

GCP: Gossip-based Code Propagation for Large-scale Mobile Wireless Sensor Network

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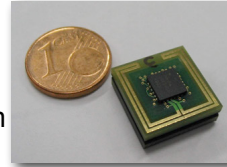
Mobile Wireless Sensor Network

Sensor:

- Compact device
- Low cost
- Limited resources
- ➔ Power, memory, processing, ...

Wireless communication:

- Ad-hoc network
- Restricted vision of the system



Needed capabilities:

- Adaptability
- Large scale
- Self organization

Peer-to-peer and Gossip-based Paradigms

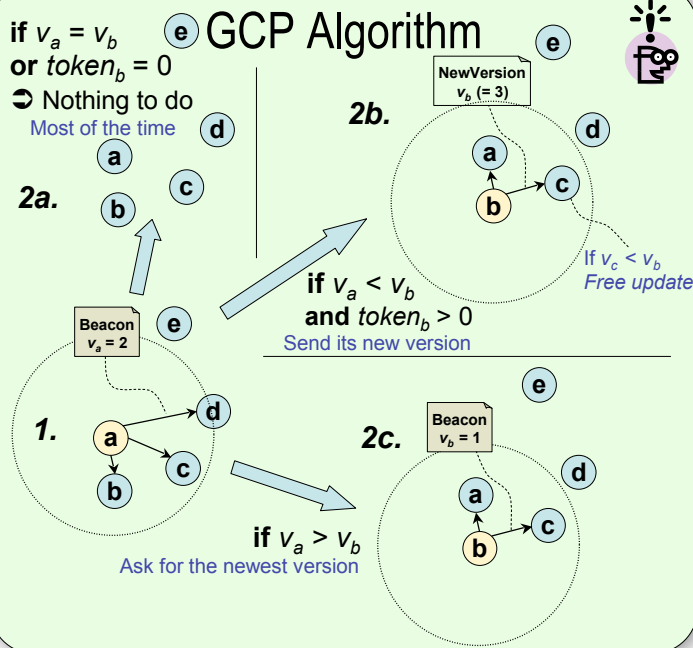
Peer-to-peer:

- Logical overlay network
- Symmetrical node role
- Knowledge of a small subset of the network

Epidemic model:

- Periodic information exchange
- Fast information propagation
- Low-cost algorithm
- ➔ Number of message, load balancing, ...

Ideal candidate for adaptation to mobile WSN



Objectives: Software Update

Why?

- Deployed for a long period of time
- Updating code "by hand" unfeasible

How?

➔ Epidemic propagation

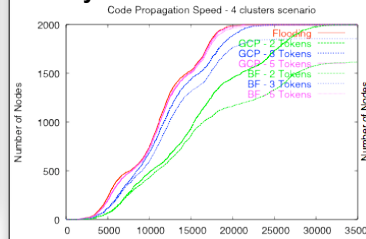
What we need?

- High speed propagation
- Optimal load balancing

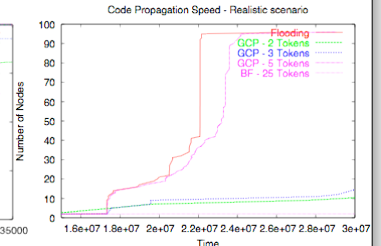
Simulation Results

Propagation speed:

Synthetic

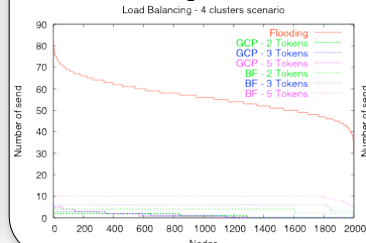


Realistic

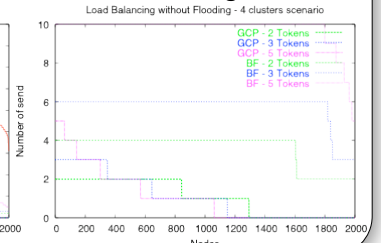


Load balancing:

With flooding



Without flooding



Algorithms Comparative

| | No local additional information | No beacon additional information | Load balancing | Propagation speed |
|--------------|---------------------------------|----------------------------------|----------------|-------------------|
| Flooding | + | + | -- | ++ |
| Boundary fl. | - | + | + | - |
| GCP | - | - | ++ | ++ |

Conclusion

Propagation speed

Almost the same speed than optimal one (Corresponding to the flooding version)

Load balancing

Significantly improve load balancing

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