

Smart devices





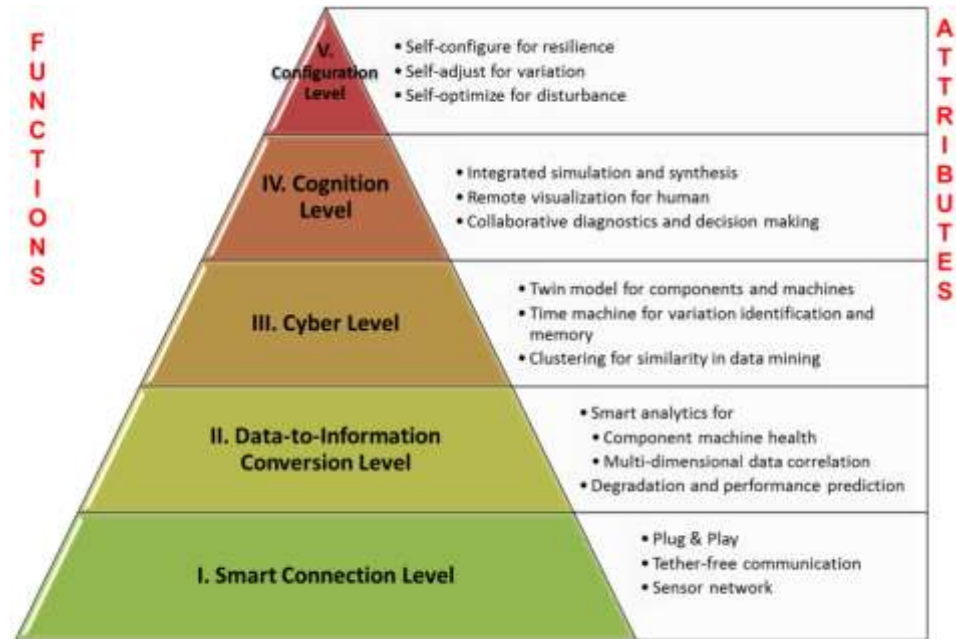
Smart devices

- › Tab-class devices (Weiser)
- › Smart devices are characterised by
 - the ability to execute multiple, possibly concurrent, applications,
 - supporting different degrees of mobility and customisation and by
 - supporting intermittent remote service access and operating according to local resource constraints
- › Smart devices tend to be owned, operated, configured and under the control of individual human users.
- › Devices represent an execution environment for (service) processes, comprising a device specific and limited set of local (to the device) ICT system resources and physical environment resources.
- › Smart devices embody user access to distributed system components such as information and task based services, e.g., resource management and control, within a user centred access device to a distributed ICT service.



Internet of Things

- › The Internet of things (IoT) is the **network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and network connectivity** which enable these objects to connect and exchange data.
- › Any type of everyday object augmented with digital capabilities can be considered as part of the IoT





Enabling Technologies

- › Sensors
- › Processors
- › Actuators
- › Connectivity
 - Short range
 - Medium range
 - Long range
- › Identification
 - Addressability
 - Discoverability
- › Cyber-physical identification
 - Smart cards
 - RFID / NFC
 - QR (2-D) codes
 - Visual recognition
- Application level
 - Data filtering / preprocessing
 - Data -> Information -> Knowledge
 - Self-* properties
 - Data management
 - Privacy, ethics, security
 - Environmental impact!



MediaCup (Gellersen et al. 1999)



Smart device applications

- › Distributed
- › Decentralised
- › Connected
- › Simple

- › Quantified Self
- › Smart homes & indoor environments
- › Smart vehicles
- › Smart grid



Εθνικό Κέντρο Έρευνας και Καινοτομίας Πληροφορικής

Quantified Self

- › Wearable sensors
 - Smartwatches
 - Fitness bands
 - Physiological parameter monitoring
- › Wearable displays
 - Augmented reality
 - Virtual reality



Wearable Sensors

Wearable
Activity Tracking
Quantified Self



<http://amigo.co/>

ION Glasses



Angel



Acoustical
Optical
Acceleration
Temperature



@idezo_ch

Fitbit



Heart rate
Skin temp.
Blood oxygen
Physical activity

#fec14



Εθνικό Κέντρο Έρευνας και Τεχνολογίας

Smart homes

- › Home automation & assisted living
- › Maturing technology
 - Google Home
 - Philips Hue
 - GE Link
 - IKEA Smart Home
 - Apple HomeKit

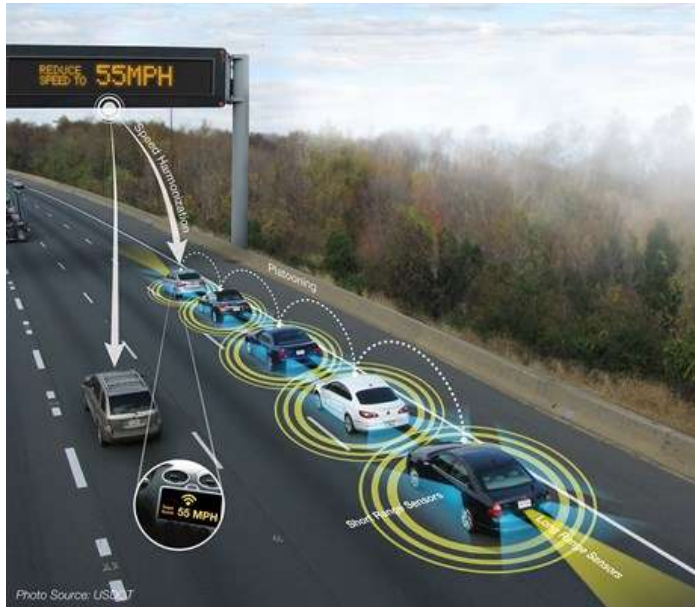
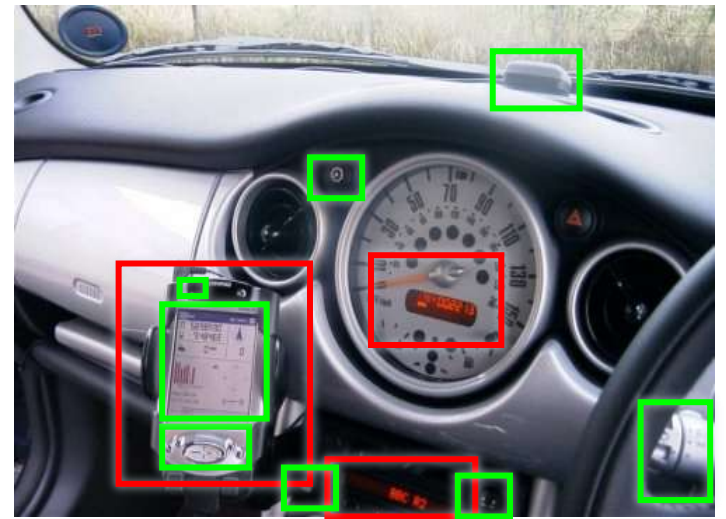




Υπουργείο Κινητότητας και Διάδοσης Τηλεπικοινωνιών

Smart vehicles

- › Vehicle management & behaviour
- › Vehicle-to-Vehicle
- › Vehicle-to-Infrastructure

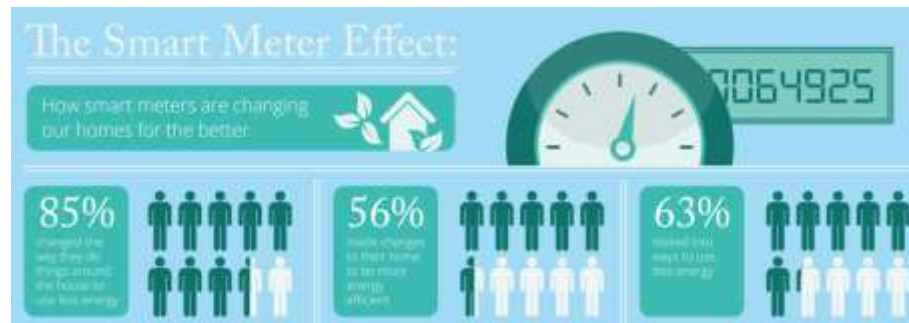




Υπουργείο Ενέργειας και Διαχείρισης Υδάτινων Πόρων

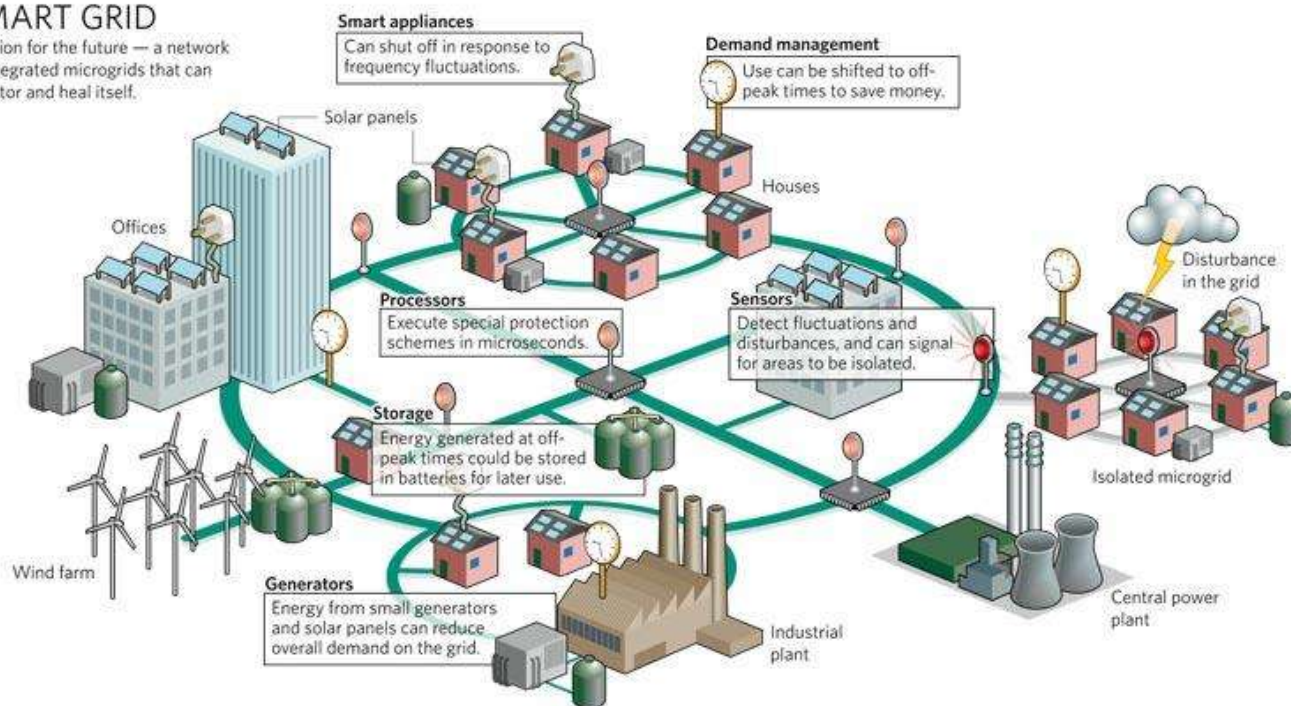
Smart Grid

- A modernized electricity grid that enables **bidirectional** flows of energy and uses **two-way communication** and **control** capabilities.
 - Demand management
 - Supply & transport management
 - Tariff management
 - Disturbance management
 - Sustainability and environmental protection



SMART GRID

A vision for the future — a network of integrated microgrids that can monitor and heal itself.



<https://www.youtube.com/watch?v=JwRTpWZReJk>