handover during LCLS directly between BTSs

So far, we have implemented LCLS on the BSC level, i.e. in case of a local switch, the RTP stream still goes from BTS A to the BSC-colocated MGW and from there to BTS B. This removes the RTP/voice from A, but not from the Abis side.

In deployments where there are e.g. 3 BTS (A,B,C) at one site, back-hauled via Abis to a BSC in a remote data center, we want the voice to go directly between BTS A and BTS B, without going to the MGW at the BSC.

This basically means that we close the loop not inside our osmo-mgw via MGCP, but that we close it between the two involved BTSs.

Even in a single-remote-BTS use case, this helps in cases where both calling and called subscribers are attached to that same BTS.

Related issues:

- Related to OsmoMSC - Feature #2487: MSC side of LCLS (local call local switch... Stalled 09/03/2017
- Related to OsmoBSC - Feature #1602: BSC side of LCLS (local call local switch... Resolved 02/23/2016
- Related to OsmoBSC - Bug #3413: TC_lcls_connect_clear does not pass anymore. Resolved 07/23/2018
- Related to OsmoMSC - Feature #2487: MSC side of LCLS (local call local switch... Stalled 09/03/2017
- Related to OsmoBSC - Feature #3586: support LCLS for inter-BSC handover Resolved 11/21/2016
- Related to OsmoBSC - Feature #3783: Make conn-timeout compatible with LCLS Resolved 02/06/2019

History

#1 - 10/17/2018 10:33 AM - laforge
- Priority changed from Normal to Urgent

#2 - 10/22/2018 01:18 PM - msuraev
- Related to Feature #1602: BSC side of LCLS (local call local switching) as per the 3GPP specs added

#3 - 10/24/2018 10:05 AM - msuraev
- Status changed from New to In Progress

Preparing test setup using fake_trx/virtphy to check signalling locally.

#4 - 10/29/2018 11:31 AM - msuraev

On a related note: right now TTCN-3 TC_lcls_connect_clear() fails due to commit 6fe125294b219a519c77717140de26870d17b40a in OsmoBSC. Reverting just this commit doesn't fix it though so it's also affected by some changes in related commits as well.

The failing part in TC_lcls_connect_clear is probably CONN_A.receive(tr_RSL_DATA_REQ(?), tr_RslLinkID_DCCH(0), l3_rr_chan_rel)) due to missing "DATA REQuest (DTAP) (RR) Channel Release" packet - see difference in .pcap from https://jenkins.osmocom.org/jenkins/view/TTCN3/job/ttcn3-bsc-test/369/ and https://jenkins.osmocom.org/jenkins/view/TTCN3/job/ttcn3-bsc-test/370/

#5 - 11/01/2018 10:37 AM - msuraev
- % Done changed from 0 to 30

Implemented "lcls-mode bts-loop" in gerrit 11552, corresponding tests are in 11559 - WIP. Related preparation patches are under review.
- Related to Bug #3413: TC_lcls_connect_clear does not pass anymore. added

- Related to Feature #2487: MSC side of LCLS (local call local switching) as per the 3GPP specs added

- Checklist item [ ] add TTCN tests for RSL MDCX added
  - Checklist item [ ] add RSL MDCX to BSC LCLS added
  - Checklist item [ ] handle LCLS-MGW in handover added
  - Checklist item [ ] handle LCLS-BTS in handover added
  - Checklist item [ ] add TTCN test handover with LCLS-MGW added
  - Checklist item [ ] add TTCN test handover with LCLS-BTS added
  - % Done changed from 30 to 20

- Checklist item [ ] add TTCN tests for RSL MDCX set to Done

- Checklist item [x] add RSL MDCX to BSC LCLS set to Done

- % Done changed from 20 to 30

Almost all related libosmocore code is merged (except for gerrit 11703), TTCN-3 tests for RSL MDCX are merged but will fail until gerrit 11552 and 11550 are merged.

- Checklist item [x] add RSL MDCX to BSC LCLS set to Done

- % Done changed from 30 to 40

Both BTS and MGW variants are tested using unmerged (yet) code from #2487 and work fine. Handover-related cases are pending on completion of handover implementation in #3586. What remains in addition to handover is to check that:

- LCLS break works as intended (needs corresponding MSC code)
- both variants work fine when closing the loop between phones connected to different BTS (using osmocom-bb "stick" feature to use explicit ARFCN)

Remaining patches: libosmocore 7, OsmoBSC 4.

- Related to Feature #3586: support LCLS for inter-BSC handover added

- Related to Feature #1609: Inter-BSC hand-over is missing (MSC side) added

LCLS-BTS is not working when 2 phones are connected to different BTS: the loop is established but but no voice can be heard. Investigation is in progress.

- Related to Feature #3429: idea: auto-cleanup endpoints after long period of inactivity? added

- Related to Feature #3783: Make conn-timeout compatible with LCLS added

- Status changed from In Progress to Stalled
  - % Done changed from 40 to 50

05/15/2020
The test failure with 2 BSC connected to OsmoMSC could be reproduced using https://gerrit.osmocom.org/c/osmo-msc/+/13422 and related patches.

The unfinished implementation which simplifies troubleshooting is available in https://gerrit.osmocom.org/c/osmo-bsc/+/13419

#19 - 05/08/2019 03:33 PM - laforge
- Assignee changed from msuraev to dexter
- Priority changed from Urgent to High

#20 - 05/15/2019 01:40 PM - laforge
- Assignee changed from dexter to Hoernchen

#21 - 12/01/2019 10:51 AM - laforge
- Assignee changed from Hoernchen to dexter

#22 - 01/07/2020 03:08 PM - dexter

We have inspected the code now and the implementation looks more complete as expected. Even TTCN3 tests seem to be there:

- BSC_Tests_LCLS.TC_lcls_bts_gcr_bway_connect
- BSC_Tests_LCLS.TC_lcls_bts_gcr_bway_connect_hr
- BSC_Tests_LCLS.TC_lcls_bts_connect_break

I have looked at the wireshark trace of TC_lcls_bts_gcr_bway_connect and it looks good. However I will give this also a try in a lab setup to see if it really works.

#23 - 01/07/2020 03:06 PM - dexter
- Status changed from Stalled to In Progress

#24 - 01/08/2020 10:58 AM - dexter
- File lcls_bts_loop_experiment_with_osmo-bsc_and_osmo_msc_08012020.pcapng added

I had a look at the osmo-msc code. Apparently we do not have support for LCLS there yet. At least during assignment the GCR and the other LCLS related info is not generated. I have added some hardcoded values here and then it works (see attached trace). I do not know if it is enough to set some static configuration for LCLS via VTY, at least the Node ID would be static. The GCR is probably more difficult. The MSC would need to correlate the incoming calls and assign equal GCRs to each pair of calls.

#25 - 01/08/2020 08:09 PM - neels
- Tracker changed from Bug to Feature

#26 - 05/12/2020 12:05 PM - laforge
- Subject changed from LCLS directly between BTSs to handover during LCLS directly between BTSs
- Status changed from In Progress to New
- Assignee deleted (dexter)

Files

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