



shaping tomorrow with you

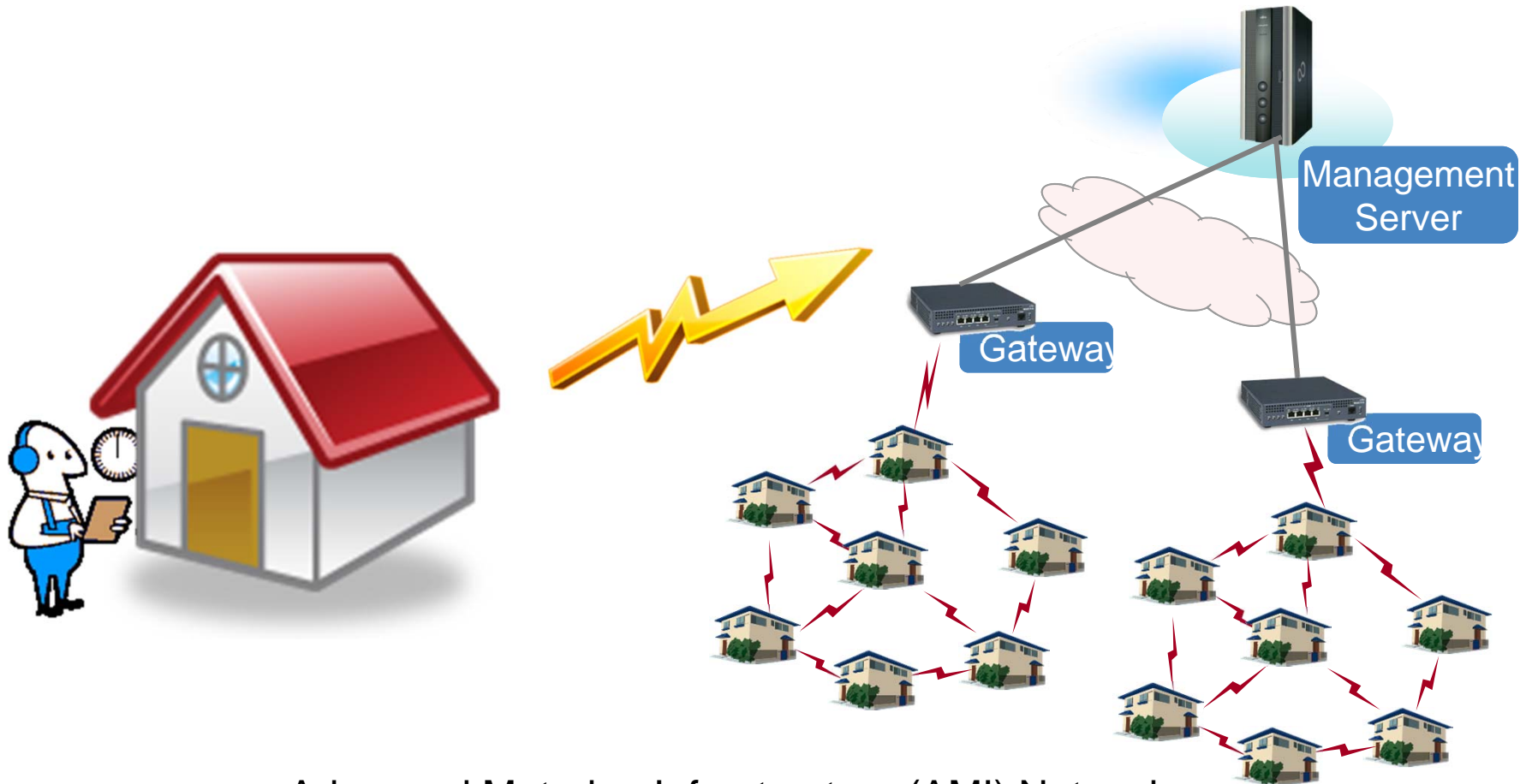
M2M Communication Challenges in Emerging Smart Grid Applications

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Towards a Smarter Grid

The power grid is becoming increasingly more networked and automated.



Advanced Metering Infrastructure (AMI) Networks

Early SG Applications Focus on AMI

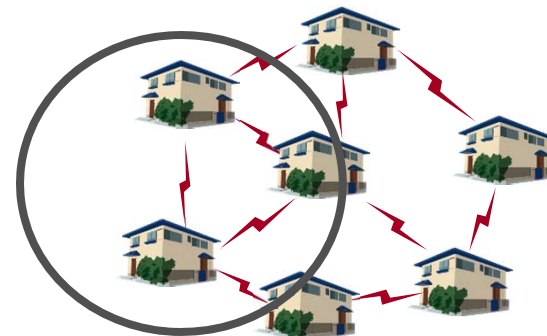
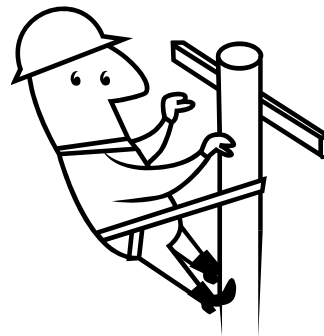
- Billing



- Remote service initiation & disconnection

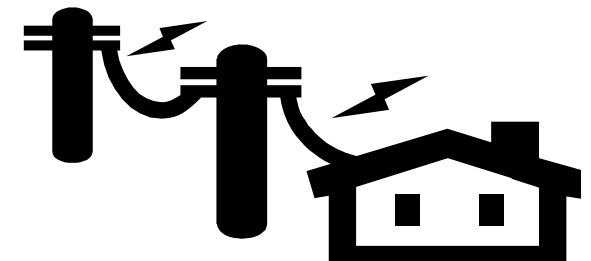


- Quick localization of failures



Emerging Applications

- Automated Demand Response
- Distribution Automation (DA)
- Energy efficiency analysis & apps
- End-user awareness of real-time energy prices
- Smart water & gas metering



All could use AMI as a backbone network.

Challenge: Scalability

- Millions of smart meters (~1 billion world-wide by 2020)

- Millions of Home Area Network devices

 - Home gateways, thermostats, appliances, EVs

- Data-hungry analytics applications



Networking & automation are skyrocketing

...IoT...IoE...

Challenge: Reliability

- Introduction of a lot of new technology into the grid threatens reliability



- Power disruptions increasingly more expensive due to growing reliance on technology



Challenge: Security

- More & more critical functions reachable remotely
- AMI on route to using standard network stack



Challenge: Privacy

- A lot of detailed private data is being collected and stored – how do we protect it?



Opportunities

- How to harness the emerging communication capabilities of the grid?



- Some future applications
 - Virtual Power Plants
 - Transactive Energy

Thanks!

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