



Inteligentní budovy v internetu věcí

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Produkce inteligentních zařízení

1B	
10B	10^{10} Cooperating Smart Things
100B	10^{11} Networked Smart Things
1T	10^{12} Smart Things
10T	10^{13} Things
100T	10^{14} Products

The number of communicating data devices will grow from 2.4 billion [in 2004] to 23 billion in 2008 and one trillion by 2012

Krishna Nathan, IBM Research, 2004

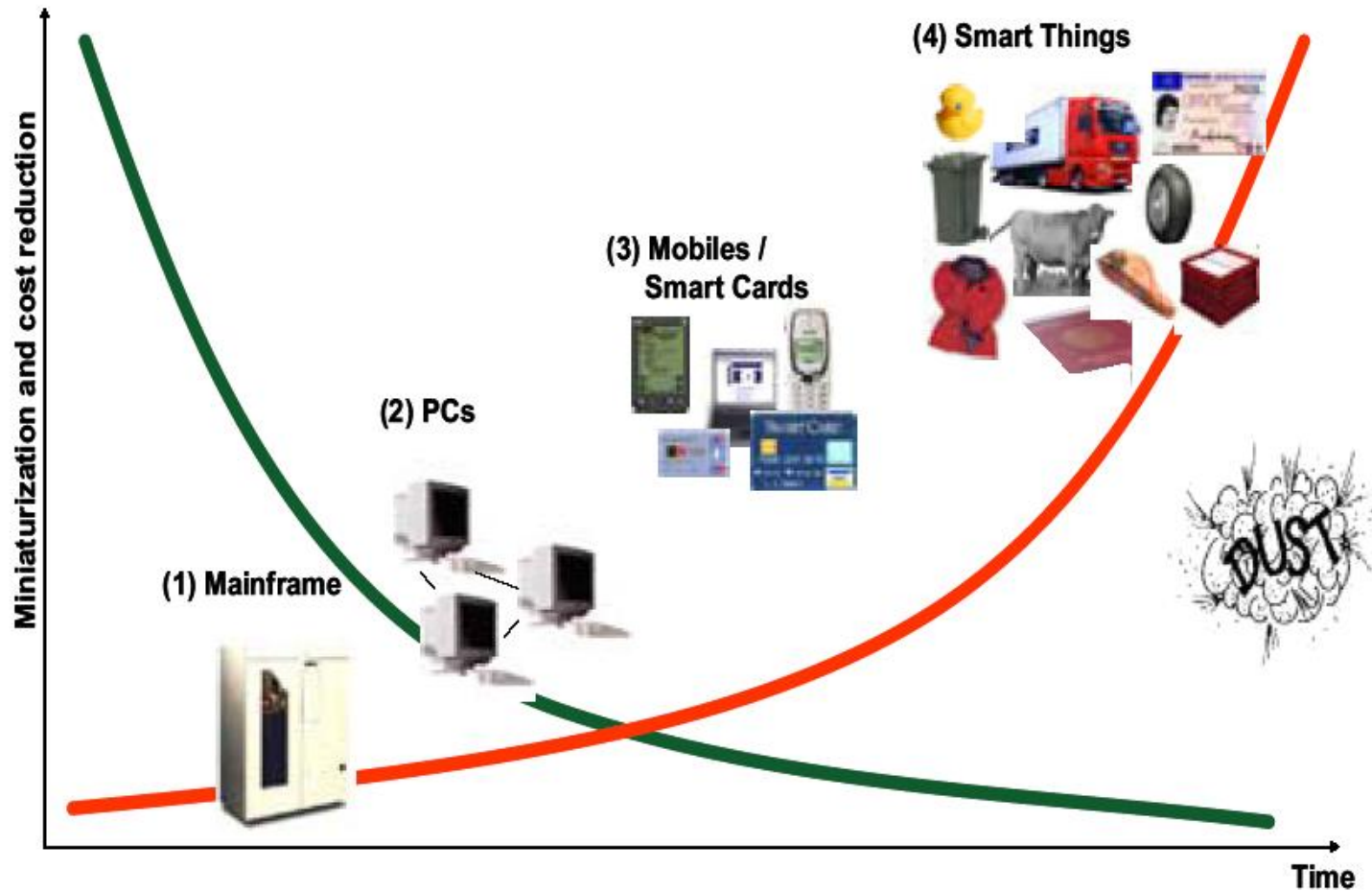
versus

10^9 personal computers

10^{10} mobile phones

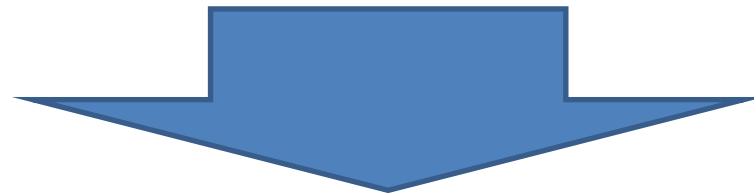


Rozvoj výroby HW



Source: ITU "Ubiquitous Network Societies and their impact on the telecommunication industry", April 2005, available at www.itu.int/ubiquitous

Internet of Things

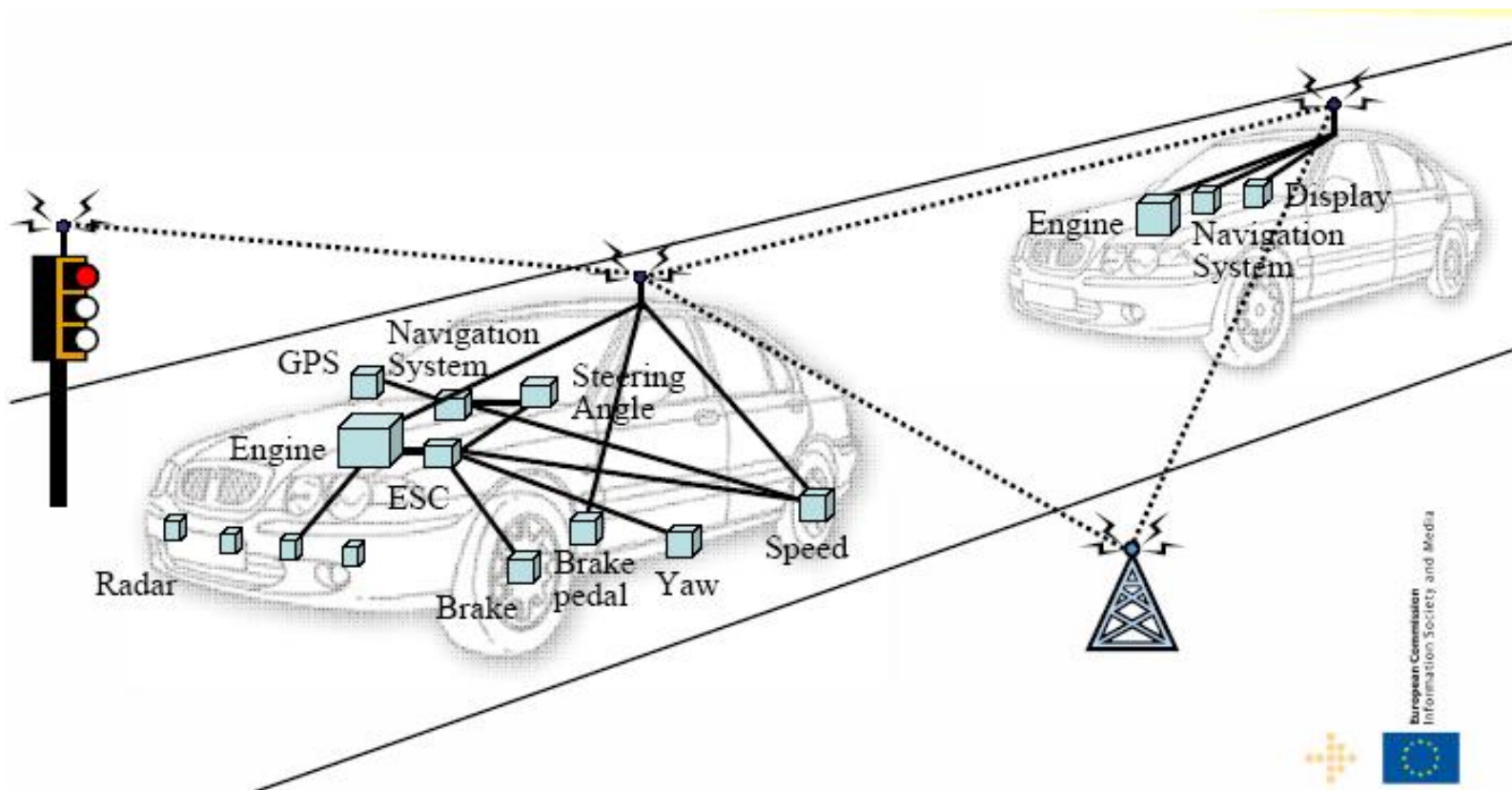


propojení mezi atomy a bity

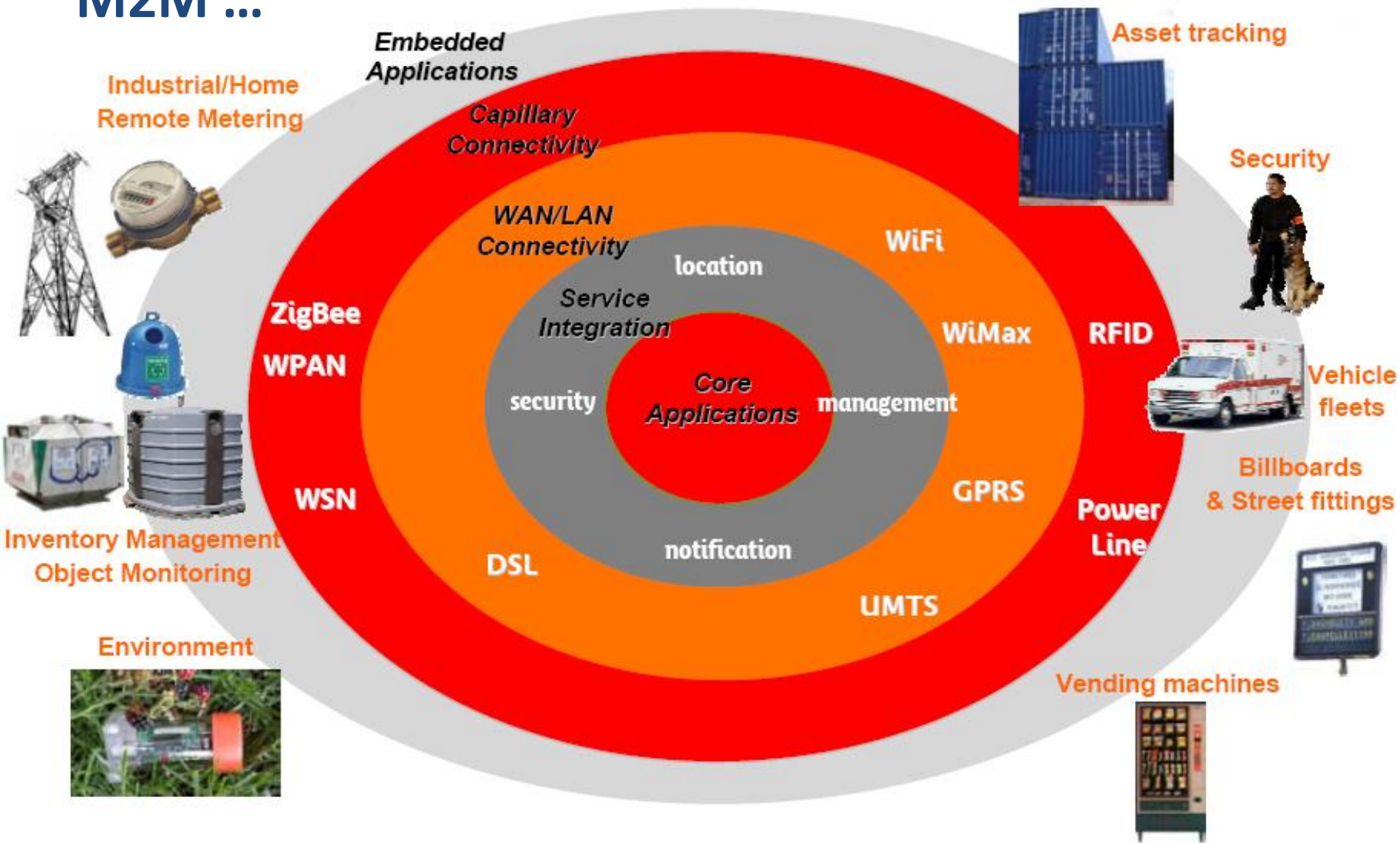
Internet (chytrých) věcí => SLUŽBY



IoT = spolupracující zařízení a služby

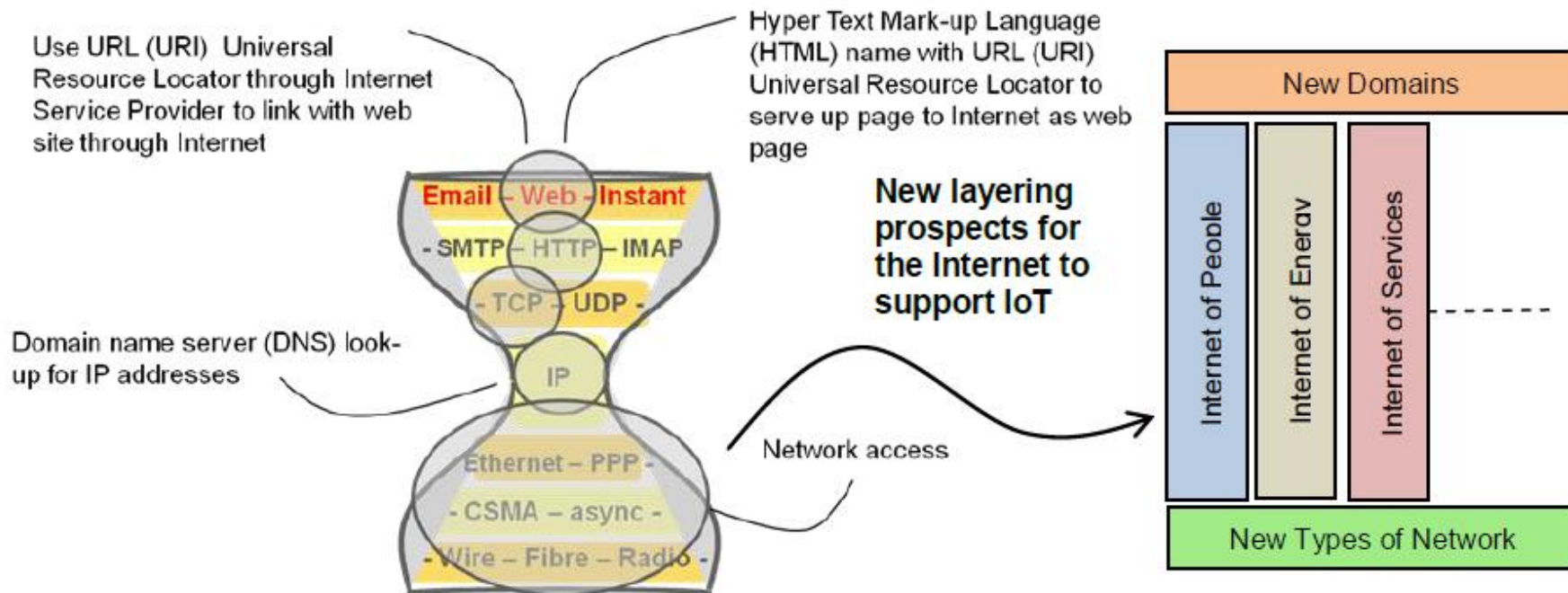


M2M ...



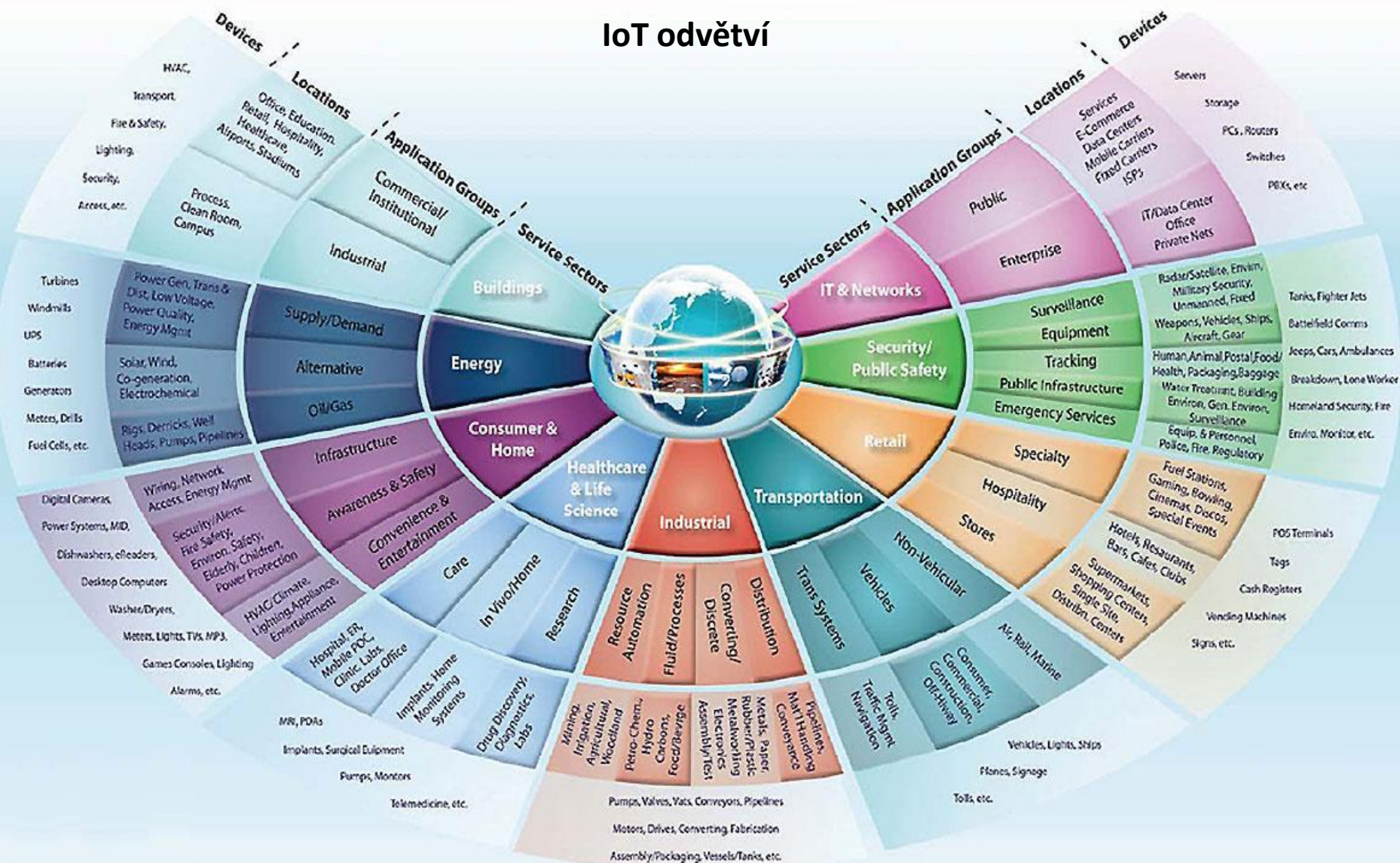


Budoucí internet



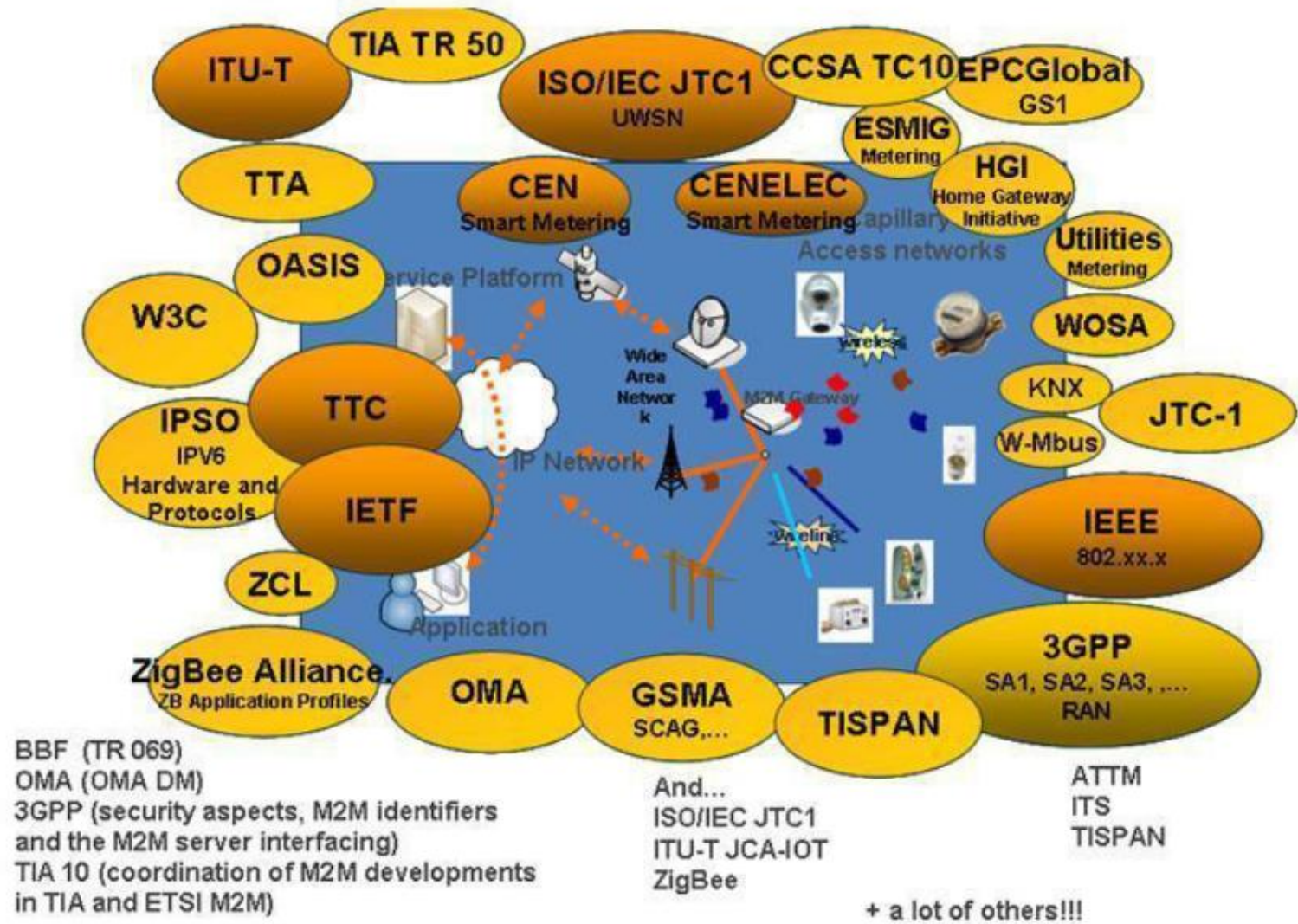
IPv6







M2M / IoT standardy



Fragmentace stávajících oficiálních standardů a obchodních řešení



THE FULLY CONNECTED WAY OF
MAKING THINGS

Industry 4.0 is based on new and radically changed processes in manufacturing companies: Factory 4.0. In this concept, data is gathered from suppliers, customers and the company itself and evaluated before being linked up with real production. The latter is increasingly using new technologies such as sensors, 3D printing and next-generation robots. The result: production processes are fine-tuned, adjusted or set up differently in real time.



Suppliers

LOGISTICS 4.0

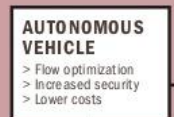
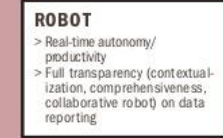
- > Fully integrated supply chain
- > Interconnected systems
- > Perfect coordination

FACTORY 4.0



CLOUD COMPUTING

- BIG DATA**
- > Making sense out of complexity
 - > Creativity
 - > Collaborative manufacturing



Customers



Plant of the future



Problémy IoT

Kdo a kde je
zákazník?

(služby, aplikace, potřeby)



Problémy IoT

Koexistence technologií (kabel x bezdrát, EMC)





Problémy IoT

Spolehlivost technologií a služeb

(QoS, QoE -

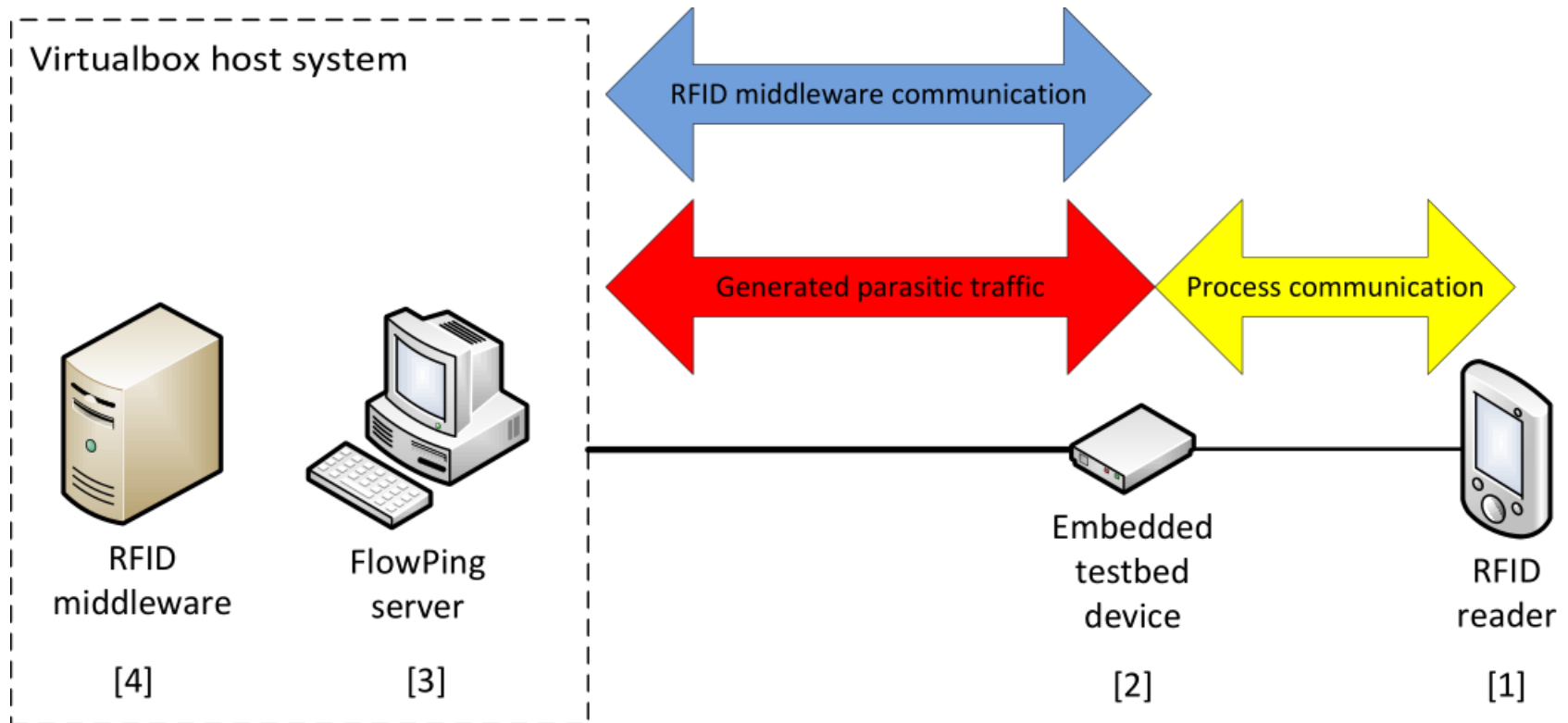
FlowPing, FlowTester, CLAudit)



FlowPING

Testing Platform for IoT Network Devices

DEMO IoT 2014, Boston

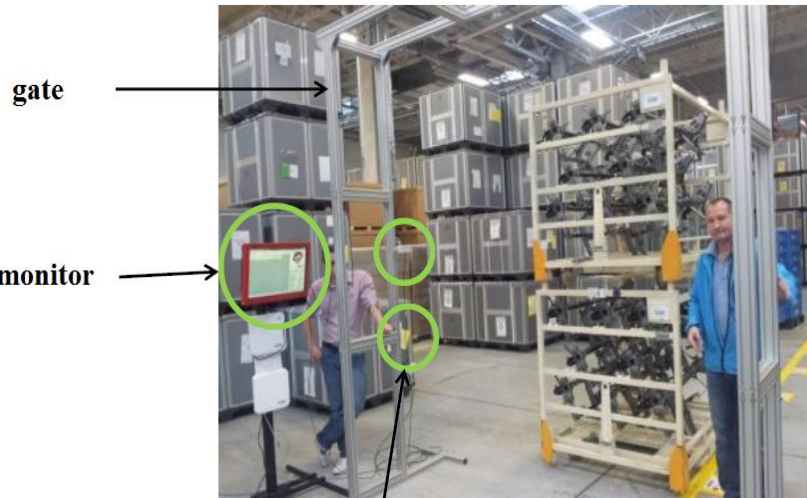




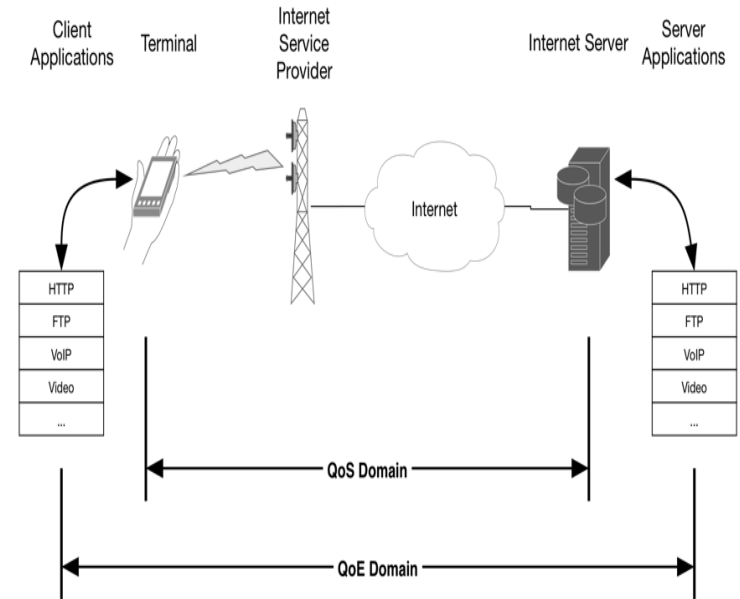
FlowPING

Testing Platform for IoT Network Devices

DEMO IoT 2014, Boston



RFID antenna



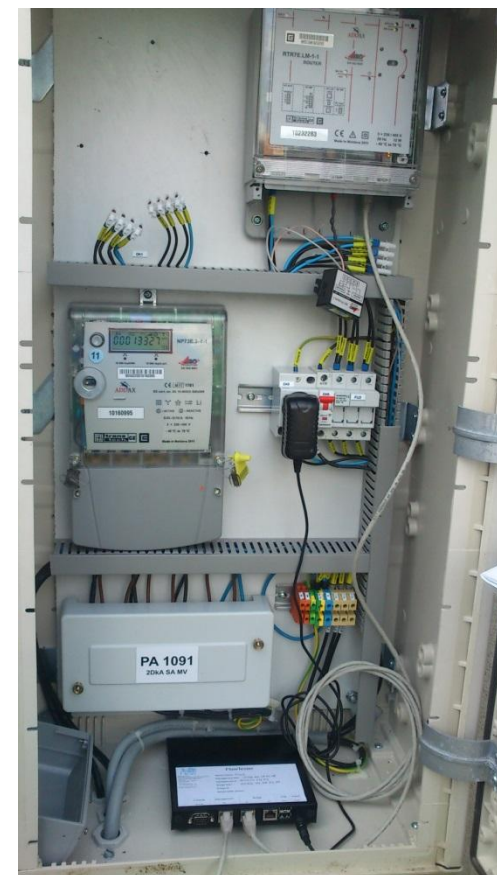
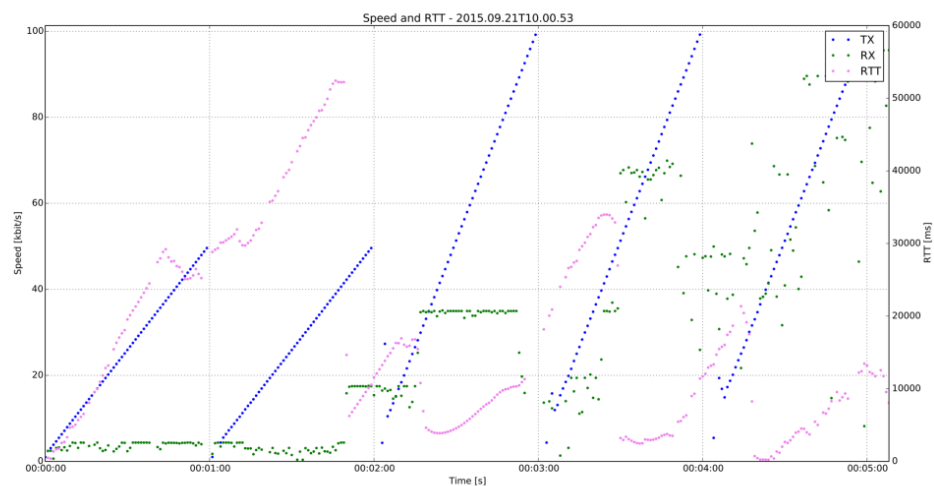
Industry 4.0 concept DEMO:

- Internet of processes - Remote RFID reader/middleware as checkpoint
- Stand alone RFID reader – AutoEPCIS Eureka in AUTOMOTIVE INDUSTRY
- 150 km Remote middleware (defined by customer security needs)
- Does we have appropriate QoS and QoE?
- What will be service delay? Does it acceptable for our customer/industry needs?



FlowTester

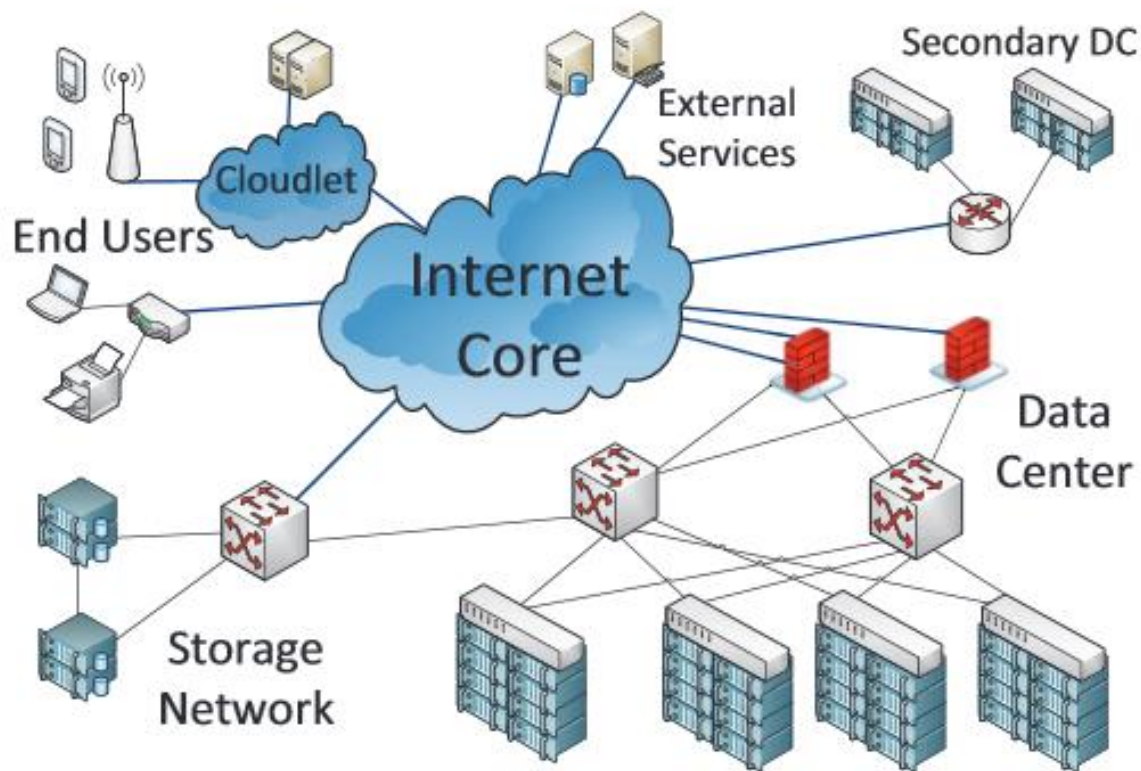
IoT and SmartGrids performance measurement



CLAudit

Planetary-Scale Cloud Latency Auditing Platform

<http://claudit.feld.cvut.cz>





Problémy IoT

Bezpečnost

(FEL ČVUT v Praze je ITU Centre of Excellence)

Profilace zaměření: Kybernetická bezpečnost nejen pro průmysl 4.0
(smart factories/industries, IoT, energetika)

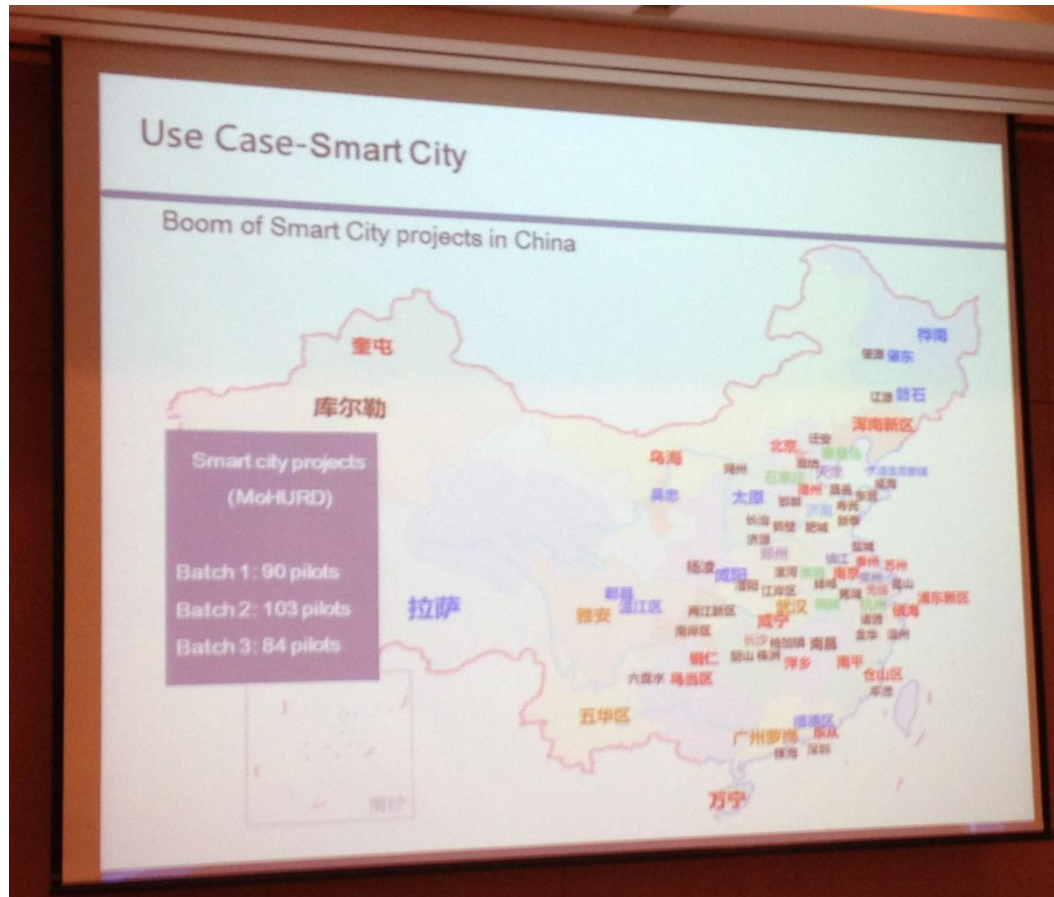


Problémy IoT

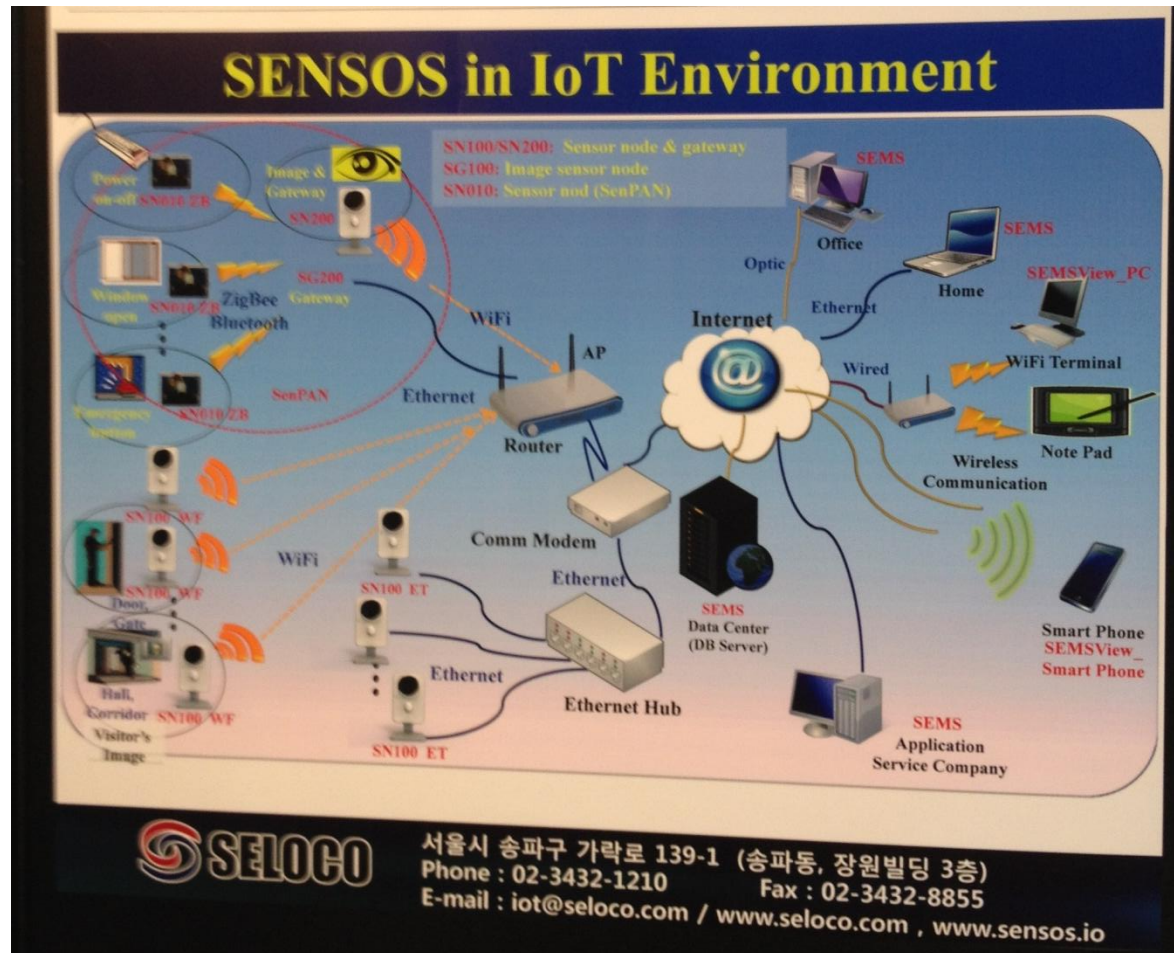
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IoT pro Inteligentní bydlení, budovy i život (ozvěny IoT2015, Seoul)



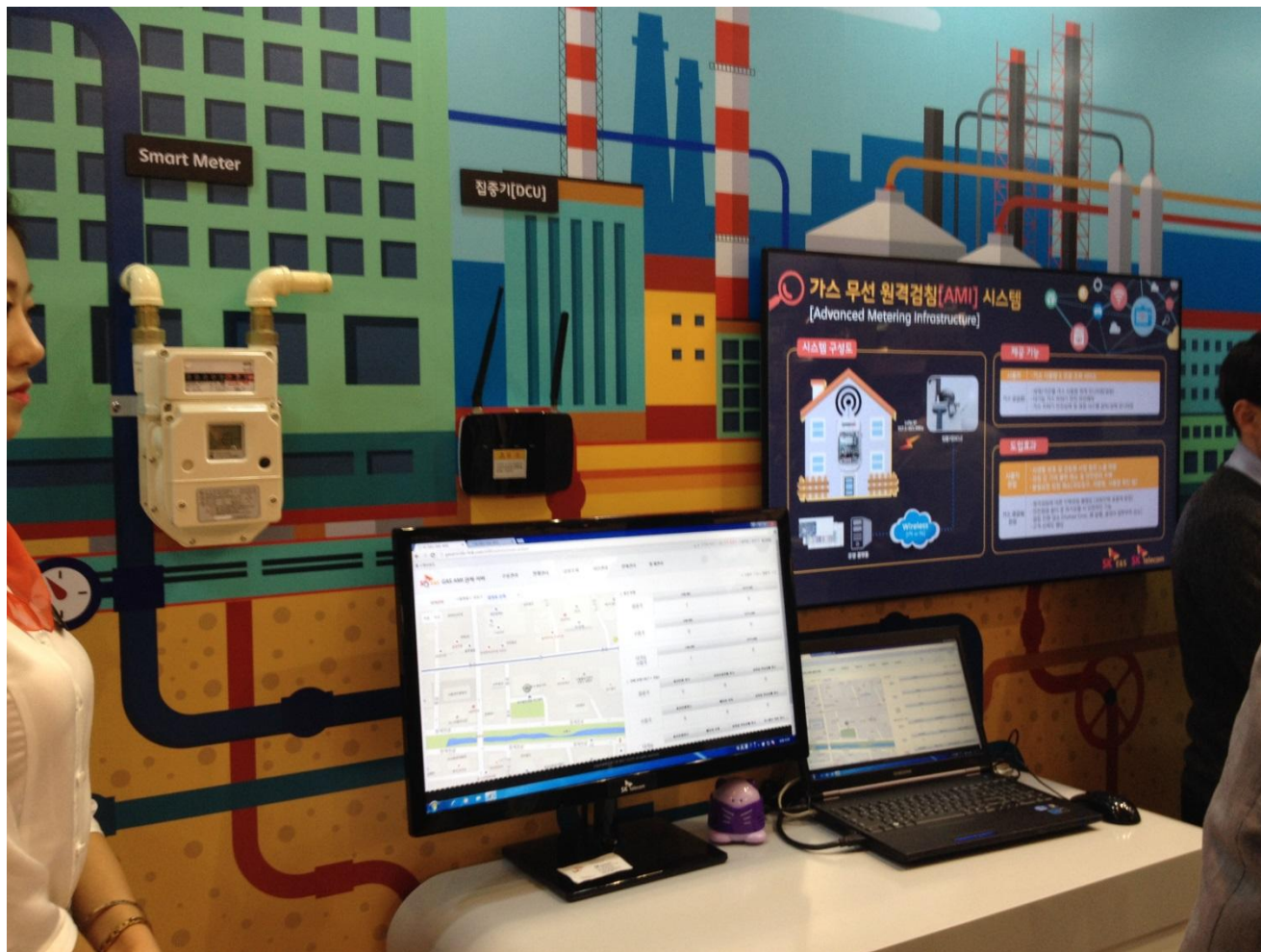
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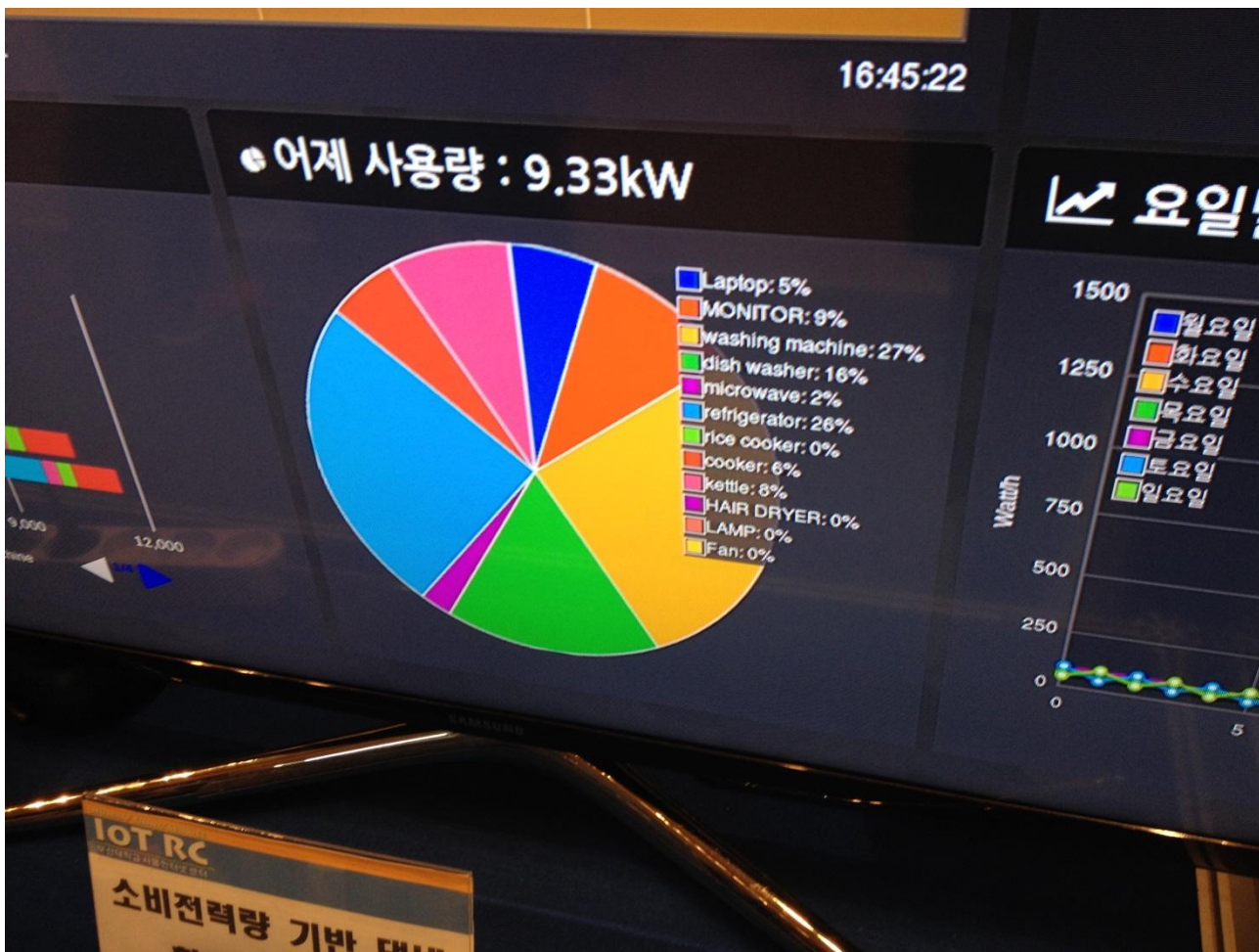


IoT pro Inteligentní bydlení, budovy i život (ozvěny IoT2015, Seoul)





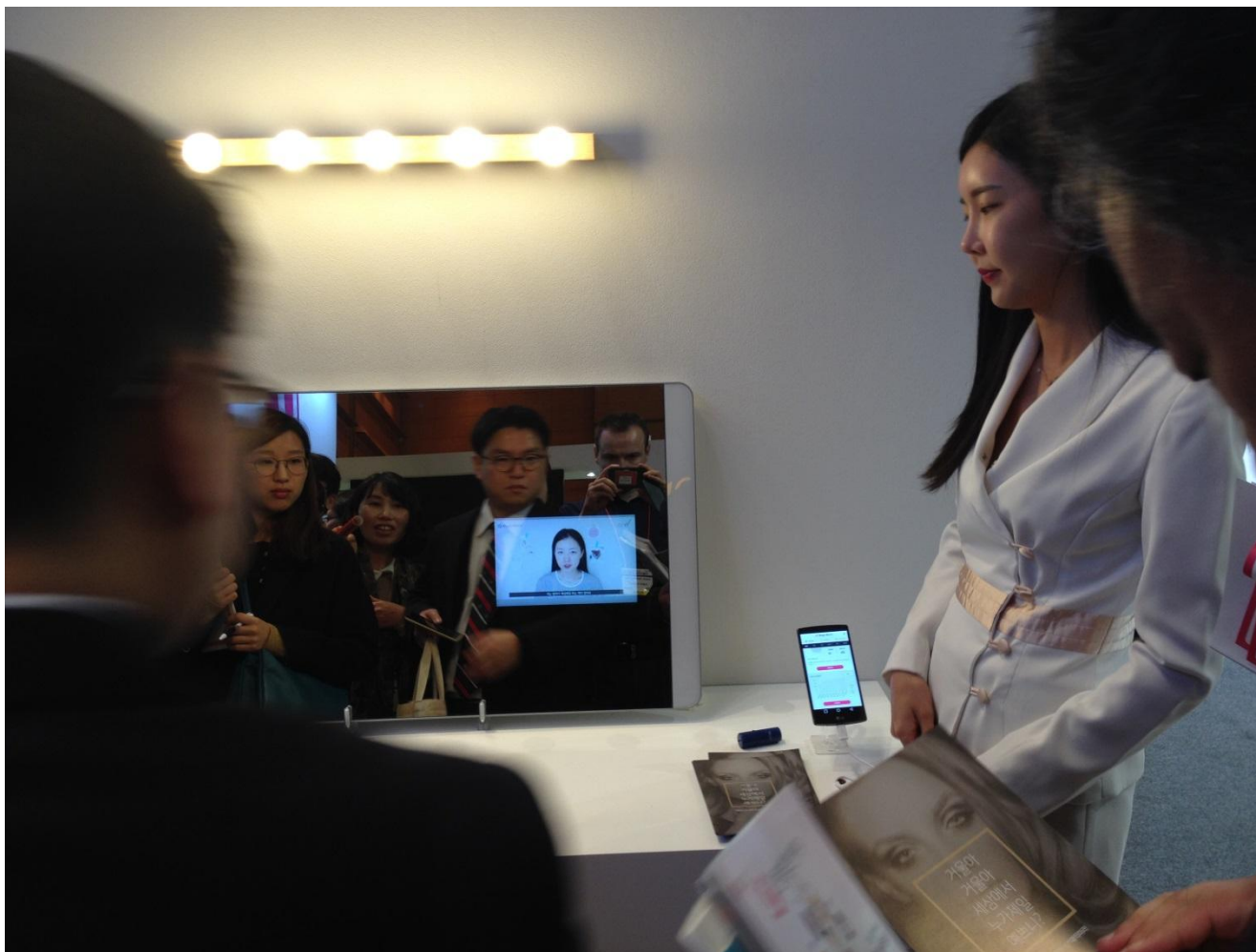
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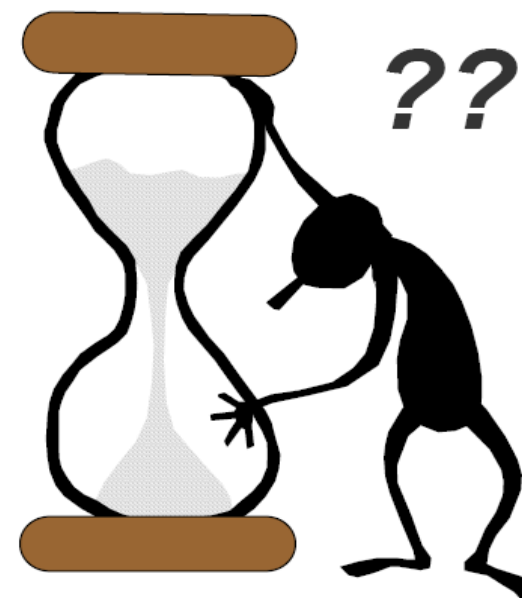
Internet věcí nejen v inteligentních budovách

- IoT není o HW, ale o službách ... Kdo, proč a za kolik?
- Udržitelnost konceptu IoT ... QoS, QoE, Bezpečnost
- Intelligence versus praktičnost našich řešení
- Technologie existují, hledejme vhodné aplikace a prospěšné služby
- Nezapomínejme na inženýrsky čistá řešení (raději jednoduše, ale spolehlivě)
- Potřebujete konzultovat, měřit, testovat, navrhovat, zkoumat či vyvíjet? Jsme připraveni!

Tým FEL ČVUT v Praze



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http://www.theregister.co.uk/2015/08/13/nsa_funds_iot_research_alabama/