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# CONTEXTUAL CO-PRESENCE DETECTION SECURING ZERO-INTERACTION AUTHENTICATION

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## Zero-Interaction Authentication



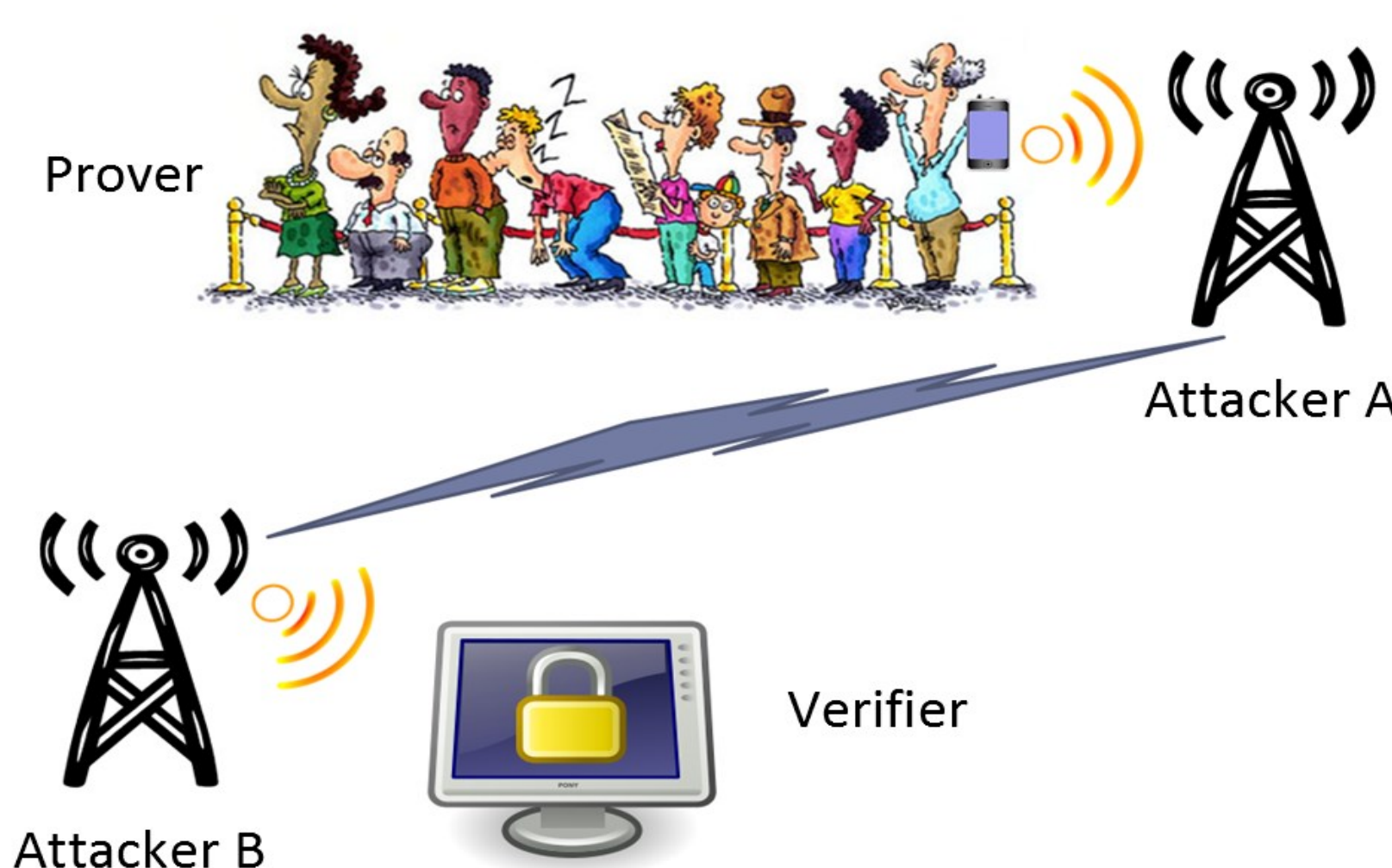
ZIA: an example scenario.

In ZIA users do not need to do anything to authenticate (login) or de-authenticate (logout).

*ZIA makes security easy to use.*

BlueProximity [1]: open-source ZIA app to lock/unlock PC screen by detecting co-presence via Bluetooth RSSI

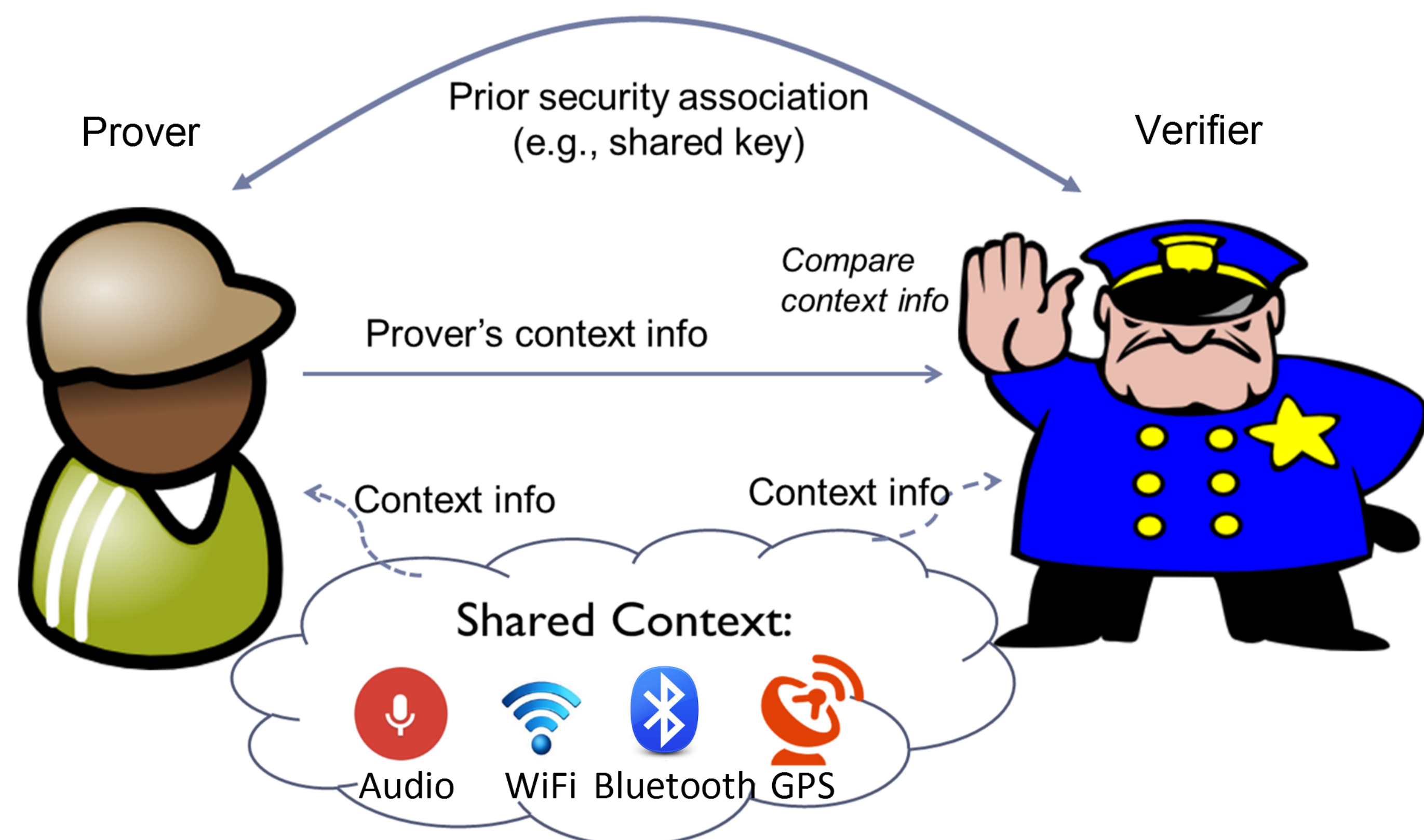
## Relay Attack



Relay attack model for ZIA.

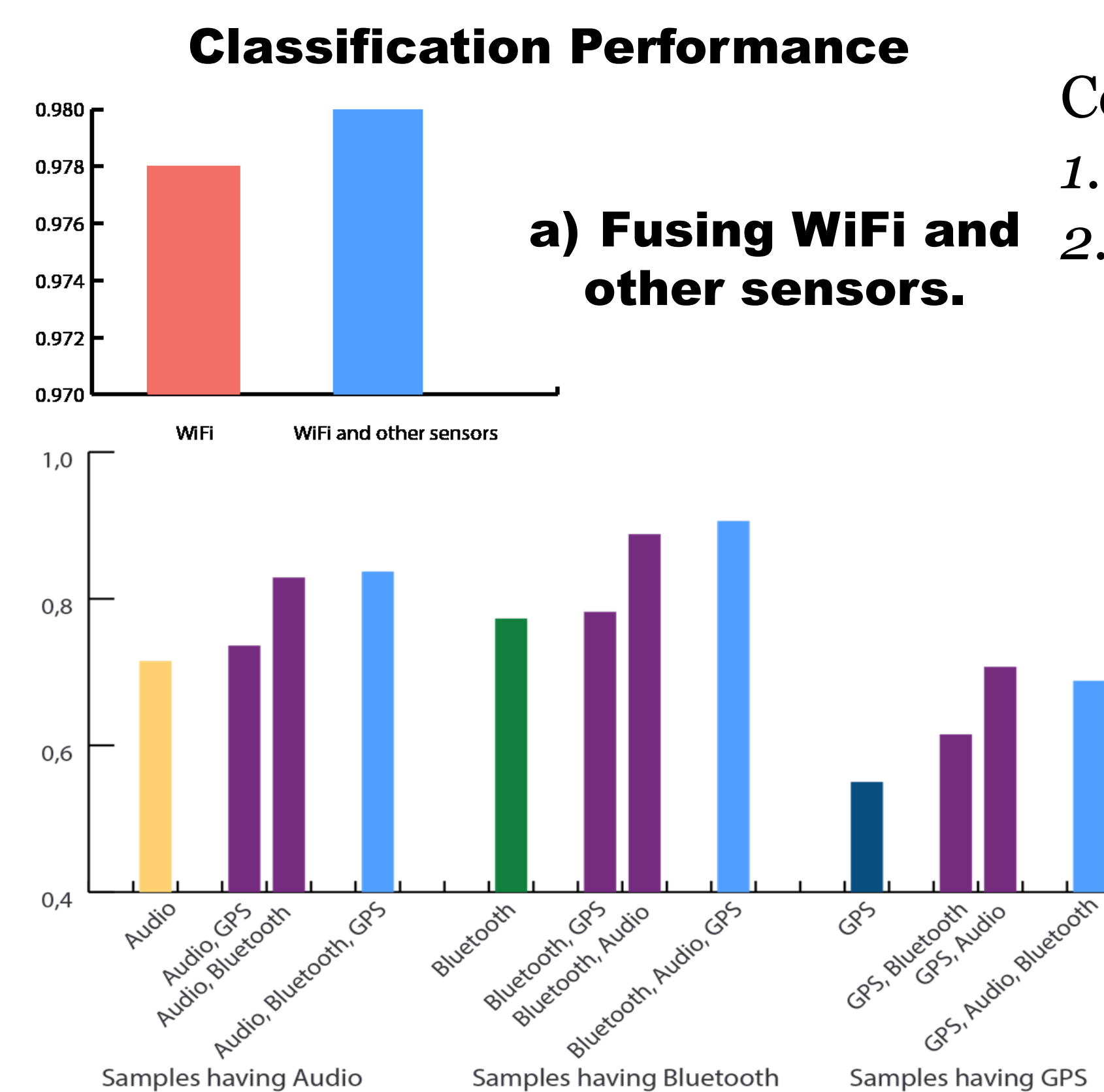
When legitimate prover and verifier are far away from each other, attackers can relay messages to fool the verifier.

## Contextual Co-Presence Detection



ZIA enhanced with Contextual Co-Presence Detection (CCD) [2,3].

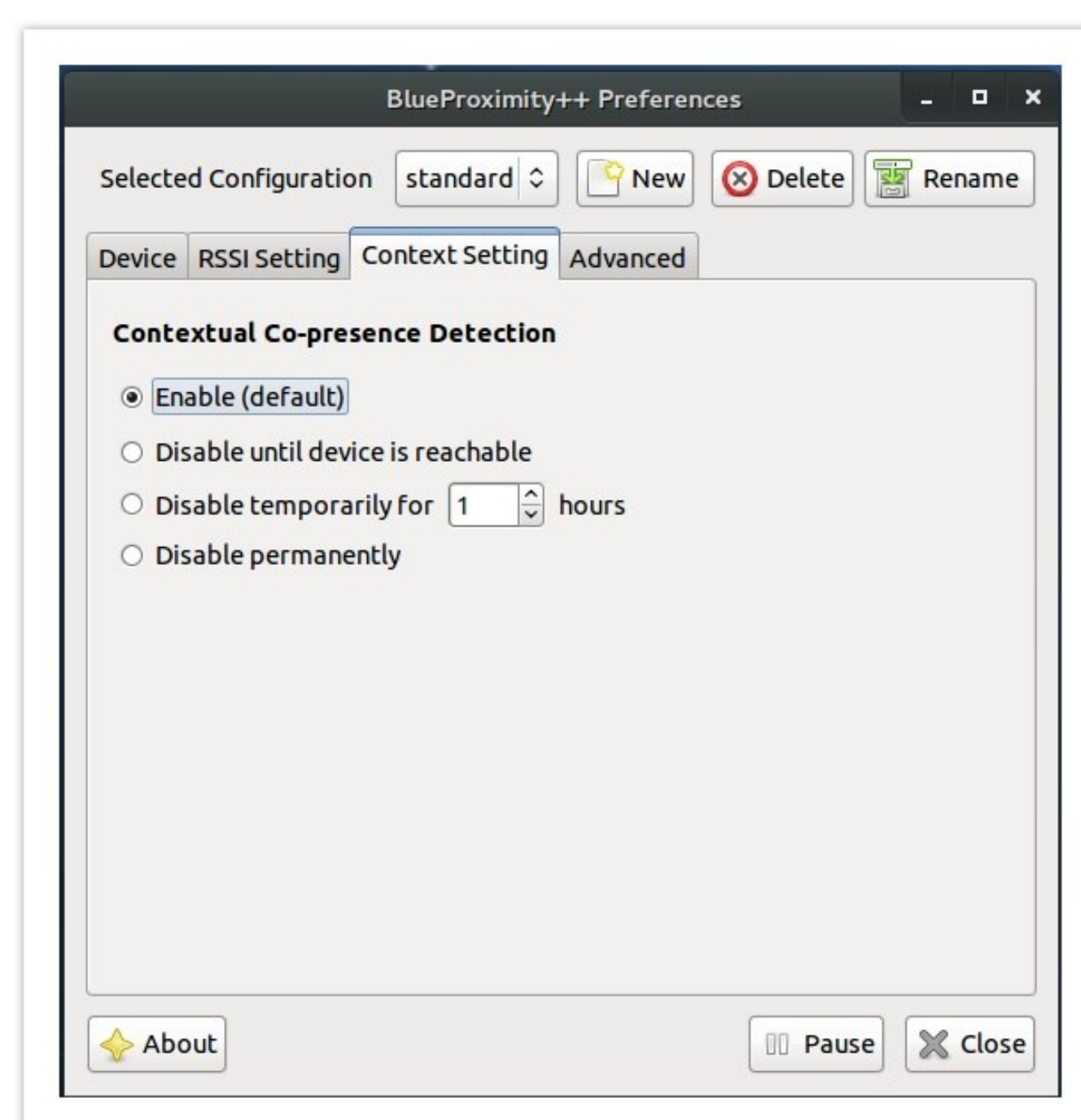
## Fusing Multiple Modalities



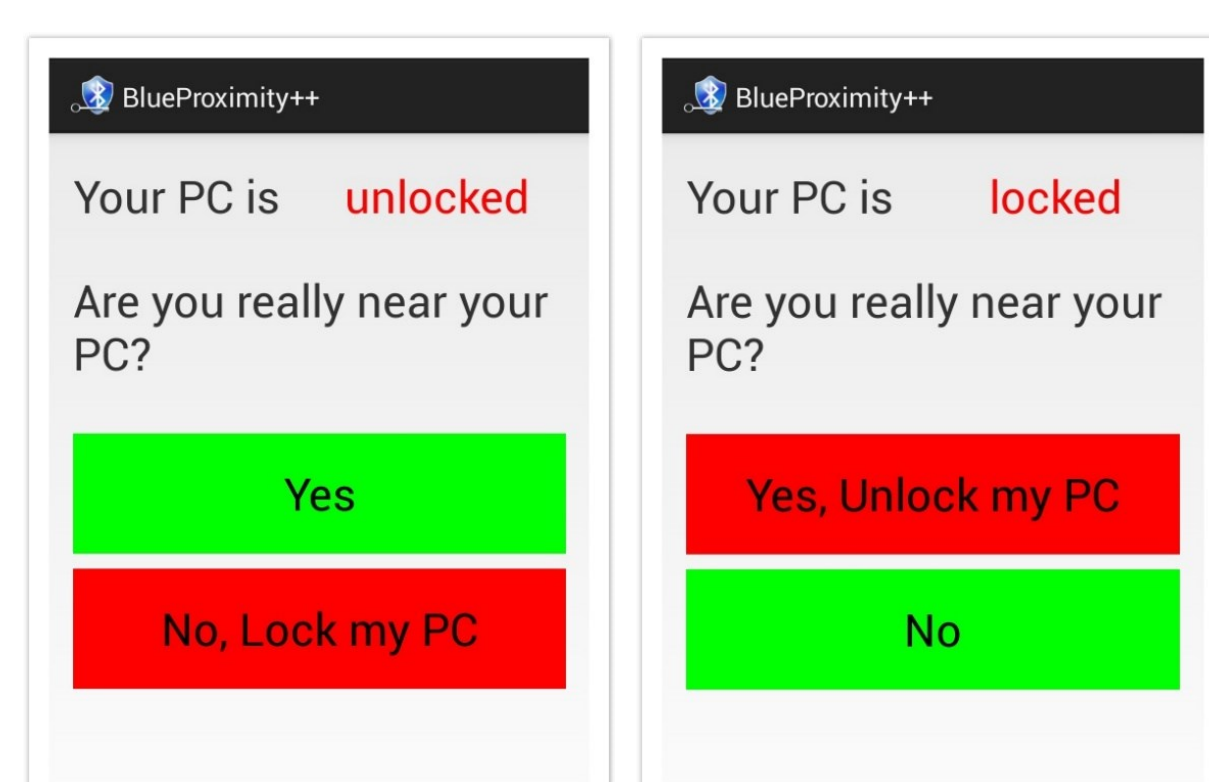
Conclusions:  
1. WiFi outperforms others.  
2. Fusing modalities improves performance.

b) Fusing Audio, Bluetooth, GPS [3].

## Application: BlueProximity++

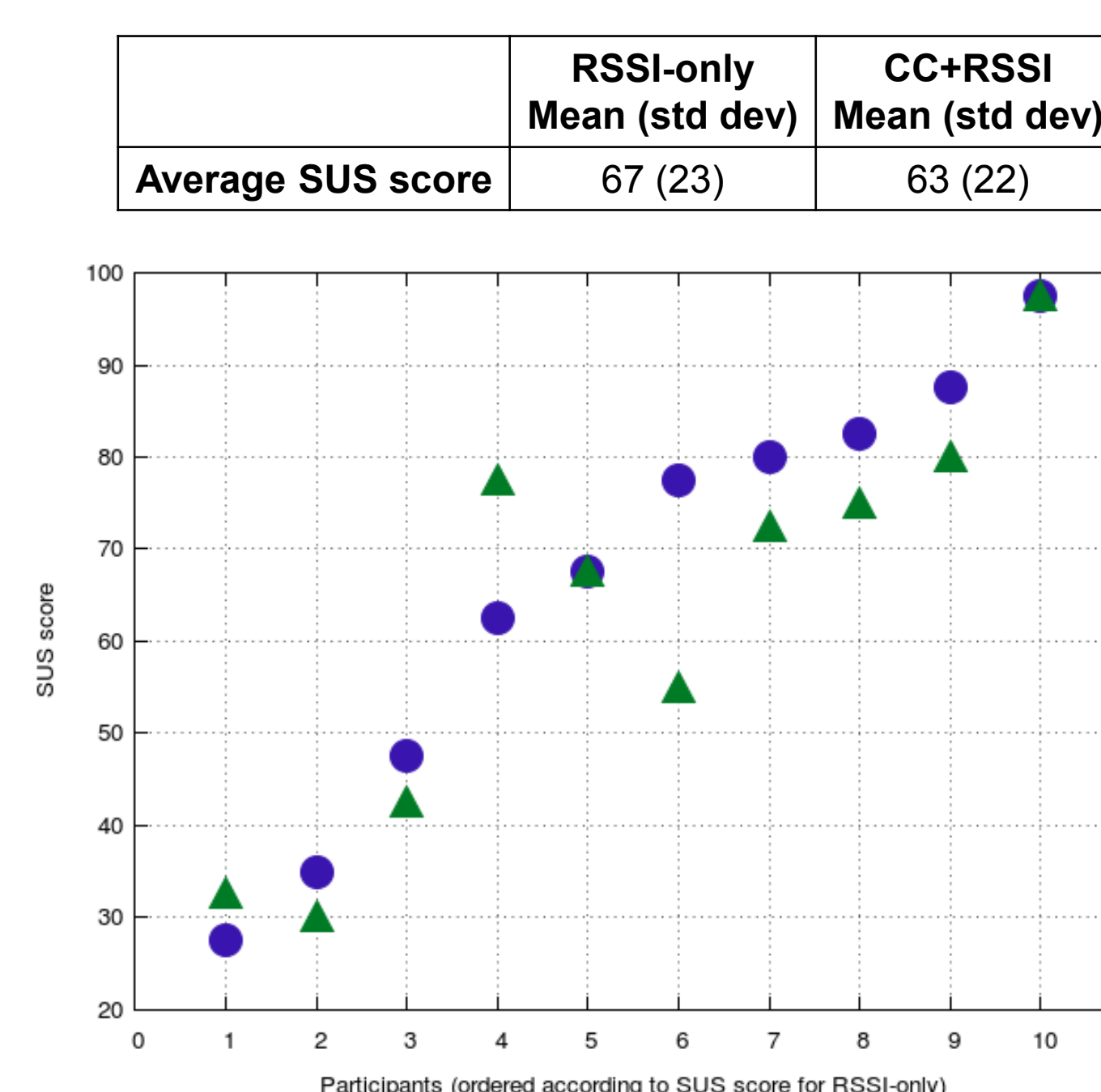


a) Adds co-presence detection via context comparison [3].



b) Provides UI for user notification of authentication decisions and corrective feedback.

## User Study



SUS score summary & distribution [3].

Comparing the two co-presence detection techniques:

- Bluetooth RSSI only
- ▲ Context Comparison + Bluetooth RSSI

Result:  $Z = 0.49$ ,  $p = 0.63$ , No significant difference.

Conclusion: Adding CCD may not degrade the usability.

### References:

- [1] BlueProximity++ wikipedia: <http://goo.gl/sRn7wN>
- [2] B. Shrestha, N. Saxena, H. Truong, N. Asokan, Drone to the Rescue: Relay-Resilient Authentication using Ambient Multi-Sensing, Financial Crypto 2014.
- [3] H. Truong, X. Gao, B. Shrestha, N. Saxena, N. Asokan, P. Nurmi, Comparing and fusing different sensor modalities for relay attack resistance in zero-interaction authentication, IEEE PerCom 2014.

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