



SCHOOL OF GEOGRAPHY  
AND THE ENVIRONMENT



# Securing the 'Smart' Grid

Andrew Dwyer | ECI 'Brown Bag' | 31 May 2018

# What is 'smart'?

- *Autonomous* decision-making (*machine learning, certain algorithmic structures*)
- Internet-connected devices (*Internet of Things*)
- Greater efficiency, inclusivity, choice (depending on what paradigm you wish to engage in)

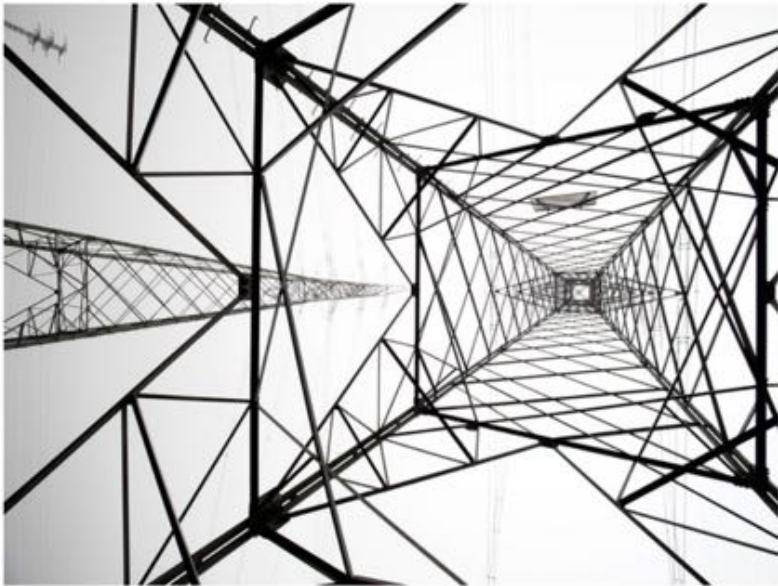
# SCADA v IoT

- 'Cyber-physical' attacks
- SCADA usually used within large industrial processes (utilities in particular), which have been vulnerable to cyber attack due to lack of authentication
- IoT devices are often cheaply built, with security as an afterthought, which are being connected to home networks
- Smart grids blend these two forms – one could be broadly categorized 'top-down', one 'bottom-up'

# Current *known* attacks

KIM ZETTER SECURITY 03.03.16 07:00 AM

## INSIDE THE CUNNING, UNPRECEDENTED HACK OF UKRAINE'S POWER GRID



JOSE A. BERNAT BACET/GETTY IMAGES



**US-CERT**  
UNITED STATES COMPUTER EMERGENCY READINESS TEAM

HOME ABOUT US CAREERS PUBLICATIONS ALERTS AND TIPS RELATED RESOURCES C\* VP

**Alert (TA18-074A)** [More Alerts](#)

Russian Government Cyber Activity Targeting Energy and Other Critical Infrastructure Sectors

Original release date: March 16, 2018 | Last revised: March 16, 2018

[Print](#) [Tweet](#) [Send](#) [Share](#)

# Smart energy grids

- Obviously, there are the 'goods' that are more your specialism
- However, connected devices can be vulnerable to collective hacking
- This is due to the spatialized risk that I think is a bit different, which I shall explore

Security

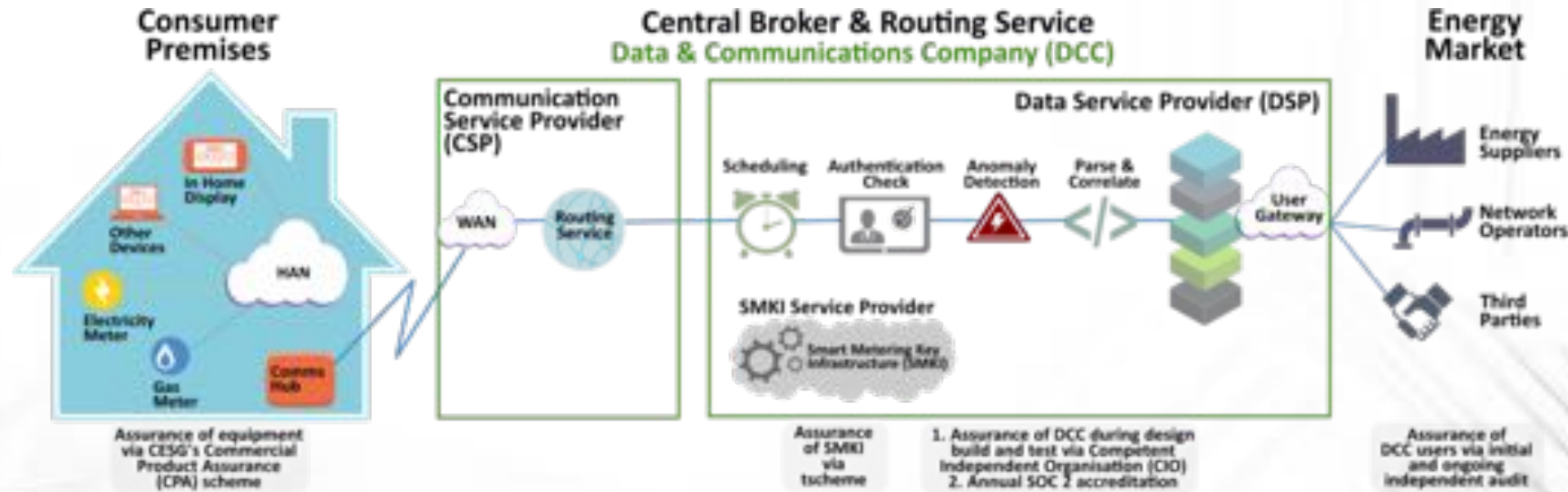
## As our power grids get smarter, they're more vulnerable to attack

Hackers are learning how to crack connected devices to bring down entire power systems



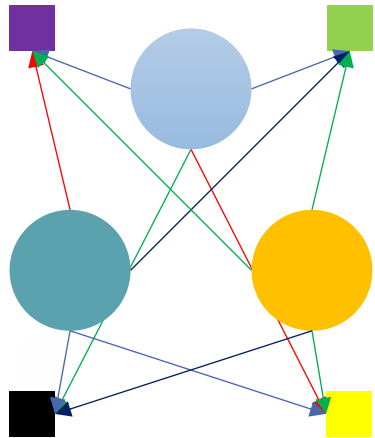
# Smart meters

- Advanced Metering Infrastructure becoming more widespread
- Appropriate authentication and monitoring mechanisms (through trust modelling)
  - GCHQ in the UK had to step in due to issues with security on SMETS 2
- Privacy concerns?

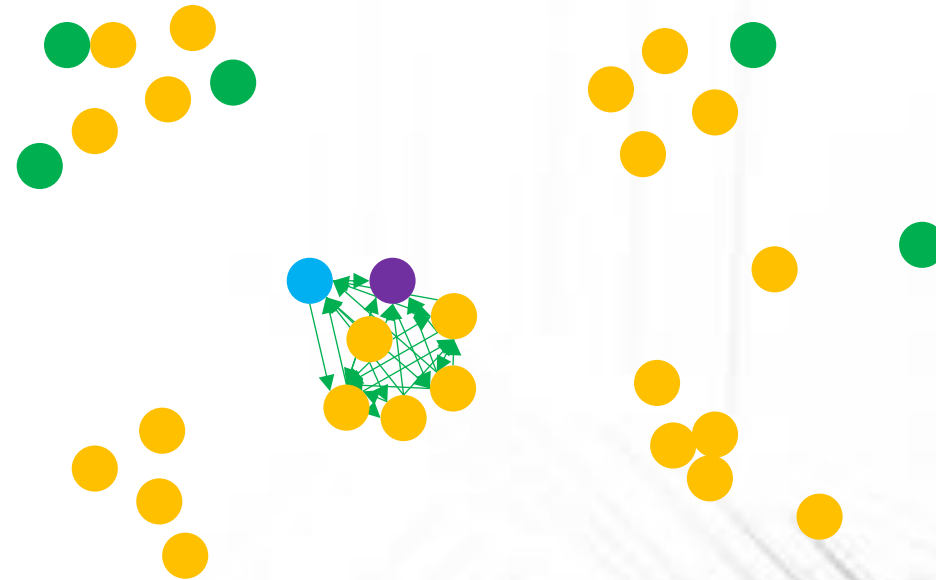


# Two forms of risk?

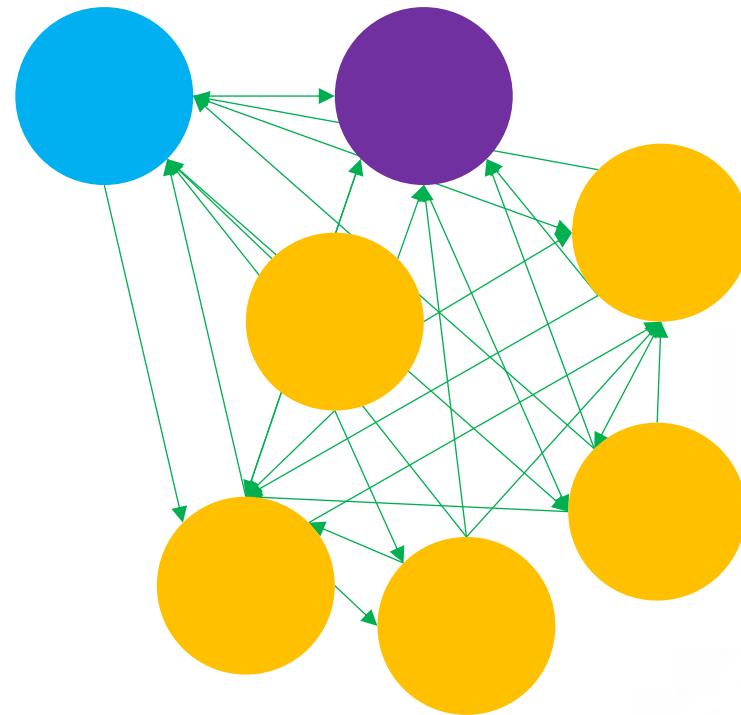
1



2



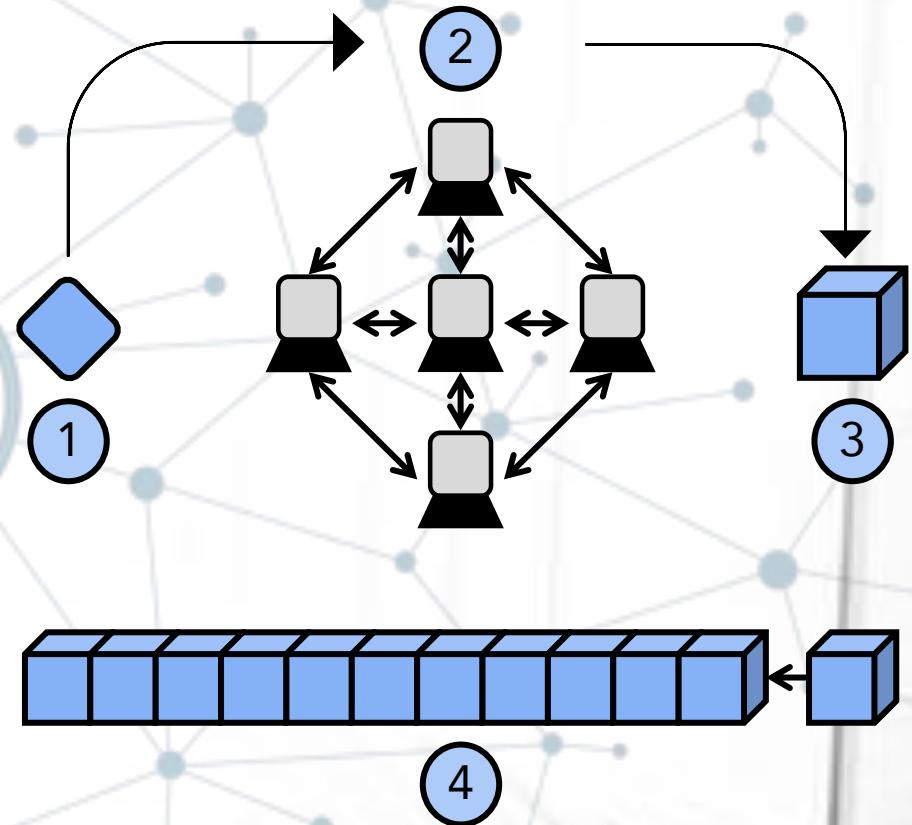
# Two forms of risk?





# Solutions? *Blockchain?*

- Blockchain often emerges as a way for 'open' and 'reliable' transactions to be available on autonomous systems *but* there are always power brokers, which develops new security vulnerabilities
- There are other methods that are not well known but provide better security, and we should not fetishize a particular technology, as organizational processes (such as around smart metering) may be better



# Thanks

andrew.dwyer@cybersecurity.ox.ac.uk |  @andrewcdwyer