

libosmo-sccp + libosmo-sigtran - Feature #4635

quirks when initializing SS7 ASP

06/24/2020 10:17 PM - neels

Status:	New	Start date:	06/24/2020
Priority:	Normal	Due date:	
Assignee:		% Done:	0%
Category:			
Target version:			
Spec Reference:			
Description			
<p>This is about starting up the SCCP links in osmo-bsc and osmo-msc (and possibly others), using the API provided by libosmo-sigtran.</p> <p>There are problems when:</p> <ul style="list-style-type: none">a) the 'cs7' / 'as' and 'asp' vty config is in the .cfg fileb) and/or when invoking osmo_sccp_simple_client() more than once <p>This came up because rapidly shutting down and restarting an SCTP connection to osmo-stp recently started triggering a race condition, where osmo-stp's select() returned the new connection's accept before (or at the same time as) the old connection's close. This because osmo-bsc recently started re-running osmo_sccp_simple_client() for each MSC in the pool: thrice for ttcn3-bsc-tests.</p> <p>At first thought it seems that osmo-msc could also run it twice (for A and lu) but actually figures out to run the osmo_sccp_simple_client() only once when both A and lu are on the same ss7 instance.</p> <p>The first fix was to only re-start the ASP in osmo_sccp_simple_client() IF a new ASP was created. That worked for osmo-bsc but only because of the peculiarity that the osmo-bsc.cfg does not contain an AS. At the same time that broke osmo-msc tests, where the osmo-msc.cfg has AS and ASP configured in the cfg file.</p> <p>I know, this is getting more and more entangled...</p> <p>(I'll open this issue and then elaborate in follow-up comments.)</p>			
Related issues:			
Related to OsmoSTP - Bug #4625: osmo-stp crashes in ttcn3-bsc-tests on first ...		Resolved	06/20/2020

Associated revisions

Revision 5c48fb8e - 06/25/2020 06:56 AM - neels

Revert "sccp_simple_client: only restart ASP if it was created"

This reverts commit ec20a6164b046f9b6190dc886c3cc8a8e1445739.

Reason for revert: this patch makes specific variants of 'cs7' config fail. In short, if AS and ASP are configured and connected, the ASP is never started. See OS#4635 for elaborate details.

Related: OS#4635

Change-Id: Id6e1fd69f312e5dc74e8718b2e2e678ad54bc16b

Revision d897e7da - 06/26/2020 02:05 PM - Neels Hofmeyr

osmo_sccp_simple_client_on_ss7_id(): do not care about ASP name

Our manuals explain that the cs7 config automatically adds missing parts. However, previous code requires an ASP to exactly match the default name that the autoconfiguration would choose -- that is unintuitive.

If a config included only an ASP, or both AS and ASP but omitting to add the ASP to the AS, auto configuration would pick it up iff it exactly had the name the application chose. For osmo-bsc, that was 'asp-clnt-msc-0', if 'msc 0' is the first MSC in the config file. For osmo-msc, it is 'asp-clnt-OsmoMSC-A' or 'asp-clnt-OsmoMSC-A-lu' and so forth, so it is not always clear which name the

user should pick to get the ASP used by auto config.

Refactor so that any ASP with a matching protocol that is not associated with any AS yet is picked up by the auto configuration, i.e. associated with the AS etc., regardless of the name chosen in the config file.

Related: OS#4635

Change-Id: I2954e0167729fd0b1a7d0144a5b5775fc1c44c35

History

#1 - 06/24/2020 10:56 PM - neels

Let's go through some start up sequences, chronologically:

osmo-bsc in ttcn3-bsc-tests

osmo-bsc.cfg:

```
cs7 instance 0
  asp asp-clnt-msc-0 2905 2905 m3ua
  remote-ip 172.18.2.200
```

- no AS
- no 'sctp-role client'

1. First, the cs7 vty gets parsed.

- The 'asp' vty command creates an ASP with `is_server = true`.
- `osmo_ss7_vty_go_parent()` exits the ASP node and runs `osmo_ss7_asp_restart()`.
- log says: DLSS7 NOTICE 0: asp-asp-clnt-msc-0: ASP Restart for server not implemented yet!

2. `osmo_bsc_sigtran_init()` runs

- 'msc 0' gets set up by `osmo_sccp_simple_client_on_ss7_id()`.
- it finds no AS, so sets up a new one.
- `asp = osmo_ss7_asp_find_by_proto(as, prot)`; returns no ASP, because the AS was not in the config file.
- in the if (`!asp`) conditional, the configured ASP gets found and added to the AS.
- also the ASP gets set to `is_server = false` unconditionally.
- our new `libosmo-sccp` patch thus restarts the ASP with `osmo_ss7_asp_restart()` (the patch intends to only start a newly created ASP, but the patch https://gerrit.osmocom.org/c/libosmo-sccp/+18990/2/src/sccp_user.c actually pivots on whether the AS had an ASP instead)
- 'msc 1' and 2 get set up
- now `osmo_sccp_simple_client_on_ss7_id()` finds an AS with ASP and does not restart the ASP.

Result: the initial "server" restart from parsing the vty had no effect.

The first 'msc 0' invoked the ASP restart once.

Everything is fine.

what if i add an AS in the cfg

osmo-msc in ttcn3-msc-tests has this config:

```
cs7 instance 0
  point-code 0.23.1
  asp asp-clnt-OsmoMSC-A 2905 0 m3ua
  remote-ip 172.18.1.200
  as as-clnt-OsmoMSC-A m3ua
  asp asp-clnt-OsmoMSC-A
  routing-key 3 0.23.1
```

- there is an AS and an ASP
- no 'sctp-role client'

1. First, the cs7 vty gets parsed.

- The 'asp' vty command creates an ASP with `is_server = true`.
- `osmo_ss7_vty_go_parent()` exits the ASP node and runs `osmo_ss7_asp_restart()`.
- log says: DLSS7 NOTICE 0: asp-asp-clnt-msc-0: ASP Restart for server not implemented yet!

2. `osmo-msc's ss7_setup()` runs

- the A link gets set up by `osmo_sccp_simple_client_on_ss7_id()`.
 - it finds an AS, and an ASP as part of that AS
 - the `if (!asp)` conditional is skipped
 - the ASP **remains configured as `is_server=true`**.
- the lu link uses the same SCCP instance, does not re-run the simple-client and does not restart the ASP.

conclusions

- It is not a good idea to restart the ASP while the vty config file is being read.
The `osmo_ss7_vty.c` should probably differentiate between a telnet vty shell and a vty config file, and it should only restart the ASP if the command comes from a vty shell.
Each `libosmo-sccp` user should then make sure to start the ASP once the config is complete, particularly after setting `asp->is_server = false`.
(Also consider that an ASP is added to an AS only after the 'asp' vty node is exited)
- Trying to make `osmo_sccp_simple_client_on_ss7_id()` safe to invoke multiple times for the same cs7 instance is not a good idea:
 - if we restart the ASP only when it was created, then specific variants of incomplete 'cs7' config will omit to start the ASP.
 - if we restart the ASP every time the simple client setup is invoked, then we rapidly shut down and reopen the same SCTP link.
With the `osmo-stp` fix in place that seems not so harmful anymore, but still is Not Good (tm).

solutions

How to fix `osmo-bsc`'s multi-MSC startup?

- With the `osmo-stp` fix in place, we could actually make `osmo-bsc` rapidly close and open the same SCTP link without crashing.
- A better solution would be to fix `osmo-bsc` code so that it sets up AS and ASP per cs7 instance exactly once.
 - either by doing the things `osmo_sccp_simple_client()` does manually / more intelligently in `osmo-bsc` source directly,
 - or by making sure to invoke the simple client setup exactly once per cs7 instance.
I know it seems appropriate to not use the "simple client" setup at all, but I think this is actually the simplest to implement.
We have only one SCCP User (per cs7 instance) in `osmo-bsc`, so the setup **is** fairly simple.

How to fix `osmo-msc` startup?

- we need to revert the `libosmo-sccp` patch that modifies the simple-client setup, because it makes the cs7 config fail in complex ways.

How to fix weird "server" startup log error for SCCP/M3UA client programs?

- We should change `osmo_ss7_vty.c` to not start up components when the vty is read from a config file.
- Possibly we should never restart components implicitly in `go_parent()`, but rather provide an explicit vty command to restart an ASP.

#2 - 06/24/2020 11:01 PM - neels

- Related to Bug #4625: *osmo-stp crashes in ttcn3-bsc-tests on first M3UA message added*

#3 - 06/25/2020 01:09 AM - neels

<https://gerrit.osmocom.org/c/osmo-bsc/+/19003>

#4 - 06/25/2020 04:46 PM - neels

I just now realized another quirk: the "simple client" auto configuration takes what AS or ASP already exist and completes the configuration by adding missing parts.

At least that's what I thought. Now I notice that this only works when the AS / ASP has exactly the default name.

Example: current `osmo-bsc.cfg` in `ttcn3-bsc-test`:

```
cs7 instance 0
asp asp-clnt-msc-0 2905 2905 m3ua
remote-ip 172.18.2.200
```

This uses the name "asp-clnt-msc-0", which matches the default name given by `osmo_bsc_sigtran_init()`.

However, when more MSCs are contacted via that ASP, the name "msc-0" does not make sense.

So in the `osmo-bsc` sources, I changed the name to "A-0-m3ua" (A-interface 0 on M3UA proto).

That made `osmo-bsc` unable to contact the STP, because of the resulting auto config:

```
OsmoBSC# show cs7 config
cs7 instance 0
point-code 0.23.3
asp asp-clnt-msc-0 2905 2905 m3ua
remote-ip 172.18.2.200
asp asp-clnt-A-0-m3ua 2905 0 m3ua
```

```
remote-ip 127.0.0.1
sctp-role client
as as-clnt-A-0-m3ua m3ua
asp asp-clnt-A-0-m3ua
routing-key 0 0.23.3
```

So instead of picking up the ASP found in the osmo-bsc.cfg, osmo-bsc created another ASP with the name "asp-clnt-A-0-m3ua".

The cause is this code in sccp_user.c:

```
asp = osmo_ss7_asp_find_by_proto(as, prot);    <----- (1)
if (!asp) {
    /* Check if the user has already created an ASP elsewhere under
     * the default asp name. */
    asp_name = talloc_asprintf(ctx, "asp-clnt-%s", name);
    asp = osmo_ss7_asp_find_by_name(ss7, asp_name);    <----- (2)
    if (!asp) {
        LOGP(DLSCCP, LOG_NOTICE, "%s: Creating ASP instance\n",
              name);
        asp =
            osmo_ss7_asp_find_or_create(ss7, asp_name,
                                         default_remote_port,
                                         default_local_port,
                                         prot);
    }
}
[...]
```

(1): At first, we're looking for **any** ASP matching M3UA **on the AS**.

(This config had no AS, so the AS was added automatically just above this, hence the AS has no ASP associated.)

No ASP was found, so then (2) we look for an ASP not by protocol, but by name. That seems wrong to me.

To successfully complete a config where the .cfg file has only an ASP, the ASP has to exactly match the name that the program would choose automatically.

(depending on which msc nr appears first in the config, that could be any asp-clnt-msc-N where N is the msc nr.)

Our manuals describe that any ASP is automatically picked up, no matter which name.

IMHO we should not require the name to match, rather look for any ASP

(possibly one that is not bound to an AS yet??)