AI-IoT2016

Workshop on *Artificial Intelligence* and *Internet of Things*

Organisers:

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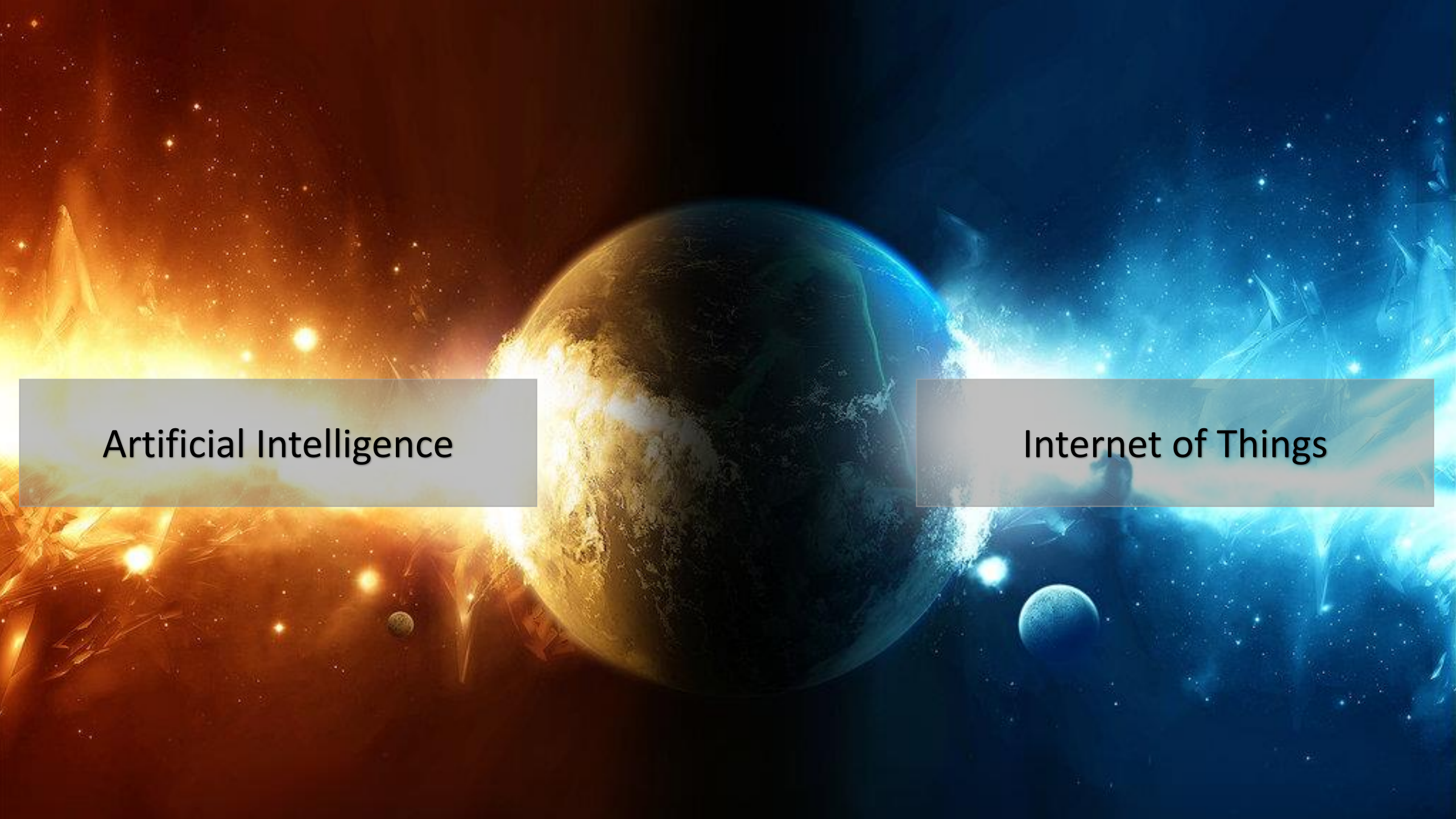
1st AI-IoT Workshop, SETN 2016, May 18, 2016, Thessaloniki, Greece.


Artificial Intelligence
Internet of Things

Ambient Intelligence

WIRED

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IOT WON'T WORK WITHOUT ARTIFICIAL INTELLIGENCE

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What will happen when the internet of things becomes artificially intelligent?

From Stephen Hawking to Spike Jonze, the existential threat posed by the onset of the 'conscious web' is fuelling much debate - but should we be afraid?

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Connecting artificial intelligence with the internet of things

With the two technologies set to meet, lines between sci-fi and a high-tech new reality continue to blur. Industry experts see no reason to be fearful

Ahmed Banafa

IoT Expert | Faculty | Author | Keynote Speaker

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How Artificial Intelligence Will Kickstart the Internet of Things

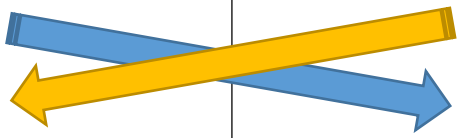
Dec 28, 2015 | 441 views | 34 Likes | 4 Comments

The possibilities that IoT brings to the table are endless. IoT continues its run as

A Waterfall of Emerging Opportunities

Artificial Intelligence

Internet of Things



Quasi-real-time Data

Big Data (5 Vs)

Real-world Health, Agriculture, Behavioural, Financial… Data

End-users' demand for personal services

…

Predictive Analytics

Forecasting

(under uncertainty)

Process Optimizations

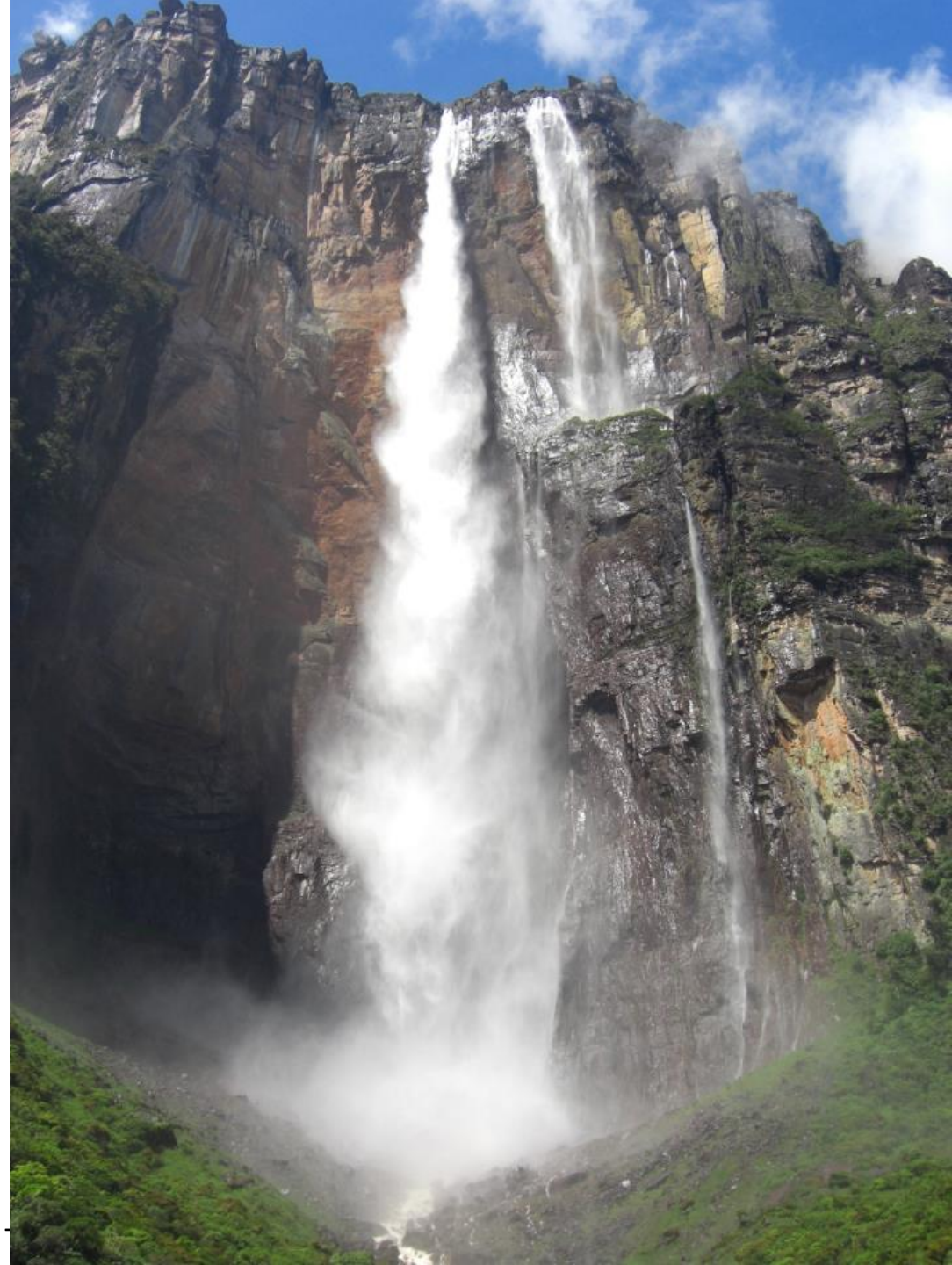
Behavioural Patterns

Event's Management

Data-driven Decision Support Systems

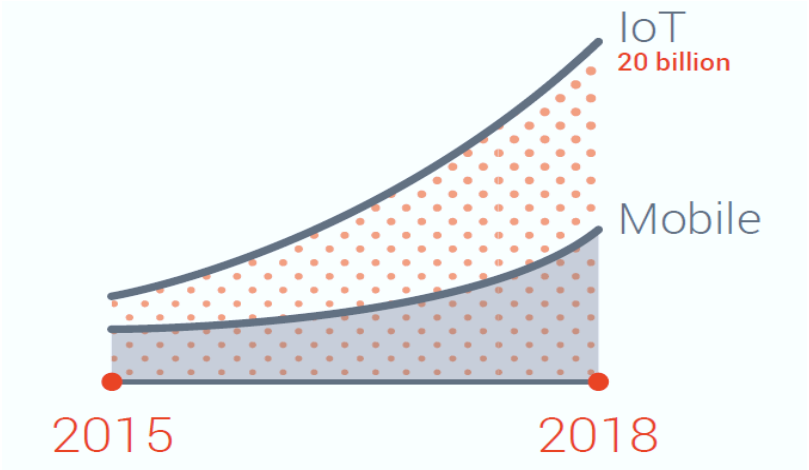
Service Discoverability/ Interoperability/Composition

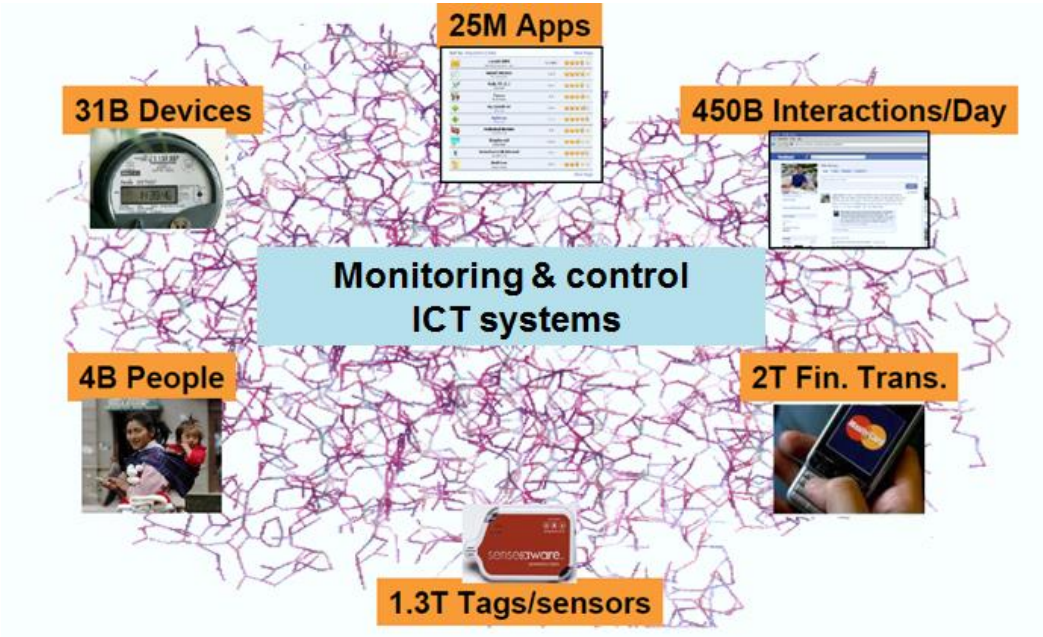
…



IoT Opportunities for Growth in the EU

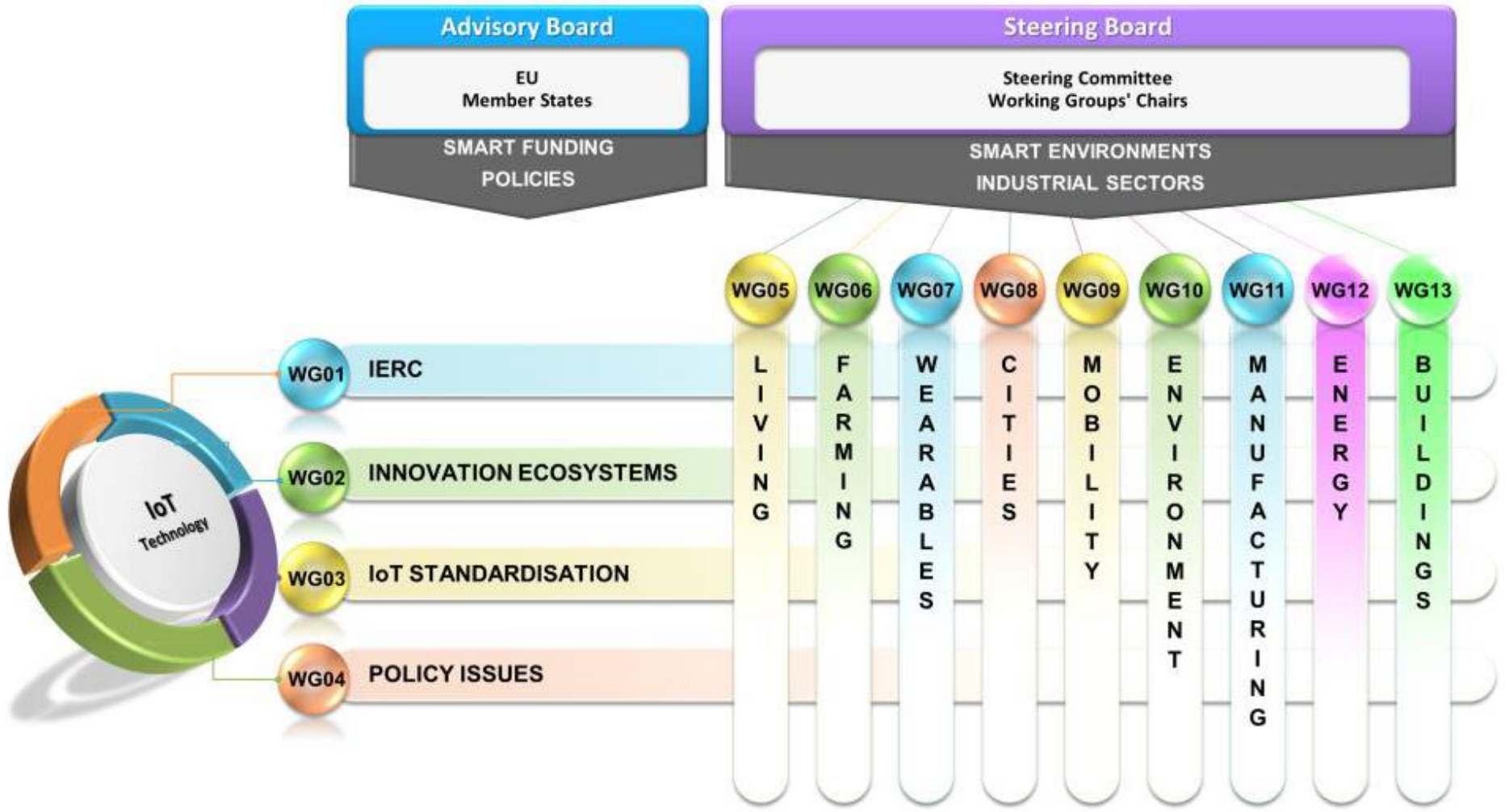
IDC expects the IoT market in EU to expand yearly over 20% in value between 2013 and 2020



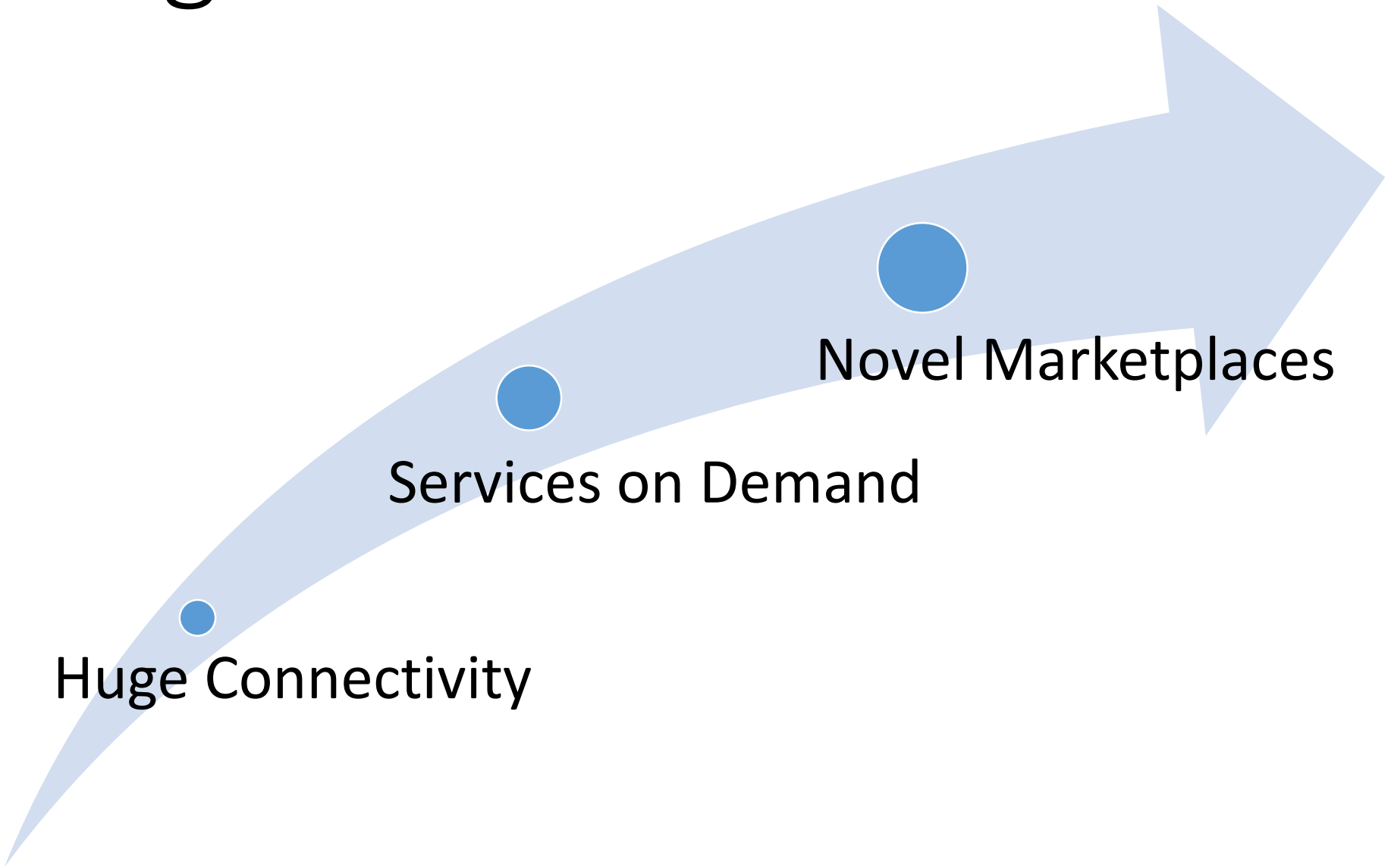


IoT revenues in the EU28: increase from more than €307 bn in 2013 to more than €1,181 bn in 2020.

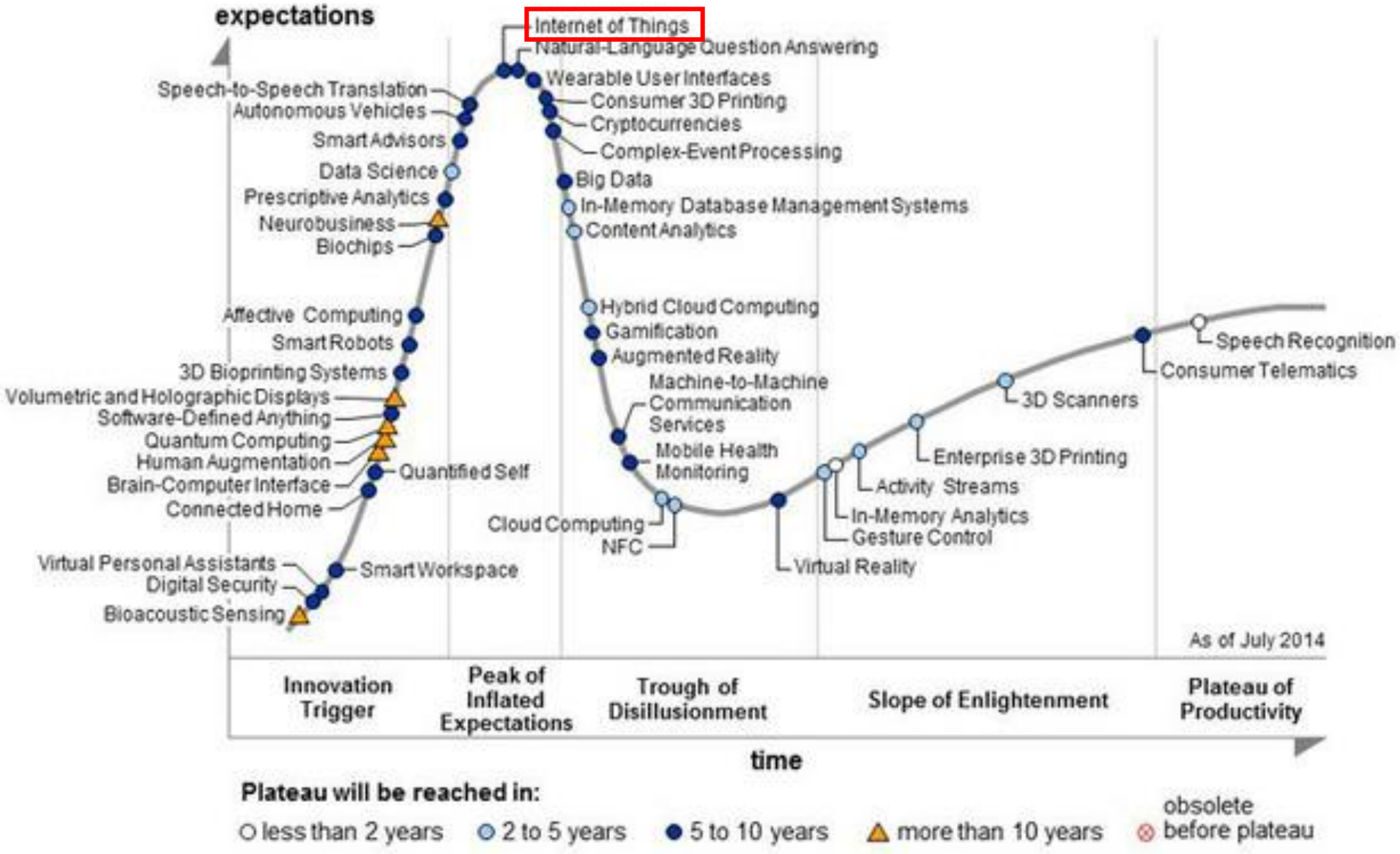
ALLIANCE FOR INTERNET OF THINGS INNOVATION - AIOTI



Growing demand…



Gartner's Hype Cycle



Gartner's Hype Cycle for emerging technologies

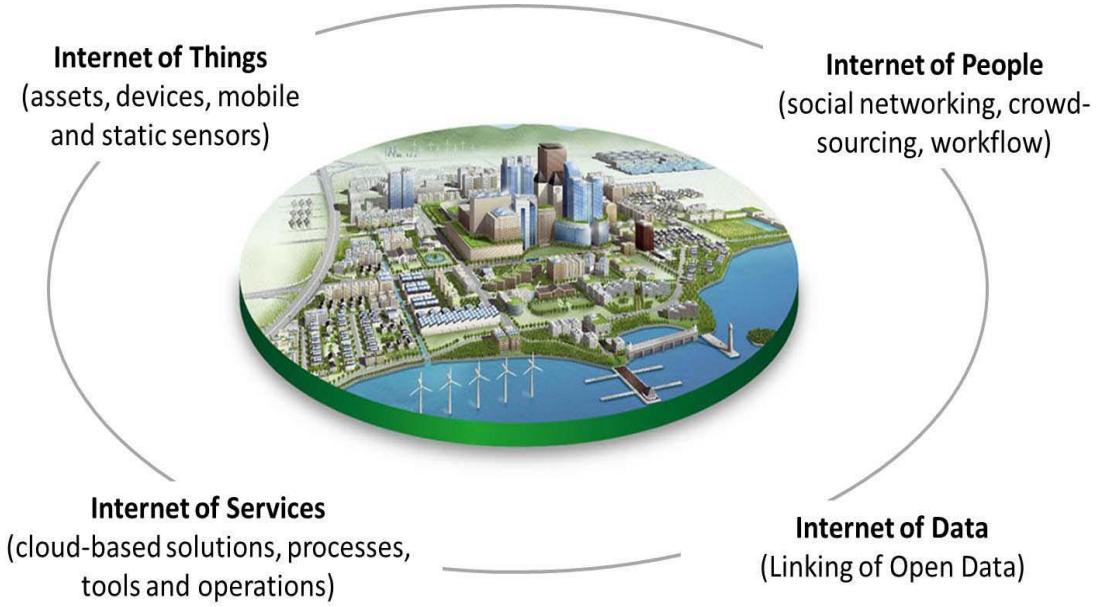
The role of IoT Technology

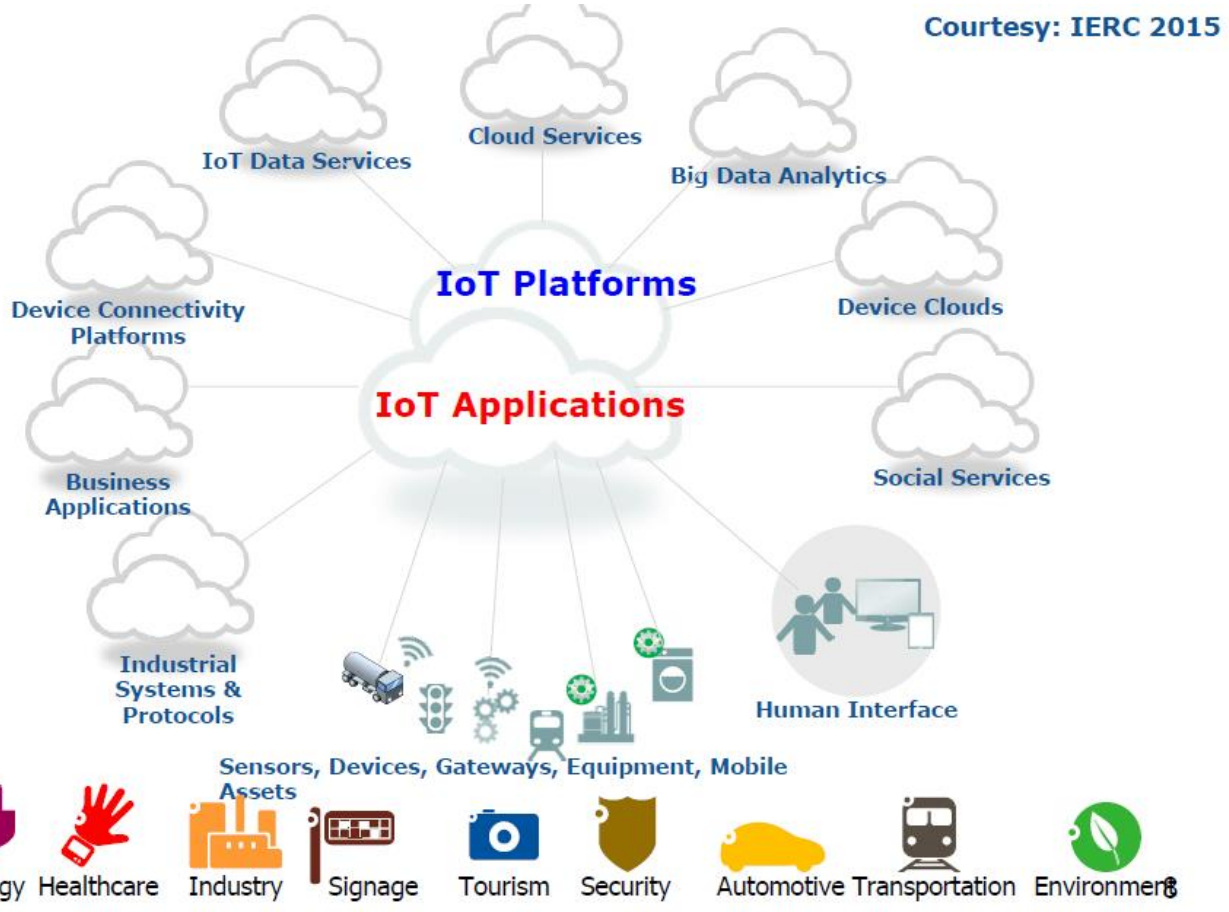
supported by the whole Web-related research ecosystem

IoT research can play the **difficult** role of:

1. Penetrating the market, our devices, homes, kitchens, TVs, cars, energy providers, airplanes… our everyday life **as deeply as** possible!
2. Resolving scalability issues
3. Establishing common protocols
4. Resolving communication issues (e.g., Multitenancy of network and cloud infrastructure, or low power communication)
5. Ensuring high availability
6. Achieving IoT platform interoperability
7. Increasing data granularity (even bigger Big Data) and complexity (5Vs)
8. Securing, Encrypting and Anonymizing data and the user in multiple levels
9. Trust and Privacy
10. …and many more

The Visionary IoT Ecosystem





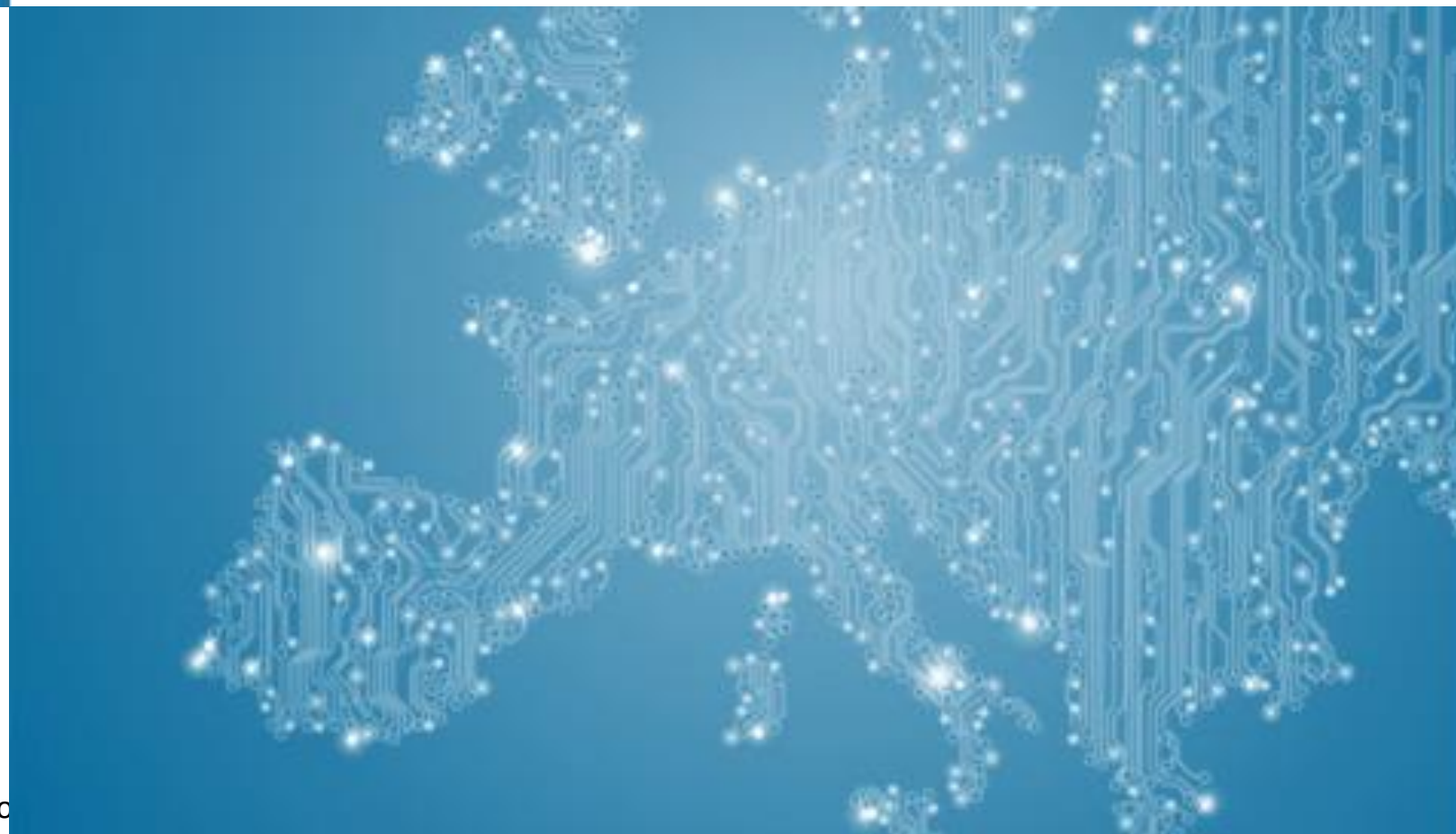
Digital Single Market

A Political Priority for EU

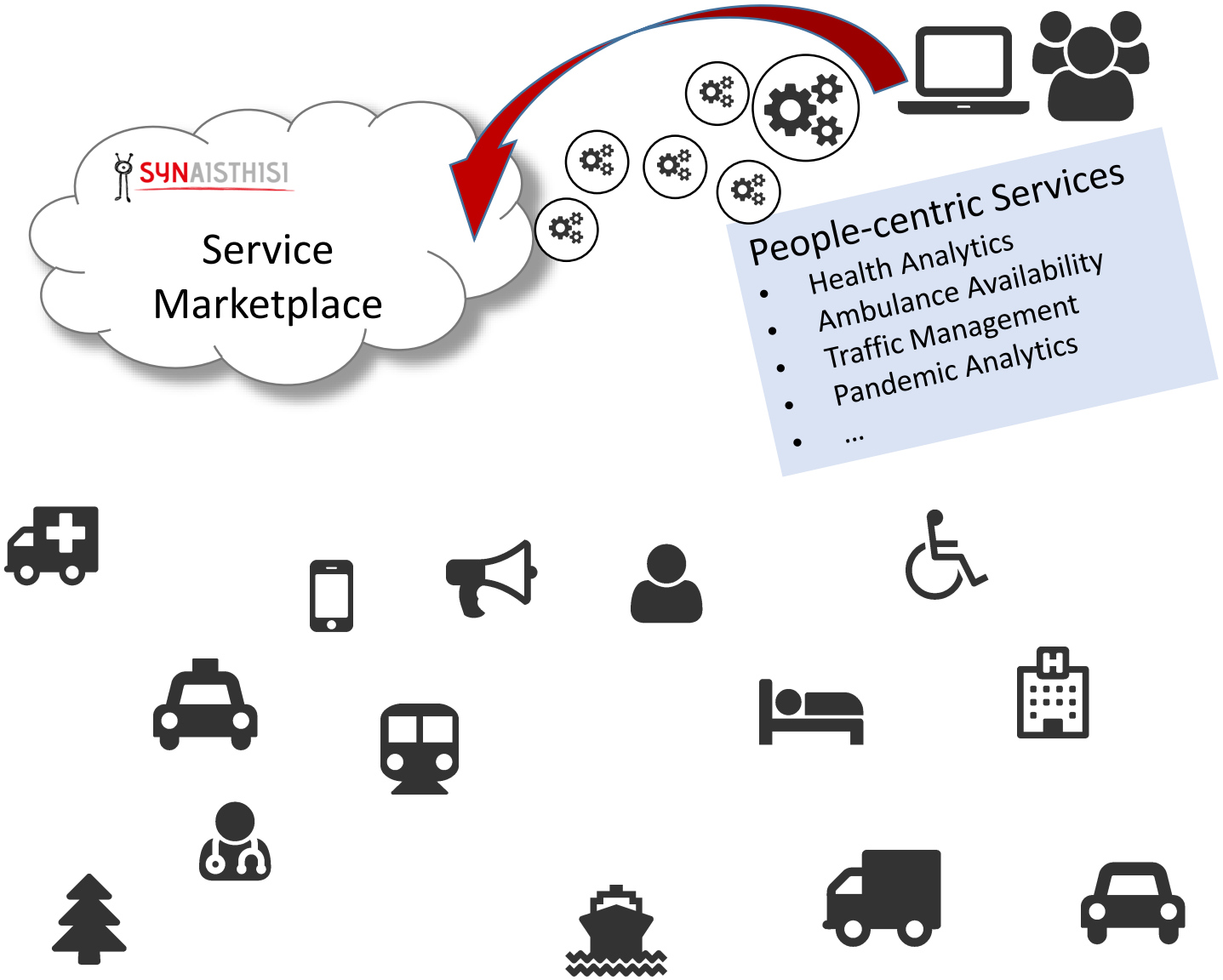
"Free movement of people, services, capital, where the individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of nationality or place of residence"

In our domain we should expect an **Everything as a Service** approach!

Supported by Cloud Computing, IoT, AI, Telcos, Network Infrastructure and many more!

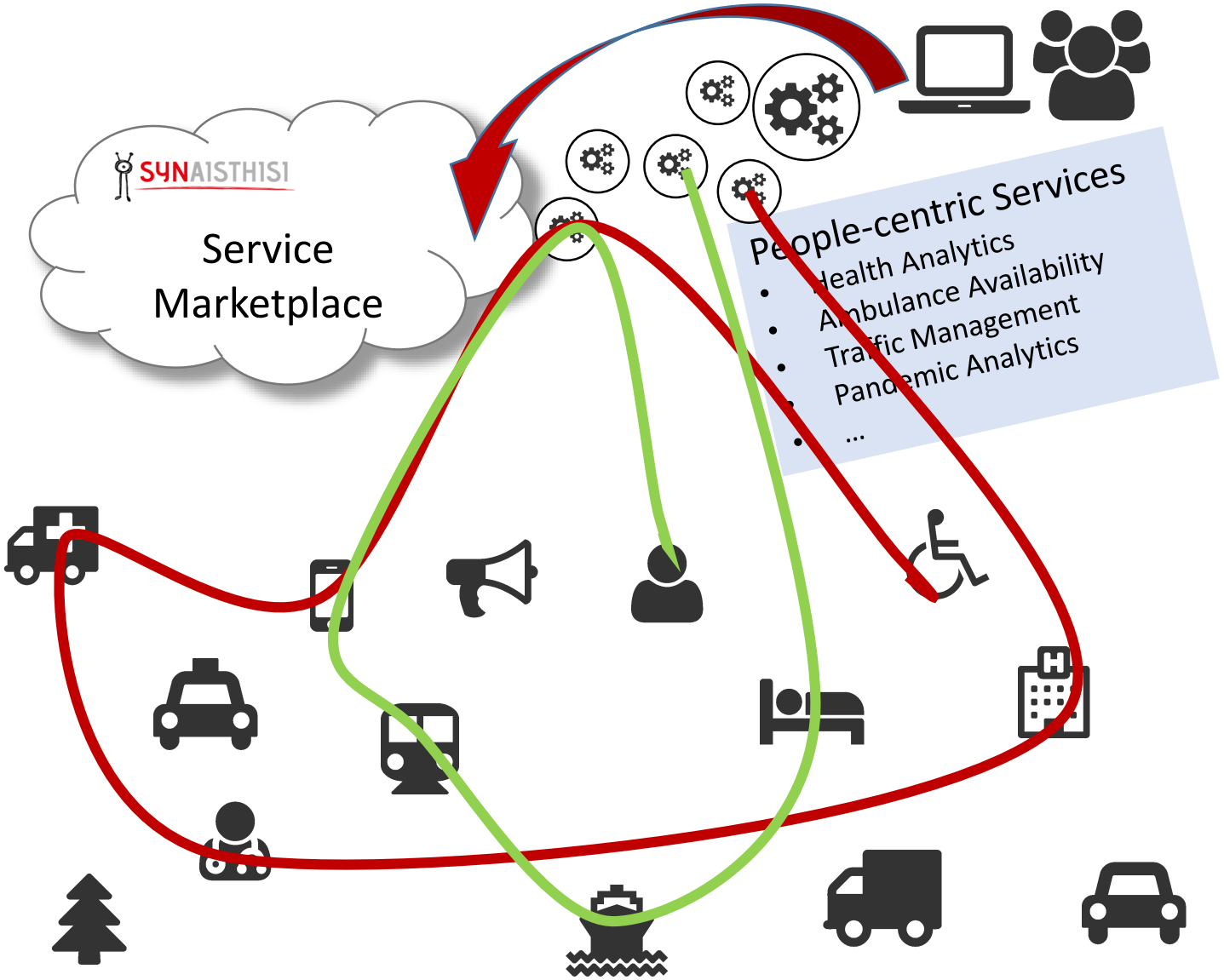


The Concept of Marketplace services



Breaking Down Silos

The Concept of Marketplace services



Reconfigurable Applications

Health Application

Tourist Application

AI to the Rescue

Organizational Layer

- Complex Service composition via AI, Sustainable maintenance, Evolutionary services' improvements, dealing with uncertainty and missing information, procurement optimization,...
- Meta-layer to enable AI algorithms to coordinate IoT Platforms and automatic negotiation on a high level

Service Layer

- AI and ML as a Service, Audio/Image/Video services processing, Event Recognition, Monitoring and Predictive Analytics, Security & Surveillance, Smart Grids…
- Imagine all the traditional AI efforts of the past transformed into reusable services for the masses

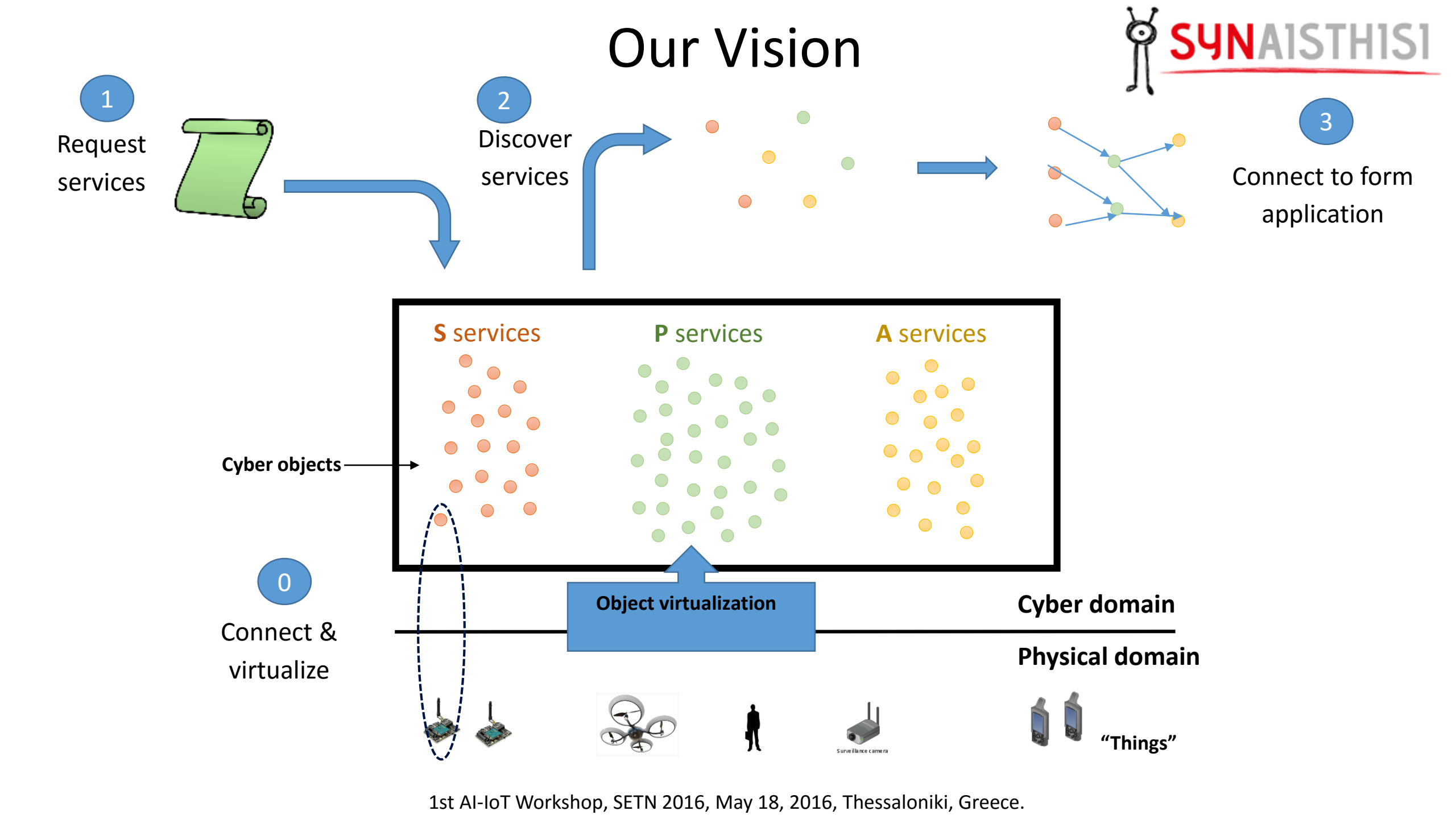
Support Layer

- AI algorithms to optimize Software Defined Networks, routing, server/service availability, load prediction, hot swapping of servers, communication minimization, and anything else you could imagine that would improve the scalability of IoT reference infrastructure

A Sample of **Opportunities** for AI

- Service & Data Representation
  - Blueprints Description
  - Service and data Models expression
  - knowledge representation
- Discoverability
  - Fast and Reliable Search Engines
  - Smarter (Faster) Queries (on billions of services)
  - Trust evaluation of discovered services
- Interoperability
  - Ontologies
  - Distributed AI methods, Multi Agent Systems
  - Data Mining, Alignment and/or Matching
- Service Composition and sustainable maintenance
  - AI Planning, Markov Decision Processes
  - Symbolic Reasoning, Graph based Reasoning
  - Machine Learning, Reinforcement Learning
  - Automatic Service Composition Evaluation

Our Vision


1
Request services
2
Discover services
3
Connect to form application
S services
P services
A services
Cyber objects
0
Connect & virtualize
Object virtualization
Cyber domain
Physical domain
Surveillance camera
"Things"

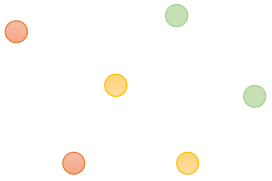
Our Vision

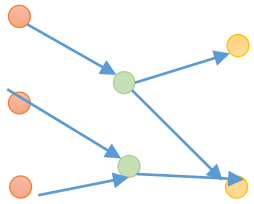
SYNAISTHISI

1 Request services

2 Discover services

3 Connect to form application





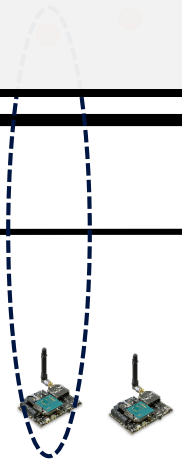
All steps could benefit from the advances of Artificial Intelligence!

0 Connect & virtualize

Object virtualization

Cyber domain

Physical domain



Surveillance camera

"Things"

IoT, no AI

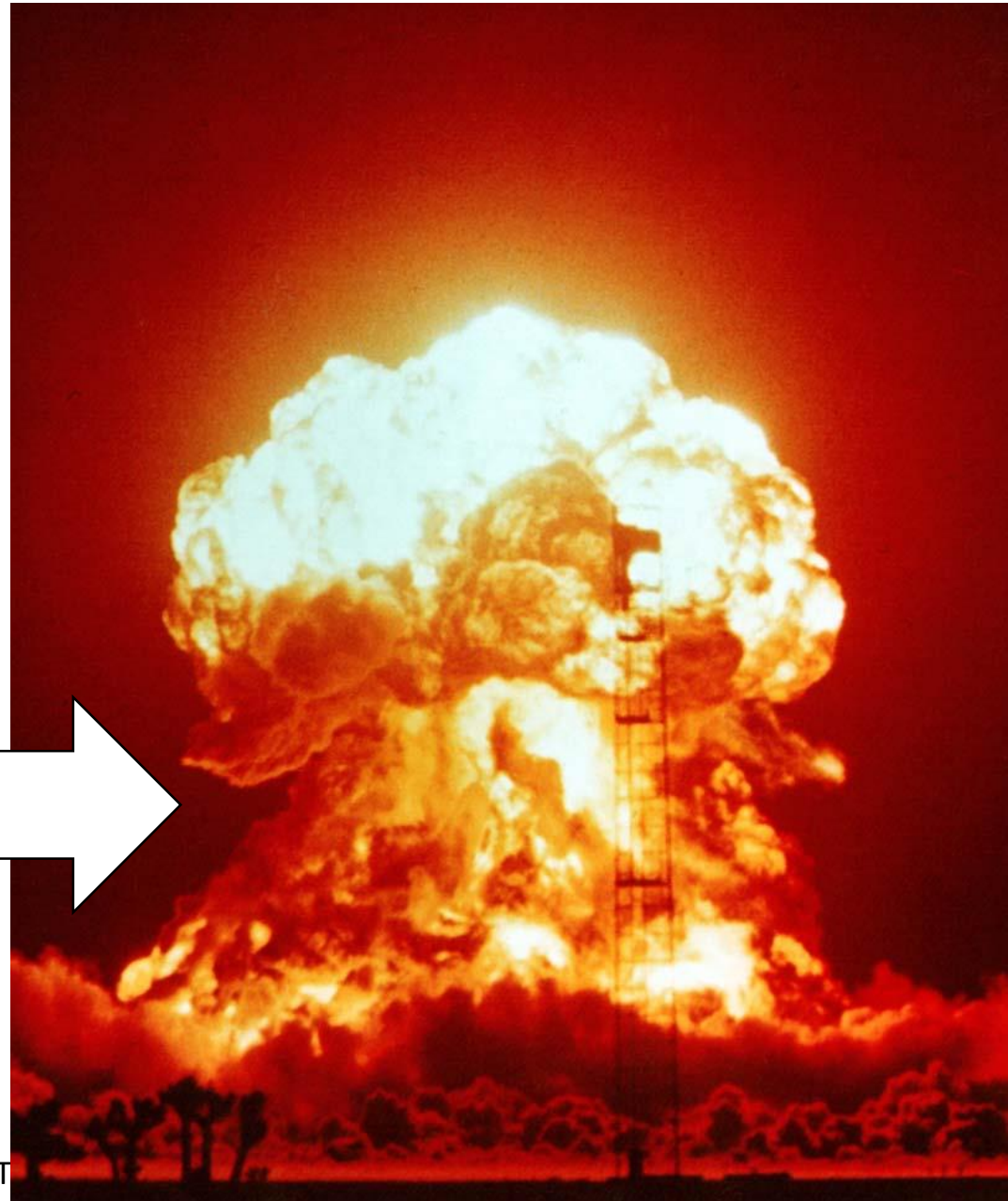
Cute technology!

IoT, no AI

IoT + AI + BD + ICT

Cute technology!

Let’s plan for this!



Workshop's Plan

Wednesday, May 18

9.00 – 9.30	**Registration and welcome**
	Chair: Constantine D. Spyropoulos
9:30 - 9:50	**AI-IoT Overview** *Dr. Constantine D. Spyropoulos - NCSR "Demokritos", Greece*
9:50 - 10:20	**Dem@Lab: Ambient Assisted Living Framework for the Assessment of Dementia in Clinical Trials** *Thanos Stavropoulos, Georgios Meditskos, Stelios Andreadis, Thodoris Tsompanidis and Ioannis Kompatsiaris*
10:20 - 10:50	**Creating a Smart Room Using an IoT Approach** *Giorgos Sfikas, Charilaos Akasiadis and Evaggelos Spyrou*
10:50 - 11:20	**Pervasive Semantic Representation and Integration of Context-aware Homes in Context Sensitive Cities** *Aggeliki Vlachostergiou, Georgios Stratogiannis, Georgios Siolas, George Caridakis and Phivos Mylonas*
11:20 - 11:50	**Coffee Break**
11:50 - 12:20	**A Semi-Automatic Approach for Semantic IoT Service Composition** *Grigorios Tzortzis and Evaggelos Spyrou*
12:20 - 12:50	**Trust Semantics in IoT Entities' Deployment** *Konstantinos Kotis and George Vouros*
12:50 - 13:00	**Final Discussion and Workshop Closing**