

### PREDICTIONS & PREHISTORY

~50 years

- 1923** ● *"A house is a machine for living in."*  
– Le Corbusier, in his essay collection *Vers Une Architecture*
- 1926** ● *"When wireless is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole...and the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket."*  
– Nikola Tesla, in *Colliers* magazine
- 1932** ● *"Within our grasp is the leisure of the Greek citizen, made possible by our mechanical slaves, which far outnumber his twelve to fifteen per free man. ...As we step into a room, at the touch of a button a dozen light our way. Another slave sits twenty-four hours a day at our thermostat, regulating the heat of our home. Another sits night and day at our automatic refrigerator. They start our car; run our motors; shine our shoes, and cult our hair."*  
– Jay B Nash, in his book *Spectatoritis*
- 1950** ● Ray Bradbury writes his short story, *The Veldt*, for *The Saturday Evening Post*, exploring the pleasures and perils of a so-called "HappyLife House," an early vision of a fully automated smarthome.
- 1962** ● MIT researcher and first head of DARPA computer research J.C.R. Licklider envisions the *"Galactic Network,"* a globally interconnected set of computers through which everyone could quickly access data and programs from any site.
- Hanna-Barbera's popular cartoon, *The Jetsons*, predicts an American middle class existence of the future facilitated by domestic robots, integrated appliances and automated creature comforts of all type and manner.
- 1965** ● Laurence G Roberts and Thomas Merrill connect two early super-computers in Massachusetts and California, creating the *world's first wide-area network (WAN)*.
- 1966** ● *"In a few decades time, computers will be interwoven into almost every industrial product."*  
– Karl Steinbuch, in his book *Die Informierte Gesellschaft*
- 1969** ● *ARPANET* sends its first message, bringing online the world's first operational packet switching network using TCP/IP, forming the backbone of how today's Internet works.
- 1973** ● First patent issued for a *passive RFID* tag to Italian inventor Mario Cardullo.
- 1982** ● The *first Internet-connected machine* was a Coke vending machine rigged by Computer Science grad students at Carnegie Mellon University to tell them whether or not the machine was stocked with cold soda.
- 1988** ● *"Ubiquitous Computing"* coined as term by Mark Weiser, chief technologist at Xerox PARC, to describe the concept where computing is made to appear everywhere - on any device, in any location, in any format.
- 1990** ● John Romkey creates the *first Internet-controlled 'device'*, a toaster that could be turned on and off over the Internet.
- 1991** ● Mark Weiser publishes *"The Computer in the 21st Century"* in *Scientific American*.
- 1995** ● Siemens introduces M1, a dedicated department within its mobile unit for *machine-to-machine (M2M)* industrial applications, enabling machines to communicate over wireless networks.
- 1998** ● *"Ubiquitous Computing is roughly the opposite of virtual reality. Where virtual reality puts people inside a computer-generated world, ubiquitous computing forces the computer to live out here in the world with people."*  
– Mark Weiser, in his book *The Future of Integrated Design of Ubiquitous Computing*
- 1999** ● *"Internet of Things"* coined as term by British tech pioneer Kevin Ashton (now at Belkin, behind WeMo), the title of a presentation given to P&G about supply chain innovation.
- 2002** ● MIT's CompSci & AI Lab launches *Project Oxygen* and *HomeLab*, dedicated to exploring and testing *"Ambient Intelligence"* - pervasive, human-centered computing consisting of hand-held terminals and computers embedded in various environments.
- *"...the Internet is becoming the communication fabric for devices to talk to services, which in turn talk to other services. Humans are quickly becoming a minority on the Internet, and the majority stakeholders are computational entities that are interacting with other computational entities without human intervention."*  
– Jim Waldo, CTO Harvard, in the *Journal of Information Systems Frontiers*

~20 years

### ADVENT OF THE "IoT" PROPER

- Sep 2005** ● Interaction Design Institute Ivrea (IDII) in Italy develops *Arduino*, a game-changing cheap and easy-to-use microcontroller, for students to use in developing interactive projects, introducing a foundational element of physical, distributed computing.
- 2007** ● The number of *connected devices exceeds the human population* of the planet for the first time (~6.6 billion).
- Jun 2012** ● *IPv6 launches*, offering more than  $7.9 \times 10^{28}$  times as many unique addresses as previous protocol IPv4, thus facilitating a suitable identification and location system for all IoT networked devices.
- Nov 2012** ● Toronto-based Unified Computer Intelligence Corporation introduce the *Ubi* (via Kickstarter campaign), a voice-activated always-on home computer system that plugs into a standard outlet.
- Oct 2013** ● Inaugural *M2M & Internet of Things Global Summit* held in Washington, DC.
- Cisco hosts inaugural *IoT World Forum* in Barcelona, overtly positioning itself as "all in" with regards to IoT and announcing the investment of billions of dollars over the next few years, including R&D and startup venture funding.
- Feb 2014** ● *Google acquires NEST labs for \$3.2 Billion*, signaling the IoT's movement into the mainstream consumer spotlight, primarily via smarthome products.
- Mar 2014** ● Founding members Cisco, GE, AT&T, Intel, and IBM announce the *Industrial Internet Consortium (IIC)*, a cooperative body aimed at standardizing IoT specs and protocols.
- Jun 2014** ● *Apple announces HomeKit*, a software platform for managing home automation via iPhone or iPad, in conjunction with a host of hardware, fixture, and appliance partners.
- Aug 2014** ● *"Hope we're not just the biological boot loader for digital superintelligence. Unfortunately, that is increasingly probable."*  
– Elon Musk; founder of Paypal, Tesla Motors, and Space X; via Twitter
- *Intel releases Galileo Gen2 Development Board* to compete with the *Raspberry Pi* open-source PC in used by IoT hackers and developers. The 'system on a chip' (SoC) is an all-in-one platform using the *Quark* chip, designed specifically for low-power IoT applications and software compatible with Windows, Mac, Linux, and Arduino IDE.

~10 years

### RECENT SEMINAL MOMENTS

TODAY

- 2014** ● 2nd annual *Internet of Things World Forum* to be held in London in November.
- 2020** ● Gartner estimates the IoT space will generate over *\$300 Billion* in total incremental revenue by the end of this decade.
- Cisco projects there will be *over 50 billion connected objects* by 2020, and estimates 100 smart "things" come online every second.
- 2024** ● *37% of Americans* believe devices and appliances without smart technology will be obsolete within a decade. 31% think it will take two or more decades, and 32% don't think non-smart things will ever be obsolete. (*WiFi Alliance survey in USA Today, Feb 2014*)
- 2025** ● McKinsey estimates the potential total economic impact of the IoT's application across major sectors to be *\$2.7 - \$6.2 Trillion per year* by 2025. (*'Disruptive Technologies' report, May 2014*)
- ????** ● *INDUSTRY 5.0 - "Industry 1.0 was the invention of mechanical help, Industry 2.0 was mass production, pioneered by Henry Ford, Industry 3.0 brought electronics and control systems to the shop floor, and Industry 4.0 is peer-to-peer communication between products, systems and machines."*  
– Stefan Ferber, IoT Director at Bosch Software Innovations

~10 years

### VISIONING THE FUTURE

SOURCES

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