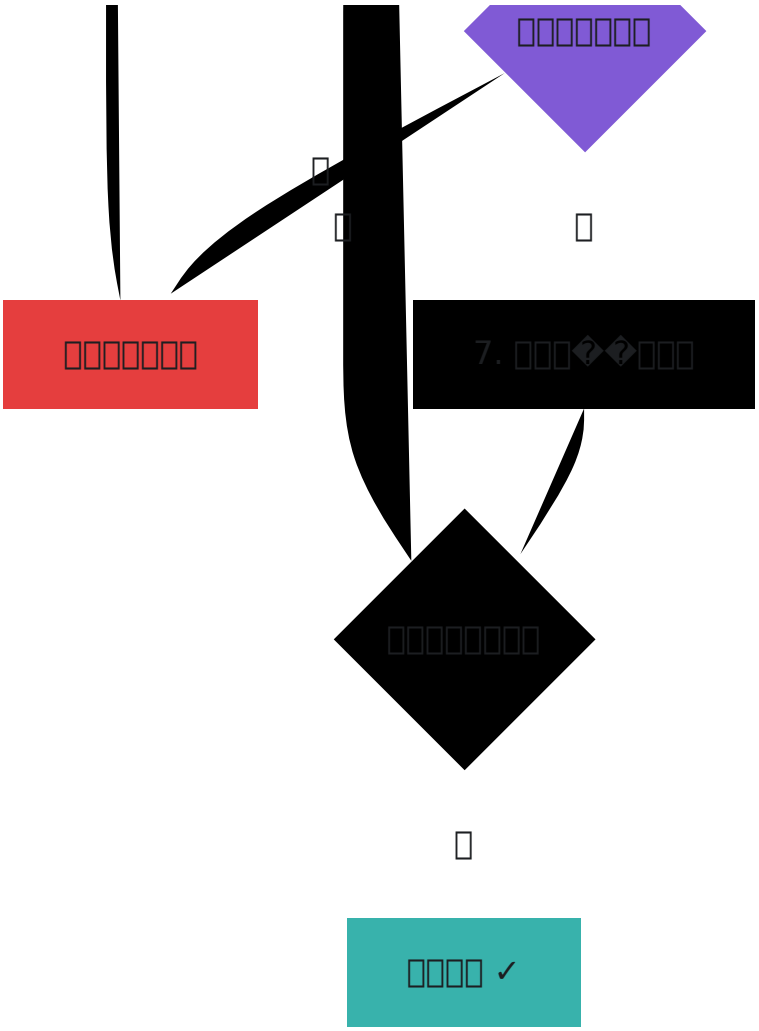

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```
# □□1□10□□□□□□□□□□
%{
  calling_match: "^(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^(\d{10})$",
  called_replace: "+1\1",
  priority: 5,
  description: "□□□□10□□□□□+1",
  enabled: true,
  continue: false
}

# □□2□1 + 10□□□□□□□□□□
%{
  calling_match: "^1(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^1(\d{10})$",
  called_replace: "+1\1",
  priority: 10,
  description: "□1XXXXXXXXXX□□□+1XXXXXXXXXX",
  enabled: true,
  continue: false
}

# □□□□□
# "5551234567" → "+15551234567"□□□1□
# "15551234567" → "+15551234567"□□□2□
# "+15551234567" → "+15551234567"□□□□□□□□□□
```

□□2□□□□□□□□□□□□

□□□□OO□□□□□+□□□□□□□□□

```
# □□1□□00□□□+□□□□□□□□□□
%{
  calling_match: "^00(.+)$",
  calling_replace: "+\1",
  called_match: "^00(.+)$",
  called_replace: "+\1",
  priority: 5,
  description: "□00□□□□□□□+",
  enabled: true,
  continue: true  # □□□□□
}

# □□2□□□□□□□□□□□□□□□
%{
  calling_match: "^\+(\d+)$",
  calling_replace: "00\1",
  called_match: "^\+(\d+)$",
  called_replace: "00\1",
  priority: 10,
  description: "□+□□□□□□00□□□□□",
  enabled: true,
  continue: false  # □□
}

# □□□□□
# □□1: "00441234567890" → "+441234567890"□□□1□□□□
# □□2: "+441234567890" → "00441234567890"□□□2□□□□
# □□: "00441234567890"
# □□□□□: [□□1, □□2]
```

□□3□SMSC□□□□

□□□□□□SMSC□□□□□□□

```
# □□1□□□□□□SMSC - □□□□□□□□□5□
%{
  source_smsc: "trusted_gateway",
  calling_match: nil,  # □□□
  calling_replace: nil,
  called_match: nil,
  called_replace: nil,
  priority: 5,
  description: "□□□□□□□□□□□□□□",
  enabled: true,
  continue: false
}

# □□2□□□□□□□SMSC - □□□□□□□□10□
%{
  source_smsc: "untrusted_gateway",
  calling_match: "^(.*)$",
  calling_replace: "+VALIDATE\1",
  called_match: "^(.*)$",
  called_replace: "+VALIDATE\1",
  priority: 10,
  description: "□□□□□□□□□□□□□□□□□",
  enabled: true,
  continue: false
}

# □□3□□□SMSC□□□□□□□□□□□100□
%{
  source_smsc: nil,  # □□□
  calling_match: "^(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^(\d{10})$",
  called_replace: "+1\1",
  priority: 100,
  description: "□□□□10□□□□□□+1",
  enabled: true,
  continue: false
}
```

□□4□□□□□□□□

□□□□□□ → □□□□□□ → □□□□□□□

```
# □□1□□□□□□□□□□□
%{
  calling_match: "^0+(.+)$",
  calling_replace: "\1",
  called_match: "^0+(.+)$",
  called_replace: "\1",
  priority: 5,
  description: "□□□□□",
  enabled: true,
  continue: true
}

# □□2□□□□□□□□□□□□□□□□□□
%{
  calling_match: "^(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^(\d{10})$",
  called_replace: "+1\1",
  priority: 10,
  description: "□10□□□□□+1",
  enabled: true,
  continue: true
}

# □□3□□□□□□□□□□□□□
%{
  calling_match: "^\+1(\d{3})(\d{3})(\d{4})$",
  calling_replace: "+1-\1-\2-\3",
  called_match: "^\+1(\d{3})(\d{3})(\d{4})$",
  called_replace: "+1-\1-\2-\3",
  priority: 15,
  description: "□□□□+1-XXX-XXX-XXXX",
  enabled: true,
  continue: false
}

# □□□□□
# □□: "005551234567"
# □□1: "005551234567" → "5551234567"□□□1□□□□
# □□2: "5551234567" → "+15551234567"□□□2□□□□
# □□3: "+15551234567" → "+1-555-123-4567"□□□3□□□□
```

```
# □□: "+1-555-123-4567"
# □□□□□: [□□1, □□2, □□3]
```

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- □□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□□□□□□□□□□□
- □□Mnesia□□□□:`:mnesia.table_info(:translation_rule, :size)`
- □□Telemetry□□□□□□□□□□

SMS-C □□□□

← □□□□□□□

SMS-C □□□□□□□□□□□□□□□□□□□□□□□□□□□□

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1. □□□□□□□

```
# API □□□□
curl https://api.example.com:8443/api/status

# □□□□□
# {"status":"ok","application":"OmniMessage","timestamp":"2025-10-
30T08:00:00Z"}
```

2. □□ Prometheus □□

□□ Prometheus □□□□□□□□

- □□□□□□□□□ 24 □□□
- □□□□□□□□ < 1%□
- □□□□□□□ < 1000 □□□□
- □□□□□□□□ > 95%□
- □□□□□□□□□□□□□□□□□□□□□□□□□□□□

3. □□□□□□□

□□ Web UI: `https://sms-admin.example.com/message_queue`

□□□

- □□□□□□□□□□□□□□
- □□□□□□□□□□ < 5 □□□
- □□□□□□□□□□□□ > 3 □□□□
- □□□□□□□□□□□□□□□□□□

4. □□□□□□□

□□ Web UI: `https://sms-admin.example.com/frontend_status`

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- □□□□□□□□□□□□□□□□
- □□□□□□□□□□□
- □□ 24 □□□□□□□□□□

5. □□□□□□□

□□ Web UI: `https://sms-admin.example.com/logs` □□□□□□□□

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□□□□□□□□□□□□

□□ Prometheus □□□

```
# □□□□□□□□□□
increase(sms_c_message_received_count[1h])

# □□□□□□□□□□
increase(sms_c_delivery_succeeded_count[1h])

# □□□□□□
rate(sms_c_delivery_succeeded_count[1h]) /
rate(sms_c_message_received_count[1h])
```

□□□□□

- □□□□□□□□□□□□□
- □□/□□□□□□□□□□
- □□□□□ > 95%

□□□□□

- □□□□□□□□> 50% □□□
- □□□□□□□□> 200% □□□
- ��□□□□ 90% □□

□□

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□□□□□□□ (`sms_c_message_received_count`)□

- □□□□□□□□□□□□□
- □□□□□□□□□□□□
- □□□ `rate(sms_c_message_received_count[5m])`

□□□□□□□□□ (`sms_c_message_processing_stop_duration`)□

- □□□□□□□□□□□□
- □□□p95 > 1000ms
- □□□ `histogram_quantile(0.95, sms_c_message_processing_stop_duration)`

□□□□

□□□□ (`sms_c_routing_failed_count`)□

- □□□□□□□□□□□□□□
- □□□□□□□□□> 0□
- □□□ `increase(sms_c_routing_failed_count[5m])`

□□□□ (`sms_c_routing_route_matched_count`)□

- □□□□□□□□□□□
- □□□□□□□□□□□□□
- □□□ `sms_c_routing_route_matched_count`

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□□□□□□

- □□□□□□□□□□□□
- □□□□ < 95%
- □□□ `rate(sms_c_delivery_succeeded_count[5m]) / rate(sms_c_delivery_queued_count[5m])`

□□□□ (`sms_c_delivery_succeeded_attempt_count`)□

- □□□□□□□□□□□□□

- □□□p95 > 2□□□□□□□□□
- □□□ `histogram_quantile(0.95, sms_c_delivery_succeeded_attempt_count)`

□□□□

□□□□ (`sms_c_queue_size_size`)□

- □□□□□□□□□□□
- □□□□□ > 10,000
- □□□ `sms_c_queue_size_size`

□□□□□□ (`sms_c_queue_oldest_message_age_seconds`)□

- □□□□□□□□□□□□□□□
- □□□□□ > 300 □
- □□□ `sms_c_queue_oldest_message_age_seconds`

□□□□

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1. □□□□□□□□□□
    - □□□□□□5 □□□
    - □□□□□□5 □□□
    - □□□□□□□ 24 □□
2. □□□□□□□□□□
    - □□□□□□□
    - □□□□□□
    - □□□□□□
3. □□□□□□□□
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    - □□□□□□□□

- □□□□□□□□ 24 □□

4. □□□□□□□□□

- □□ ID
- □□□□□□□□□□□□□
- □□ SMSC
- □□□

5. □□□□□□□□□

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6. □□□□□□□□□□□

- API □□□□□p95□
- □□□□□□□□p95□
- ENUM □□□□□p95□

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```yaml
# ⍰⍰□□□□□ - □□□□□□□
- alert: RoutingFailures
  expr: increase(sms_c_routing_failed_count[5m]) > 0
  severity: critical
  description: "{{ $value }} □□□□□ 5 □□□□□□□□"

# □□□□ - □□□□
- alert: QueueBacklog
  expr: sms_c_queue_size_pending > 10000
  severity: critical
  description: "□□□ {{ $value }} □□□□□□"

# □□□□ - □□□□
- alert: OldMessagesInQueue
  expr: sms_c_queue_oldest_message_age_seconds > 300
  severity: critical
  description: "□□□□□ {{ $value }} □"

# □□□□ - □□□□□
- alert: FrontendDisconnected
  expr: sms_c_frontend_status_count{status="disconnected"} > 0
  severity: critical
  description: "{{ $value }} □□□□□□"
```

□□□□□□□□□□□

```
# □□□□□□□□
- alert: LowDeliveryRate
  expr: rate(sms_c_delivery_succeeded_count[10m]) /
rate(sms_c_delivery_queued_count[10m]) < 0.90
  severity: warning
  description: "□□□□□□□ {{ $value }}"

# □□□□□□□
- alert: HighRetryRate
  expr: histogram_quantile(0.95,
sms_c_delivery_succeeded_attempt_count) > 2
  severity: warning
  description: "95th □□□□□□□□□□□□{{ $value }}"

# ENUM □□□□□□□□
- alert: SlowEnumLookups
  expr: histogram_quantile(0.95, sms_c_enum_lookup_stop_duration)
> 5000
  severity: warning
  description: "ENUM □□□□ > 5 □"

# ENUM □□□□□□□
- alert: LowEnumCacheHitRate
  expr: rate(sms_c_enum_cache_hit_count[10m]) /
(rate(sms_c_enum_cache_hit_count[10m]) +
rate(sms_c_enum_cache_miss_count[10m])) < 0.70
  severity: warning
  description: "ENUM □□□□□□□{{ $value }}"
```

□□□□

□□□□□□□

□□□ ID□

1. **Web UI**□□□□ `/message_queue`
2. □□□□□□□□□□ ID
3. □□□□□□□□□□□□□□□

□□ **API**□

```
curl https://api.example.com:8443/api/messages/12345
```

□□□□□□□

1. **Web UI**□□□□ `/message_queue`
2. □□□□□□□□□□□□□
3. □□□□□□□□□□□□

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1. **Web UI**□□□□□□□□□□□□□□□□“□□”□□
2. **API**□ `GET /api/events/12345`

□□□□□□□□

```
1. message_inserted - □□□□□□
   ↓
2. number_translated - □□□□□□□□□□□□□□□□
   ↓
3. message_routed - □□□□□□□□
   ↓
4. charging_attempted - □□□□□□□□□□□
   ↓
5. message_delivered - □□□□
```

□□□□□□□□

```
1. message_inserted
   ↓
2. message_routed
   ↓
3. delivery_attempt_1 - □□□□□□□□
   ↓
4. delivery_attempt_2 - □□□□□□□□□2□□□□□
   ↓
5. delivery_attempt_3 - □□□□□□□□□4□□□□□
   ↓
6. message_dead_letter - □□□□□□□
```

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□□□□□

- □□□“queued”□□□□□□□□□“backoff”□□□□□□
- deliver_after□□□ `queued` □ nil/□□□□□ `backoff` □□□□□□
- delivery_attempts□□□□□□ `queued` □□□ 0□□□ `backoff` □□□□□

□□□□□□

- □□□“delivered”□□□□□□□“sent”□□□□□□□ DLR□
- deliver_time□□□□□□
- dest_smsc□□□□□□

□□□/□□□□□□

- □□□“backoff”□ delivery_attempts □□ - □□□□□□ 30 □□□□□□□□□□□□□ `expires` □□□
- □□□“expired”□“dropped”□“balance_rejected”□“auto_replied” - □□□□
- □□□□□□□□□□□□□

□□□□□□□□□

SMS-C □□□□□□□□□□□□□

□□□□□ `get_messages_for_smsc(smsc_name)` □□□□□□

```
# □□□□□□□
GET /api/messages/queue?smsc=uk_gateway

# □□□□□□□□ dest_smsc □ null
# □□□□□□□□□ uk_gateway □□
```

□□□□□

□□□□□□□□□□□□□□□□□

- `locations` □□□□□ `destination_msisdn` □□□
- `location` ��□□□□□□□ SMSC □□□□
- `expires` □□□□□□□□□

□□□□□□□□□□

□□□□□□□□

```
# □□ API
GET /api/locations/{msisdn}

# □□□□□□□□□
# expires □□□ > □□□□
```

□□□□□

- □□□□□□□□□□□□□□□□□
- □□□□□□□□ `location` □□□□□□□□□□□□□□□
- □□□□□□□□□□□□□□□□□□□

□□□

□□□□□□□□

```
# □□ delivery_attempts □ deliver_after
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{
    "delivery_attempts": 0,
    "deliver_after": "2025-10-30T12:00:00Z"
  }'
```

□□□□□

```
# □□□□□□ SMSC
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{
    "dest_smsc": "backup_gateway"
  }'
```

□□□□□□□□

```
curl -X DELETE https://api.example.com:8443/api/messages/12345
```

□□□

□□□□□

Web UI□□□ `/sms_routing`

□□ **API**□

```
# □□□□□
curl https://api.example.com:8443/api/routes
```

□□□□□□□□

Prometheus □□

```
# □□□□□□□□□□□□□□□□□□□□
increase(sms_c_routing_route_matched_count[1h])
```

□□□□□

Web UI□

1. □□□ `/sms_routing`
2. □□“□□□□□”
3. □□□□□
   - □□□□□□□□□□□□□□□□
   - □□□□□□□□□□□□□□□□□□□□□□□□
   - □ **SMSC**□□□□□□□□□□□□
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4. □□“□□□□”

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- □□□□□□ `+44`
- □□ SMSC□ `uk_gateway`
- □□□□ 50
- □□□ 100
- □□□ "□□□□"

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□□ 1□

- □□□□□□ `+44`

- □□ SMSC□ `uk_primary`
- □□□□ 50
- □□□ 70
- □□□ "□□□□□□□70%□"

□□ 2□

- □□□□□□ `+44`
- □□ SMSC□ `uk_backup`
- □□□□ 50
- □□□ 30
- □□□□□ "□□□□□□□□30%□"

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3. □□“□□□□”
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Web UI□

1. □□□ `/sms_routing`
2. □□□□□□□□□
3. □□“□□”
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- □□□□□□□□□□□□□ SMSC

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Web UI□

1. □□□ `/sms_routing`
2. □□□□□□□□□
3. □□“□□”

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1. □□□ `/sms_routing`
2. □□“□□□□”
3. □□ JSON □□

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1. □□□ `/sms_routing`
2. □□“□□□□”
3. □□ JSON □□
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Web UI□□□□ `/frontend_status`

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- □□□□□□□□□“□□”

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□□ **API**□

```
# □□□□□□□
curl https://api.example.com:8443/api/frontends/active

# □□□□□□□
curl https://api.example.com:8443/api/frontends/stats
```

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2. □□□ SMS-C □□□□□
3. □□□□□□□□□
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1. □□□□□□□□ POST `/api/frontends/register`
2. □□ API □□□□□□□□□
3. □□ JSON □□□□□□
4. □□ curl □□□□□□

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```
curl -X POST https://api.example.com:8443/api/frontends/register \
  -H "Content-Type: application/json" \
  -d '{
    "frontend_name": "test_gateway",
    "frontend_type": "smpp",
    "ip_address": "10.0.1.50",
    "hostname": "gateway.example.com"
  }'
```

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Web UI□

1. □□□ `/frontend_status`
2. □□□□□□□□□
3. □□“□□”
4. □□□□□□□□□□

□□ API□

```
curl https://api.example.com:8443/api/frontends/history/uk_gateway
```

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□□□□□□□□ `config/runtime.exs` □□□□□□□□□□□□□□□□□□

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```
cat config/runtime.exs | grep -A 20 "translation_rules:"
```

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□□ `config/runtime.exs`□

```
%{
  calling_prefix: nil,
  called_prefix: nil,
  source_smsc: nil,
  calling_match: "^(\d{10})$",
  calling_replace: "+1\1",
  called_match: "^(\d{10})$",
  called_replace: "+1\1",
  priority: 100,
  description: "□ 10 □□□□□□□□ +1",
  enabled: true
}
```

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```
%{
  calling_prefix: nil,
  called_prefix: nil,
  source_smsc: nil,
  calling_match: "^00(\d+)$",
  calling_replace: "+\1",
  called_match: "^00(\d+)$",
  called_replace: "+\1",
  priority: 10,
  description: "□ 00 □□□□□ +",
  enabled: true
}
```

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```
%{
  calling_prefix: nil,
  called_prefix: "101",
  source_smsc: "carrier_a",
  calling_match: nil,
  calling_replace: nil,
  called_match: "^101(\d+)$",
  called_replace: "\1",
  priority: 5,
  description: "□□□□ A □□□□□□□□□",
  enabled: true
}
```

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2. □□□□□□□□□/□□□□□
3. □□□□□□□□□□ `number_translated` □□
4. □□□□□□□□□□□

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□□□□□□ `enabled: false`□

```
%{
  ...
  enabled: false
}
```

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□□□□□□□□□□□□□□□□ CDR □□□□□□

- **MySQL/MariaDB**□□□ `information_schema.tables` □□□□□□□□
- **PostgreSQL**□□□ `pg_database_size()` □□□□ psql □□□ `\l+` □□

□□□□ **CDR** □□□

□□□□□□□□□□CDR □□□□□□□□□□□□□□

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- **MySQL/MariaDB**□□□□□□□□□□ `OPTIMIZE TABLE` □□
- **PostgreSQL**□□□□□□ `VACUUM ANALYZE`□□□□ autovacuum□

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Mnesia □□□□□

□□ **Mnesia** □□□□

```
# □ IEx □□□□
:mnesia.table_info(:sms_route, :size)
:mnesia.table_info(:translation_rule, :size)
```

□□ **Mnesia** □□

```
# □□□□□Web UI□
# □□□ /sms_routing
# □□“□□□□”

# □□□ Mnesia □□
:mnesia.backup("/var/backups/sms_c/mnesia_backup.bup")
```

□□ **Mnesia**□

```
# □□ Web UI □□
# □□□□□□
:mnesia.restore("/var/backups/sms_c/mnesia_backup.bup", [])
```

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□□□□□□□□□ logrotate□

```
# /etc/logrotate.d/sms_c
/var/log/sms_c/*.log {
    daily
    rotate 30
    compress
    delaycompress
    notifempty
    create 0644 sms_user sms_group
    sharedscripts
    postrotate
        systemctl reload omnimessage || true
    endscript
}
```

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```
# □□□□□□□□□□
systemctl restart omnimessage

# □□□□□□□□□□
# □□□□□□□□
```

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```
systemctl restart omnimessage
```

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- □□□□□□□□□□□
- □□ Prometheus □□□□□□
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1. □□□□□

   - `config/runtime.exs`
   - `config/config.exs`
   - `config/prod.exs`□□□□□□

2. □□□□Mnesia□□

   - □□ Web UI □□
   - □ Mnesia □□□□

3. **SQL CDR** □□□□

   - □□□□□□
   - □□□□□□□□□□□

4. **TLS** □□□
    - `priv/cert/*.crt`
    - `priv/cert/*.key`

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```
#!/bin/bash
# /opt/omnimessage/scripts/backup_config.sh

BACKUP_DIR="/var/backups/sms_c/$(date +%Y%m%d)"
mkdir -p $BACKUP_DIR

# □□□□
cp -r /opt/omnimessage/config $BACKUP_DIR/

# □□□□
cp -r /opt/omnimessage/priv/cert $BACKUP_DIR/

# □□□□
chmod 600 $BACKUP_DIR/cert/*

echo "□□□□□□□□$BACKUP_DIR"
```

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```
#!/bin/bash
# /opt/omnimessage/scripts/backup_database.sh

BACKUP_DIR="/var/backups/sms_c/database"
DATE=$(date +%Y%m%d_%H%M%S)

mkdir -p $BACKUP_DIR

# □□ SQL CDR □□□
# MySQL/MariaDB□□□ mysqldump □ --single-transaction □□□□□□
# PostgreSQL□□□ pg_dump -F c □□□□□□

# □□□□□□□□□□□□□□□□□□□□□□
# - □□□□□□□□□□□mysqldump□pg_dump□
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# - □□□□□□□□□□30 □□

# □□□□□
find $BACKUP_DIR -name "sms_c_*.gz" -mtime +30 -delete

echo "□□□□□□□□□sms_c_${DATE}"
```

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```
#!/bin/bash
# /opt/omnimessage/scripts/backup_routes.sh

BACKUP_DIR="/var/backups/sms_c/routes"
DATE=$(date +%Y%m%d)

mkdir -p $BACKUP_DIR

# □□ API □□
curl https://api.example.com:8443/api/routes/export \
  > $BACKUP_DIR/routes_${DATE}.json

echo "□□□□□□□□routes_${DATE}.json"
```

□□□□□crontab□□

```
# □□□□□ 2 □
0 2 * * * /opt/omnimessage/scripts/backup_config.sh
0 2 * * * /opt/omnimessage/scripts/backup_database.sh
0 2 * * * /opt/omnimessage/scripts/backup_routes.sh
```

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```
# □□□□□□□
systemctl stop omnimessage

# □□□□□□□
cp -r /var/backups/sms_c/20251030/config/*
/opt/omnimessage/config/

# □□□□
cp -r /var/backups/sms_c/20251030/cert/*
/opt/omnimessage/priv/cert/

# □□□□□□□
systemctl start omnimessage
```

□□ **SQL CDR** □□□□

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- **MySQL/MariaDB**□□□□□□□ mysql □□□□□□□□
- **PostgreSQL**□□□ pg_restore □□□□□□□□□□□

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1. □□□ Web UI `/sms_routing`
2. □□“□□□□”
3. □□□□ JSON □□
4. □□“□□”□□

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Prometheus □□□30 □□□□□

```
avg_over_time(sms_c_message_received_count[30d])
```

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```
-- □□□□□□□
SELECT
  DATE_FORMAT(inserted_at, '%Y-%m') AS month,
  COUNT(*) AS message_count,
  ROUND(SUM(LENGTH(message_body)) / 1024 / 1024, 2) AS data_mb
FROM message_queues
GROUP BY month
ORDER BY month DESC
LIMIT 12;
```

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CPU □□□□

- □□□< 50% □□
- □□> 70% □□
- □□□> 90%

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- □□□< 70% □□
- □□> 80%

- □□□> 90%

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- □□□< 60% □□
- □□> 75%
- □□□> 85%

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- □□□< 1000 □□□
- □□> 5000 □□□
- □□□> 10,000 □□□

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- CPU □□ > 70%
- □□□□ > 80%
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- □□□□ CPU > 50%
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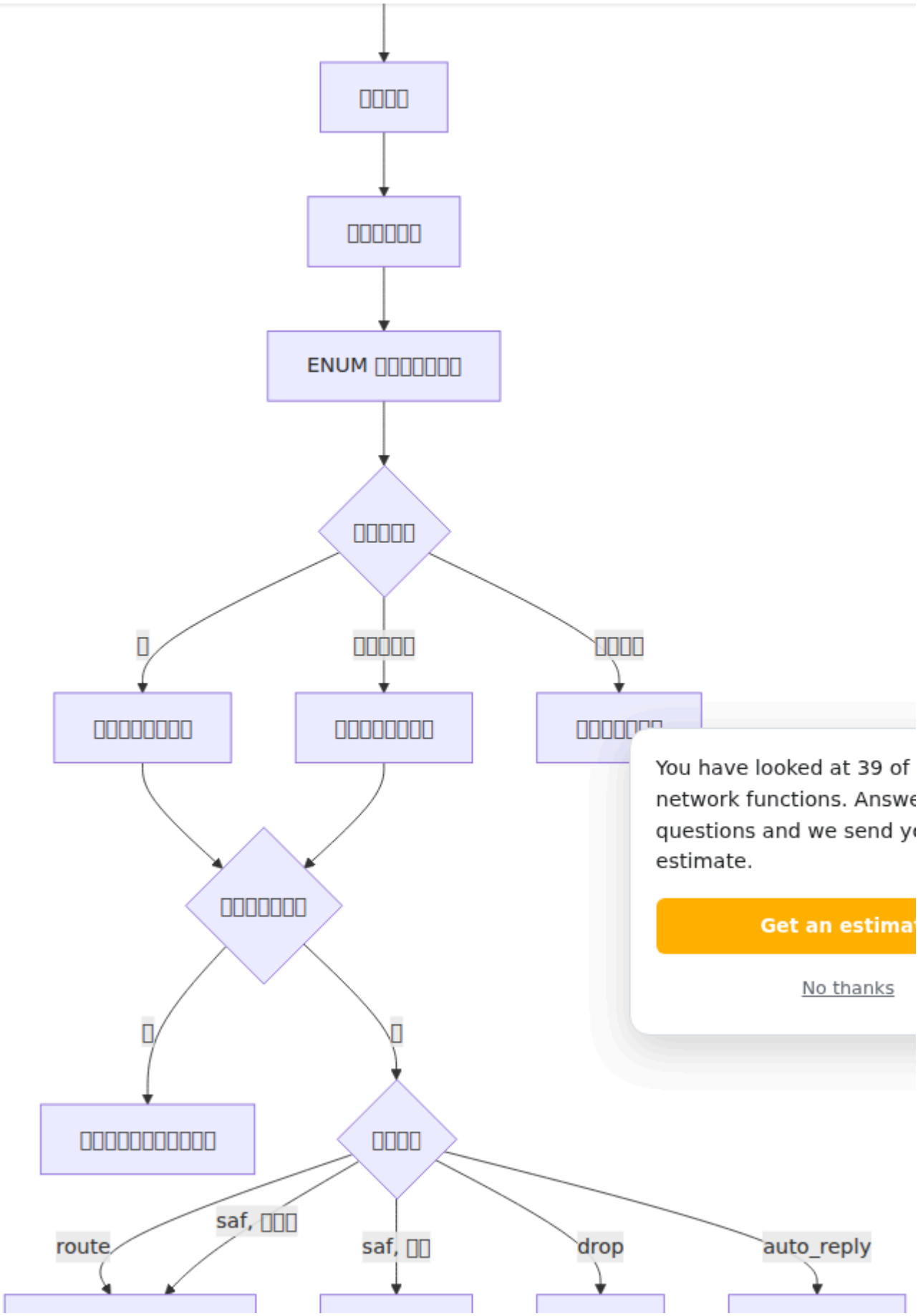

You have looked at 39 of
network functions. Answe
questions and we send y
estimate.
Get an estima
No thanks



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`charging_requested`	SMSC □□ OCS □□□
`charging_succeeded`	OCS □□□□□
`charging_failed`	OCS □□□□□□□□□□□□□□□□□□□□□□□□□□
`charging_skipped`	□□□□□□□□□□

□□□□□□□□□□□□□□□□□□□□□OCS □□□□ `on_charging_error` □□□□□ `allow`□□□□□□□□□□□□□□□□□□□

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`route_id`	□□	□□□□□□□□□□□
`calling_regex`	□□□□	□□□□□□□□□□□ `nil` = □□□□
`called_regex`	□□□□	□□□□□□□□□□□□ `nil` = □□□□
`source_smsc`	□□□□	□ SMSC □□□ `nil` = □□□□
`dest_smsc`	□□□□	□□ SMSC□□ `route` □□□□□□ `saf` □□□□□ `drop`/`auto_reply` □□□
`source_type`	□□□□	□□□□□□□ `ims`□`circuit_switched`□`smpp` □ `nil`
`enum_domain`	□□□□	□□□ ENUM □□□□ `nil` = □□□□□□□□□□□□□□□□□□□□□□□□ DNS □□□□□□ `enum_domains` □□ - □□ ENUM □□
`enum_result_domain`	□□□□	□□□□□□□□ ENUM NAPTR □□□□□□□□□□□□□□□□ `nil` = □□□□

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`action`	□□□	□□□□□ `route`□`drop`□`auto_reply`□`saf`
`auto_reply_message`	□□□	□□□□□□□□□□ `auto_reply` □□□□
`charged`	□□□	□□□ `yes`□`no`□`default`
`weight`	□□	□□□□□□□□1–100□
`priority`	□□	□□□□1–255□□□ = □□□□□□□
`description`	□□□	□□□□□□□□
`enabled`	□□□	□□/□□□□□
`originating_network`	□□	□□ MSISDN HSS □□□□□□□□ `:any` | `:on_net` | `:off_net`□□□ `:any`□
`terminating_network`	□□	□□□ MSISDN HSS □□□□□□□□ `:any` | `:on_net` | `:off_net`□□□ `:any`□

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`action` □□□□□□□□□`:route`□`:drop`□`:auto_reply`□`:saf`□

`route`□□□□

□□□□□□ `dest_smsc`□□□□□□□□□□

```
{
  "action": "route",
  "called_regex": "^61",
  "dest_smsc": "australia-gw",
  "priority": 100,
  "description": "□□□□□□□□□□ AU □□"
}
```

`drop`

□□□□□□□□ `dest_smsc`□

```
{
  "action": "drop",
  "called_regex": "^900",
  "priority": 5,
  "description": "□□□□□□□□"
}
```

`auto_reply`

□ `auto_reply_message` □□□□□□□□□□□□□□□□□□□□□□

```
{
  "action": "auto_reply",
  "called_regex": "^911$",
  "auto_reply_message": "□□□□□□□□□□□□ 911□□□□ 911□",
  "priority": 1,
  "description": "911 □□□□"
}
```

saf

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□dest_smsc □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

saf □□□ □□□□ - □□□□ HSS □□□□□□□□□□□□□□□□□□□□□□□□ saf □ terminating_network: :on_net □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

```
{
  "action": "saf",
  "terminating_network": "on_net",
  "priority": 200,
  "description": "□□□□□□□□□□□□□□□□"
}
```

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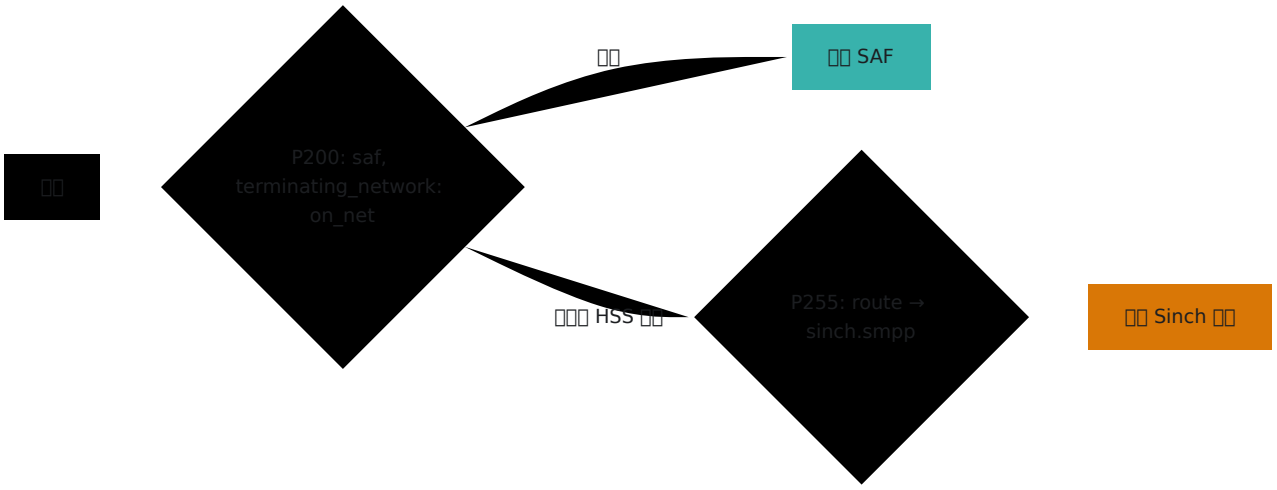

P200 □□□□□□□□□□□□□□ //□□□□□□□□□□□□□□□□□ SAF□□□□□□□□ HSS □□ - □□□□□□□□□□□□□□□□□□ □□ P255 □□□□□□□□□□□□□□□□□□□□□□□□□□□□

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Diameter Sh dip □ HSS □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ □□ □□□□□□□ □□ □□□□ □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□/SMSC/□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

`originating_network` / `terminating_network`

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`:any`	□ HSS □□□□□□□□□□□□□□□□□□□□
`:on_net`	□□ MSISDN □□□□ □□ □□□□□□□□HSS □□□□□□□□□□□□ 2001□
`:off_net`	□□ MSISDN □□□□ □□ □□□□□□□□HSS □□ *□□□□□*□□□□□□□ 5001□

- `originating_network` □□ □□ □□□□`terminating_network` □□ □□ □□□□
- □□□□□□□□□□□□□□□□□□□□□`terminating_network: :on_net`□□□□□ SMPP □□□□□□□□□□□□□□□□□□□□`originating_network: :on_net`□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□`terminating_network: :off_net`□□

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□□□□□□ `:any` □□□□□□□ HSS □□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□□

- Diameter □□ → □□□□□□
- HSS □□□□□ / □□ / □□□□□ → □□□□□□
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- □□ **TTL**□2 □□□□□□□ `hss_cache_ttl_seconds` □□□
- □□□□□□□□□□□□□□□□ `originating_network` □ `terminating_network` □□□ `:on_net` □ `:off_net` □□□ HSS□□□□□□□□ `:any` □□□□□□□□□□□□□□
- □□□□□□□□□□□□□□□□ MSISDN □□□□□□□□□□□□ HSS □□
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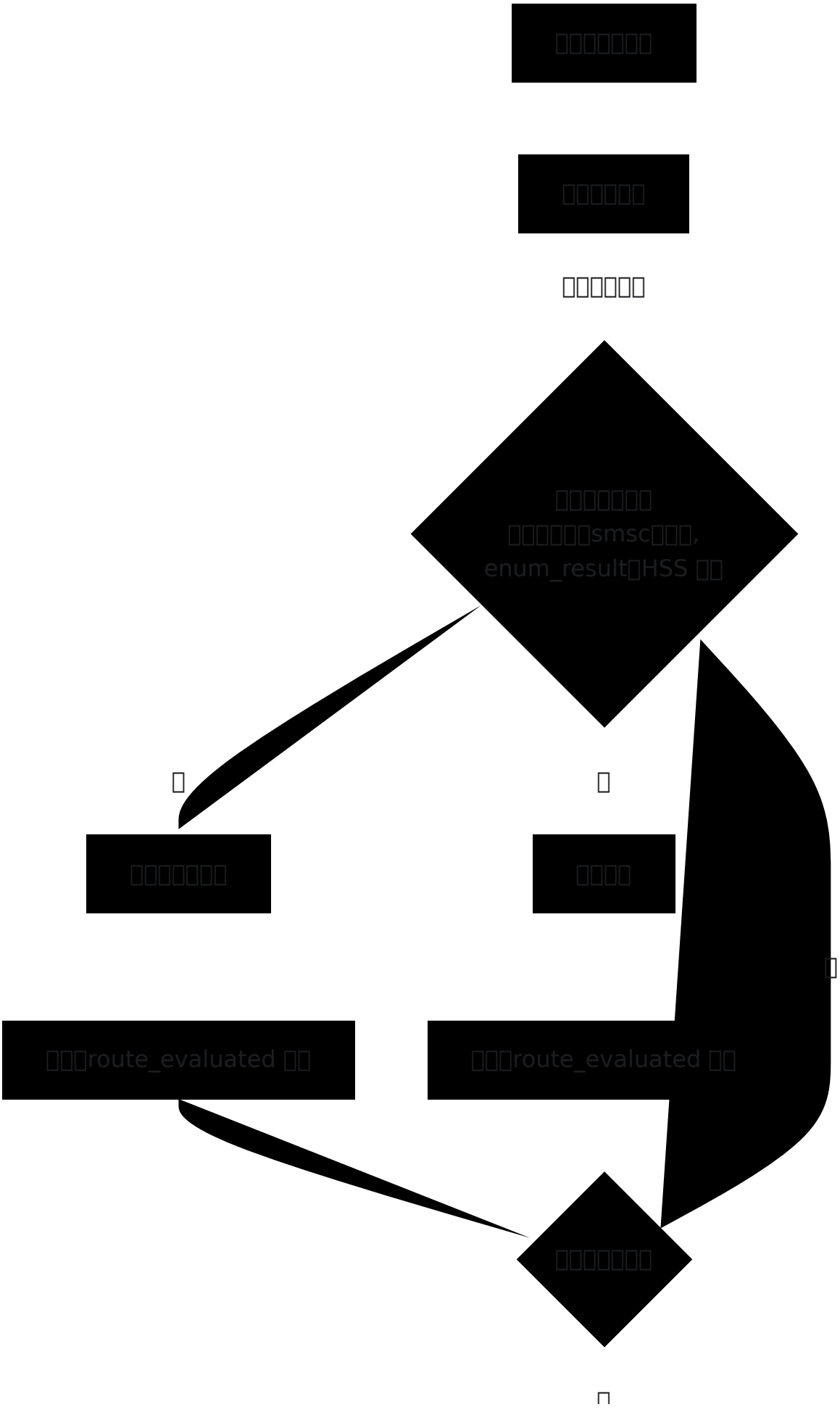

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HSS □□/□□□□□ □□□□ □□□□□□□□□□□□□□□□□□ - □□□□□□□□ HSS □□□

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□□	□□
`called_regex` □□□□	□□ × 100
`calling_regex` □□□□	□□ × 50
`source_smsc` □□	+25
`enum_result_domain` □□	+15
`source_type` □□	+10
`enum_domain` □□	+5

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□ `config/runtime.exs` □□□□□□□□□□□□□□□□□□□□

```
config :sms_c, :sms_routes, [
  %{
    called_regex: ~r/^15555/,
    dest_smsc: "example-gw",
    action: :route,
    priority: 100,
    description: "□□□□□□□"
  },
  %{
    action: :saf,
    terminating_network: :on_net,
    priority: 200,
    description: "□□□□□□□□□□□□□□□□"
  },
  %{
    action: :auto_reply,
    called_regex: ~r/^911$/,
    auto_reply_message: "□□□□□□□ 911□",
    priority: 1,
    description: "911 □□□□"
  }
]
```

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`action`	□□/□□□	□	`:route`	□□□ □□`:route`□`:drop`□`:auto_reply`
`calling_regex`	□□□□□	□	`nil`	□□□□□□□□□□`nil` □□□□
`called_regex`	□□□□□	□	`nil`	□□□□□□□□□□□`nil` □□□□
`source_smsc`	□□□	□	`nil`	□□ SMSC □□□□□`nil` □□□□
`dest_smsc`	□□□	□□□	`nil`	□ `route` □□□□□□ `saf` □□□□□ `drop`/`auto_reply` □□□
`source_type`	□□	□	`nil`	□□□□ □□`:ims`□`:circuit_switched`□
`enum_domain`	□□□	□	`nil`	□□□ ENUM □□□□□□□□□□□□□□□□□

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`enum_result_domain`	□□□□	□	`nil`	□□ ENUM NAPTR □□□□□□□□□□□□□r□□
`auto_reply_message`	□□□□	□□□	`nil`	□□□□ `:auto_reply` □□□
`charged`	□□	□	`:default`	□□□□□ `:yes` □ `:no` □ `:default`
`weight`	□□	□	`100`	□□□□□□□1–100□
`priority`	□□	□	`100`	□□□□□□1–255□□□ = □□□
`description`	□□□□	□	`""`	□□□□□□□
`enabled`	□□□□	□	`true`	□□□□□□□□□□
`originating_network`	□□□	□	`:any`	□ MSISDN HSS □□□ □□ `:any` □ `:on_net` □ `:off_net`
`terminating_network`	□□□	□	`:any`	□□ MSISDN HSS □□□ □□ `:any` □ `:on_net` □ `:off_net`

HSS □□□□

□□	□□	□□	□□
`hss_cache_ttl_seconds`	□□	`7200`	□□ HSS □□□□□□□□□□□□□□□□ `runtime.exs` □□□

API

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```
POST /api/routes
```

```
{
  "action": "saf",
  "terminating_network": "on_net",
  "priority": 200,
  "description": "□□□□□□□□□□□□□□□"
}
```

□□□□

```
GET /api/routes
```

□□□□

```
PUT /api/routes/:id
```

□□□□

```
DELETE /api/routes/:id
```

□□/□□

```
POST /api/routes/import
GET /api/routes/export
```

□□□□ `merge`□□□□□□□□ `replace`□□□□□□□□□□□□

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□□□□□□□□□□□□□□`dest_smsc: null`□□□□□□□ `sms_routing_failed`

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- □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□□□ HSS □□□□ `terminating_network`/`originating_network` □□□□□□□□ □□□□□□ HSS □□□□□□□□ `:any` □□□□□□

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2. □□□□□□□□□□□□□□□□□□□□□□
3. □□□□□□□□□□□□□□`originating_network: :any`□`terminating_network: :any`□□□□□□□□□□□ 255□

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- □□□□ `terminating_network: :on_net` □□□□□□□□□□
- □□□□□□□□ *//*□□□□□□□□□□□□□□□□
- HSS □□□□□□□ `hss_dip_error` / Sh □□□ - □□□□□□□□□□□□□□□□□□□□□□□□
- □□□□□□ Diameter

□□□□□

1. □□□□ `terminating_network: :on_net` □□□□□□□□□□□□□□□□
2. □□□□□□□□ Diameter □□□□□□HSS □□□□□□□□
3. □□ HSS □□□□□□□□□□□□□□□□□□

HSS □□□□

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1. □□ API □□□□□□ - □□□□□□□□ HSS □□
2. □□□□ TTL □□□□□ 2 □□□
3. □□□□□□□□□□□□ `hss_cache_ttl_seconds`

SMS-C □□□□□□

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- API □□
- Web UI □□
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```
# 1. □□ API □□
curl https://api.example.com:8443/api/status

# 2. □□ Prometheus □□□□
curl https://api.example.com:9568/metrics | grep sms_c

# 3. □□□□□□□□□
tail -f /var/log/sms_c/application.log

# 4. □□□□□□
systemctl status omnimessage

# 5. □□ SQL CDR □□□□□ (MySQL/MariaDB)
mysql -u sms_user -p -h db.example.com -e "SELECT 1"

# □□ PostgreSQL:
# psql -U sms_user -h db.example.com -d sms_c_prod -c "SELECT 1"
```

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```
# □□ 100 □□□□□□□□□□
tail -1000 /var/log/sms_c/application.log | grep "\[error\]"

# □□□□□□□□□
grep "routing_failed" /var/log/sms_c/application.log

# □□ SQL □□□□□
grep -i "database\|sql\|ecto" /var/log/sms_c/application.log |
grep error
```

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```
# □□□□□□□□□□
tail -f /var/log/sms_c/application.log | grep -E "
(error|warning|critical)"
```

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```
# □□□□□□
rate(sms_c_message_received_count[5m])

# □□□□□□
rate(sms_c_delivery_succeeded_count[5m]) /
rate(sms_c_delivery_queued_count[5m])
```

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```
# □□□□□□□
sms_c_queue_size_pending

# □□□□□□□□□□□□
sms_c_queue_oldest_message_age_seconds
```

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```
# □□□□□□□ (p95)
histogram_quantile(0.95,
sms_c_message_processing_stop_duration_bucket)

# □□□□ (p95)
histogram_quantile(0.95, sms_c_routing_stop_duration_bucket)
```

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- □□□□ "queued"/"backoff" □□
- □□□□□□□□□
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1. □□□□□□□□

```
curl https://api.example.com:8443/api/frontends/active
```

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2. □□□□□□□□

□□ Web UI: `/message_queue`

- □□□□□□ "queued" □ "backoff"
- □□ `dest_smsc` □
- □□ `deliver_after` □□□□

3. □□□□□

□□ Web UI: `/simulator`

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- □□□□□□□□□□□□

4. □□□□□□□□

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- □□□□□□□□ `/api/messages`□

- □□□□□□□□□ `smsc` □□

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```
# □□□□□□□□□
systemctl status frontend_service

# □□□□□□□□□□□ API
curl -k https://api.example.com:8443/api/status

# □□□□□□□
curl -X POST https://api.example.com:8443/api/frontends/register \
  -H "Content-Type: application/json" \
  -d '{
    "frontend_name": "test_gateway",
    "frontend_type": "smpp",
    "ip_address": "10.0.1.50"
  }'
```

□□□□□□□□ **SMSC**□

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- □□□□□□□□□
- □□□□□□□□□□□□ `dest_smsc` □□

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- □□ `deliver_after` □□□
- □□□□□□□

```
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{"deliver_after": "2025-10-30T12:00:00Z"}'
```

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- `delivery_attempts` □□□□
- □□□□□□□□□□□> 3□
- □□□□□□□

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```
curl https://api.example.com:8443/api/events/12345
```

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```
# □□□□□□□□
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{"dest_smsc": "backup_gateway"}'

# □□□□□□□
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{"delivery_attempts": 0, "deliver_after": "2025-10-
30T12:00:00Z"}'
```

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- □□□□ `deadletter: true`
- □□□□□□□□□
- □□□□ "queued"/"backoff"□□□□□□□□□□□□□□□□□□□□□□□ `expires`□□□□□□□□□□

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□□ Web UI: `/message_queue`

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```
# □□□□□□□□ 24 □□
curl -X PATCH https://api.example.com:8443/api/messages/12345 \
  -H "Content-Type: application/json" \
  -d '{"expires": "2025-10-31T12:00:00Z", "deadletter": false}'
```

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- □□□ `no_route_found`
- `sms_c_routing_failed_count` □□□□
- □□□□□□ "routing_failed"

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1. □□□□□□□□□□

□□ Web UI: `/sms_routing`

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- □□□□□□□□□□□□□□

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□□ Web UI: `/simulator`

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- □ SMSC □□□□□□□□□
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```
□□□□: (□)
□□□□: (□)
□ SMSC: (□)
□□ SMSC: default_gateway
□□□: 255
□□: 100
□□: ✓
□□: □□□□□□
```

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```
□□□□: +
□□ SMSC: international_gateway
□□□: 200
□□: 100
□□: ✓
□□: □□□□□□
```

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- □□ Web UI □□□□□□□
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□□ Web UI: `/simulator`

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- □□ "□□□□" □□
- □□□□□□□□□□□□

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- □□□□□□□□□□□□□□ +50 □
- □□□ SMSC□+25 □
- □□□□□□□+10 □
- □□ ENUM □□+15 □

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```
□□□□□:
  □□□□□: +1555
  □□□: 10 (□□□□□)

□□□□□:
  □□□□□: +1
  □□□: 50 (□□□□□)
```

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```
□□□ (70%):
  □□: 70

□□□□□ (30%):
  □□: 30
```

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```
□□□□□:
  □□□□□: +15551234
  □□ SMSC: dedicated_gateway
  □□□: 1

□□□□□:
  □□□□□: +1
  □□ SMSC: general_gateway
  □□□: 50
```

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1. □□□□□□□□

- `action: :auto_reply`
- `auto_reply_message` □□□□
- □□□□□
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2. □□□□□□□□□

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- □□□□□ "auto_reply" □□

3. □□□□□□□□

```
curl https://api.example.com:8443/api/events/12345 | grep
auto_reply
```

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```
□□□□: ✓
□□□□□□□: "□□□□□□□□□□□□□□□□□□□"
```

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```
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  □□□: 10

□□□□□:
  □□□: 50
```

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- `sms_c_message_processing_stop_duration` p95 > 1000ms
- API □□□□□
- □□□□□

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1. □□□□□□□□□

```
# □□□□□
histogram_quantile(0.95, sms_c_routing_stop_duration_bucket)

# ENUM □□□□□
histogram_quantile(0.95, sms_c_enum_lookup_stop_duration_bucket)

# □□□□□
histogram_quantile(0.95, sms_c_charging_succeeded_duration_bucket)

# □□□□□
histogram_quantile(0.95, sms_c_delivery_succeeded_duration_bucket)
```

2. □□□□□□□□

```
# CPU □□□
top -b -n 1 | grep sms_c

# □□□□□
ps aux | grep beam.smp
```

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ENUM □□□□□

- □□ DNS □□□□□
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```
# config/config.exs
# □□□□□□□□□□□□□□□□
config :sms_c,
  batch_insert_batch_size: 200,
  batch_insert_flush_interval_ms: 200

# □□□□□□□
config :sms_c, SmsC.Repo,
  pool_size: 50
```

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- □□ < 100 msg/sec
- □□□□ API □□□□□
- □ API □□□□

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1. □□□□□□□□□□

```
# □□□□□□□ (iex)
SmsC.Messaging.BatchInsertWorker.stats()
```

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- `current_queue_size` □□□□□
- `flush_errors` > 0
- `last_flush_duration_ms` □□□

2. □□□□□

```
# □□□□□□□□
ecto_pools_query_time

# □□□□□□□□
ecto_pools_queue_time
```

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```
config :sms_c, SmsC.Repo,
  pool_size: 50  # □ 20 □□
```

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```
config :sms_c,
  batch_insert_batch_size: 200,  # □□□□□□□
  batch_insert_flush_interval_ms: 200  # □□□□□
```

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```
# □□□□□□□□ /create_async
curl -X POST
https://api.example.com:8443/api/messages/create_async

# NOT: /api/messages (□□)
```

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- `sms_c_queue_size_pending` □□
- □□□□□□□□□□

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1. □□□□□□□□□□□□

```
# □□□□□
rate(sms_c_message_received_count[5m])

# □□□□□
rate(sms_c_delivery_succeeded_count[5m])
```

2. □□□□□□□□

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3. □□□□□□□□□□

```
rate(sms_c_delivery_succeeded_count[5m]) /
rate(sms_c_delivery_attempted_count[5m])
```

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- □□□ "unable to connect to database"
- API □□ 500 □□
- □□□□□□□□□

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1. □□ **SQL CDR** □□□□□□□

```
# MySQL/MariaDB
systemctl status mysql

# PostgreSQL
systemctl status postgresql

# □□□□□ (MySQL/MariaDB)
mysql -u sms_user -p -h db.example.com -e "SELECT 1"

# □□□□□ (PostgreSQL)
psql -U sms_user -h db.example.com -d sms_c_prod -c "SELECT 1"
```

2. □□□□□□

```
# Ping □□□□□
ping db.example.com

# □□□□□□□ (MySQL/MariaDB: 3306, PostgreSQL: 5432)
telnet db.example.com 3306
# □
telnet db.example.com 5432
```

3. □□□□□

```
# □□□□□□□
echo $DB_USERNAME
echo $DB_HOSTNAME
echo $DB_PORT

# □□□□□□□□□□□□□□ (MySQL/MariaDB)
mysql -u $DB_USERNAME -p$DB_PASSWORD -h $DB_HOSTNAME

# □□ PostgreSQL:
# psql -U $DB_USERNAME -h $DB_HOSTNAME -d sms_c_prod
```

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```
# □□□□□ (MySQL/MariaDB)
systemctl start mysql

# □□□□□ (PostgreSQL)
systemctl start postgresql
```

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```
export DB_USERNAME=correct_user
export DB_PASSWORD=correct_password

# □□□□□□□
systemctl restart omnimessage
```

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- □□□□□□□□
- □□□□□□□□□
- □□ VPN/□□□□

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```
config :sms_c, SmsC.Repo,
  pool_size: 50  # □□□□□□
```

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- □□□□□□□□□
- API □□□□
- □□□□□□□□

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1. □□□□□□□□□

```sql
-- MySQL/MariaDB: □□□□□□□□
SET GLOBAL slow_query_log = 'ON';
SET GLOBAL long_query_time = 1;  -- □□ > 1 □□□□

-- □□□□□□ (MySQL/MariaDB)
SELECT * FROM mysql.slow_log ORDER BY query_time DESC LIMIT 10;

-- PostgreSQL: □ postgresql.conf □□□□□□□□□
-- log_min_duration_statement = 1000  # □□
-- □□□□ PostgreSQL □□
```

2. □□□□□□□□□

```sql
-- □□□□□□
SHOW INDEX FROM message_queues;

-- □□□□□□
-- - source_smsc
-- - dest_smsc
-- - send_time
-- - inserted_at
```

3. □□□□□□□□□

```sql
-- □□□ (MySQL/MariaDB)
SELECT
  table_name,
  table_rows,
  ROUND(data_length / 1024 / 1024, 2) AS data_mb,
  ROUND(index_length / 1024 / 1024, 2) AS index_mb
FROM information_schema.tables
WHERE table_schema = 'sms_c_prod';

-- □□□ (PostgreSQL)
-- SELECT schemaname, tablename,
--
pg_size_pretty(pg_total_relation_size(schemaname||'.'||tablename))
AS size
-- FROM pg_tables WHERE schemaname = 'public';
```

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```
CREATE INDEX idx_message_queues_source_smsc ON
message_queues(source_smsc);
CREATE INDEX idx_message_queues_dest_smsc ON
message_queues(dest_smsc);
CREATE INDEX idx_message_queues_send_time ON
message_queues(send_time);
CREATE INDEX idx_message_queues_status ON message_queues(status);
```

□□□□

```
-- MySQL/MariaDB
OPTIMIZE TABLE message_queues;
OPTIMIZE TABLE frontend_registrations;

-- PostgreSQL
-- VACUUM ANALYZE message_queues;
-- VACUUM ANALYZE frontend_registrations;
```

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```
-- □□□□ 30 □□□□□□□□
DELETE FROM message_queues
WHERE status = 'delivered'
AND deliver_time < DATE_SUB(NOW(), INTERVAL 30 DAY)
LIMIT 10000;
```

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- □□□ "Disk full"
- □□□□□□□□

- □□□□□□□

□□□□□

1. □□□□□□□□□□

```
df -h

# □□ SQL □□□□□□ (MySQL/MariaDB)
du -sh /var/lib/mysql

# □□ SQL □□□□□□ (PostgreSQL)
du -sh /var/lib/postgresql
```

2. □□□□□□□

```
# □□□□□□□ (MySQL/MariaDB)
find /var/lib/mysql -type f -exec du -h {} + | sort -rh | head -20

# □□□□□□□ (PostgreSQL)
find /var/lib/postgresql -type f -exec du -h {} + | sort -rh |
head -20

# □□□□□□□
du -sh /var/log/sms_c/*
```

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```
-- □□□□□□
DELETE FROM message_queues
WHERE inserted_at < DATE_SUB(NOW(), INTERVAL 90 DAY)
LIMIT 100000;
```

□□□□□

```
# □□□□□□□
logrotate -f /etc/logrotate.d/sms_c

# □□□□□□□□
find /var/log/sms_c -name "*.log.*" -mtime +30 -delete
```

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- □□□□□□□ "expired"
- □□□□□□□□□□
- □□□□□□□□□

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1. □□□□□

```
curl https://api.example.com:8443/api/frontends/active | grep
frontend_name
```

2. □□□□□□□□

- □□□□□□□□ `/api/frontends/register`□
- □□□ API □□□□
- □□□□□□□□ 60 □□□□

3. □□ **API** □□□

```
grep "frontend.*register" /var/log/sms_c/application.log | tail
-20
```

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```
curl -X POST https://api.example.com:8443/api/frontends/register \
  -H "Content-Type: application/json" \
  -d '{
    "frontend_name": "uk_gateway",
    "frontend_type": "smpp",
    "ip_address": "10.0.1.50"
  }'
```

□□□□□□□□□□□□□□□/□□□□

□□□□

□□□ 90 □□□□□□□□ 60 □□□□□□

```
# □□□□ 60 □□□□□
while True:
    register_with_smsc()
    time.sleep(60)
```

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- □□□□□ API □□□□□□
- □□ DNS □□
- □□□□□□□□ curl

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1. □□□□□□□□

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- □□□□□□□□□
- □□□□□CPU/□□□□

2. □□□□□□□□□

```
# □□□□
ping -c 100 api.example.com

# □□□□□□□
netstat -s | grep -i reset
```

3. □□□□□□□□

- □□□□□□□□□□□□□
- □□□□□□□□□□> 90 □□

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- □□□□□□□
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```
REGISTRATION_INTERVAL = 60  # □
```

□□□□ **Diameter Ro**□□□□□□□□□□□□□□□□ □□□□□□OCS □□□□□□□□ Diameter □□□□□□□□□□□□□□□□□

- □□ IP □□□□□□□□ DRA □□□□□□□□□ Diameter □□□□Origin-Host/Realm□□
- □□ CCR `Service-Context-Id`□`rating_profile`□□ OCS □ SMS □□□□□□□□□□

□□□□□□□□`config :sms_c, :charging`□□

```
config :sms_c, :charging,
  out_of_balance_action: :reject,    # □ :auto_reply
  out_of_balance_reply_text: "...",
  rating_profile: "sms@sms-c"
```

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```
config :sms_c,
  default_charging_enabled: false
```

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- □□□□□□□□□□ OCS
- □□□□□□□□□□
- □□□□□□□□□□□□

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- `sms_c_charging_succeeded_duration` p95 > 500ms
- □□□□□□□□□□□□
- □□□□□□□□

□□□□□

1. □□□□□□□□

```
histogram_quantile(0.95, sms_c_charging_succeeded_duration_bucket)
```

2. □□ **OCS / DRA** □□□Diameter Ro □□□□□
   `sms_c_charging_succeeded_duration` □□□□ OCS □□□□□□□□□/□□□□ DRA □□□□

3. □□□ **DRA** □□□□□□□

```
# Ping DRA / OCS □□
ping -c 10 dra01.example.com
```

□□□□□

OCS □□��

- □□ OCS □□
- □□ OCS □□
- □□□□□□□□□□

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- □ OCS □□□□□□ SMS-C
- □□□□□□□□□
- □□□□□□□□ VPN/□□

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```
config :sms_c,
  ocs_timeout: 5000  # 5 □
```

ENUM □□□□

ENUM □□□□

□□□

- `sms_c_enum_lookup_stop_duration` □□□□

- □□□□□□□ ENUM □□
- □□□ `enum_result_domain` □□□

□□□□□

1. □□ **ENUM** □□□

```
grep -A 10 "enum_" config/runtime.exs
```

2. □□ **DNS** □□□

```
# □□ DNS □□□
dig @8.8.8.8 e164.arpa

# □□ ENUM □□
# □□ +15551234567□
dig @8.8.8.8 NAPTR 7.6.5.4.3.2.1.5.5.5.1.e164.arpa
```

3. □□ **DNS** □□□□

```
# □□□ DNS □□□□□
ping 10.0.1.53

# □□□□
nc -zv 10.0.1.53 53
```

□□□□□

DNS □□□□□□□□

□□□□ DNS□

```
config :sms_c,
  enum_dns_servers: [
    &amp;#123;"8.8.8.8", 53&amp;#125;,  # Google □□ DNS
    &amp;#123;"1.1.1.1", 53&amp;#125;   # Cloudflare DNS
  ]
```

ENUM □□□□

□□□□

```
config :sms_c,
  enum_domains: ["e164.arpa"]  # □□□□□
```

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```
config :sms_c,
  enum_timeout: 10000  # 10 □
```

□□ **ENUM**□□□□□□□□

```
config :sms_c,
  enum_enabled: false
```

ENUM □□□□

□□□

- □□□□□□□□< 70%□
- □□□□□□□□□
- □□□□□

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1. □□□□□□□□

```
# □□□□□□
rate(sms_c_enum_cache_hit_count[5m]) /
(rate(sms_c_enum_cache_hit_count[5m]) +
rate(sms_c_enum_cache_miss_count[5m]))

# □□□□□
sms_c_enum_cache_size_size
```

2. □□□□□□□□

- □□□□□□□□
- □□ TTL □□□□□□

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- □□□□□□□□□□□□□□□□
- □□□□□□ < 70% □□□□

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□□ NAPTR □□□□□□□□□□□□□□□□□□□□

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- □□□□□□□
- □□□□□□□□□
- □□□□□ TTL

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- □□□□□□□□□□□□□

- Erlang □□□□

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1. □□□□□□□□

```
# □ IEx □□□□
Node.self()
# □□□:sms@node1.example.com

Node.list()
# □□□□□□□□□□□□
```

2. □□ **Erlang Cookie**□

```
# □□ cookie □□
cat ~/.erlang.cookie

# □���□□□□□□□□
```

3. □□□□□

```
# □□□□□□□□□□□□□□
ping node2.example.com

# □□□□
nc -zv node2.example.com 4369
nc -zv node2.example.com 9100-9200
```

□□□□□

Cookie □□□□

□□□□□□□□□□□□ cookie□

```
export ERLANG_COOKIE=same_secret_value_here

# □□□ ~/.erlang.cookie
echo "same_secret_value_here" > ~/.erlang.cookie
chmod 400 ~/.erlang.cookie
```

□□□□□□□

□□□□□□□□

```
# EPMD
iptables -A INPUT -p tcp --dport 4369 -j ACCEPT

# Erlang □□
iptables -A INPUT -p tcp --dport 9100:9200 -j ACCEPT
```

DNS □□□

□□ IP □□□□□□□□□□

```
config :sms_c,
  cluster_nodes: [
    :"sms@10.0.1.10",
    :"sms@10.0.1.11"
  ]
```

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- □□□□□□□□□□
- □□□□□□□□□□□
- Mnesia □□□

□□□□□

1. □□□□□□□□□

```
# □□□□□□□□IEx□
Node.list()
```

2. □□ **Mnesia**□

```
:mnesia.system_info(:running_db_nodes)
```

□□□□□

□□□□□□□□

```
# □□□□□□
systemctl stop omnimessage

# □□□□□□□□□
systemctl start omnimessage  # □ node1 □

# □□□□□□□□□□□□□□□□□□□□
systemctl start omnimessage  # □ node2 □
systemctl start omnimessage  # □ node3 □
```

Mnesia □□□□

- □□□□□□□□□□□
- □□□□□□□
- □□ Mnesia □□
- □□□□
- □□□□

API □□

API □□□□

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- □□□

□□□□□

1. □□ **API** □□□

```
# □□□□□□□□□□□□□
systemctl status omnimessage

# □□□□□□□
netstat -tlnp | grep 8443
```

2. □□□□□□

```
# □□ iptables
iptables -L -n | grep 8443

# □□□□□□□
curl -k https://localhost:8443/api/status
```

3. □□ **TLS** □□□

```
# □□□□□□□□□
ls -l priv/cert/server.crt priv/cert/server.key

# □□□□□□□□
openssl x509 -in priv/cert/server.crt -noout -dates
```

□□□□□

□□□□□□□□

```
systemctl start omnimessage
```

□□□□□□

```
# □□ API □□
iptables -A INPUT -p tcp --dport 8443 -j ACCEPT
```

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```
grep "port:" config/runtime.exs
```

API □□ 500 □□

□□□

- □□□□□□□□□
- 500 □□□□
- □□□□□□□□

□□□□□

1. □□□□□□□□□□

```
tail -100 /var/log/sms_c/application.log | grep "\[error\]"
```

2. □□□□□□

```
mysql -u sms_user -p -e "SELECT 1"
```

3. □□□□□

```
# □□
free -h

# CPU
top -b -n 1

# □□
df -h
```

□□□□□

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Web UI □□

□□□ Web UI

□□□

- □□□□
- 404 □□□
- □□□□□□

□□□□□

1. □□□□□□□□□□

```
systemctl status omnimessage
```

2. □□□□□

```
netstat -tlnp | grep 80
```

3. □□ **URL**□

- □□□□□□□□
- □□□□□□□
- HTTP □ HTTPS□

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```
grep "control_panel" config/runtime.exs
```

□□□□□□□□□□□□□□80 □ 4000□□

□□□□□□□□□

```
systemctl start omnimessage
```

□□□□

```
iptables -A INPUT -p tcp --dport 80 -j ACCEPT
```

LiveView □□□

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- □□□□□□□□□
- □□□□
- □□□□□□□□ WebSocket □□

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1. □□□□□□□□□

- □□□□□□□□□F12□
- □□ WebSocket □□
- □□□□□□□□□□□□□□

2. □□□□□□□

□□□□□□□□□□□□□□□ WebSocket□

```
location /live &#123;
    proxy_http_version 1.1;
    proxy_set_header Upgrade $http_upgrade;
    proxy_set_header Connection "upgrade";
&#125;
```

□□□□□

WebSocket □□□□

- □□□□□□□ WebSocket
- □□□□□
- □□□□□□□

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- □□□□□Ctrl+F5□
- □□□□□□□

□□□□□□

CPU □□□□

□□□

- CPU □□ > 80%
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1. □□□□□

```
top -b -n 1 | grep beam.smp
```

2. □□□□□

```
# □□□□□□□
rate(sms_c_message_received_count[5m])

# □□□□
rate(sms_c_routing_route_matched_count[5m])
```

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- □□□□ > 90%
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1. □□□□□

```
free -h

ps aux | grep beam.smp
```

2. □□□□□□□

```
sms_c_enum_cache_size_size
```

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ENUM □□□□□

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```
# □□□□□□□□IEx□
SmsC.Messaging.BatchInsertWorker.stats()
```

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- □□□□□□□ - `/var/log/sms_c/application.log`