

Secure management of Networked IoT Systems using Blockchain

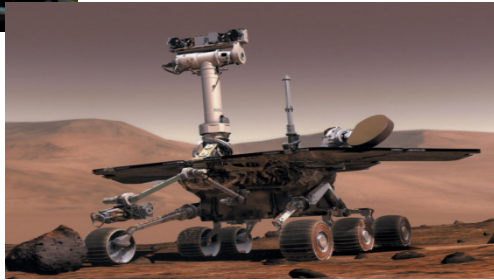
Angelos Stavrou



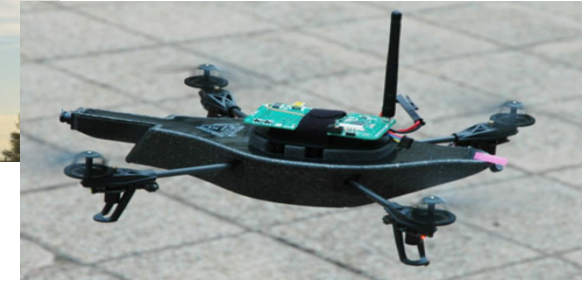
Volgenau School
of Engineering

What the Future Holds

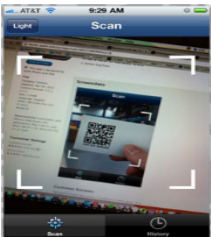
Drivables



Flyables



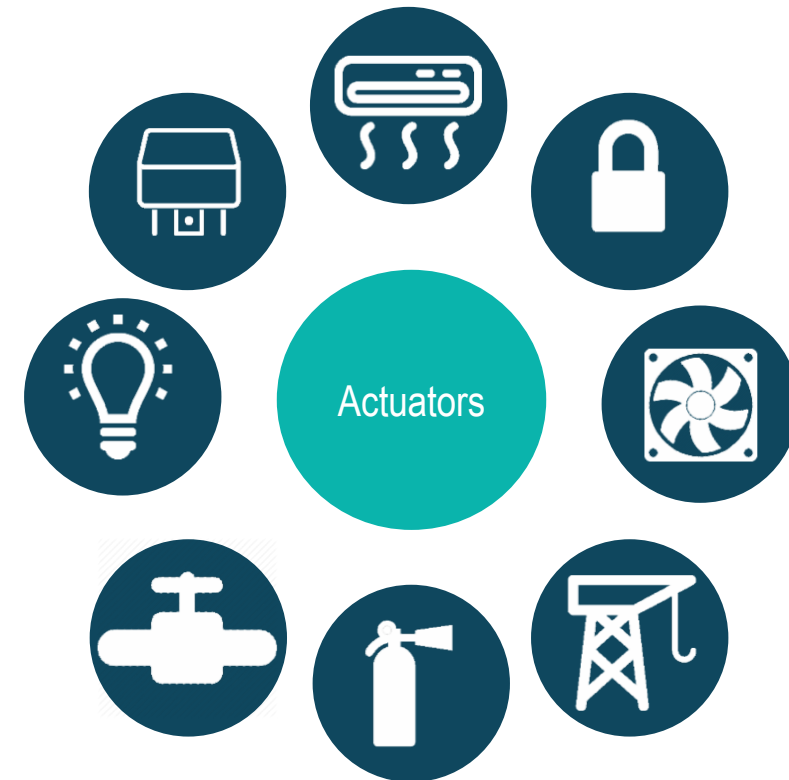
Scannables



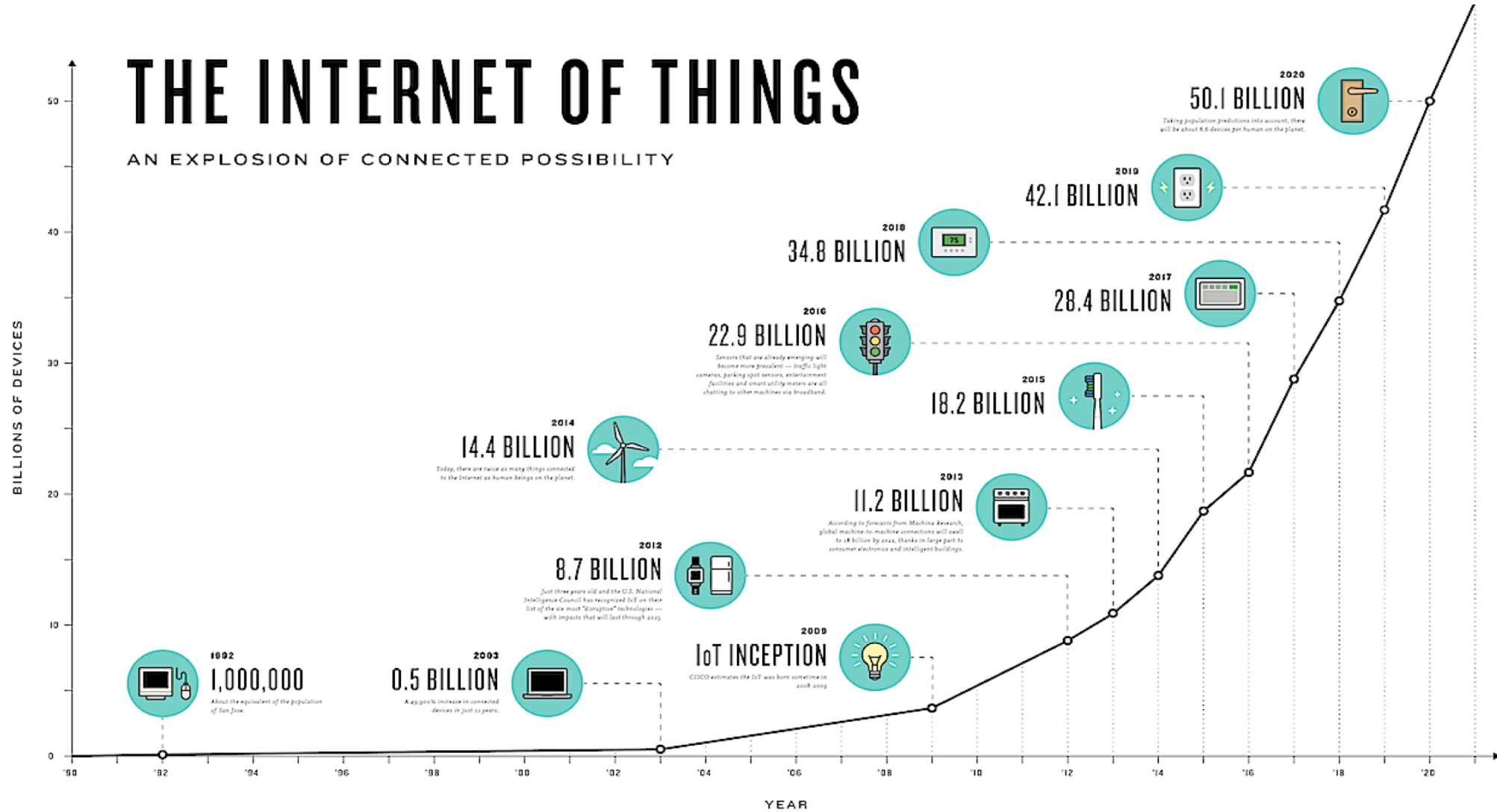
Wearables



Sensors & Actuators



The Growth of IoT

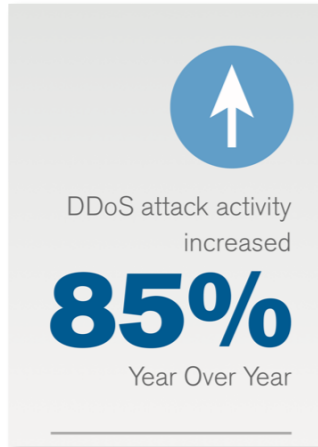
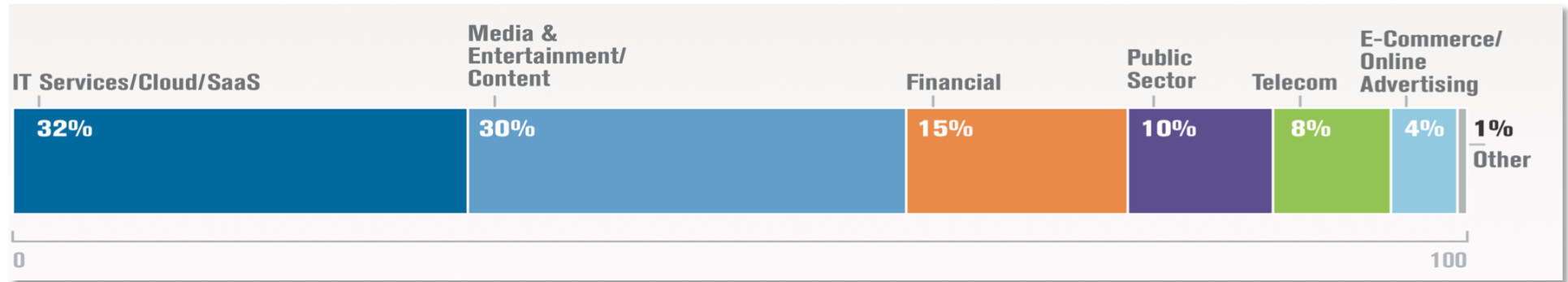


Management Complexity due to Connectivity



How Bad Is it?

Targets



DDoS attacks increased 91% in 2017 thanks to IoT

32%

of organizations say IoT-based DDoS attacks are their biggest future cybersecurity concern

35%

of companies say IoT devices were the primary source of a data breach in the prior year

86%

of organizations say they expect IoT threats to increase in the coming year¹⁰

An IoT botnet is partly behind Oct 19, 2016 massive DDOS attack
DVRs, Cameras and other IoT devices compromised with the Mirai malware are being the attack – Oct 21 2016

After DDOS attack, senator seeks industry-led security standards for IoT devices. **Attack reveals a 'new level of vulnerability'** Sen. Mark Warner. Oct 2016

Can we use Blockchain-inspired protocols as a Secure Management Fabric for IoT?

Strengths

- Trust among untrusted Parties
- Distributed resilience and control
- Fully Decentralized network
- Primarily Open source
- Security and modern cryptography
- Controlled & Open Participation
- Smart Contracts
- Dynamic and Fluid Operation

Challenges

- Requires proof of “work”
- Requires Public Key Encryption
- Size of the Ledger an issue for “small” devices
- Transactions too slow and computationally expensive
- Not a traditional bi-directional communication channel

Path Forward

- IoT Scale, Vendors, Technologies increase exponentially
- IoT Devices will always have diverse capabilities & Resources
- Use of Cryptography is done without clear understanding of the implications
- No Current Standards for Lightweight cryptography

New Blockchain inspired protocols combined with new Cryptographic primitives a potential solution for a Secure Management Fabric for IoT

Discussion

Now that we build a Blockchain for IoT what is next?

- Secure Software Updates and Transactional Cross-IoT
- Audit & Monitor Devices from different Vendors
- Enable Application Markets for IoT
- Share information using Blockchain Smart Contracts
- Verified Time for IoT

Thank you, Questions?

