SIXTEENTH INTERNATIONAL CONFERENCE ON AUTONOMOUS AGENTS AND MULTIAGENT SYSTEMS - AAMAS 2017

MATe: Multiagent Architecture for Taming e-Devices

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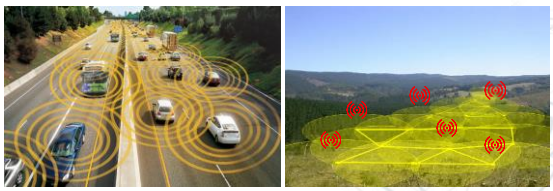
Keywords Multiagent systems, DHT, IoT.

Problem

How to continuously monitor a large number of IoT devices considering **scalability** and **efficiency** while searching and updating their information?



Source: Connected vehicles. US Department of Transportation.

Current Work

Existing efficient solutions combine data aggregation [1] and a distributed structure, called Distributed Hash Table – DHT [2].

✓ Minimize the number of transmissions and save energy.

✗ Scalability is still a key challenge when the group comprises a large number of devices.

MATe

Scalable architecture for discovering and for updating the location of a group of devices in the IoT context [3].

- Composed of a multiagent layer above the device layer (Figure 1).
- In the device layer, only the devices that bound a group aggregate and send the group information.
- In the multiagent layer, each agent creates new agents (i.e., agentifying devices) to distributes the responsibility of managing the group.

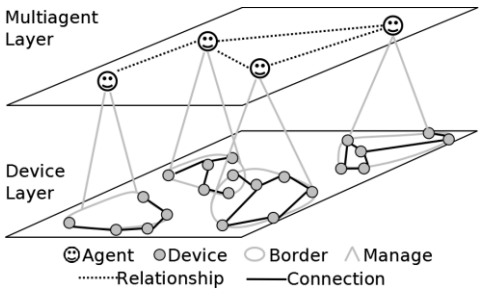
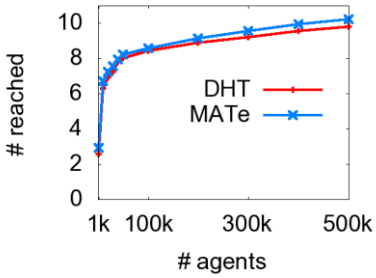


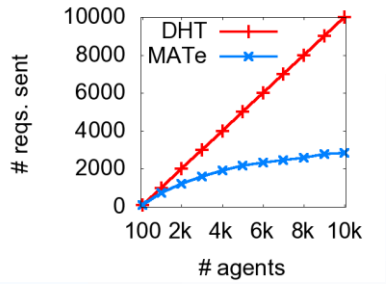
Figure 1 Multiagent Architecture MATe

Experimental Results

Efficiency: # of agents needed to find a group is almost the same as the number of nodes reached by DHT.



Scalability: using the frontier decreases the # of messages if compared with DHT (all devices send msgs.).



References

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[3] V.Rocha and A.Brandão, "A Scalable Multiagent Architecture for Monitoring Biodiversity Scenarios". *Multi-Agent-Based Simulations Applied to Biological and Environmental Systems*, 1ed. pp. 81-105, 2017.