Enabling Micro Transactions Between IoT Devices

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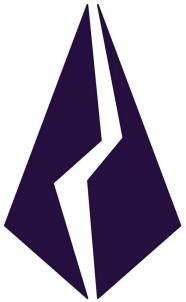
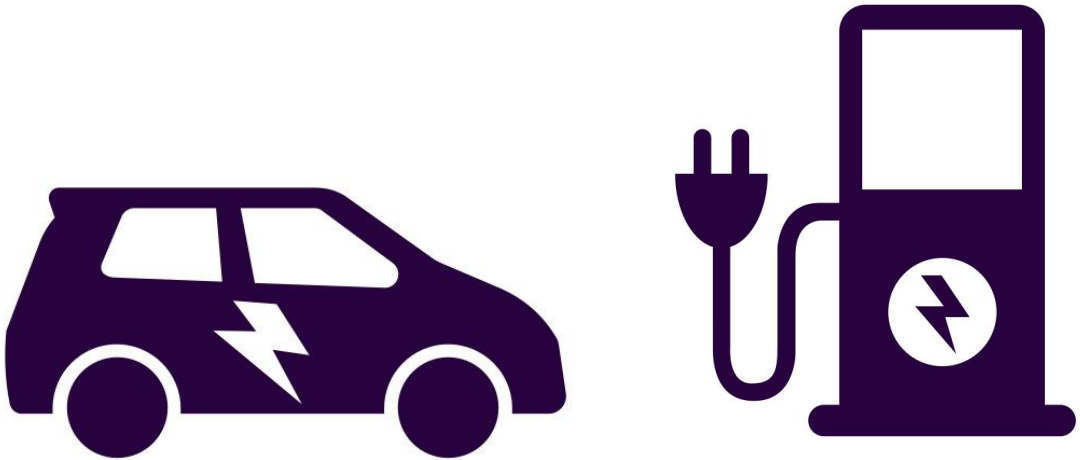


PERUN

BOSCH

POLYCRYPT

“An electric car wanting to charge at a charging station”



Humans

- Arrive at the charging station
- Make an informal agreement
- Charge the car
- Make payment (pre/post)
- Leave the station

Machines

- How to make agreement ?
- How to handle disputes ?
- How to design for IoT scale ?
- How to deal IoT device constraints ?
- Is machines holding money safe ?

Translating to technical requirements

1. Enable machines to make agreements, handle disputes
   : use enforceable digital agreements, algorithmic dispute resolution.

ethereum

2. Design for IoT scale
   : make the interactions in a transaction mostly peer to peer

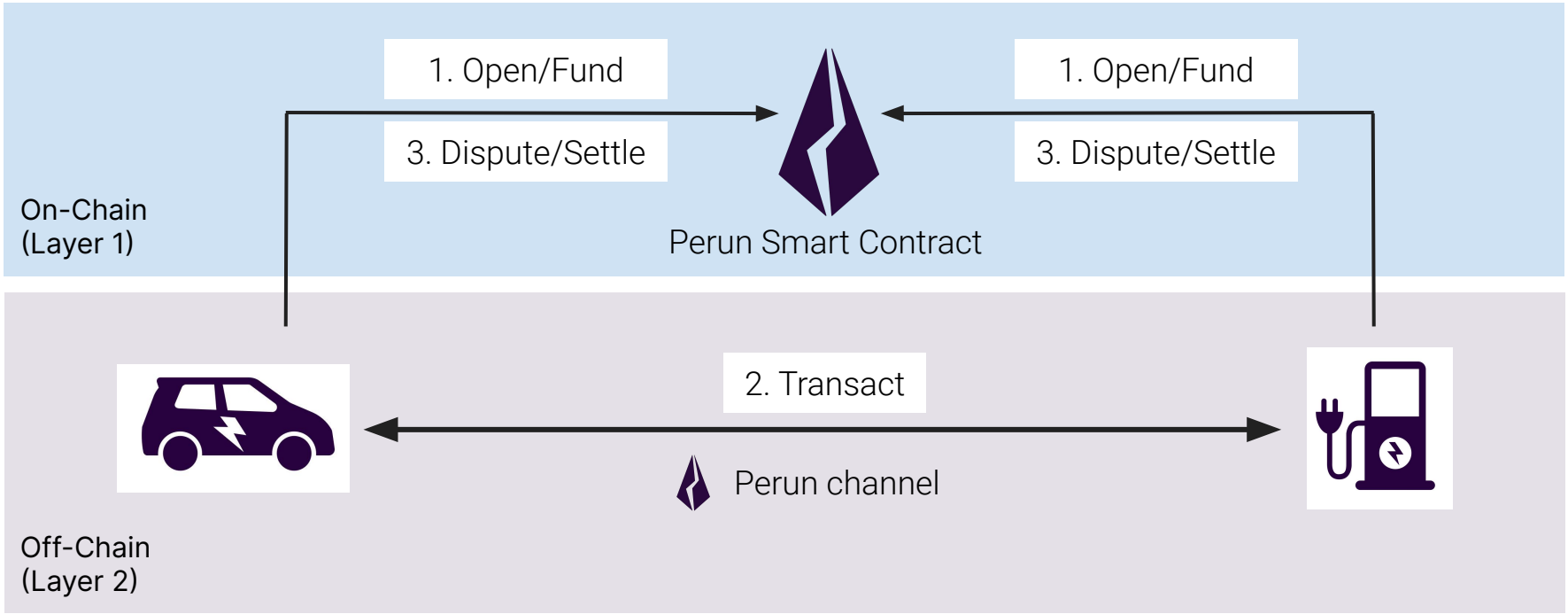
PERUN

3. Design to run on constrained IoT devices
   : consider limitations on compute, memory, network, power consumption

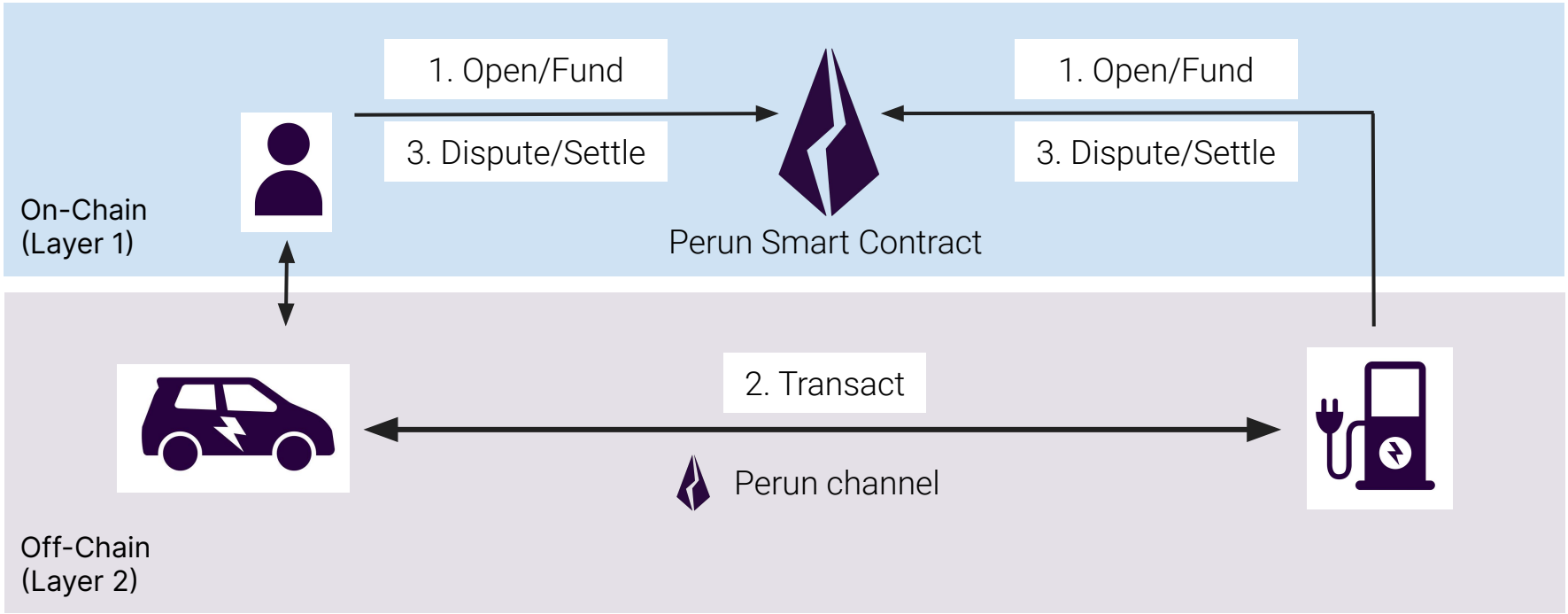
4. Limit/eliminate the need for machines to hold money
   : use pre-authorizations

Solution

Perun State Channels



Perun IoT State Channels



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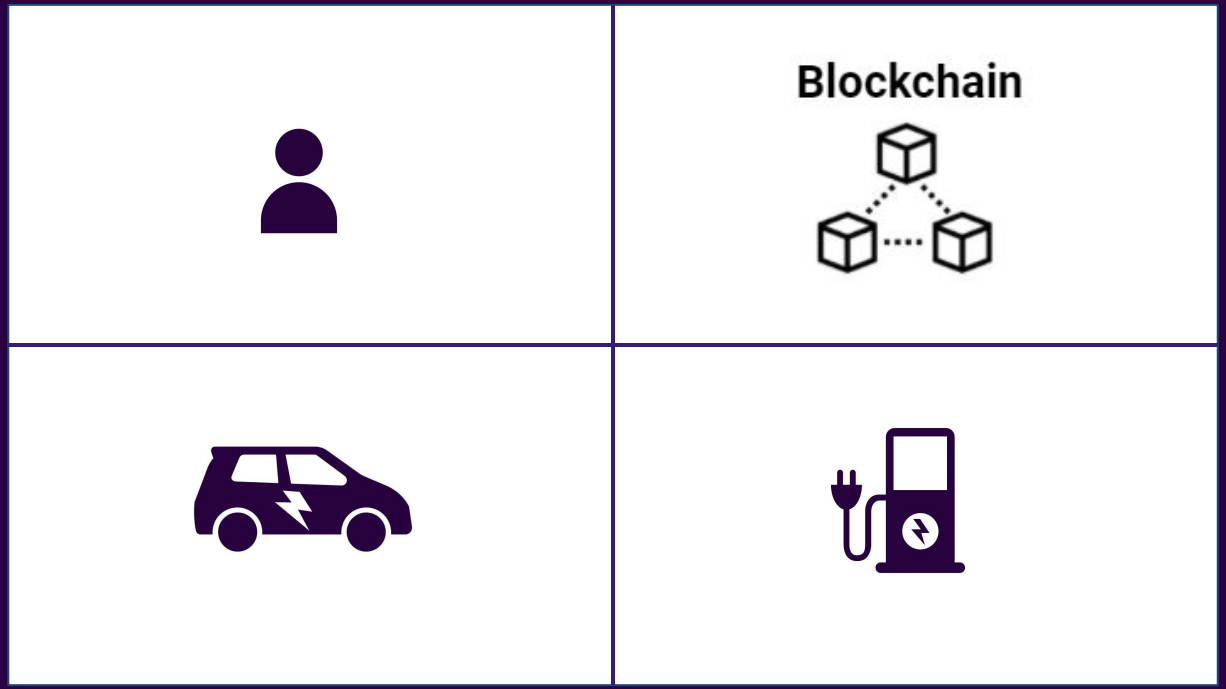
DEMO



Blockchain icon: created by Nikita Kozin from the Noun Project

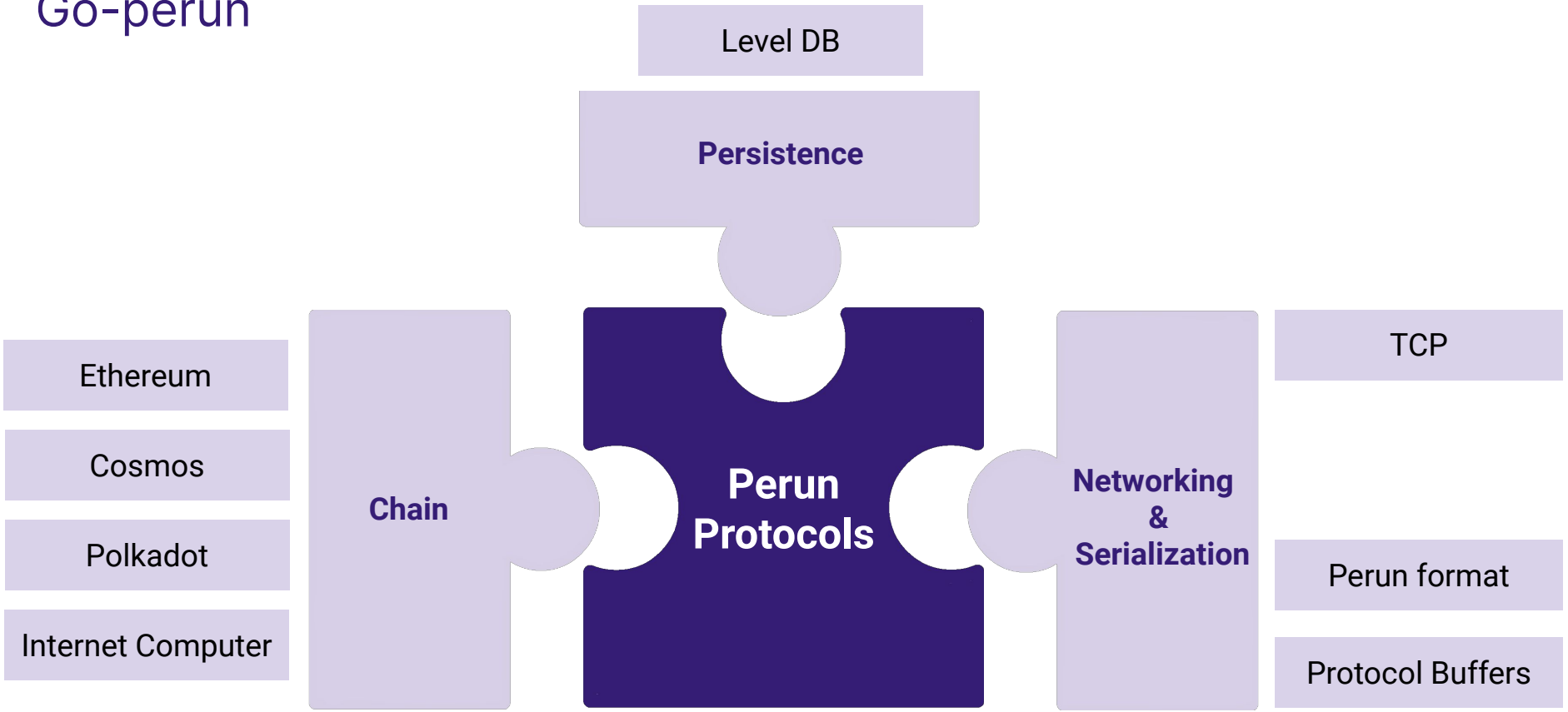
Let’s look under the hood

What makes IoT State Channels work ?

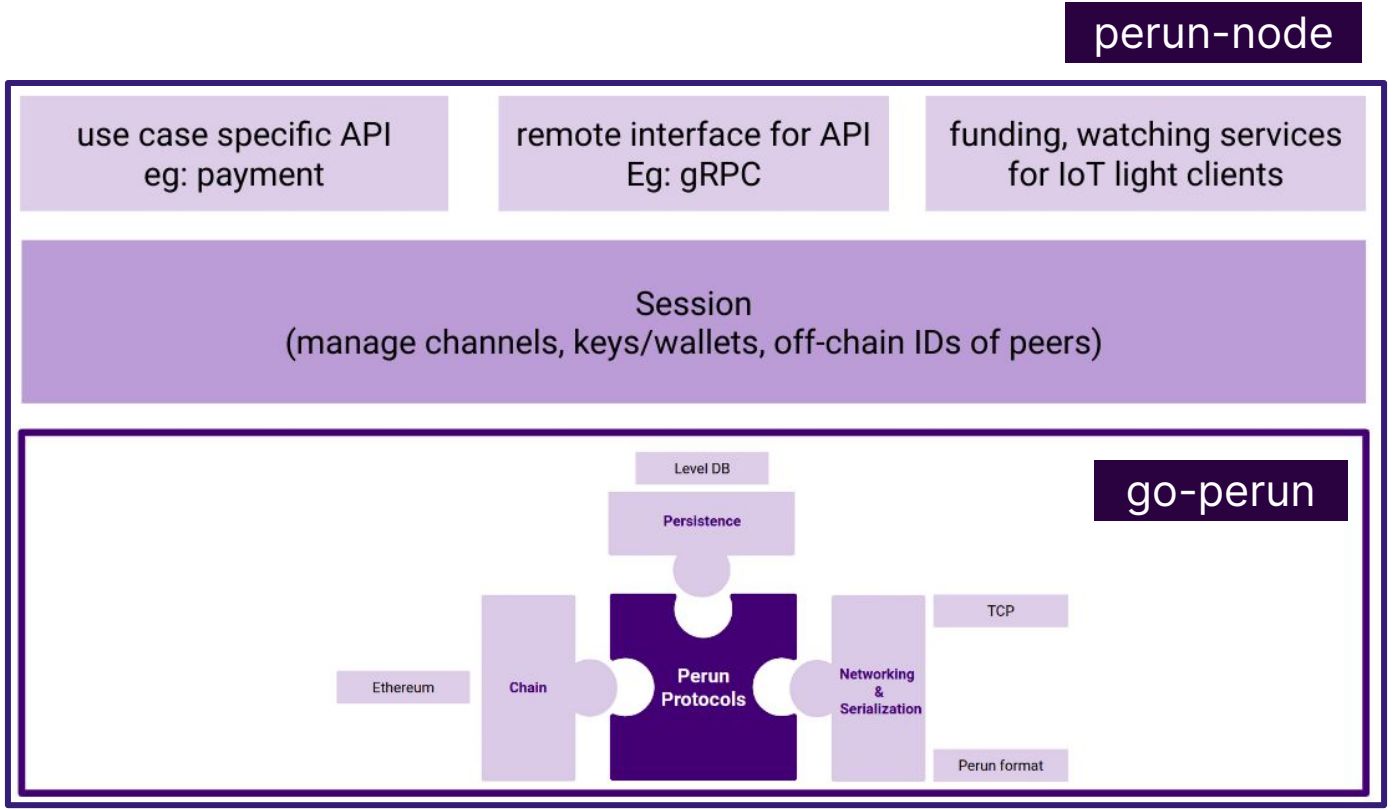
1. Split the on-chain and off-chain components of perun protocol (Proposal #3).
2. Design a protocol for externalizing watching service (Proposal #4).
3. Use standardized schemes for encoding off-chain messages (go-perun v0.9.0)
4. Use the external funding and watching components (in demo, to be released)

Putting things together

Go-perun


Level DB
Persistence
Ethereum
Cosmos
Polkadot
Internet Computer
Chain
Perun Protocols
Networking & Serialization
TCP
Perun format
Protocol Buffers

Perun node


perun-node
use case specific API
eg: payment
remote interface for API
Eg: gRPC
funding, watching services
for IoT light clients
Session
(manage channels, keys/wallets, off-chain IDs of peers)
go-perun
Level DB
Persistence
Ethereum
Chain
Perun
Protocols
Networking
&
Serialization
TCP
Perun format

in near future, we plan to focus on

- implement a light client for deep embedded devices (bare metal, RTOS).

and ... we are looking for contributions !

- find the concept relevant ?
- like to evaluate ?
- interested in joining our development efforts ?

Thank you :)

Open for discussion :)