



Social Internet of Energy

A new paradigm for Demand Side Management

What do we want to achieve?

Energy consumers and producers that share a common goal can operate autonomously (or as much as possible). **Demand Side** Management.

Available solutions

- Microgrids
- Virtual Power Plants
- **Prosumer Community Groups (PCG)** → virtually interconnect prosumers that may not be technically connected. Prosumers in a PCG make an effort to pursue a mutual goal.

What is interesting about PCGs?

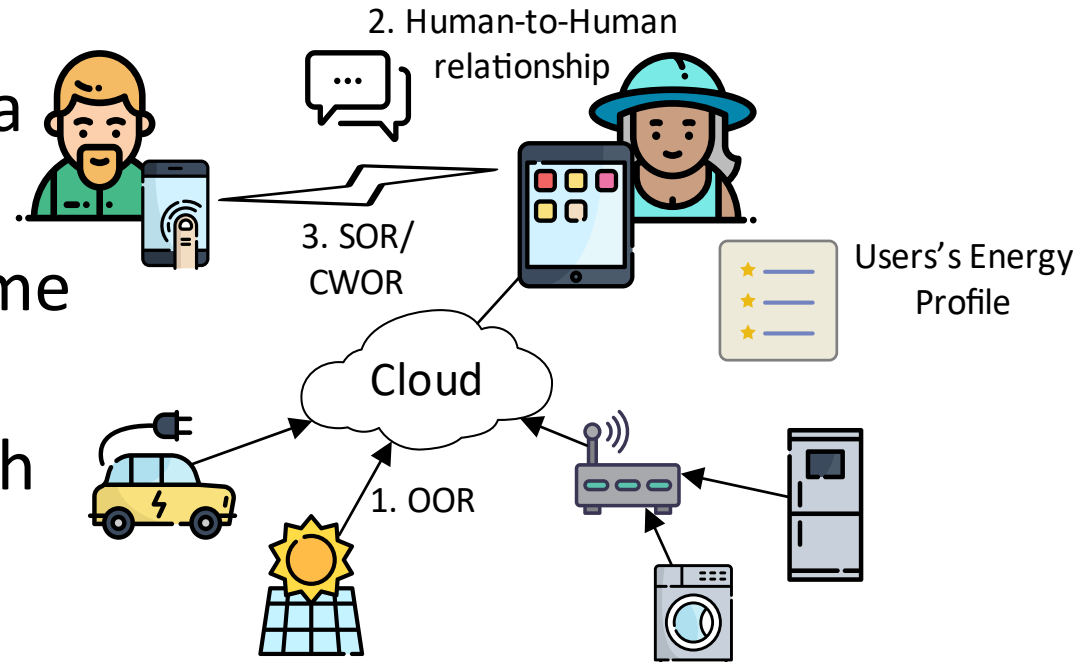
- The authors explore Social Network Services
- What if we can dynamically create PCGs to optimize energy consumption at the demand side?
- What if the entities that dynamically create and modify those groups are the devices themselves?

Social Internet of Things – A new IoT paradigm

- Interactions between Things in a collaborative and cooperative manner.
- Based on the Small World Phenomenon.
- Devices create social relationships → Autonomous inter-object interactions occurring on the **objects' social network**.

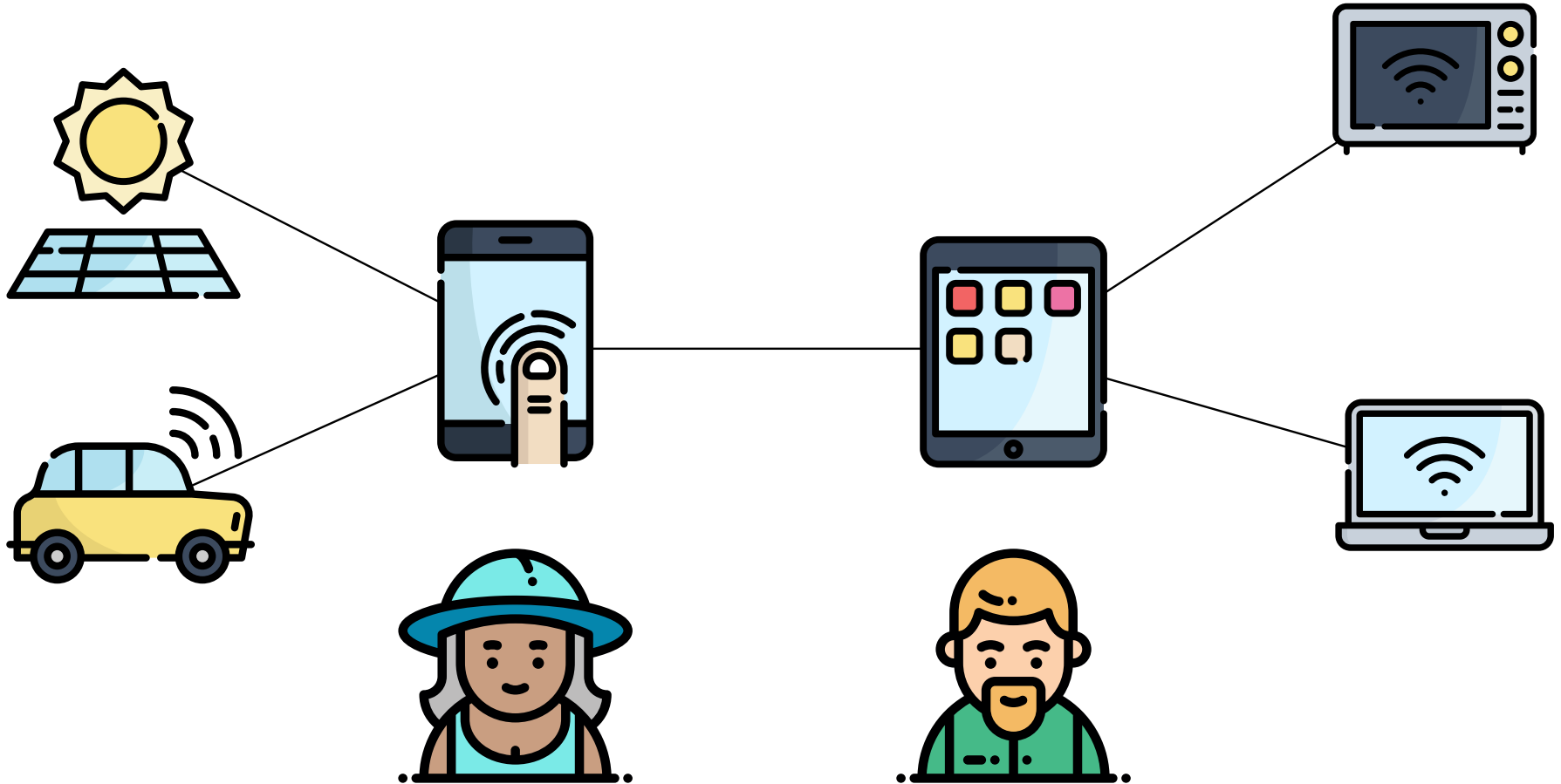
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1. Prosumers and appliances establish a relationship.
2. When prosumers come close together,
3. their devices establish relationships and exchange the energy profiles of the prosumers.



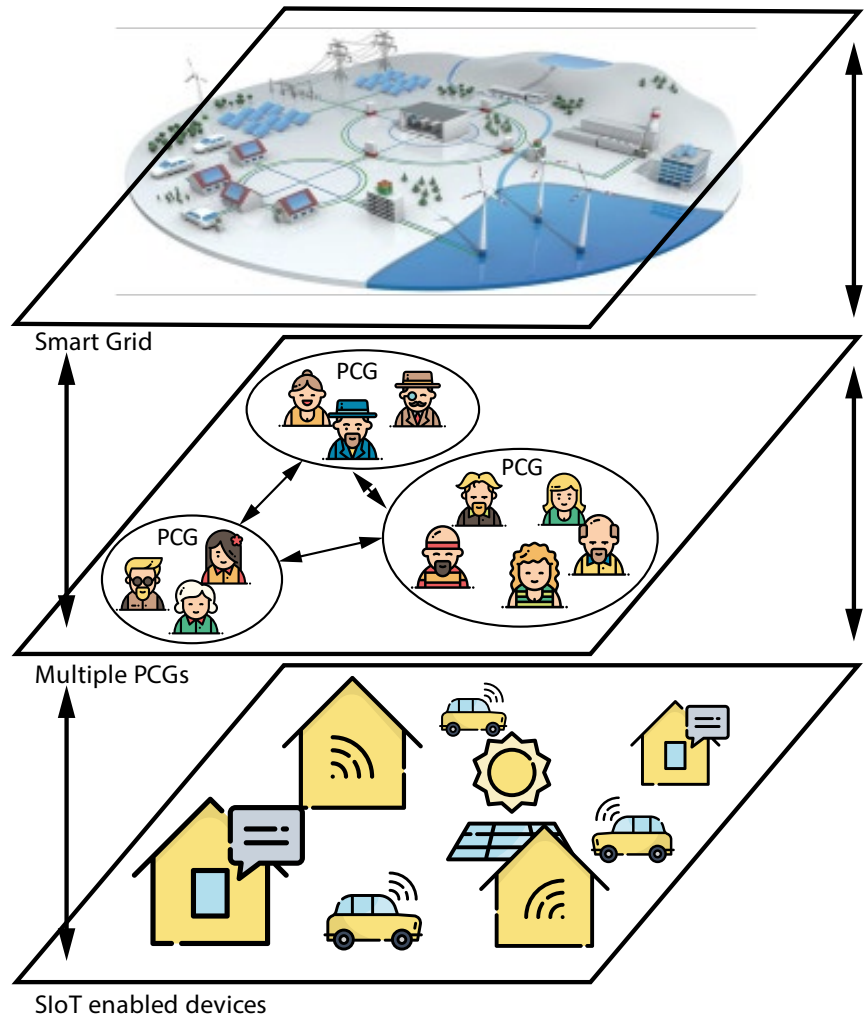
*OOR, SOR and CWOR are types of relationships in the SloT

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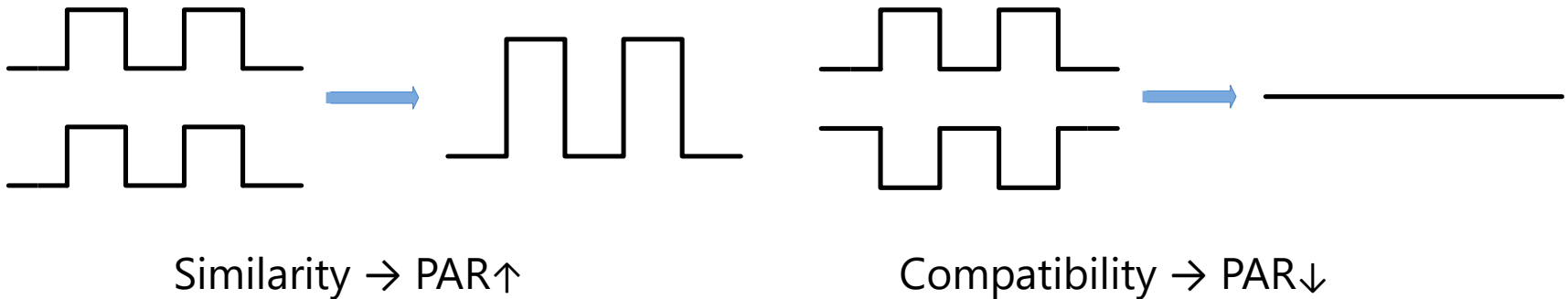
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- Each PCG aims at minimizing its peak-to-average ratio (PAR).
- PCGs are coordinated and aim at decreasing global PAR.
- PCGs are created by prosumer compatibility.



What does compatibility mean?

- We focus on demand profile flatness \rightarrow PAR of aggregated demand profiles.
- Although the action of grouping them does not reduce aggregate PAR per se, we can group them to reduce local PAR.



What do we expect

- PCGs to work autonomously to decrease global PAR. More automation for end-user, less intervention from end-user
- PCG dynamic creation and modification
- Resource Optimization (energy and computation)

Further work

- Evaluate the contributions to DSM of grouping PCGs in such manner.
- Observe how the network structure is dynamically created and develop specific parameters to enhance creation and modification.
- Improve the model: storage, generation, ...

Bibliography

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