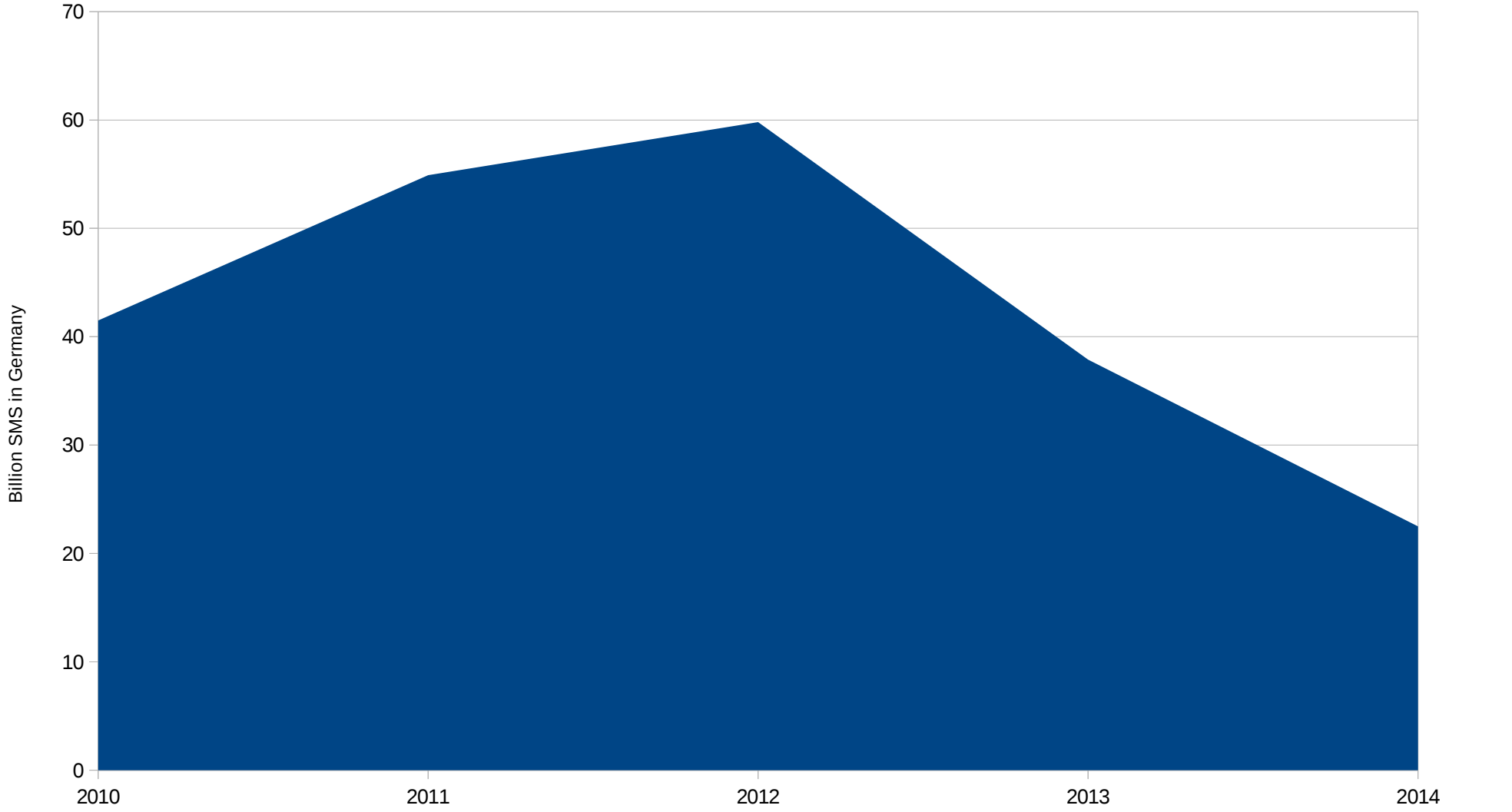
Kamailio as a SMSCenter for Voice-over-LTE (VoLTE)

Why SMS? Isn't it dead yet?

- Still 22,5 billion SMS sent – in Germany only
- SMS is still the mandatory for various services, e.g.
  - Online Banking
  - E-Ticketing
  - ...
- SMS is based on very old standards
  - Developed 1984, first SMS 1992
- It's the only universal service

Image by Scared Poet (scaredpoet.com)
Wikipedia

… but it's decreasing:



SMS in Germany

Source: Jahresbericht der Bundesnetzagentur 2014

What's the challenge?

We have to deal with different variants:

- 3GPP SMS for VoLTE
- SIP Message for OTT
- Other networks, e.g. other mobile carriers

⇒ different devices on one network!

The easy part: The “other” networks

- Use http- or rest-interfaces for interworking
  - a “kannel”-Server (www.kannel.org) for SMPP
  - any other SMS-Service with an rest-interface

nexmo

The easy part: The “other” networks (2)

- Kamailio’s “utils” module as http-client (outbound)

```
http_query("https://rest.nexmo.com/sms/json?
api_key=NEXMO_APIKEY&api_secret=NEXMO_APISECRET&from=$avp(from)&to=$avp(to
)&text=$(avp(text){s.escape.user})", "$var(result)");

json_get_field("$var(result)", "messages", "$var(messages)");
json_get_field("$var(messages)", "status", "$var(status)");
if ($var(status) != 0) return -1;
return 1;
```

- Kamailio’s “xhttp” module as http-server (inbound)

```
event_route[xhttp:request] {
$avp(from) = $(hu{url.querystring}{param.value,msisdn,&});
$avp(to) = $(hu{url.querystring}{param.value,to,&});
$avp(text) = $(hu{url.querystring}{param.value,text,&}
    {s.replace,+,%20}{s.unescape.user});
xhttp_reply("200", "OK", "text/html", "<html><body>OK - [$si:
$sp]</body></html>");
}
```

Determing VoLTE from OTT

VoLTE-Handsets indicate 3GPP SMS in the contact:

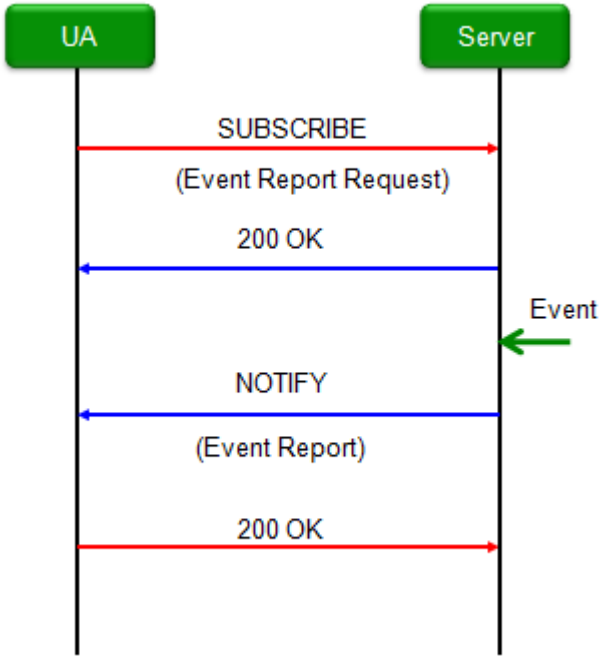
```
REGISTER sip:ims.voiceblue.com SIP/2.0
Expires: 3600
User-Agent: SLICK IMS 4.0.0
P-Access-Network-Info: IEEE-802.11;i-wlan-node-id=9cc7a608a31d
Contact:
<sip:494046895124@192.168.178.26:5060;alias=91.15.76.14~44499~2>;q=1.00;+g
.3gpp.icsi-ref="urn%3Aurn-7%3A3gpp-service.ims.icsi.mmtel";
+g.3gpp.smsip;video;sip.instance="<urn:gsma:imei:35676506-815566-0>
From: <sip:494046895124@ims.voiceblue.com>;tag=371914093
To: <sip:494046895124@ims.voiceblue.com>
Call-ID: 707917751@192.168.178.26
CSeq: 1 REGISTER
Max-Forwards: 69
Via: SIP/2.0/TCP
192.168.178.26:5060;received=91.15.76.14;branch=z9hG4bK1859570468smg;trans
port=TCP;rport=44499
```

(RFC 3840: “Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)”)

“reginfo” comes in handy (1)

- Defined in RFC 3680
- Implemented in Kamailio’s “pua_reginfo” module:

```
reginfo_subscribe("$ru");
---
if(is_method("NOTIFY"))
if (reginfo_handle_notify("location"))
        send_reply("202", "Accepted");
```



“reginfo” comes in handy (2)

“NOTIFY” from network to SMSC contains capabilities

```
NOTIFY sip:reginfo@smsc.ams.voiceblue.com SIP/2.0.
To: <sip:reginfo@smsc.ams.voiceblue.com>;tag=12345-2bd2.
From: <sip:494046895124@ims.voiceblue.com>;tag=12345-2fd7.
Event: reg.
Subscription-State: active;expires=7200.
Content-Type: application/reginfo+xml.

<contact id="0x7f22a29cc958" state="active" event="registered"
expires="3566" q="1.000">
 <uri>sip:494046895124@192.168.178.26:5060;alias=91.15.76.14~44499~2</uri>
  <unknown-param name="+sip.instance">"&lt;urn:gsma:imei:35676506-815566-
0&gt;"</unknown-param>
  <unknown-param name="video"></unknown-param>
  <unknown-param name="+g.3gpp.smsip"></unknown-param>
  <unknown-param name="+g.3gpp.icsi-ref">"urn0X0.00013P-1022urn-
70X0P+03gpp-service.ims.icsi.mmtel"</unknown-param>
  <unknown-param name="q">"1.00"</unknown-param>
</contact>
```

ng voice

New problems...

An SMS from a VoLTE Handset:

```
MESSAGE sip:894@ims.voiceblue.com SIP/2.0
Via: SIP/2.0/UDP 93.180.154.153:5080;branch=z9hG4bKuhrVgaLL;rport
From: <sip:494046895124@ims.voiceblue.com>;tag=5FB43BEC-5564CCC10005DDCF-
29D46700
To: <sip:894@ims.voiceblue.com>
CSeq: 10 MESSAGE
Call-ID: 201A9683-5564CCC10005DDEA-29D46700
Route: <sip:orig@scscf-1.ams.voiceblue.com:5060;lr;lr>
Max-Forwards: 70
User-Agent: SLICK IMS 4.0.0
P-Asserted-Identity: <sip:494046895124@ims.voiceblue.com>
Content-Type: application/vnd.3gpp.sms
Contact: <sip:93.180.154.153:5080;transport=udp>
Content-Length: 36

\0x00\0x09\0x00\0x03\0x81\0x98\0xf4\0x1c\0x11\0x09\...
```

(3GPP TS 24.229, 3GPP TS 23.040 and 3GPP TS 23.038)

Introducing SMSops for 3GPP SMS (1)

- SMSOps can decode 3GPP SMS (user to network):

```
xlog("RP-Data: Originator: $rpdata(originator)");
xlog("RP-Data: Reference: $rpdata(reference)");
xlog("TPDU: Validity: $tpdu(validity)");
xlog("TPDU: Payload: $tpdu(payload)");
```

Introducing SMSops for 3GPP SMS (2)

- Create RP-DATA ACK (network to user) messages:

```
$uac_req(method) = "MESSAGE";
$uac_req(ruri) = $ai;
$uac_req(furi) = $ai;
$uac_req(turi) = $ai;
$uac_req(hdrs) = "Content-Type: application/vnd.3gpp.sms\r\nAccept-
Contact: *;+g.3gpp.smsip;require;explicit\r\n";
$uac_req(body) = $smsack;
uac_req_send();
```

Introducing SMSops for 3GPP SMS (3)

- Create new 3GPP SMS Messages

```
// Construct a new SMS-Body:
$rpdata(all) = $null;
$rpdata(type) = 1; // RP-DATA: Network to UE
$rpdata(reference) = $avp(id);
$rpdata(originator) = $avp(from);
$tpdu(type) = 4; // SMS-Deliver
$tpdu(origen) = $avp(from);
$tpdu(payload) = $avp(text);

$uac_req(method) = "MESSAGE";
$uac_req(ruri) = "sip:"+$avp(to)+"@"+DOMAIN;
$uac_req(furi) = "sip:"+$avp(to)+"@"+DOMAIN;
$uac_req(turi) = "sip:"+$avp(to)+"@"+DOMAIN;
$uac_req(hdrs) = "Content-Type: application/vnd.3gpp.sms\r\n";
$uac_req(body) = $smsbody;
uac_req_send();
```

Open Topics

- Proper handling of “User-Data-Headers” (UDH)
  - Necessary for e.g. “Multipart SMS”
- More troubleshooting and more testing!
- In GIT-Master next week!

Thank you!

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