Pervasive computing is an emerging trend associated with embedding microprocessors in day-to-day objects, allowing them to communicate information. It is also known as ubiquitous computing. The terms ubiquitous and pervasive signify "existing everywhere." Pervasive computing systems are totally connected and consistently available.

Pervasive computing goes past the arena of desktops so that virtually any device, from apparel to kitchen appliances, could be embedded with microchips, connecting these devices to a boundless network of other gadgets.

Pervasive computing creates an unobtrusive environment with full and integrated Internet connectivity.

A combination of technologies is used to make pervasive computing possible, such as Internet capabilities, voice recognition, networking, artificial intelligence and wireless computing. Pervasive computing devices make day-to-day computing activities extremely easy to access. Pervasive computing also has a number of prospective applications, which range from home care and health, to geographical tracking and intelligent transport systems.

A distinct problem with pervasive computing is that it is not entirely secure. The devices and technologies used in pervasive computing do not lend themselves well to typical data security. This is because they combine in an ad hoc manner within the pervasive network. As such, trust models must be developed in order to ensure tighter security. Other disadvantages of pervasive computing include frequent line connections that are broken, slow connections, very expensive operating costs, host bandwidths that are limited in nature and location-dependent data. All of these instances can impede the security of pervasive computing because they result in multiple system vulnerabilities.

Pervasive computing devices are network-connected and constantly available.

Unlike desktop computing, pervasive computing can occur with any device, at any time, in any place and in any data format across any network, and can hand tasks from one computer to another as, for example, a user moves from his car to his office. Thus, pervasive computing devices have evolved to include not only laptops, notebooks and smartphones, but also tablets, wearable devices, fleet management and pipeline components, lighting systems, appliances and sensors, and so on.

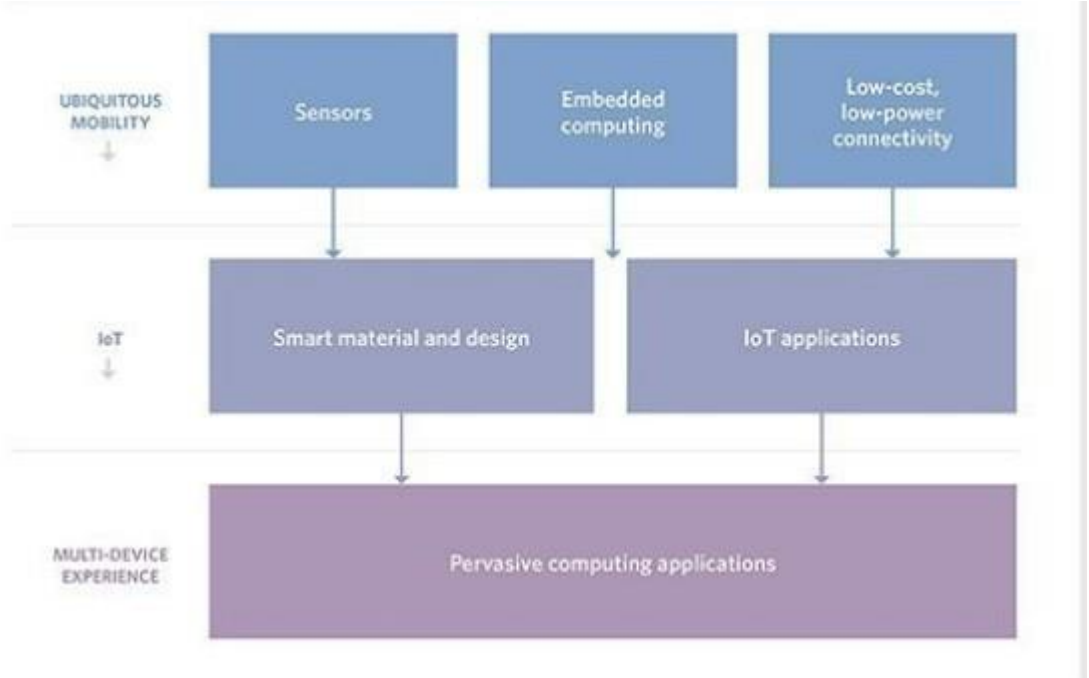
The goal of pervasive computing is to make devices "smart," thus creating a sensor network capable of collecting, processing and sending data, and, ultimately, communicating as a means to adapt to the data's context and activity; in essence, a network that can understand its surroundings and improve the human experience and quality of life.

Often considered the successor to mobile computing, ubiquitous computing and, subsequently, pervasive computing, generally involve wireless communication and networking technologies, mobile devices, embedded systems, wearable computers, RFID tags, middleware and software agents. Internet capabilities, voice recognition and artificial intelligence are often also included.

Pervasive computing applications can cover energy, military, safety, consumer, healthcare, production and logistics.

An example of pervasive computing is an Apple Watch informing a user of a phone call and allowing him to complete the call through the watch. Or, when a registered user for Amazon's streaming music service asks her Echo device to play a song, and the song is played without any other user intervention.

**Architecture of Pervasive Computing**




Some of the examples are:

- Apple Watch
- Amazon Echo Speaker
- Amazon EchoDot
- Fitbit

- Electronic Toll Systems
- Smart Traffic Lights
- Self Driving Cars
- Home Automation
- Smart Locks

## The most important characteristics of pervasive environments are:

**Heterogeneity:** Computing will be carried out on a wide spectrum of client devices, each with different configurations and functionalities.

**Prevalence of "Small" Devices:** Many devices will be small, not only in size but also in computing power, memory size, etc.

**Limited Network Capabilities:** Most of the devices would have some form of connection. However, even with the new networking standards such as GPRS, Bluetooth, 802.11x, etc., the bandwidth is still relatively limited compared to wired network technologies. Besides, the connections are usually unstable.

**High Mobility:** Users can carry devices from one place to another without stopping the services.