COS10011/60004
Creating Web Applications

Recent Trends

Contents

Some trends in Internet Technology

- Cloud

- Internet of Things – Sensor networks and RFID

- AI Powered Chatbots

- Voice Search

Cloud Computing

Response to the complexities of computing structure ownership and management.

Cloud computing describes the abstraction of web-based computers, resources, and services that system developers can utilize to implement complex web-based systems.

- A series of recycled ideas presented with a fresh twist

- Commoditisation of servers
- Virtualisation
- Automation
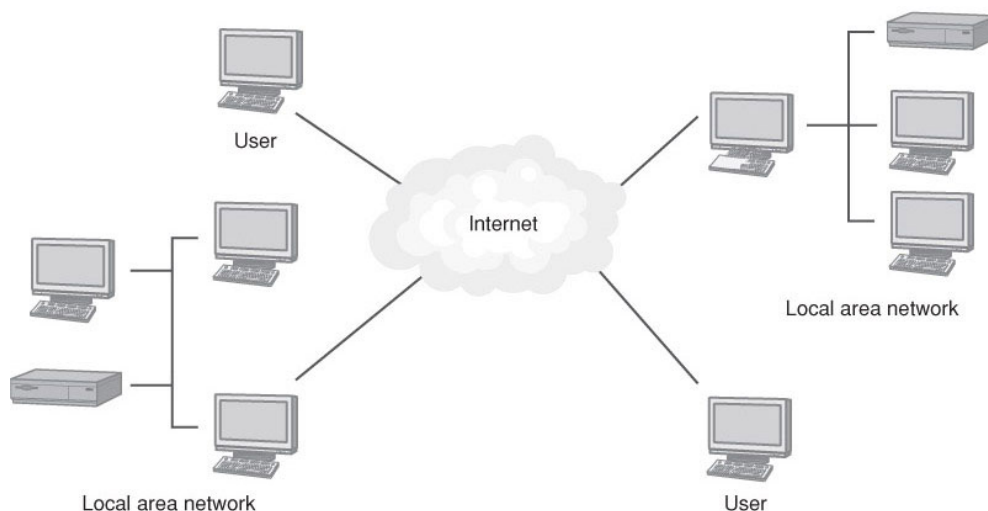- Ubiquitous network access

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Why Use the Term "Cloud"?

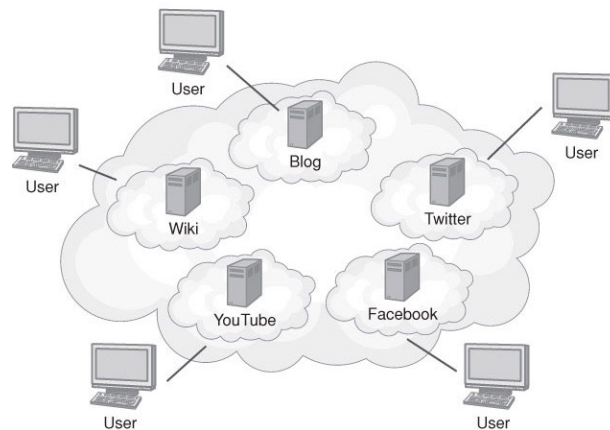For years developers and network administrators have represented the Internet as a cloud.

e.g. iCloud

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Mobile Computing and Cloud

■ Mobile 'thin-clients'. Pesonalised data strorage in the cloud

■ Web 2.0 tools and sites, users essentially publish content directly to the cloud for access by other users.

Features of Cloud-based Platforms

■ **Scalability.** On demand resource scaling.

■ **Redundancy.** Servers, storage, and networks.

■ **Cost benefits from resource pooling.** Shares IT resources across a very large number of companies, which provides cost savings to each.

■ **Outsourced server management.** Provides an IT staff who maintain operating systems and underlying support software.

■ **Low cost of entry.** Companies do not need to invest in their own IT data center.

Google Data Centres

Your experience with Google !
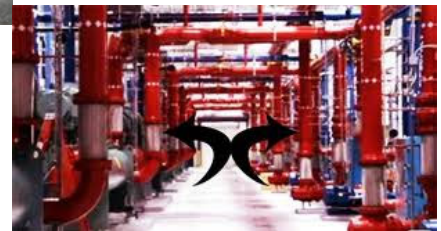
Cloud Computing

- Computing as a Service

  - Infrastructure-as-a-Service (IaaS)

  - Platform-as-a-Service (PaaS)

  - Software-as-a-Service (SAAS)

Software as a Service (SaaS)

- SaaS provides a cloud-based foundation for software on demand.

- Web-delivered content that users access via a web browser.

- The software can reside within any of the deployment-model clouds.
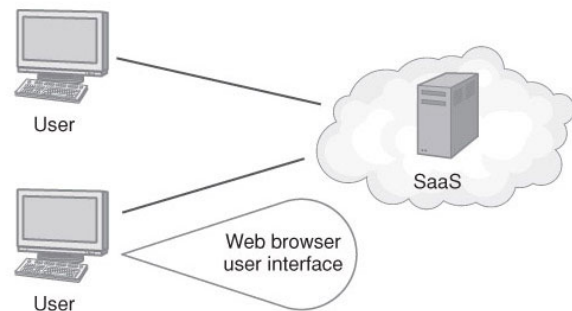
Real World: Salesforce.com

- One of the first companies to launch a large-scale SaaS.

- Leveraged the fact that as much as three-fourths of a salesperson's day was spent on non-sales tasks.

- Recognised that regardless of the items a company sold, the selling process was similar across companies and even industries.

- Automated these tasks and put the underlying data storage in the cloud—the sales cloud.

Platform as a Service (PaaS)

■ PaaS provides the underlying hardware technology, such as one or more servers (or virtual servers), operating systems, database solutions, developer tools, and network support, for developers to deploy their own solutions.

■ The hardware and software within a PaaS solution is managed by the platform provider.

■ Developers need not worry about performing hardware or operating system upgrades. Instead, developers can focus on their own applications.

Real World: Microsoft Azure

■ Microsoft platform for developers to move applications to the cloud.

■ Provision of OS support for .NET applications and a cloud-based SQL server (SQL Azure)

■ Also Google AppEng

Infrastructure as a Service (IaaS)

- IaaS provides a virtual data center within the cloud.

- IaaS provides servers (physical and virtualized), cloud-based data storage, and more.

- Developers must install their own operating system, database management software, and support software.

- Then the developers (or the company's system administrators) must manage both the hardware and the software.

Real World: Amazon AWS

- Companies can use **Amazon Web Services (AWS)** to host their own systems.

- Today, AWS process hundreds of thousands of web-based requests for companies every second!

Cloud provider examples

Different providers provide various combinations of IaaS/PaaS/SaaS.

- Amazon
  - Provides high control to the developer to select hardware stack as they need (can select till the kernal) so that the developer can use many technique/technology to develop the application. D
  - Down side is automation of scalability is less due to low level of abstraction. Each developer has to tackle the resource allocation and removal implementation of different layers through provided APIs

Google AppEngine
  - Provides full automation of scaling. However, application has to be written adhering to certain rules and designs to be deployed in the environment. Loose coupling of tiers is required.
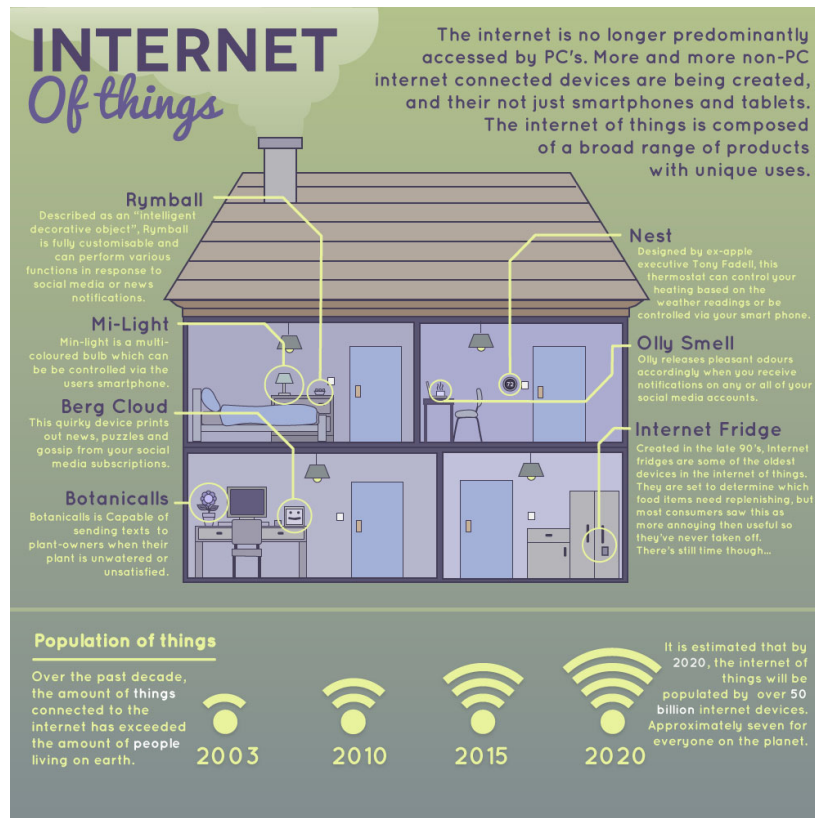 - Mainly, targeted for traditional web application.

Microsoft Azure :
  - For .Net applications, hardware stack cannot be altered drastically.
  - However, many types of applications and languages can be deployed.
  - Some automation of scalability is provided.

IoT, Sensor Networks and RFID

- Now more interconnected devices than people

- Devices talking to each other

- Sensors providing information on the state of the environment

- Not new. First Internet enabled Coke Vending machine at Carnegie Mellon University in 1982!
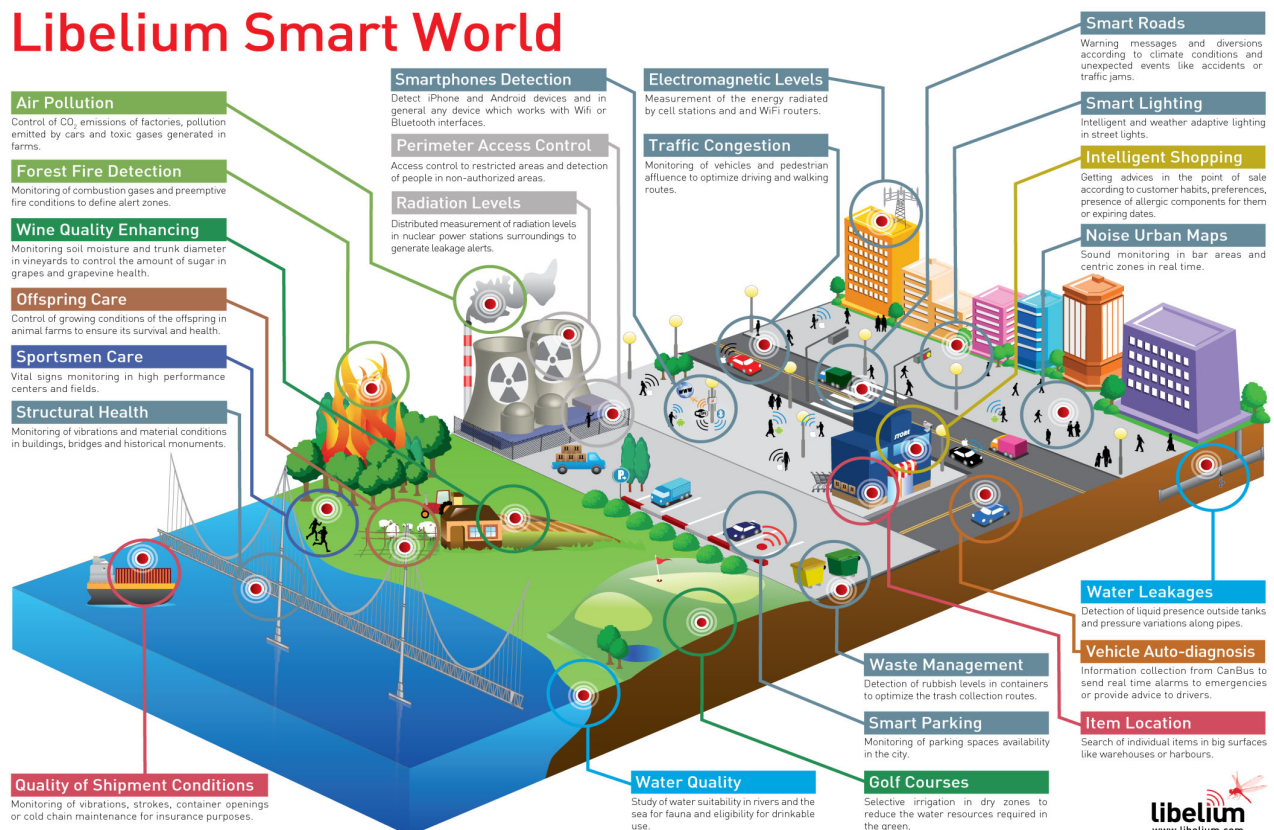
IoT examples - Home

IoT – Smart Cities

IoT - Scenarios

The example

| All the monuments of the world are described in detail on the Net.	The packages that we send are tracked on the Web and we know where they are.	Lost or stolen objects (eg keys or car) can tell us where they are.	Plants can water themselves when they are thirsty.	The alarm can ring earlier in case of traffic or bad weather.

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How it works

Objects are identified by their position in the World. They have an information shadow on line, but there is no direct interaction with the object.	Moving objects are uniquely identified by a code. They have an information shadow on line, but there is no direct interaction with the object.	The objects are connected to the Internet and interact with people: they communicate, take orders and state information about themselves (e.g. their position if they are lost).	Objects communicate with each other and action each other to the occurrence of certain conditions.	Objects communicate with the Net to which they provide information that can be elaborated and used as new knowledge.

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Technologies	Augmented Reality Geotagging GPS	RFID NearFieldCommunication Barcode Visual Recognization	Remote control	Machine2Machine	Object Generated Content (OGC) Device to grid
On the market					

Internet of Things and Context awareness


TECHNOLOGY ROADMAP: THE INTERNET OF THINGS
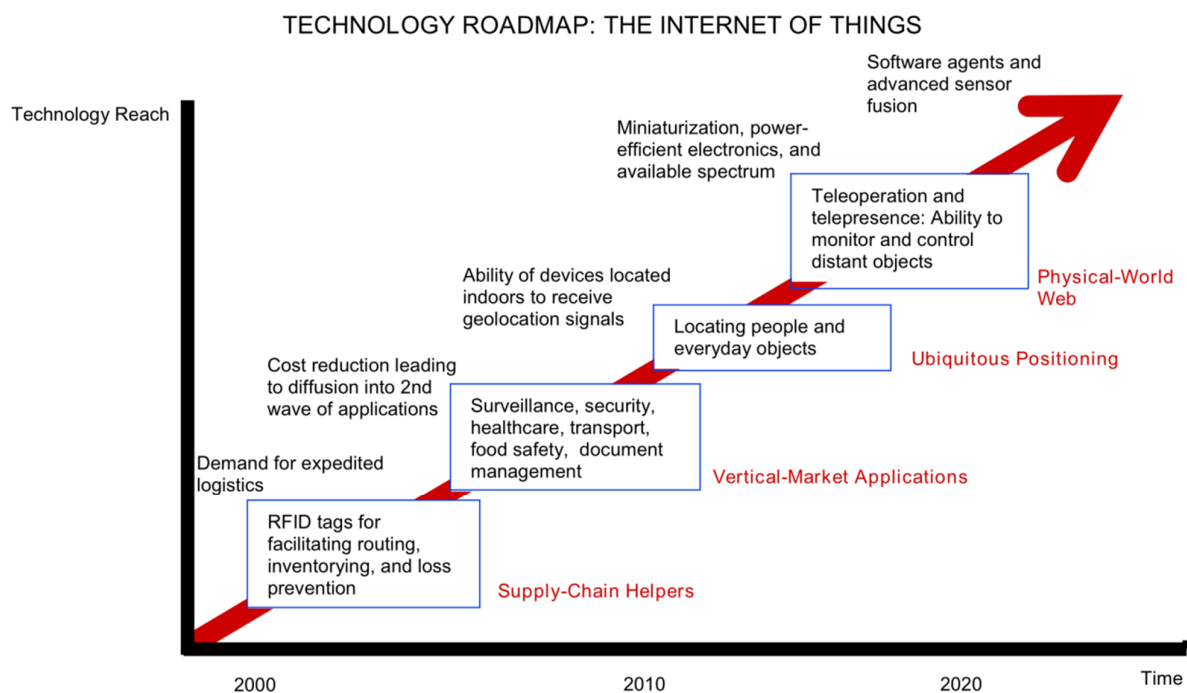
Source: SRI Consulting Business Intelligence

http://en.wikipedia.org/wiki/Internet_of_Things

AI Powered Chatbots

■ A chatbot, or chat bot, is a machine that has a conversation with humans via text or audio.

■ An AI powered chatbot is a smarter version which uses natural language processing (NLP) and machine learning (ML) to better understand the intent of the human and provide a more natural, near human-level communication.
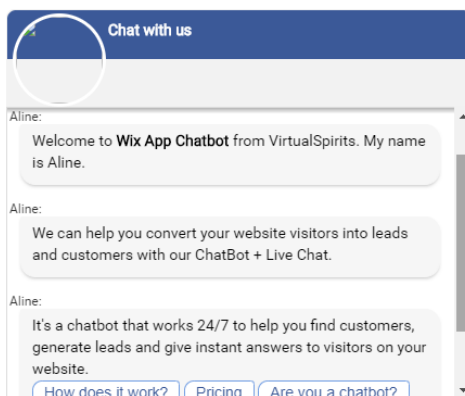
Wix Chatbot
Aline

CBA Bank Assistant
Ceba
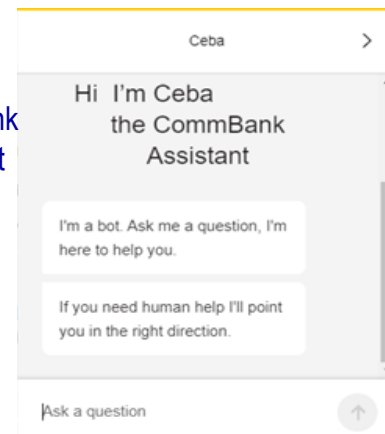
Voice Search

■ Voice searching is a method of search which allows users to search using spoken voice commands rather than typing.

■ For example, Web Speech API can be used to work with voice data. The API is divided into two components: speech recognition and speech synthesis.

■ Speech recognition allows recognizing voice context and responding to queries. Speech synthesis is a text-to-speech component that allows scripts to read text content.