# KAITS MAGAZINE

DEPARTMENT OF INFORMATION TECHNOLOGY
SRI VENKATESWARA COLLEGE OF ENGINERRING

VOLUME 10 JAN-JUN 2017




## ABOUT THE DEPARTMENT

### Vision of the Department

To provide an excellent education in Information Technology through effective teaching and research environment in pursuit of academic proficiency, employment & higher education with social and ethical values.

### Mission of the Department

M1: To provide high quality technical education in Information Technology by delivering the core instructions through world class infrastructure.
M2: To prepare students with fine professional and intellectual skills to solve challenging tasks in the field of Information Technology.
M3: To train students in design and implement novel systems based on education and research with the support of senior faculty.
M4: To inculcate students with leadership capabilities, integrity, ethical & social values.

### Program Educational Objectives (PEO)

**PEO1:** Graduates will be technically competent and well trained as software engineers to attain National and International recognition.
**PEO2:** Graduates will be oriented to analyze, design & development of best engineering solutions for software products in contribution to industrial growth as well as societal wellbeing.
**PEO3:** Graduates are passionately involved in professional development, research and work effectively, progressively to become a successful entrepreneur with ethical & social values.

### Program specific Outcome (PSO)

1. **PSO 1:** Problem Solving Skills:- Ability to understand the evolutionary changes in modern computing & do analyze, design and development of software applications in the upgrade to novel methodologies & provide the best computational solutions in the areas related to algorithms, database, cloud computing, web & mobile applications, big data, networking & security of varying complexity.
2. **PSO 2:** Professional Skills:- To apply best practices and methods of software management in integration with software projects for providing a good quality product across the globe.

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**INSIDE THIS ISSUE:**



# Waymo

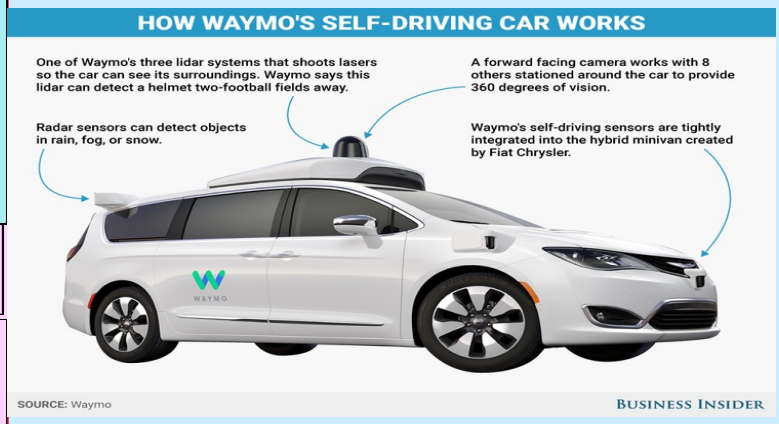
Waymo LLC is a self-driving technology development company. It is a subsidiary of Alphabet Inc. Waymo originated as a project of Google before it became a stand-alone subsidiary in December 2016.

In April 2017, Waymo started a limited trial of a self-driving taxi service in Phoenix, Arizona. The service launched its first commercial self-driving car service called "Waymo One", where users in the Phoenix metropolitan area can use an app to request the service.

In 2017, Waymo unveiled new sensors and chips that are less expensive to manufacture, cameras that improve visibility, and wipers to clear the lidar system. Waymo manufactures a suite of self-driving hardware developed in-house. These sensors and hardware—enhanced vision system, improved radar, and laser-based lidar—reduce Waymo's dependence on suppliers. The in-house production system allows Waymo to efficiently integrate its technology to the hardware. In the beginning of the self-driving car program, the company spent $75,000 for each lidar system from Velodyne. As of 2017, that cost was down approximately 90 percent, due to Waymo designing its own version of lidar.

Short-range lasers detect and focus on objects near the vehicle, while radar is used to see around vehicles and track objects in motion. The interior of these cars include buttons for riders to control certain functions: "Help", "Lock", "Pull over", and "Start ride". Waymo engineers have also created a program called Carcraft, a virtual world where Waymo can simulate driving conditions. The simulator is named after the video game World of Warcraft.With Carcraft, 25,000 virtual self-driving cars navigate through models of Austin, Texas, Mountain View, California, Phoenix, Arizona, and other cities. As of 2018, Waymo has driven more than 5 billion miles in the virtual world.

In May 2016, Google and Fiat Chrysler Automobiles announced an order of 100 Chrysler Pacifica hybrid minivans to test the self-driving technology. Waymo ordered an additional 500 Pacifica hybrids in 2017 and in late May 2018, Alphabet announced plans to add up to 62,000 Pacifica Hybrid minivans to the fleet. Waymo partners with Intel to use Intel technologies, such as processors, inside Waymo vehicles. Its deals with Avis and AutoNation are for vehicle maintenance. With Lyft, Waymo is partnering on pilot projects and product development.




## Limitations

Waymo operates in some of its testing markets, such as Chandler, Arizona, at level 4 autonomy with no one sitting behind the steering wheel, sharing roadways with other drivers and pedestrians. However, more testing is needed. Waymo's earlier testing has focused on areas without harsh weather, extreme density or complicated road systems, but it has moved on to test under new conditions.

In 2014, a critic wrote in the MIT Technology Review that unmapped stopped lights would cause problems with Waymo's technology and the self-driving technology could not detect potholes.


**Submitted by**
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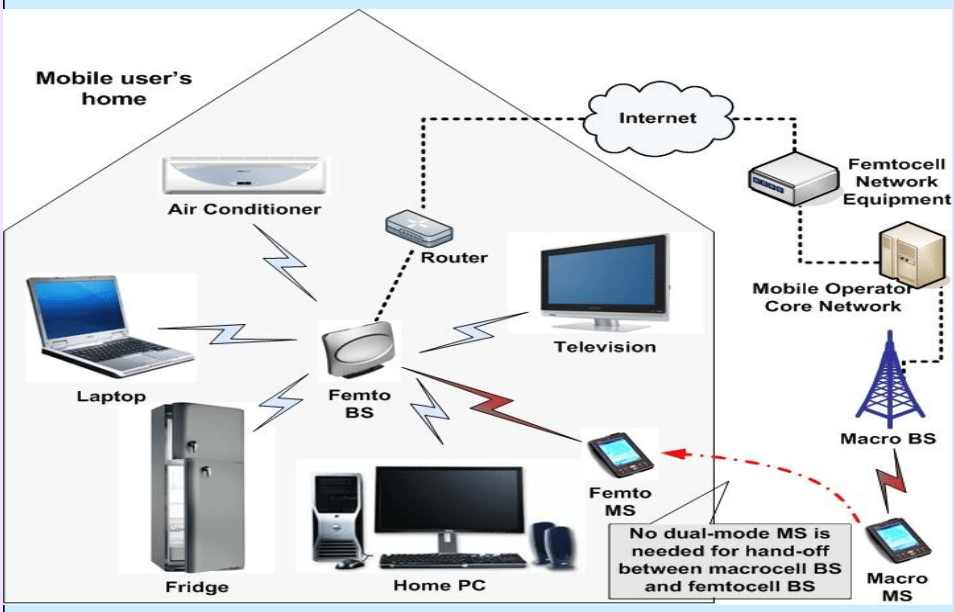
**IT**

# Femtocell

## Femtocell

A Femtocell is a small device that is used to improve wireless coverage over a small area, mostly indoor. It is a small cellular base station, also called a wireless access point that connects to a broadband Internet connection and broadcasts it into radio waves in its area of coverage. As a result, mobile handsets can handle phone calls through the femtocell, via the broadband Internet connection. The name femtocell has the prefix 'femto', meaning a very small cell (area of network coverage).




Small is rather a big word here, because femto denotes a division that is mathematically represented by 10 raised to the power of -15, or a quadrillionth. In plain English, it is one divided by a figure with fifteen zeros. Well, close to infinitely small. The first interest in femto cells started around 2002 when a group of engineers at Motorola were investigating possible new applications and methodologies that could be used with mobile communications. Further after 2yrs. In 2004 more attention was given to this technology and it was enhanced further. A femtocell is a small device that is used to improve wireless coverage over a small area, mostly indoor.

## Working of Femtocell

Femtocells from part of the mobile operation's network, although they are located at home or in the business. Most of the functionality of a completer 3G cell site has been miniaturized onto a chip, which look and operates like a WiFi access point, and is connected via broadband DSL back to the mobile operator's network. A femtocell is installed at home and connected to mains power and a standard broadband IP connection (typically DSL) through to the mobile operator's core network. Voice calls, text massages and data services are provided by the same systems. Femtocells operate at very low radiation power levels (50 milliwatts peak output during a call, much lower when idle), and typically have a range of 200 meters.

The signals do not travel through walls particularly well, but this is a benefit because it allows the frequency to be reused for other calls in nearby building. Where users walk outside or out of range, calls are automatically handed over to the external mobile network. Any standard 3G phone can be used on the femtocell if permitted by the mobile operator. Unlike WiFi access points, 3G Femotcells operate using licensed spectrum and thus must be supplied and operated in conjunction with the mobile operator Figure 1 shows working of femtocell. SIP based solutions may be of interest where the user wants to bypass the network operator When registered handsets enter the range of a femtocell, handing over to the femtocell network is done automatically, such that calls are channeled through the broadband connection. One femtocell can support up to 5 mobile handsets. Femtocell technology, which is another block in the Fixed-Mobile Convergence concept, is still in its early days and it is receiving fierce competition from UMA and Wi-Fi technologies. For instance, one might ask why invest in femtocells when a cheap Wi -Fi router can do the work with a Wi-Fi supporting handset, given that handsets supporting Wi-Fi are becoming more common and are being shipped by hundreds of millions.

Advantages

- A Femtocell is used for compensating poor cellular coverage inside the homes – in some places.
- A Femtocell can also give lower call charges while the caller calling from home, using the Femtocell as it directly connects to the core network through the internet.
- Some vendors are also planning to incorporate all the three features – Wi-Fi, cellular and DSL into the same box to achieve maximum functionality.
- The voice calls/data calls through the Femtocells are encrypted and the cell phones automatically switches over to the Femtocells when they come in their range – eg. in homes, where they are installed.
- Femtocell units can handle up to three or four simultaneous calls, from the same operator, depending on the model. They can operate with normal cellphones, without any enhancements.
- Femtocell units can help related cellular services like 3G by offering a better speed and data rate when inside buildings, where the coverage and data rate is generally lesser than outside.
- Generally, the cell towers are back-hauled by using lines with bandwidth of around 2 Mbps (in some places) and hence when newer services like 3G are introduced, these lines may not be sufficient and hence may require a upgrade. But with Femtocells, since the subscribers internet connection is used, there may not be an issue with existing infrastructure if Femtocells are adopted in a large scale.

**Submitted by**
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# Cyborgs

The world's first cyborg was a white lab rat, part of an experimental program at New York 's Rockland State Hospital in the late 1950s. The rat had implanted in its body a tiny osmotic pump that injected precisely controlled doses of chemicals, altering several of its physiological parameters. It was part animal, part machine.

The Rockland rat is one of the stars of a paper called " Cyborgs and Space ," written by Manfred Clynes and Nathan Kline in 1960. This engineer/psychiatrist double act invented the term cyborg (short for "cybernetic organism") to describe the vision of an "augmented man,"

From the start, the cyborg was more than just another technical project; it was a kind of scientific and military daydream. The possibility of escaping its annoying bodily limitations led a generation that grew up on Superman and Captain America to throw the full weight of its grown-up R&D budget into achieving a real-life superpower. By the mid-1960s, cyborgs were big business, with millions of US Air Force dollars finding their way into projects to build exoskeletons, master-slave robot arms, biofeedback devices, and expert systems.

It wasn't only the military that was captivated by the possibilities of the cyborg. Now there was the possibility of making better humans by augmenting them with artificial devices. Insulin drips had been used to regulate the metabolisms of diabetics since the 1920s. A heart-lung machine was used to control the blood circulation of an 18-year-old girl during an operation in 1953. A 43-year-old man received the first heart pacemaker implant in 1958. In fact robots, automata, and artificial people have been part of the Western imagination since at least as far back as the Enlightenment

Legendary automaton builder Wolfgang von Kempelen built a chess-playing tin Turk and became the toast of Napoleonic Europe. Mary Shelley's Frankenstein built a monster out of body parts and activated it with electricity. Even the Indian national epic, the Mahabharata, composed about 300 BC, features a lion automaton.

## The next step towards true Cyborgs?

On the 14th of March 2002 , a one hundred electrode array was surgically implanted into the median nerve fibres of the left arm of Professor Kevin Warwick. The operation was carried out at Radcliffe Infirmary, Oxford , by a medical team headed by the neurosurgeons Amjad Shad and Peter teddy. The procedure, which took a little over two hours, involved inserting a guiding tube into a two inch incision made above the wrist, inserting the microelectrode array into this tube and firing it into the median nerve fibres below the elbow joint . The purpose of this experiment was to link the nervous system in the left arm, to a radio transmitter receiver; to send signals from nervous system to a computer and vice versa.

## THE CYBORG ANCESTRY

The world's first cyborg was a white lab rat, part of an experimental program at New York's Rockland State Hospital in the late 1950s. The rat had implanted in its body a tiny osmotic pump that injected precisely controlled doses of chemicals, altering several of its physiological parameters. It was part animal, part machine.

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One thing makes today's cyborg fundamentally different from its mechanical ancestors - Information. Cyborgs, Donna Haraway explains, "are information machines. They're embedded with circular causal systems, autonomous control mechanisms, information processing - automatons with built-in autonomy.

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# Palladium

"Palladium" is the code name for an evolutionary set of features for the Microsoft® Windows® operating system. When combined with a new breed of hardware and applications, these features will give individuals and groups of users greater data security, personal privacy, and system integrity. In addition, "Palladium" will offer enterprise customers significant new benefits for network security and content protection.

Users implicitly trust their computers with more of their valuable data every day. They also trust their computers to perform more and more important financial, legal and other transactions. "Palladium" provides a solid basis for this trust: a foundation on which privacy- and security-sensitive software can be built.

There are many reasons why "Palladium" will be of advantage to users. Among these are enhanced, practical user control; the emergence of new server/service models; and potentially new peer-to-peer or fully peer-distributed service models. The fundamental benefits of "Palladium" fall into three chief categories: greater system integrity, superior personal privacy and enhanced data security.

Development of "Palladium" is guided by important business and technical imperatives and assumptions. Among these are the following: A "Palladium"-enhanced computer must continue to run any existing applications and device drivers. "Palladium" is not a separate operating system. It is based on architectural enhancements to the Windows kernel and to computer hardware, including the CPU, peripherals and chipsets, to create a new trusted execution subsystem.

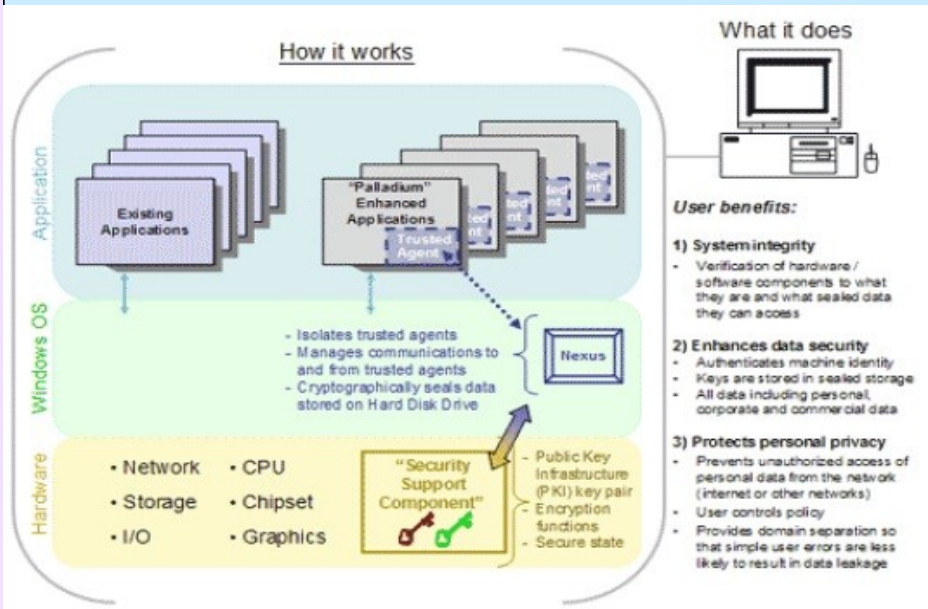


**Figure 1: Windows-based personal computer of the future**

## Core Principles

"Palladium" will not eliminate any features of Windows that users have come to rely on; everything that runs today will continue to run with "Palladium." In addition, "Palladium" does not change what can be programmed or run on the computing platform; it simply changes what can be believed about programs, and the durability of those beliefs. Moreover, "Palladium" will operate with any program the user specifies while maintaining security. "Palladium"-based systems must provide the means to protect user privacy better than any operating system does today. "Palladium" prevents identity theft and unauthorized access to personal data on the user's device while on the Internet and on other networks. Transactions and processes are verifiable and reliable (through the attestable hardware and software architecture described below), and they cannot be imitated.

With "Palladium," a system's secrets are locked in the computer and are only revealed on terms that the user has specified. In addition, the trusted user interface prevents snooping and impersonation. The user controls what is revealed and can separate categories of data on a single computer into distinct realms.

Palladium must be highly resistant to software attacks (such as Trojan horse viruses), and must provide users with the integrity of a protected, end-to-end system across networks. Palladium provides a trusted processing environment. Trusted code runs in memory that is physically isolated, protected, and inaccessible to the rest of the system, making it inherently impervious to viruses, spy-ware, or other software attacks. With respect to viruses, the contribution from Palladium is fairly straightforward. Since Palladium does not interfere with the operation of any program running in the regular Windows environment, everything, including the native OS and viruses, runs there as it does today. So antivirus monitoring and detection software in Windows will still be needed .

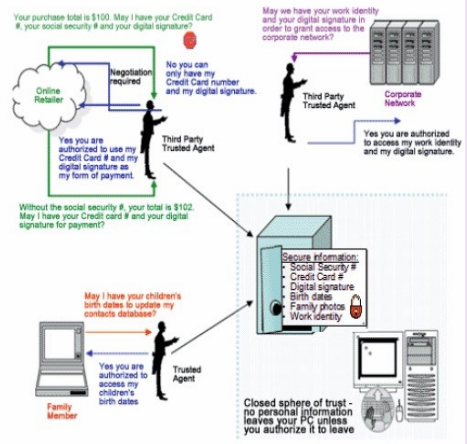


**Figure 3: "Palladium" Scenarios**

**Submitted by**
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# Invisible Eye

Today's security systems are extremely effective in preventing burglary and thefts as well as helping police respond to emergency situations. The mainstay of the home security system is definitely the high decibel siren. Today the siren is used to ward off would be intruders not for monitoring purposes. In most cases home security systems are monitored by large companies with multiple monitoring centers. These centers house countless trained professionals who are there in times of need for residences and businesses across the country. These monitoring centers also can provide support for other potential disasters such as carbon monoxide, fire, freezing pipes, and much more.

Modern security systems use alarms, infrared motion sensors, digital surveillance and contemporary monitoring stations. Monitoring is extremely efficient and emergency response time for triggered alarms has improved dramatically due to technology

PIC16F877A belongs to a class of 8-bit microcontrollers of RISC Architecture. PIC microcontroller is an amazing powerful fully featured processor with Internal RAM, EEPROM FLASH memory and peripherals

## PIR Motion Detector Module:

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared","Pyroelectric", or "IR motion" sensors.

To increase the efficiency of SIP signaling, yet maintain 100% standards compatibility with external VoIP systems and soft switches, xG has created patent pending SIP compression technology for the Invisible Eye system that reduces SIP overhead bandwidth from 400% to 66% on the over the air links and backhaul links from the Base Stations to the Invisible Eye MSCs. The MSCs do the SIP compression and decompression to maintain 100% interoperability with third -party VoIP systems. This also has the benefit of making more bandwidth available for mobile data applications being carried alongside voice traffic.

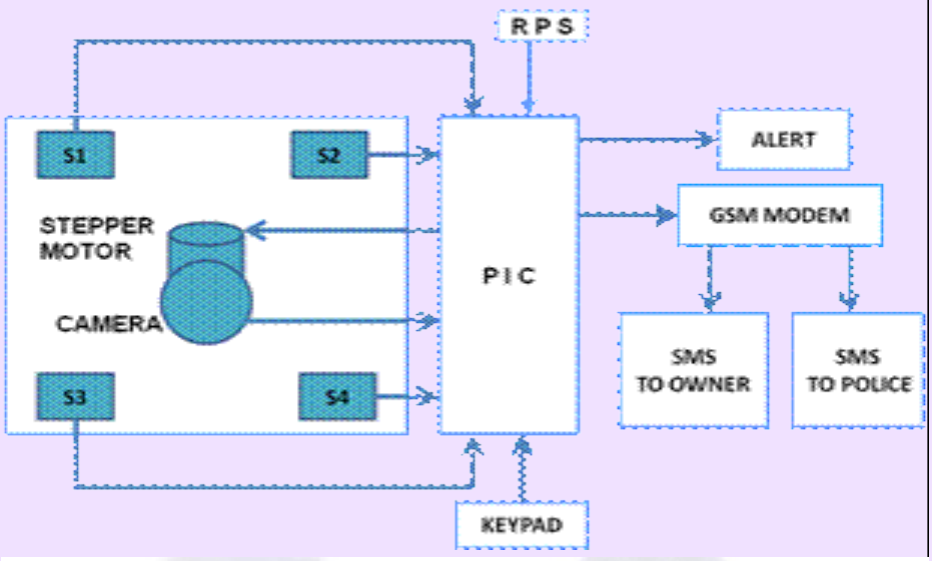


*Figure.2 Motion detector module uses a motion detector IC and PCB mounted Fresnel lens*

Invisible Eye security system solves many of the problems faced by the multiple camera based systems at an easily affordable cost. The biggest advantage is that we can stop recording the hours of footage of the empty rooms. One can also avoid installing multiple camera to cover a whole single room. Cost required for the installation is very less compared to multiple camera based system. Good view of the video footage can be obtained as camera turns 360 degrees.

## Working

Step1: User enters the password, if password entered is correct the system starts else he is prompted to re-enter the password.

Step 2: If sensors sense any change, then an intrusion is detected. Else there is no intrusion.

Step 3: If intrusion is detected, then relay triggered, stepper motor rotates the camera starts recording and an e-mail is sent to the user

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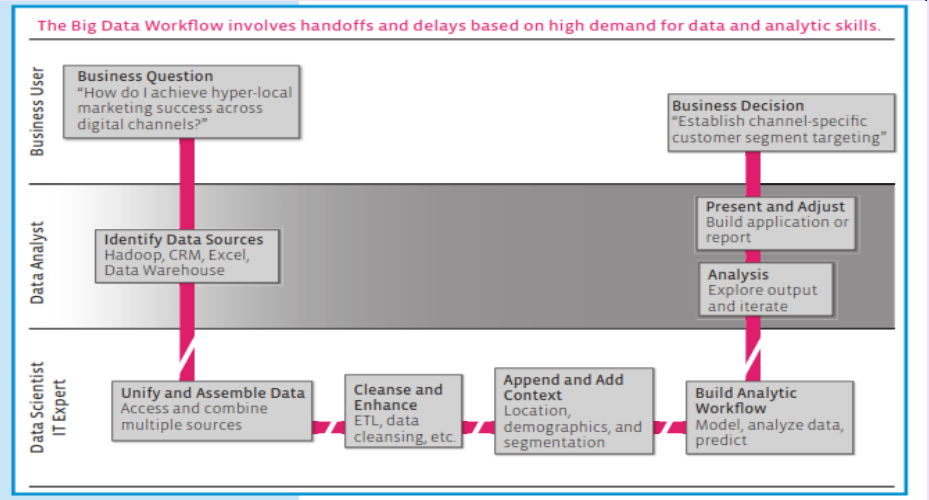
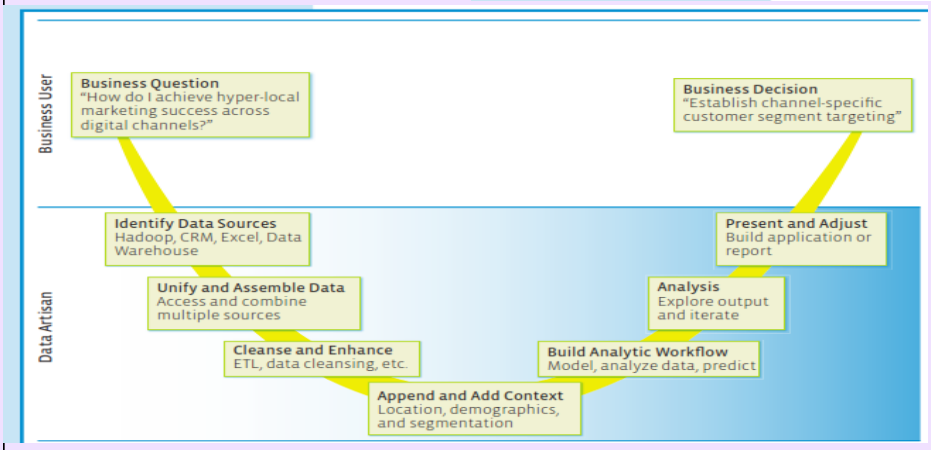
# Humanizing Big Data

In many businesses, the wrong conversation is taking place around Big Data. Businesses recognize that the data being generated by connected devices and consumer activity holds potential, but most conversations are driven by technology platforms that emphasize volume, variety, and velocity, leaving out any discussion of value. To get value from Big Data, you must add contextual information and place analytical capability in the hands of those who need it. In other words, Big Data needs to be "humanized": taken from the world of bits and bytes and converted into real insight for real businesspeople. Big Data needs to be brought down to earth where people who know business can use it to help drive decisions and unlock its value. Alteryx is on a mission to humanize Big Data, to take it from "isolation among experts" and make it accessible and useful and help draw out its story. We take inspiration from Jer Thorp of the New York Times, who has shown in his graphics and in his November 2011 TED presentation, "Make data more human," how to take complex statistics and help them tell stories we can easily understand. Humanizing Big Data is dependent on two critical elements: 1. Making Big Data easy to access: The ability to access, integrate, and analyze Big Data should be available to the data and business analysts who drive strategic decision making across the organization. 2. Helping Big Data tell its story: Big Data can provide full stories that drive business value only if it is enriched by the full context of all data available and if advanced analytical capabilities can be applied without the need for data science or statistical expertise.




The Big Data Workflow Organizations are sitting on a mountain of data that they could use to make decisions. Answers to business questions lie in Big Data: a vast array of sources, from traditional data warehouses, to unstructured, machine-generated data and free-form text. But the answers are difficult to reach. First of all, most BI tools create backward-looking reports and dashboards, based on structured data. This is often only internal data—no market insight, competitive intelligence, or location data—that tells only part of the story. The current Big Data Workflow has many constituent parts. Data must be acquired from myriad sources and cleansed. It must be sorted and joined so that queries can be made against it. It needs to be stored in a file system that will accept unstructured formats. Analysts and programmers must then work together in a statistical environment such as R, SAS, or SPSS to query the data.

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# Cloud Computing

Cloud computing is the latest of computing paradigms. It promises to change the way people use computing resources. Using Internet as the backbone, cloud computing asserts that it is possible to provide computing as a "utility" to end users "as and when needed" basis. Cloud computing has a potential to serve users of all kinds: individual users, institutions, industry at large. Cloud computing is a business model that harnesses the web as the ultimate business platform. Cloud computing is impregnated with immense potential for array of practical applications. The model is expected make computing needs available via web on retail basis and is called cloud computing. Cloud computing intends to make the Internet the ultimate home of all computing resources- storage, computations, applications and allow end user toavailable them in quantities of her choice, location of their preferences, for duration of their liking. In other world web become the provision store for all your computing needs.

## Introduction of Cloud Computing

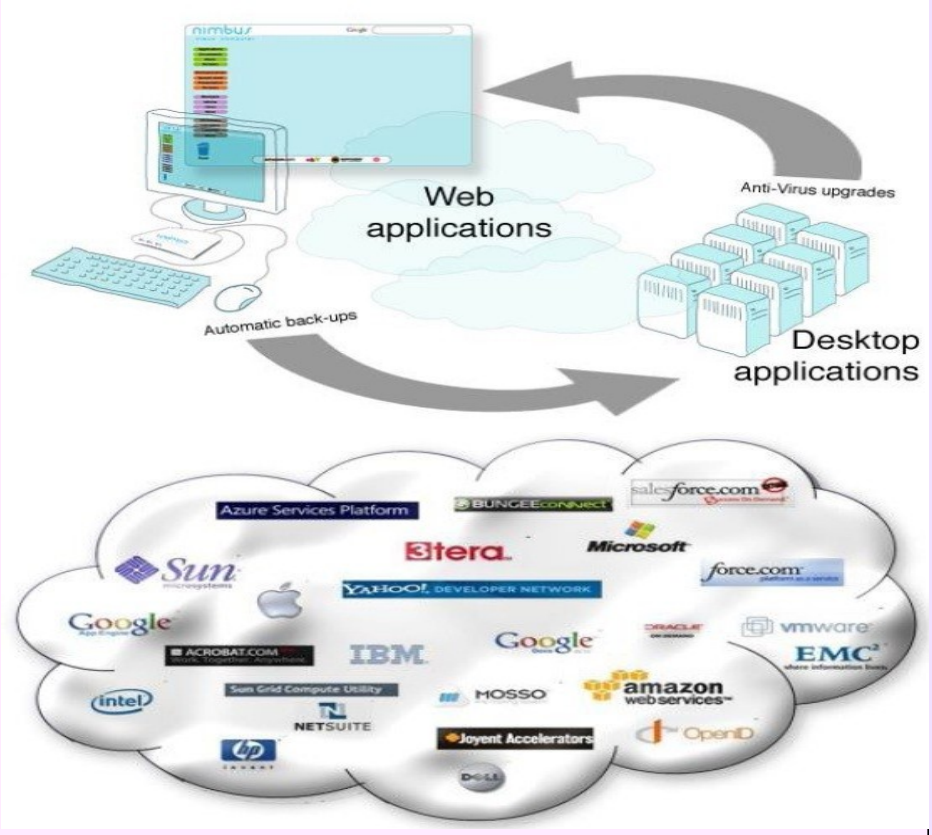
Why do I buy a computer when I use it for only few hours a week? Why do I buy a printer when I need printing occasionally? Is it possible to avail computing on "need basis" as it is possible in case of "electricity" or "water? In other words, can I avail computing resources such as storage, application, and infrastructure as a "utility"? The answer is yes.

And the name of model which is expected make computing available on retail basis is called cloud computing. Cloud computing intends to make the Internet the ultimate home of all computing resources- storage, computations, applications and allow end user (both individuals and business) to avail these resources in quantities of her choice, location of their preferences, for duration of their liking. In other world web become the provision store for all your computing needs. A business model built on this paradigm offers these resources as services either on pay per use basis or rental basis.

Cloud computing infrastructure allows enterprises to achieve more efficient use of their IT hardware and software investments. Cloud computing can increase profitability by improving resource utilization. Pooling resources into large clouds drives down costs and increases utilization by delivering resources only for as long as those resources are needed. Cloud computing allows individuals, teams, and organizations to streamline procurement processes and eliminate the need to duplicate certain computer administrative skills related to setup, configuration, and support.

**Infrastructure as a Service**, or IaaS, gives business access to vital web architecture, such as storage space, servers, and connections, without the business need of purchasing and managing this internet infrastructure themselves.

**Platform as a Service (PaaS)** clouds are




## Why cloud computing?

Cloud computing infrastructure accelerates and fosters the adoption of innovations. Cloud computing can enable innovations. It alleviates the need of innovators to find resources to develop, test, and make their innovations available to the user community. Innovators are free to focus on the innovation rather than the logistics of finding and managing resources that enable the innovation. Cloud computing helps leverage innovation as early as possible to deliver business value to a company and its customers.

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created, many times inside IaaS Clouds by specialists to render the scalability and deployment of any application trivial and to help make your expenses scalable and predictable

**Software as a Service (SaaS)** is relatively mature, and the phrase's use predates that of cloud computing. Cloud applications allow the cloud to be leveraged for software architecture, reducing the burdens of maintenance, support ,etc.

**Submitted by**
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**IT**

# Smart Home Technology


SMART home technology use devices connected to the Internet of things (IoT) to automate and monitor in-home systems. It stands for Self-Monitoring Analysis and Reporting Technology. The technology was originally developed by IBM and was referred to as Predictive failure analysis. The first contemporary SMART home technology products became available to consumers between 1998 and the early 2000s. SMART home technology allows users to control and monitor their connected home devices from SMART home apps, smart phones, or other networked devices. Users can remotely control connected home systems whether they are home or away. This allows for more efficient energy and electric use as well as ensuring your home is secure. SMART home technology contributes to health and well-being enhancement by accommodating people with special needs, especially older people . SMART home technology is now being used to create SMART cities

**SMART home technology devices can range in the following:**

- Wireless speaker systems

Thermostats

- Home security & monitoring systems
- Domestic robots
- Smoke/CO detectors
- Lighting
- Home energy use monitors
- Door locks
- Refrigerators
- Laundry machines
- Water detectors

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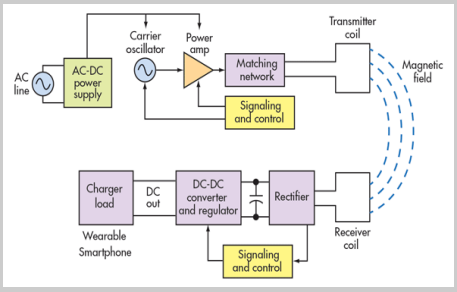
# Inductive Charging

Inductive charging (also known as wireless charging or cordless charging) uses




an electromagnetic field to transfer energy between two objects through electromagnetic induction. This is usually done with a charging station. Energy is sent through an inductive coupling to an electrical device, which can then use that energy to charge batteries or run the device.

Induction chargers use an induction coil to create an alternating electromagnetic field from within a charging base, and a second induction coil in the portable device takes power from the electromagnetic field and converts it back into electric current to charge the battery. The two induction coils in proximity combine to form an electrical transformer. Greater distances between sender and receiver coils can be achieved when the inductive charging system uses resonant inductive coupling.

Recent improvements to this resonant system include using a movable transmission coil (i.e., mounted on an elevating platform or arm) and the use of other materials for the receiver coil made of silver plated copper or sometimes aluminum to minimize weight and decrease resistance due to the skin effect.

## Advantages

**Protected connections** – No corrosion when the electronics are enclosed, away from water or oxygen in the atmosphere. Less risk of electrical faults such as short circuit due to insulation failure, especially where connections are made or broken frequently.

**Low infection risk** – For embedded medical devices, transmission of power via a magnetic field passing through the skin avoids the infection risks associated with wires penetrating the skin.

**Durability** – Without the need to constantly plug and unplug the device, there is significantly less wear and tear on the socket of the device and the attaching cable.

**Increased convenience and aesthetic quality** – No need for cables.

Automated high power inductive charging of electric vehicles allows for more frequent charging events and consequential driving range extension.

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