Year 2017 Osmocom retrospective

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2017 - a year of change

Osmocom CNI (Cellular Network Infrastructure) has changed a lot:

- software changes
- team / developer changes
- sysmocom company focus changes

2017 - CNI Software changes

- OsmoBSC migration from SCCPlite to 3GPP AoIP
- OsmoMGW as integral part of both BSC and MSC
- NITB split into separate MSC, HLR, BSC
- 3G (IuCS, IuPS) goes mainline

2016/2017/2018 - Team changes

- Q1 2016: Jacob Erlbeck leaves sysmocom
  - unfortunately a complete loss to Osmocom, particularly OsmoPCU
- 2017: Holger Freyther leaves sysmocom
  - unfortunately also shift of focus away from Osmocom :(
  - immense loss to the project in terms of skill and capacity
- Q1 2018: Max Suraev leaves sysmocom
  - another loss of lots of Osmocom knowledge

sysmocom changes

- we used to have to do lots of non-Osmocom work to cross-subsidize Osmocom
  - big distraction of resources in 2014/2015, now gone
- we used to cross-subsidize Osmocom development by hardware sales
  - not happening as much anymore
- we now work almost 100% on Osmocom
  - R&D projects, support contracts and grants

split NITB aftermath (the good parts)

- biggest architectural change since we started in 2008
- lots of good reasons and design improvements
  - finite state machines with proper timeouts / clean-up
  - proper 3GPP AoIP with interoperability tesing
  - no synchronous HLR database access
  - HLR access from OsmoMSC and OsmoSGSN
  - 2G/3G authentication over GERAN and UTRAN

split NITB aftermath (the bad parts)

- never-ending list of breakage
  - actual regressions of things that used to work before
  - things that were *known omissions* during the restructuring
- some commercial users stuck with SCCPlite and thus old @osmo-bsc-sccplite@
  - almost none of the new features or bug fixes there
  - no automatic testing
  - back-ports time-consuming

split NITB aftermath (lessons learned)

- overall complexity of Osomcoom cellular is quite stunning now
- absence of proper functional testing has caused massive fall-out
- the split architecture allows for betteer testing of smaller parts of the system
- my personal main focus of the last 5+ months:
  - testing, testing, testing, testing
  - testing, testing, testing, testing
  - some more testing
  - even more testing

Osmocom CNI testing (1/2)

- unit test (autotest, like we always had)
  - test individual functions / APIs of libraries / programs
  - executed during "make check" and hence before any patch can get merged
- automatized functional tests in TTCN-3
  - test *external* visible behavior on interfaces such as Abis, A, GSUP, GTP, MNCC, PCUIF, CTRL, VTY, ...
  - executed nightly by Jenkins (could be more frequently)

Osmocom CNI testing (2/2)

- osmo-gsm-tester
  - tests entire Osmoocom network with BTS/BSC/MSC/HLR/PCU/SGSN/GGSN/...
  - uses real BTS + MS hardware (over coaxial cable)
  - automatic execution multiple times per day
- interop tests
  - against NG40 RAN + CN simulator from NG4% (A / Gb / Iu level)
  - not fully automatized yet

Osmocom project health (CNI)

- lots of funded developments, **but**
  - primarily *enterprise features* required by professional users
- dominance of sysmocom is problematic
  - sustainable FOSS has no single point of failure!
- we need more contributions from third parties
  - particularly those that benefit commercially from Osmocom

Osmocom project health (other projects)

- OsmocomTETRA dead since 2012, occasional small fixes
- No OsmocomBB ports to other PHY/chip yet
- OsmocomDECT completely dead
- Erlang core network projects dead
- Smalltalk projects dead (AFAICT)
- SIMtrace dead for years, about to be resurrected

Osmocom project health (other projects)

- gr-osmosdr very low commit ratio
- rtl-sdr no commits in 2015-2017
- but it’s not that bad… (see next slide)

Osmocom project health (other projects)

- gr-gsm, fake_trx and trxcon a welcome change in OsmocomBB
- osmocom-analog (jolly to the rescue)
- osmo-fl2k (soon! now! this year!)

Osmocom status (CNI)

- CS RAN (BTS, BSC) is quite strong/complete these days
  - ready to be used with 3rd party CN
- PS RAN (PCU) suffers from lack of attention
  - lack of automatic testsuite with decent coverage
  - lack of uplink multi-slot any many EGPRS features
- CS CN (MSC, HLR)
  - in halthy state, but lack of TCAP/MAP interface limits us to non-roaming networks
- PS CN (SGSN, GGSN)
  - in good health, now with IPv6 supoprt and kernel GTP acceleration

Osmocom outlook (CNI)

- 2G still in demand by lots of use cases (rural, maritime, ...)
  - if we had TCAP/MAP interface, many more deployments possible
- 3G has some users but lack of FOSS RNC limits us to femtocells
- 4G is deployed in parallel to 2G in many scenarios
  - Osmocom 2G stack needs 2G-4G integration (SGs, DIAMETER)
  - Osmocom needs to contribute to FOSS 4G projects (nextepc, srsLTE)
- irony: Now that it's possible to do properly funded Osmocom development, we have less people involved than in the early days :(

If we don't manage to focus on 4G soon, interest in 2G will diminish soon

Osmocom outlook (other projects)

- activity of original/traditional Osmocom developers decreased
- without attracting more developers, a lot of projects will remain dormant and/or never realize their potential
- I'd love to work on TETRA, DMR or other mobile communications technology
  - but lack of developers and contributors even for 2G makes me stuck in 2G CNI land :(

Personal Request

- Osmocom needs you!
- we’ve lost too many friends already
- please don’t leave Osmocom; please don’t leave me

Further Reading

See my detailed 2017 review: * http://osmocom.org/news/84

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