Computer Fundamental

UNIT : 05

EMERGING TECHNOLOGIES AND VIRUS

-By Hiral Pandya

WHAT IS EMERGING TECHNOLOGY ?

- ***Emerging technology*** is a term generally used to describe a new technology, but it may also refer to the continuing development of an existing technology.

- It can have slightly different meaning when used in different areas, such as media, business, science, or education.

- The term commonly refers to technologies that are currently developing, or that are expected to be available within the next few years.

COMMUNICATION METHODS :

- ✓ GIS
- ✓ GPS
- ✓ CDMA
- ✓ GSM

# GIS (Geographic Information System) :

- A **GEOGRAPHIC INFORMATION SYSTEM (GIS)** is a computer system for capturing, storing, checking, and displaying data related to positions on Earth's surface.

- GIS can show many different kinds of data on one map. This enables people to more easily see, analyze, and understand patterns and relationships.

- It is used by multi-disciplines as tools for SPATIAL(GEOGRAPHICAL) data handling in a geographic environment. Basic elements of GIS consist of hardware, software, data and liveware.

GIS (Geographic Information System)
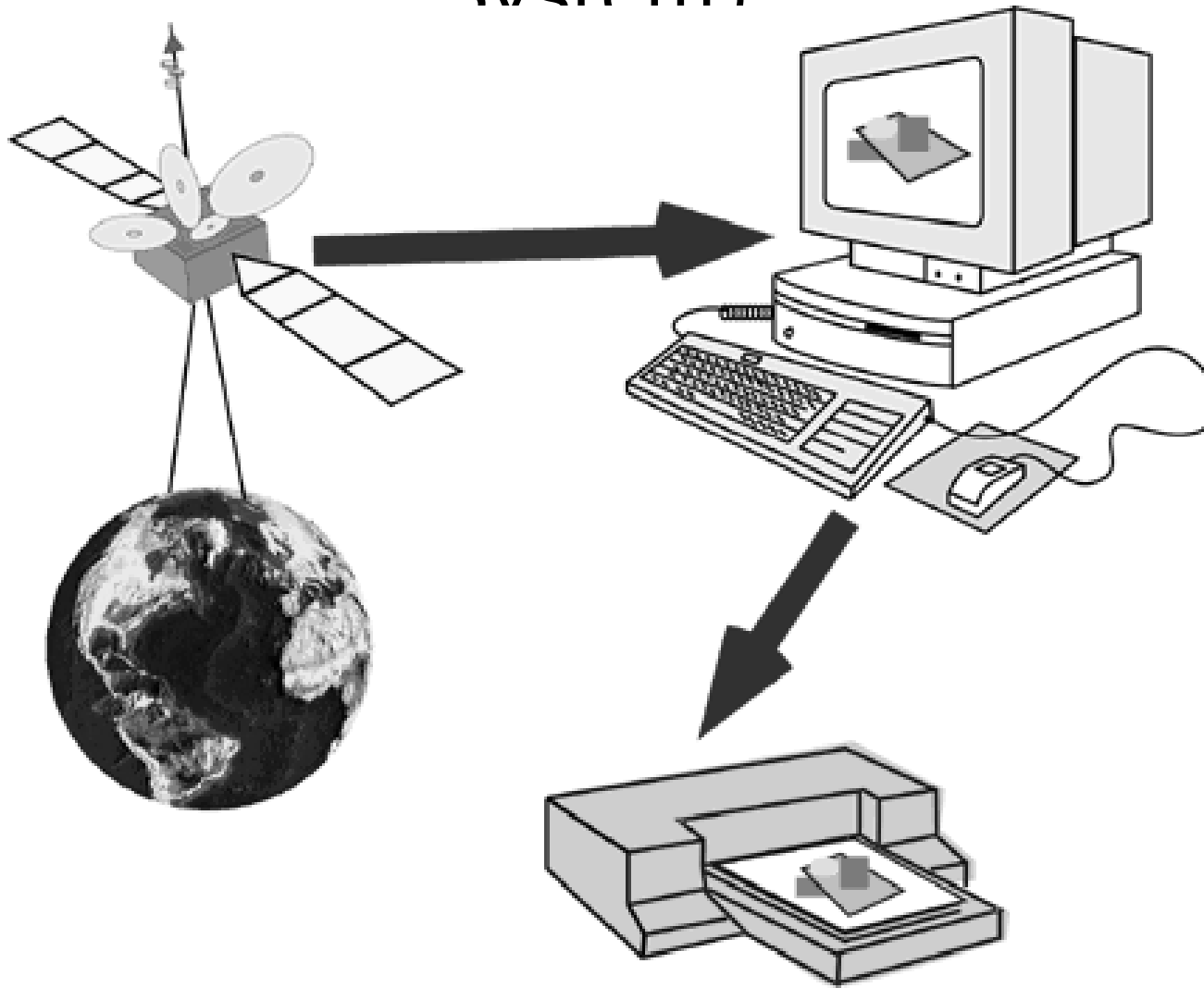
# GPS (Global Positioning System) :

- ***GLOBAL POSITIONING SYSTEM*** is a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.

- GPS traces its modern roots back to radio-wave locational technologies such as the LORAN system developed during WWII.

- A continuous development of radio-navigation has progressed into the current NAVSTAR and GLONASS space-borne satellite-based navigation systems in use today.

GPS (Global Positioning System) :
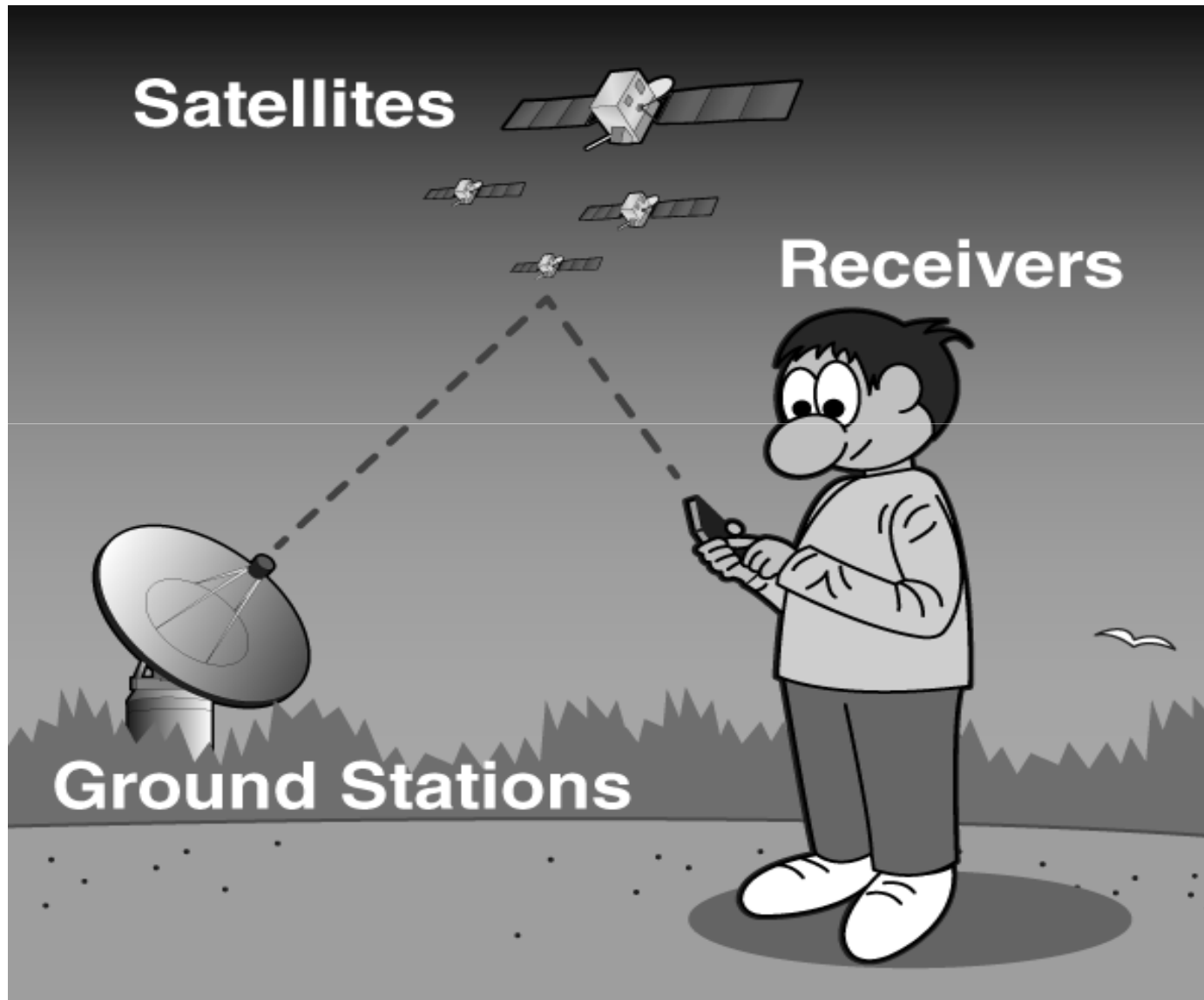
GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATION):

- GSM stands for Global System for Mobile Communication.

- It is a digital cellular technology used for transmitting mobile voice and data services.

- GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates on the mobile communication bands 900 MHz and 1800 MHz in most parts of the world.

- GSM owns a market share of more than 70 percent of the world's digital cellular subscribers.

GSM(GLOBAL SYSTEM FOR MOBILE COMMUNICATION):

- GSM makes use of narrowband Time Division Multiple Access (TDMA) technique for transmitting signals.

- GSM was developed using digital technology. It has an ability to carry 64 kbps to 120 Mbps of data rates.

- Presently GSM supports more than one billion mobile subscribers in more than 210 countries throughout the world.

- GSM provides basic to advanced voice and data services including roaming service. Roaming is the ability to use your GSM phone number in another GSM network.

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CDMA (CODE DIVISION MULTIPLE ACCESS) :

- Code Division Multiple Access (CDMA) is a sort of multiplexing that facilitates various signals to occupy a single transmission channel.

- It optimizes the use of available bandwidth.

- The technology is commonly used in **ULTRA-HIGH-FREQUENCY (UHF)** cellular telephone systems, bands ranging between the 800-MHz and 1.9-GHz.

- Techniques generally used are direct sequence spread spectrum modulation (DS-CDMA), frequency hopping or mixed CDMA detection (JDCDMA).

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CDMA (CODE DIVISION MULTIPLE ACCESS) :

- Here, a signal is generated which extends over a wide bandwidth.

- A code called spreading code is used to perform this action. Using a group of codes, which are orthogonal to each other, it is possible to select a signal with a given code in the presence of many other signals with different orthogonal codes.

- CDMA allows up to 61 concurrent users in a 1.2288 MHz channel by processing each voice packet with two PN codes. There are 64 Walsh codes available to differentiate between calls and theoretical limits.

COMMUNICATION DEVICES :

- ✓ Cell Phone
- ✓ Modem
- ✓ Infrared
- ✓ Bluetooth
- ✓ Wi-Fi
- ✓ Li-Fi
- ✓ SLM

CELL PHONE

- A mobile phone, cellular phone, cell phone, cellphone, handphone, or hand phone, sometimes shortened to simply mobile, cell or just phone, is a portable telephone that can make and receive calls over a radio frequency link while the user is moving within a telephone service area.

- The radio frequency link establishes a connection to the switching systems of a mobile phone operator, which provides access to the **PUBLIC SWITCHED TELEPHONE NETWORK (PSTN)**.

- Modern mobile telephone services use a cellular network architecture and, therefore, mobile telephones are called cellular telephones or cell phones.

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MODEM

- A modem is a network device that both modulates and demodulates analog carrier signals (called sine waves) for encoding and decoding digital information for processing.

- Modems accomplish both of these tasks simultaneously and, for this reason, the term modem is a combination of **"MODULATE"** and **"DEMODULATE".**

- The most common use for modems is for both sending and receiving of the digital information across network.

- This information used to be transmitted over telephone lines using **V.92**, the last dial-up standard, to an analog modem that would convert the signal back to a digital format for a computer to read.

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Infrared (IR)

- Infrared radiation (IR), or infrared light, is a type of radiant energy that's invisible to human eyes but that we can feel as heat.

- All objects in the universe emit some level of IR radiation, but two of the most obvious sources are the sun and fire.

- INFRARED communication is a common, inexpensive, and easy to use wireless communication technology.

- IR light is very similar to visible light, except that it has a **slightly longer wavelength**.

- This means IR is undetectable to the human eye - perfect for wireless communication.

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Bluetooth (BT)

- Bluetooth is a wireless communication technology that can be used for close-range data transmission from one digital device to another. Bluetooth is essentially a one-to-one wireless connection that uses 2.4 GHz-band radio waves.

- For two devices to connect using Bluetooth, both devices must support the same profile.

- If the devices support different profiles, they cannot be connected.

- When connecting Bluetooth devices for the first time, registration is required. This process is called pairing. For details on operation method, refer to the manual supplied with the product.

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Wi-Fi

- Wi-Fi is a wireless networking technology that allows devices such as computers (laptops and desktops), mobile devices (smart phones and wearables), and other equipment (printers and video cameras) to interface with the Internet.

- It allows these devices and many more to exchange information with one another, creating a network.

- When we access Wi-Fi, you are connecting to a wireless router that allows your Wi-Fi-compatible devices to interface with the Internet.

- Internet connectivity occurs through a wireless router.

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Li-Fi

- Li-Fi (LIGHT FIDELITY) is a bidirectional wireless system that transmits data via LED or infrared light.

- It was first unveiled in 2011 and, unlike Wi-Fi, which uses radio frequency, Li-Fi technology only needs a light source with a chip to transmit an internet signal through light waves.

- Li-Fi multiplies the speed and bandwidth of Wi-Fi, 3G and 4G.

- With Li-Fi, however, its band frequency of **2,00,000GHz**, versus the maximum **5GHz** of the Wi-Fi, is 100 times faster and can transmit much more information per second.

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SLM

- A **SPATIAL LIGHT MODULATOR (SLM)** is an object that imposes some form of spatially varying modulation on a beam of light.

- A simple example is an overhead projector transparency. Usually when the phrase SLM is used, it means that the transparency can be controlled by a computer. In the 1980s, large SLMs were placed on overhead projectors to project computer monitor contents to the screen. Since then more modern projectors have been developed where the SLM is built inside the projector. These are commonly used in meetings of all kinds for presentations.

- SLM modulates the intensity of the light beam. However, it is also possible to produce devices that modulate the phase of the beam or both the intensity and the phase simultaneously.

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WHAT IS VIRUS ?

- A computer virus is **MALICIOUS CODE** that replicates by copying itself to another program, computer boot sector or document and changes how a computer works.

- A virus spreads between systems after some type of human intervention. Viruses replicate by creating their own files on an infected system, attaching themselves to a legitimate program, infecting a computer's boot process or infecting user documents.

- The virus requires someone to knowingly or unknowingly spread the infection. In contrast, a computer worm is standalone programming that does not require human interaction to spread.

ORIGIN AND HISTORY OF VIRUS :

- The first computer virus, called "**CREEPER SYSTEM**", was an experimental self-replicating virus released in **1971**. It was filling up the hard drive until a computer could not operate any further. This virus was created by **BBN technologies** in the **U.S.**

- The first computer virus for **MS-DOS** was "**Brain**" and was released in 1986. It would overwrite the boot sector on the floppy disk and prevent the computer from booting.

- It was written by two brothers from **PAKISTAN** and was originally designed as a copy protection.

- "**The Morris**" was the first Computer virus which spread extensively in the world in **1988**.

TYPES OF VIRUS :

- Boot Sector Virus
- Web Scripting Virus
- Browser Hijacker
- Resident Virus
- Direct Action Virus
- Polymorphic Virus
- File Infector Virus
- Multipartite Virus
- Macro Virus

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PROBLEMS & PROTECTION FROM VIRUS :

- Computer viruses can damage PC, send sensitive data to attackers, and cause downtime until the system is repaired.

- We can avoid becoming the next computer virus victim by following a few best steps:

  - Install antivirus software

  - Always Update Antivirus software

  - Don't open executable email attachments

  - Keep operating system updated

  - Avoid questionable websites

  - Don't use pirated software

CLOUD COMPUTING :

- **What is Cloud Computing ?**

- *CLOUD COMPUTING* also refers to the technology that makes cloud work.

- This includes some form of virtualized IT infrastructure/servers, operating system software, networking, and other infrastructure that's abstracted, using special software, so that it can be pooled and divided irrespective of physical hardware boundaries.

- **Characteristics and Services :**

  – IAAS

  – PAAS

  – SAAS

CLOUD COMPUTING (IaaS) :

- **IaaS - INFRASTRUCTURE-AS-A-SERVICE**
- IaaS provides on-demand access to fundamental computing resources like physical and virtual servers, networking, and storage over the internet on a pay-as-you-go basis.
- IaaS enables end users to scale and shrink resources on and as needed basis, reducing the need for high, up-front capital expenditures or unnecessary on-premises or 'owned' infrastructure and for overbuying resources to accommodate periodic spikes in usage.
- **Examples :** DigitalOcean, Linode, Rackspace, Amazon Web Services (AWS), Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE)

CLOUD COMPUTING (SaaS) :

- **SaaS - SOFTWARE-AS-A-SERVICE**

- SaaS also known as cloud-based software or cloud applications is application software that's hosted in the cloud and that user access and use via a web browser, a dedicated desktop client, or an API that integrates with your desktop or mobile operating system.

- In most cases, SaaS users pay a monthly or annual subscription fee; some may offer 'PAY-AS-YOU-GO' pricing based on actual usage.

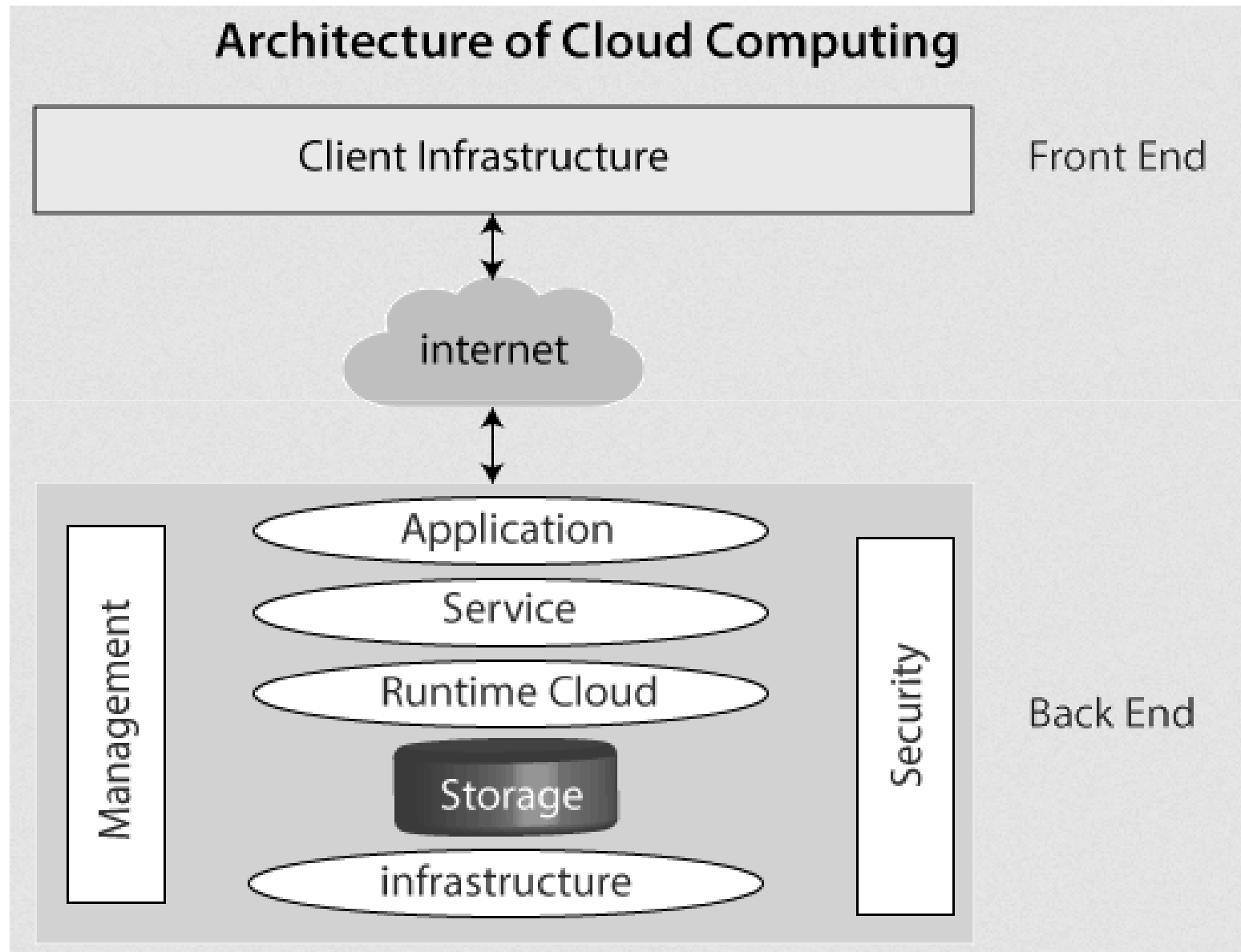- **Examples :** Google Workspace, Dropbox, Salesforce, Cisco WebEx, Concur, GoToMeeting

CLOUD COMPUTING (PaaS) :

- **PaaS - PLATFORM-AS-A-SERVICE**

- PaaS provides software developers with on-demand platform hardware, complete software stack, infrastructure, and even development tools for running, developing, and managing applications without the cost, complexity, and inflexibility of maintaining that platform on premises.

- **Examples :** AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, OpenShift
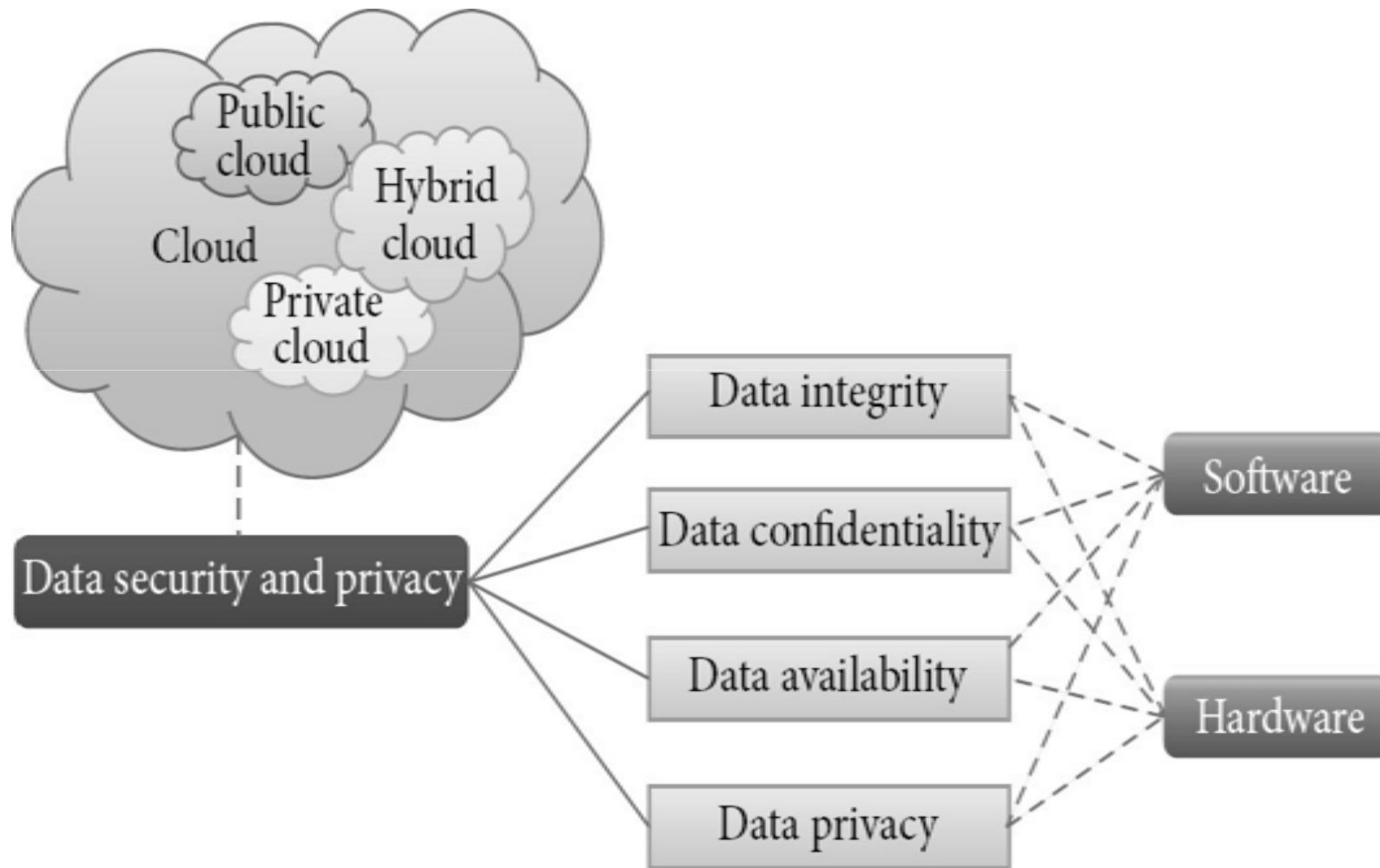
ARCHITECTURE OF CLOUD COMPUTING :

Architecture of Cloud Computing

Client Infrastructure — Front End

internet

Application
Service
Runtime Cloud
Storage
infrastructure

Management

Security

Back End

SECURITY & PRIVACY OF CLOUD COMPUTING :

IMPORTANT TERMS :

- ATM
- BACKUP / RESTORE
- HARD COPY / SOFT COPY
- BUS / DATA BUS
- BUFFER / SPOOLING
- CURSOR / POINTER / ICON
- EMAIL / ATTACHMENT
- CLI / GUI
- COMPILER
- DRIVE / DIRECTORY / FILES / PATH
- MENU / POPUP MENU / TOOL BAR

IMPORTANT TERMS :

- SHUTDOWN / REBOOT / RESTART

- SYNTAX / WILD CARD CHARACTERS

- FIBER OPTIC

- NET MEETING

- **PRINTING SPEED**

  - **CPS** - CHARACTERS PER SECOND

  - **CPM** - CHARACTERS PER MINUTE

  - **LPM** - LINES PER MINUTE

  - **DPI** – DOT PER INCH

  - **PPM** - PAGES PER MINUTE

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END OF UNIT - 05

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