

Osmo-GSM-Tester

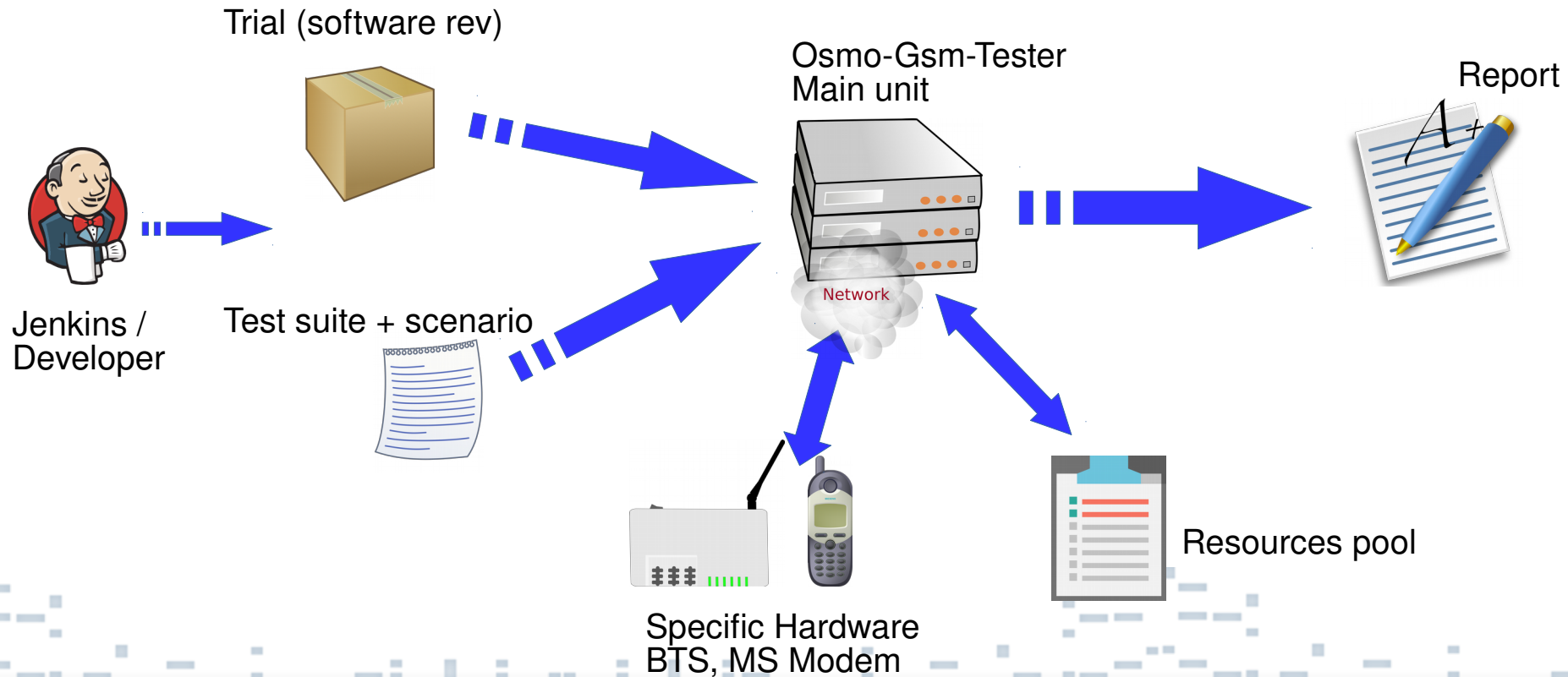
End to end testing of the Osmocom stack

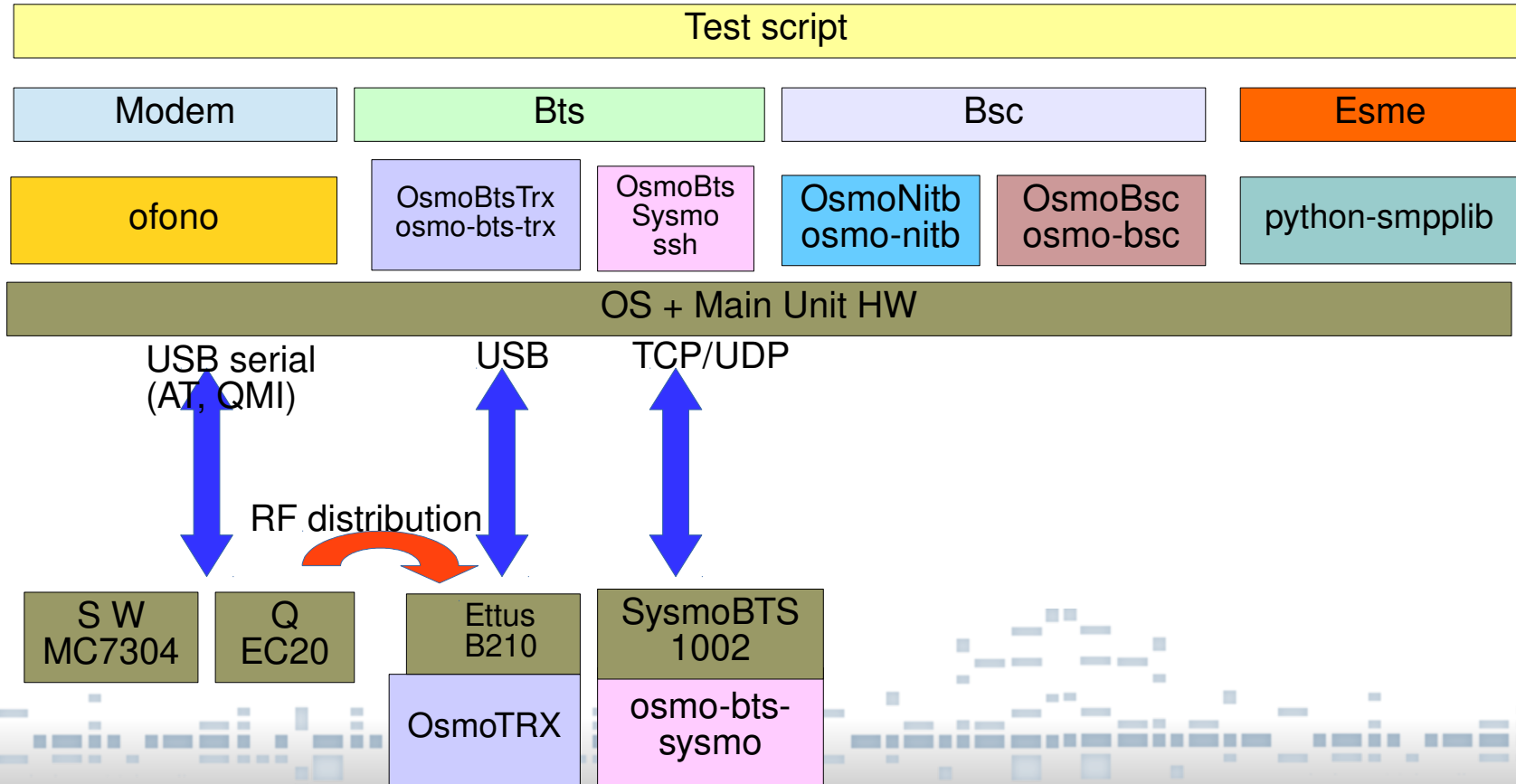
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- Testing cellular networks is hard and time consuming:
 - Distributed systems
 - Complex networks
 - Lots of deep protocol stacks, different implementations
 - Many different possible configurations
 - Hardware & software
- Unit tests, virtualized systems are great but have limitations:
 - No RF
 - No real phones
 - Interoperability
- Solution: automatic end-to-end testing between elements from different vendors testing all possible scenarios

- End-to-end testing of cellular networks with real hardware
- Interoperability
- Continuous Integration, avoid regressions
- Reproducibility
- Storage of test output + processing (pinpoint issues, KPIs)
- Easily extend with different hardware
- Easily extend with different software
- Generic test API to easily build test cases
- Collaborative open project!









ip_address:

- addr: 10.42.42.2
- addr: 10.42.42.3
- addr: 10.42.42.4

bts:

- label: sysmoBTS 1002
type: osmo-bts-sysmo
ipa_unit_id: 1
addr: 10.42.42.114
band: GSM-1800
direct_pcu: true
ciphers: [a5_0, a5_1, a5_3]

- label: Ettus B200
type: osmo-bts-trx
ipa_unit_id: 6
addr: 10.42.42.50
band: GSM-1800
launch_trx: true
ciphers: [a5_0, a5_1]

arfcn:

- arfcn: 512
band: GSM-1800
- arfcn: 514
band: GSM-1800

modem:

- label: sierra_1st
path: '/sys/devices/pci.foo/bar/usb1/1-1/1-1.7/1-1.7.2'
ki: 'EBAB63D06C3F546A16C977CB40E57C68'
auth_algo: 'comp128v1'
ciphers: [a5_0, a5_1]
features: ['sms', 'voice', 'ussd', 'gprs', 'sim']

- label: ec20
path: '/sys/devices/pci.foo/bar/usb1/1-1/1-1.7/1-1.7.6'
ki: '07F35D0A9476646169669401215580E0'
auth_algo: 'comp128v1'
ciphers: [a5_0, a5_1]
features: ['sms', 'ussd', 'gprs', 'sim']

```
! src/osmo_gsm_tester/templates/osmo-bts-sysmo.cfg.tmpl
```

```
phy 0
```

```
instance 0
```

```
bts 0
```

```
band ${osmo_bts_sysmo.band}
```

```
ipa unit-id ${osmo_bts_sysmo.ipa_unit_id} 0
```

```
oml remote-ip ${osmo_bts_sysmo.oml_remote_ip}
```

```
pcu-socket ${osmo_bts_sysmo.pcu_socket_path}
```

```
gsmtap-sapi bcch
```

```
gsmtap-sapi ccch
```

```
gsmtap-sapi rach
```

```
trx 0
```

```
phy 0 instance 0
```

```
! src/osmo_gsm_tester/templates/osmo-msc.cfg.tmpl
```

```
smpp
```

```
local-tcp-ip ${msc.ip_address.addr} 2775
```

```
system-id test-msc
```

```
policy ${msc.smsc.policy}
```

```
%for esme in smsc.esme_list:
```

```
esme ${esme.system_id}
```

```
password ${esme.password}
```

```
default-route
```

```
%endfor
```



```
# suites/aoip_sms/suite.conf:
```

```
resources:
```

```
ip_address:
```

```
- times: 5 # msc, bsc, hlr, stp, mgw
```

```
bts:
```

```
- times: 1
```

```
modem:
```

```
- times: 2
```

```
# example/scenarios/sysmo.conf
```

```
resources:
```

```
bts:
```

```
- type: osmo-bts-sysmo
```

```
# example/scenarios/trx-b200.conf
```

```
resources:
```

```
bts:
```

```
- label: Ettus B200
```

```
type: osmo-bts-trx
```

```
osmo-gsm-tester.py -s aoip_sms:sysmo -s aoip_sms:trx-b200
```



```
from osmo_gsm_tester.testenv import *
```

```
hlr = suite.hlr()
```

```
bts = suite.bts()
```

```
mgw_msc = suite.mgw()
```

```
mgw_bsc = suite.mgw()
```

```
stp = suite.stp()
```

```
msc = suite.msc(hlr, mgw_msc, stp)
```

```
bsc = suite.bsc(msc, mgw_bsc, stp)
```

```
ms_mo = suite.modem()
```

```
ms_mt = suite.modem()
```

```
hlr.start()
```

```
stp.start()
```

```
msc.start()
```

```
mgw_msc.start()
```

```
mgw_bsc.start()
```

```
bsc.bts_add(bts)
```

```
bsc.start()
```

```
bts.start()
```

```
wait(bsc.bts_is_connected, bts)
```

```
hlr.subscriber_add(ms_mo)
```

```
hlr.subscriber_add(ms_mt)
```

```
ms_mo.connect(msc.mcc_mnc())
```

```
ms_mt.connect(msc.mcc_mnc())
```

```
print('waiting for modems to attach...')
```

```
wait(ms_mo.is_connected, msc.mcc_mnc())
```

```
wait(ms_mt.is_connected, msc.mcc_mnc())
```

```
wait(msc.subscriber_attached, ms_mo,  
ms_mt)
```

```
sms = ms_mo.sms_send(ms_mt)
```

```
wait(ms_mt.sms_was_received, sms)
```



1 failures (±0)



4 tests (±0)

[Took 5 min 39 sec.](#)

[add description](#)

All Failed Tests

Test Name	Duration	Age
<ul style="list-style-type: none"> sms:trx.mo mt sms.py <ul style="list-style-type: none"> Stack Trace Process ended prematurely Standard Error <pre> Traceback (most recent call last): File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/suite.py", line 98, in run self.path) File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/util.py", line 282, in run_python_file SourceFileLoader(module_name, path).load_module() File "<frozen importlib._bootstrap>", line 539, in _check_name_wrapper File "<frozen importlib._bootstrap>", line 1614, in load_module File "<frozen importlib._bootstrap>", line 593, in _load_module_shim File "<frozen importlib._bootstrap>", line 1153, in exec File "<frozen importlib._bootstrap>", line 1129, in _exec File "<frozen importlib._bootstrap>", line 1471, in exec_module File "<frozen importlib._bootstrap>", line 321, in _call_with_frames_removed File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/suites/sms/mo_mt_sms.py", line 25, in <module> wait(ms_mt.is_connected, nitb.mcc_mnc()) File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/test.py", line 46, in <lambda> wait = lambda *args, **kwargs: event_module.wait(suite_run, *args, **kwargs) File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/event_loop.py", line 59, in wait if not wait_no_raise(log_obj, condition, condition_args, condition_kwargs, timeout, timestep): File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/event_loop.py", line 50, in wait_no_raise poll() File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/event_loop.py", line 39, in poll func() File "/home/jenkins/workspace/osmo-gsm-tester_run/osmo-gsm-tester/src/osmo_gsm_tester/suite.py", line 358, in poll raise log.Error('Process ended prematurely') osmo_gsm_tester.log.Error: Process ended prematurely </pre>	43 sec	2

All Tests

Package	Duration	Fail	(diff) Skip	(diff) Pass	(diff) Total	(diff)
(root)	5 min 10 sec	1	0	3	4	



Osmocom's Jenkins job running last rev software hourly.

Current tests:

- Network registration
- Encryption (a5/0, a5/1)
- SMS
- SMPP
- USSD (*#100#)
- GPRS (signalling)
- Voice calls (signalling)

Testing BTS:

- SysmoBTS 1002
- Ettus B210
- SysmoCell5000
- NanoBTS (band 900 & 1900)
- OctBTS 3500

Testing Modems:

- Sierra Wireless MC7304
- Quectel EC20
- Gobi 2000

- More BTS/TRX
 - LimeSDR
 - OpenCellular
- Better MS support
 - ofono
 - osmocom-bb
- Voice calls (data plane)
- GPRS/EGPRS (data plane)
- 3G testing (nano3G)
- ARFCN resource allocation algorithm

See task list in Osmocom's redmine project

- It is useful! It really helps!
 - Several regressions and bugs found
- Controlling the modems correctly is hard
 - stability issues
- Contributions to other projects:
 - osmo-*, ofono, python-smpplib, pydbus
- Re-usable work for other projects
- Upstream collection of test suites

- Issue tracker: <https://osmocom.org/projects/osmo-gsm-tester/issues>
- Code: <http://git.osmocom.org/osmo-gsm-tester>
- Manual: <http://ftp.osmocom.org/docs/latest/osmo-gsm-tester-manual.pdf>
- Ansible: <https://git.osmocom.org/osmo-ci/tree/ansible/setup-gsm-tester.yml>
- Jenkins jobs: <http://jenkins.osmocom.org/jenkins/view/osmo-gsm-tester>
- Mailing list: openbsc@lists.osmocom.org
- IRC: [#osmocom](#) at freenode