

PCNC: Proof-Carrying Network Code

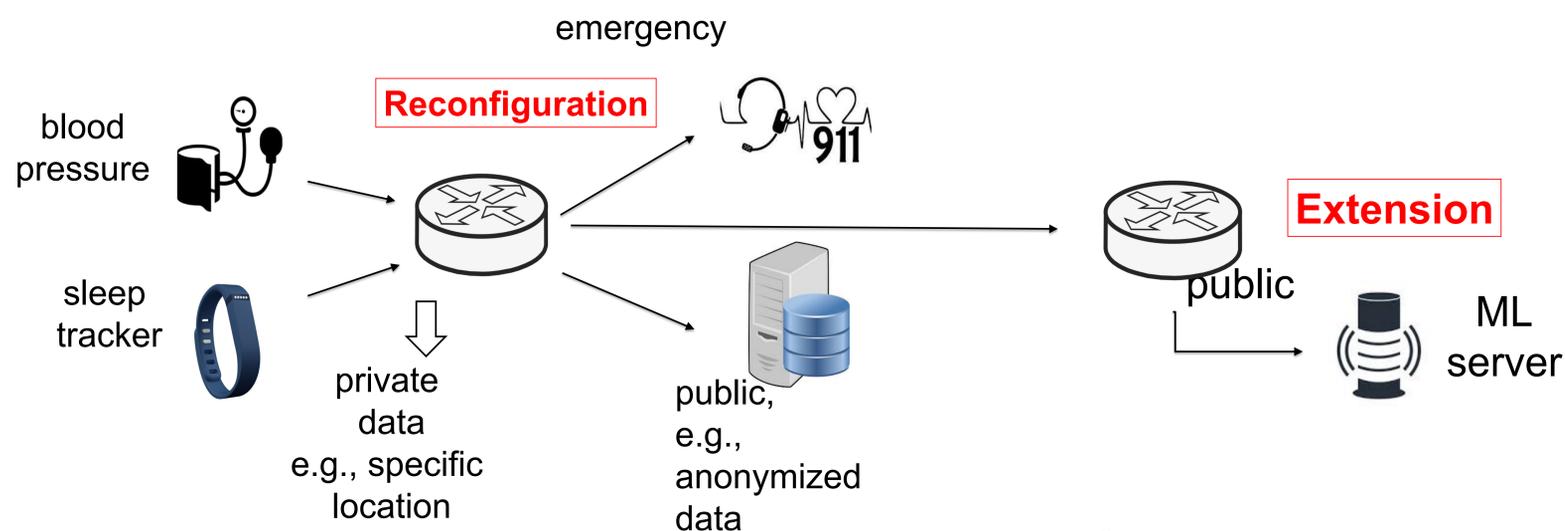
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https://github.com/uvm-plaid/PCNC_CCS_2019



Challenge:

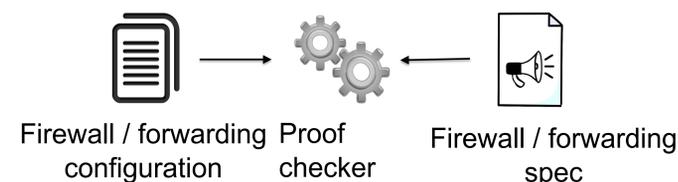
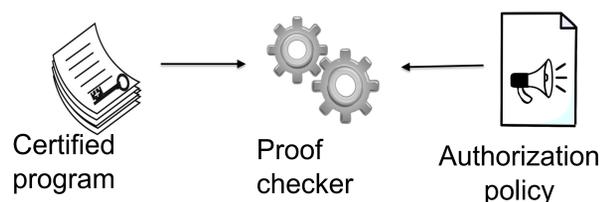
- How to *specify* and *verify* security behavior in federated networks?
- Interested in policy *reconfiguration* and *extending* networks.

Solution:

- **PCNC**: Uniform language framework for *authorization* and *behavioral* policy compliance to support SDN.
- To this end, it uses well-founded theories *System F_{says}* and *NetKAT* programming language in SDN.

Scientific Impact:

- Authorization and behavioral verification in a *single* policy *distributed* throughout the network.
- Multiple principals can collaborate to enforce security policy in federated network settings, e.g., IXP.



Impact on Society

- Open-Source Software: A prototype implementation of PCNC will be available for use-cases in small to medium-sized networks.
- Research communities and industrial partners in network programming and security are targets for a broader adoption.

Education and Outreach

- Outreach workshop for high school students, through a partnership with the New York State 4-H and Science Leadership Academy (SLA), on network security.
- Graduate students received training in the inter-disciplinary area between networking, security, and programming languages.

Potential Impact

- Make a wide range of networked systems across the nation's IT infrastructure more reliable and secure.
- Applications: IXP, federated networks, campus networks, and home networks.

