Managing SamKnows Probes using NETCONF

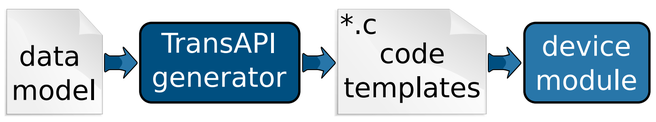
Vaibhav Bajpai
v.bajpai@jacobs-university.de
Jacobs University Bremen

Radek Krejčí
rkrejci@cesnet.cz
CESNET, z.s.p.o.

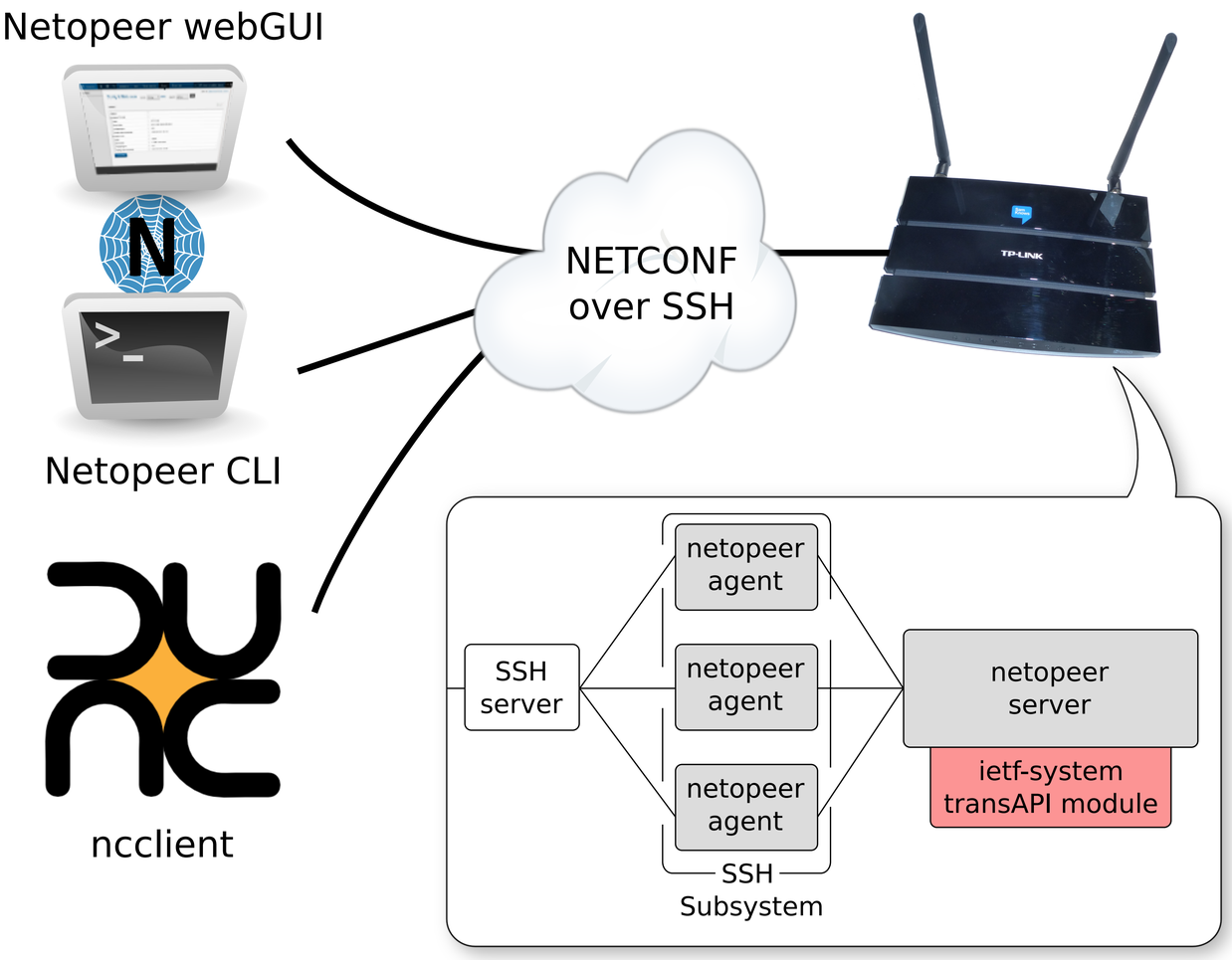
Demonstration

Configuration

- Implementation of **ietf-system** module [1].
- Selected items for system management:
  - platform information,
  - timezones settings,
  - `<set-current-datetime>` RPC,
  - `<system-restart>` RPC,
  - `<system-shutdown>` RPC.
- Implemented as *libnetconf* **transAPI** module.



- Approximately 350 LOC in C.



NETCONF Clients

- Open-source NETCONF clients:
  - *ncclient* [2],
  - *Netopeer CLI* [3],
  - *Netopeer WebGUI* [3].

NETCONF Server

- Netopeer server [3].
- Based on *libnetconf* [4] open-source library.

Measurement Agent (MA)

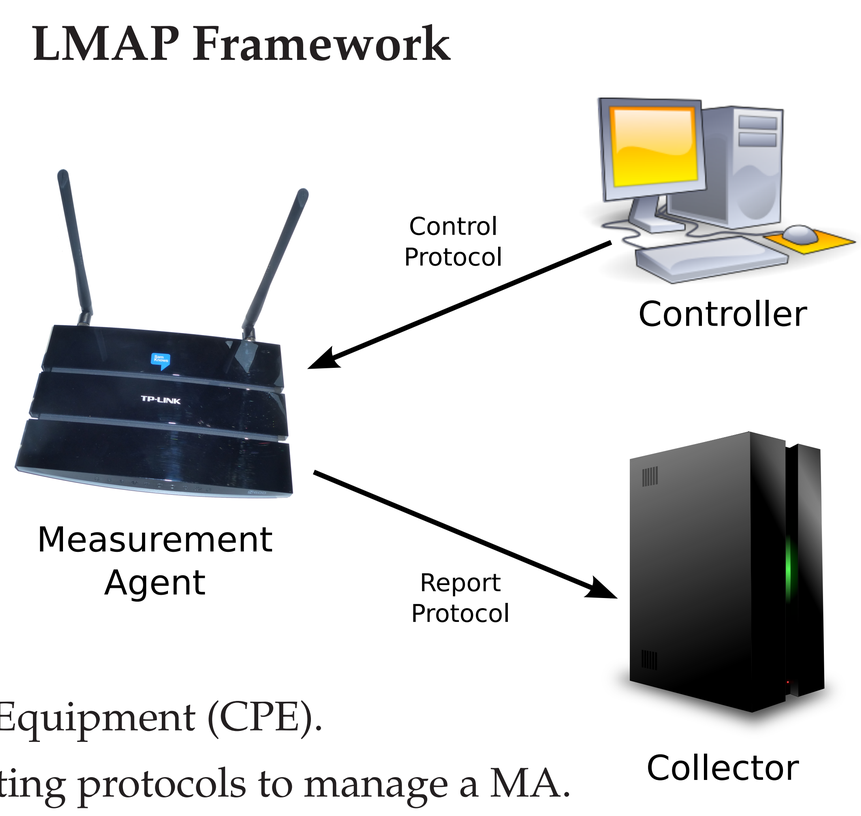
- SamKnows probe 3 (TP-Link WDR3600)
- AR9344 (MIPS), 560 MHz, 128 MB RAM
- OpenWRT-based system.

LMAP Framework

The Internet Engineering Task Force (IETF) approved a Large-Scale Measurement of Broadband Performance (LMAP) working group in 2013 [5].

Goals:

- Standardize interactions between various measurement platform elements.
- Provide measurement capability directly within a Customer Premises Equipment (CPE).
- Strong inclination towards using existing protocols to manage a MA.
- Network Configuration (NETCONF) [6] is one of the candidates of a LMAP control protocol.



SamKnows Platform

The SamKnows platform performs active measurements using dedicated hardware-based probes to asses broadband performance [7].

- Probes are off-the-shelf home routers flashed with OpenWrt.
- An open-source OpenWrt-based measurement overlay implemented by SamKnows.
- Around 40K probes deployed all around the globe.

Acknowledgements

We would like to thank Jürgen Schönwälder (Jacobs University Bremen) for supervising this research and Sam Crawford (SamKnows) for providing us with a SamKnows probe. This work was supported by the European Community's Seventh Framework Programme (FP7/2007-2013) Grant No. 317647 (Leone). The *libnetconf* and Netopeer development is supported by the "CESNET Large Infrastructure" project LM2010005 funded by the Ministry of Education, Youth and Sports of the Czech Republic.

References

[1] A. Bierman, M. Bjorklund, "A YANG Data Model for System Management", Internet Draft, IETF, 2014.

[2] ncclient, `http://github.com/vbajpai/ncclient`.

[3] Netopeer, `http://netopeer.googlecode.com`.

[4] libnetconf, `http://libnetconf.googlecode.com`.

[5] IETF LMAP Working Group, `http://datatracker.ietf.org/wg/lmap`.

[6] R. Enns, M. Bjorklund, J. Schoenwaelder, and A. Bierman, "Network Configuration Protocol (NETCONF)", RFC 6241, IETF, 2011.

[7] SamKnows.com, `http://www.samknows.com`.