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Skills that you master and validate with CompTIA A+

- **HARDWARE**
- **OPERATING SYSTEMS**
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- **OPERATIONAL PROCEDURES**
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- **MOBILE DEVICES**

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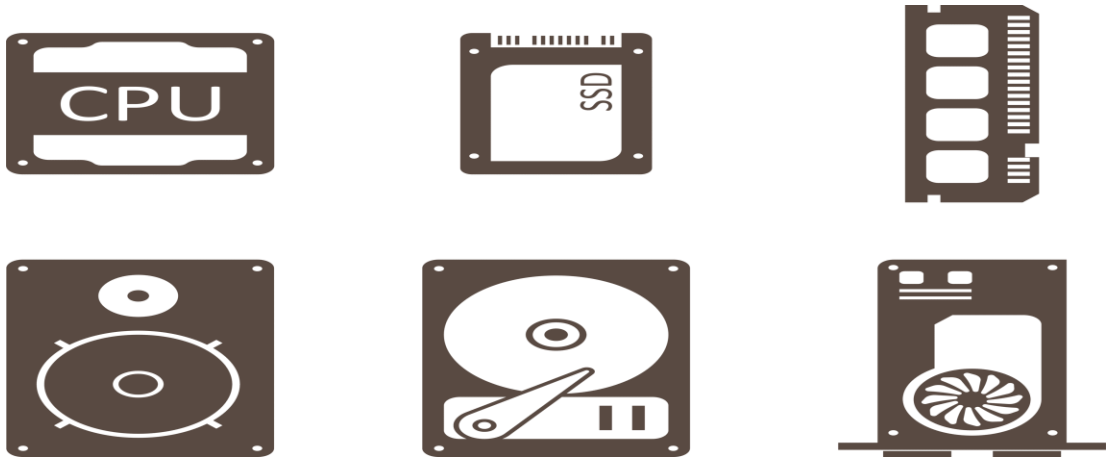
What is a Computer?

- *A computer is a programmable electronic device that accepts raw data as input and processes it with a set of instructions (a program) to produce the result as output.*

- *A computer is designed to execute applications and provides a variety of solutions through integrated hardware and software components.*



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Different types of Computer?

- ***Super Computer***
- ***Mainframe Computer***
- ***Micro Computer***
- ***Workstation***

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supercomputer

A **supercomputer** is an extremely powerful and fast computer designed to perform complex calculations and process massive amounts

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Workstation

A **workstation** is a high-performance, specialized computer designed for technical or scientific tasks that require significant computational power, precision, and reliability.

Mainframe computer

A **mainframe computer** is a powerful, large-scale computer system designed to handle and process vast amounts of data and support multiple users simultaneously.

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Microcomputer

A **microcomputer** is a small, personal computer that uses a **microprocessor** as its central unit, making it compact and affordable for individual use. Examples include systems like the Apple II and Commodore 64.

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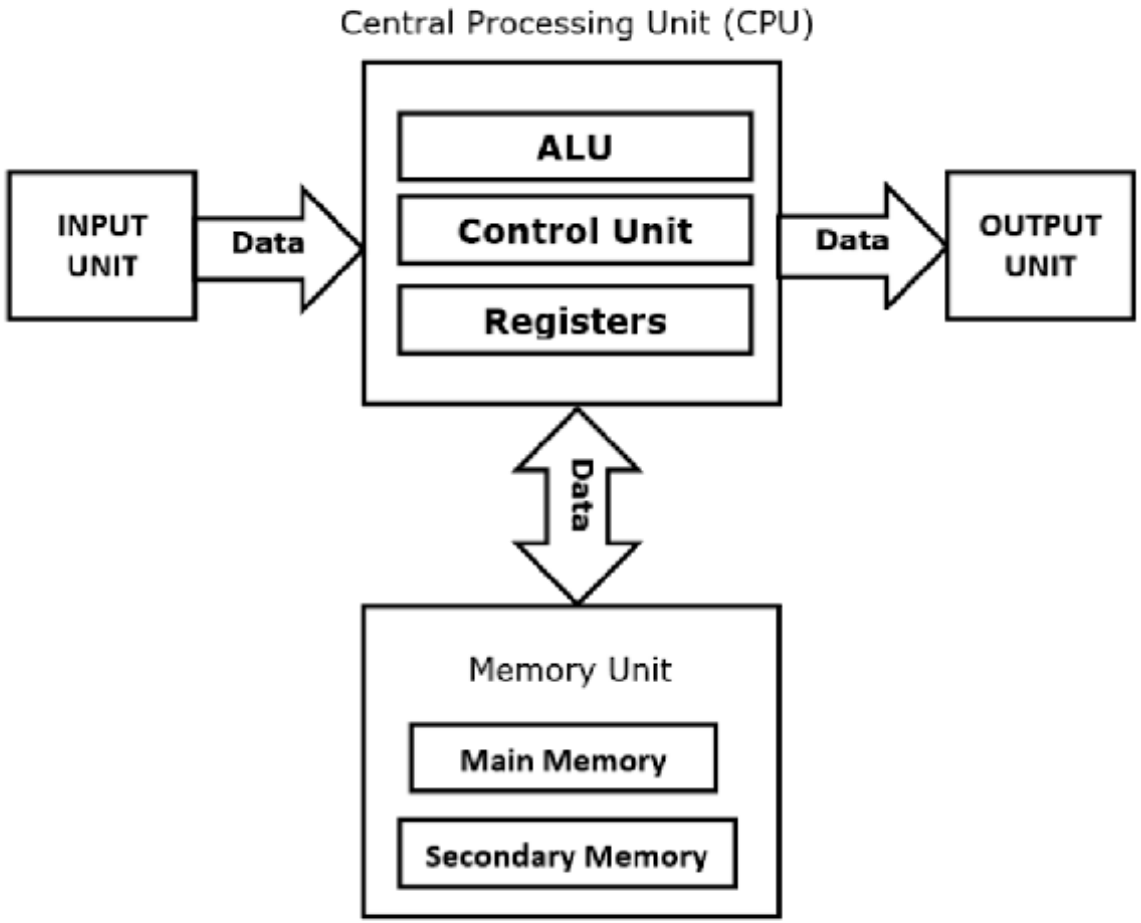
Von Neumann Architecture



Introduction to Computer Hardware

- **Processor**
- **Motherboard**
- **Primary Memory(RAM,ROM)**
- **Secondary Memory (Storage Devices)**
- **Graphics card**
- **Cooling System**
- **SMPS**
- **Cabinet**

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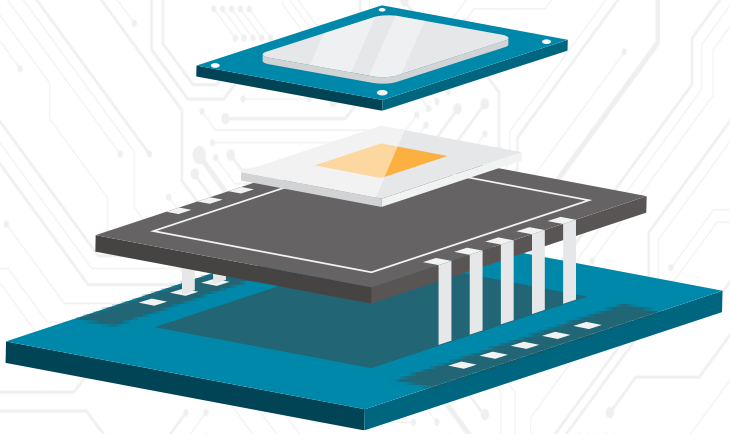
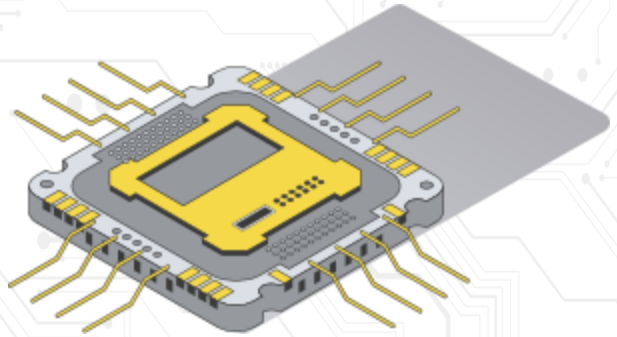
Central Processing Unit (CPU)

The CPU (Central processing unit) is the brain of a computer system. I t interpret and execute most commands, working in coordination with other hardware and software components

A CPU consists of a microchip contains billions of tiny transistors that enable data processing.



CPU performs various data processing tasks including stores data, managing intermediate results, and executing instructions (program) . It plays a crucial role in controlling and coordinating all parts of a c omputer.



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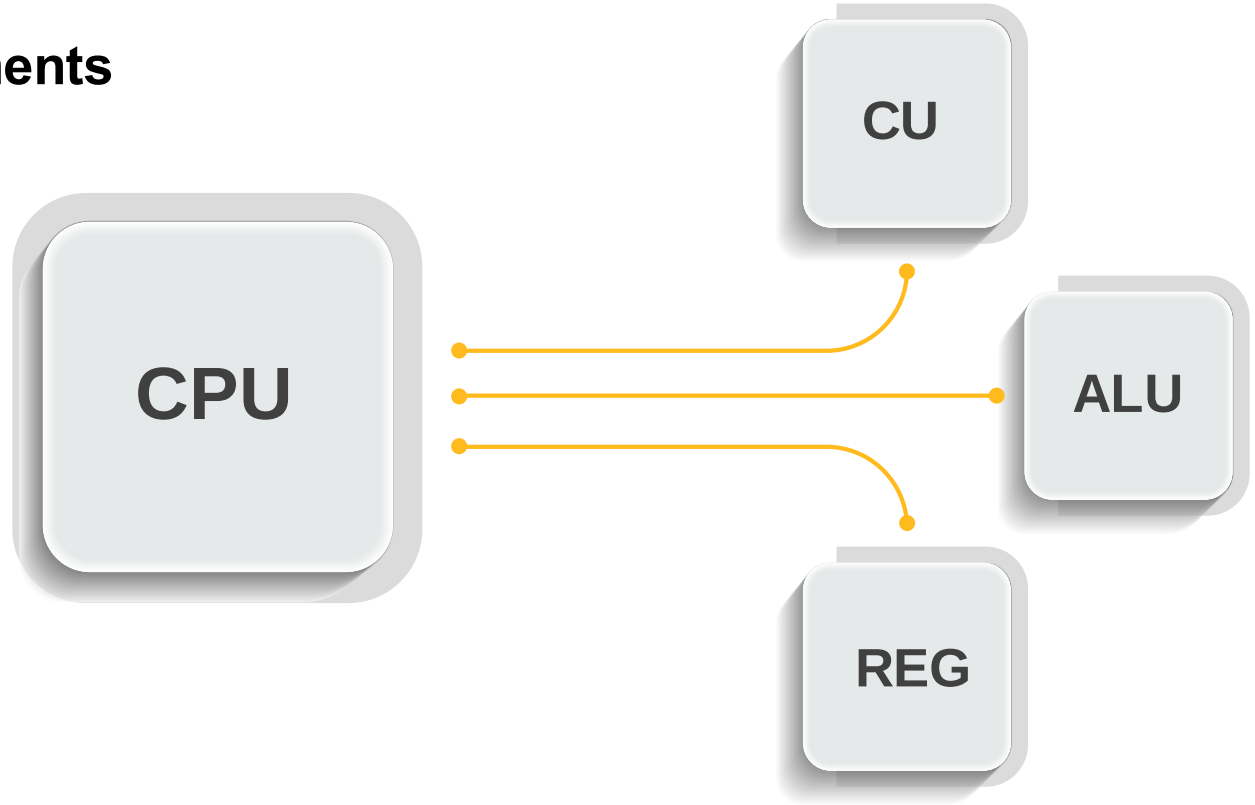
Central Processing Unit (CPU)

CPU itself has following three components

1) Registers
2) Control Unit
3) ALU(Arithmetic Logic Unit)



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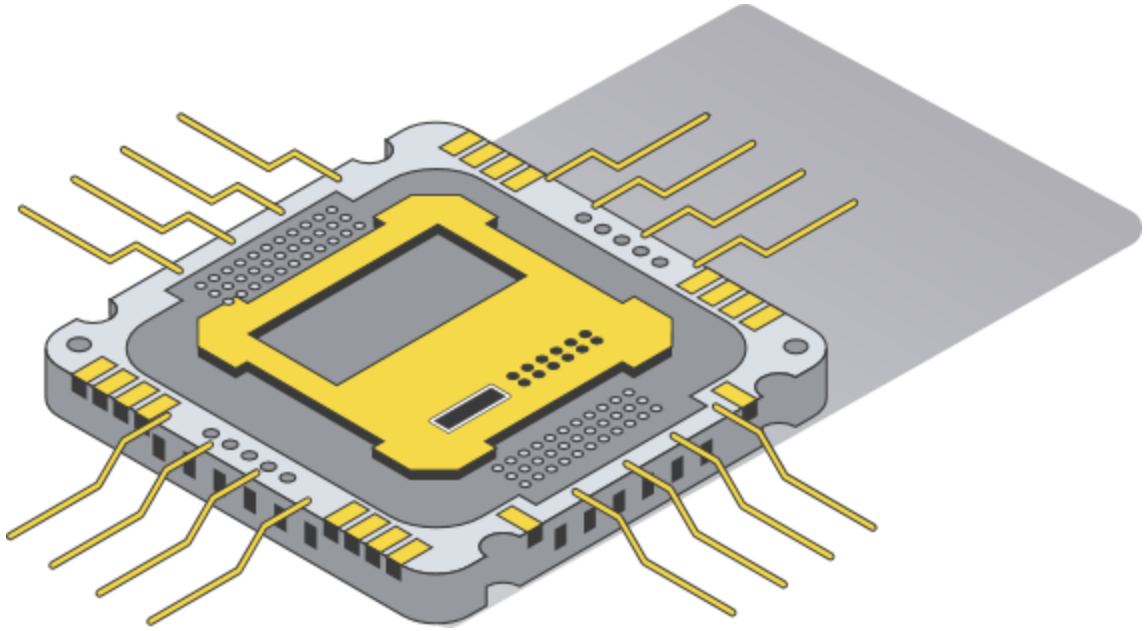
How to choose a CPU?

1. **Socket Compatibility**
2. **Cores/thread**
3. **Clock speed**
4. **Cache Memory**



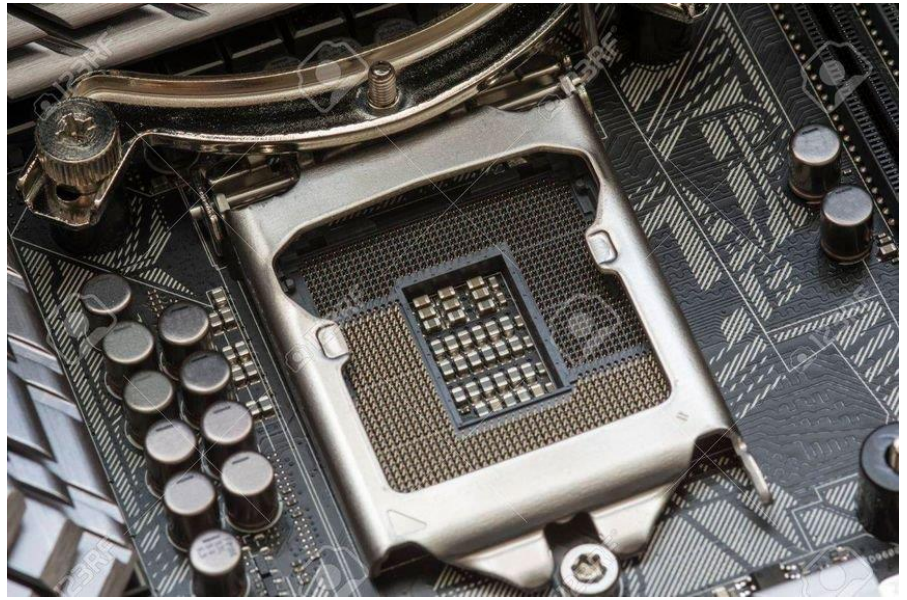
SYNNEFO SOLUTIONS

Socket

*A **socket** is the interface on the motherboard that consists of an array of pins or holes, along with a securi ng mechanism, which holds the processor in place and establishes a connection between the CPU and th e motherboard, enabling communication and power delivery.*

Major CPU manufacturers like **Intel** and **AMD** use distinct socket types for their processors

- **PGA Socket (Pins on CPU)**: The CPU has the pin s, and they go into the corresponding holes in the motherboard socket.
- **LGA Socket (Pins on Motherboard)**: The motherb oard has the pins, and the CPU has flat pads that make contact with the pins on the motherboard.



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Intel Sockets:

- **LGA 1151**:
  - Used by Intel's 6th, 7th, 8th, and 9th generation processors.
- **LGA 1200**:
  - Used by Intel’s 10th and 11th generation processors.
  - This socket features a **1200-pin** interface.
- **LGA 1700**:
  - Introduced for Intel’s 12th and 13th generation.
  - Supports **performance** and **efficiency cores** in a **hybrid architecture**.

AMD Sockets:

- **AM3:(PGA Socket)**
  Used by AMD’s **Phenom II** and **Athlon II** processors.
  Supports **DDR2** and **DDR3** memory.
- **AM4:(PGA Socket)**
  Used by AMD’s **Ryzen** processors (Zen, Zen+, Zen 2, Zen 3) and **APUs**.
  Supports **DDR4** memory.
- **AM5**:**(LGA Socket)**
  Used for **AMD Ryzen 7000 series** processors (Zen 4).
  Supports **DDR5** memory and **PCIe 5.0**.

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Core / Thread

1. Processor core are individual processing unit with in the Central Processing Unit (CPU) .Core reads instructions to perform specific actions. Instructions are chained together so that, when run in real-time, they make up your computer experience.

2. Threads are the virtual components, which divides the physical core of a CPU into virtual multiple cores.

3. Multithreading is a CPU feature that allows two or more instruction threads to execute independently while sharing the same process resources.

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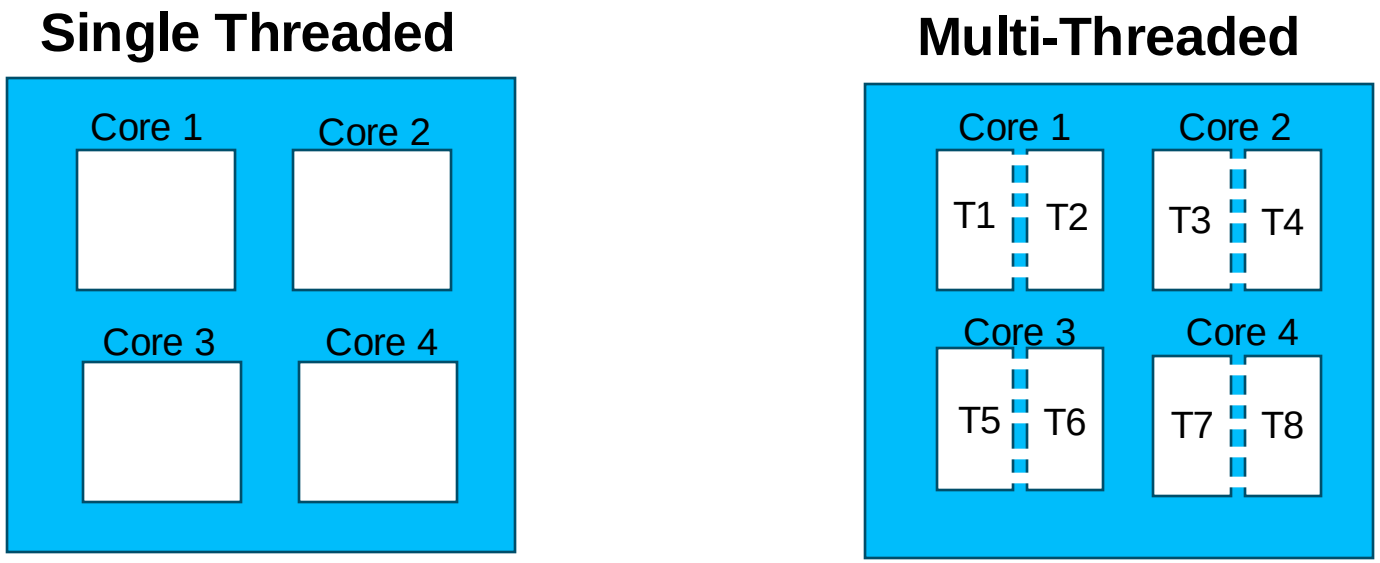
Single vs Multi-threaded CPUs



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Clock speed

The clock speed or clock rate of a processor refers to the rate at which it completes its processing cycle in one second. It is measured in Hertz, typically in gigahertz (GHz).

- ***Base Frequency:*** *This is the processor's standard operating speed under normal conditions.*
- ***Turbo Frequency:*** *Also known as Max Turbo Frequency, it represents the highest speed the processor can reach when utilizing Intel® Turbo Boost Technology.*

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Cache Memory

Supplementary memory system that temporarily stores frequently used instructions and data for q uicker processing by the central processing unit (CPU) of a computer

- ***Primary Cache(L1+L2 cache):****-very fast and its access time is similar to the processor registers. This is because it is built onto the processor chip. its size is quite small.*
- ***Secondary Cache(L3 cache):****- external cache is cache memory that is external to the primary c ache. It is located between the primary cache and the main memory. It is often housed on the p rocessor chip as well.*

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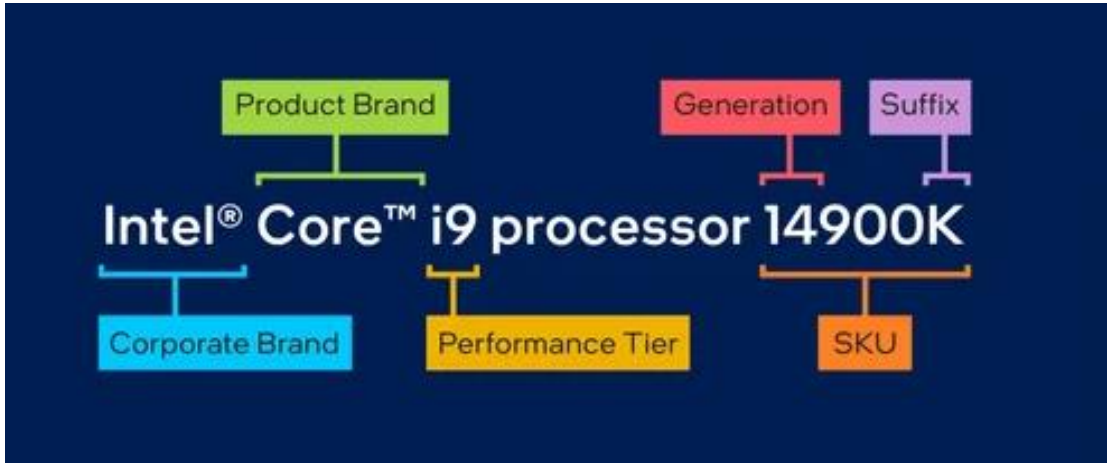
Intel Naming Conversion

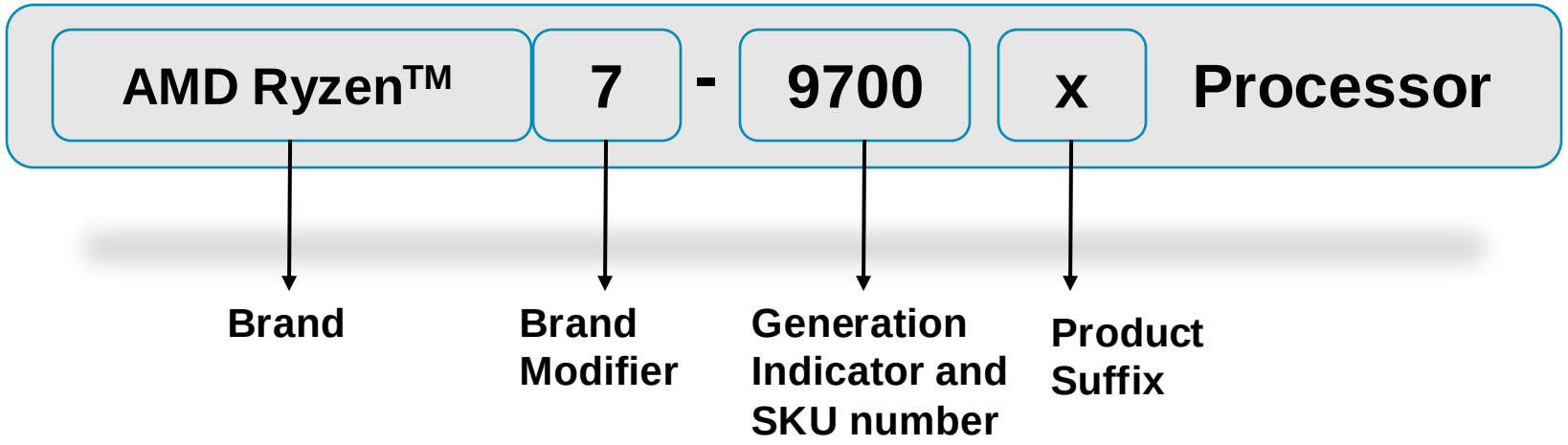
Newer naming scheme

Older naming scheme



SYNNEFO SOLUTIONS

AMD Naming Conversion



SYNNEFO SOLUTIONS

Intel® Core™ i9 14900K

- 24 Cores & 32 Threads
- 3.2 GHz Clock Speed
- 6 GHz Maximum Turbo Frequency
- LGA 1700 Socket
- 36MB Cache Memory
- Intel® UHD Graphics 770
- Supports DDR5 And DDR4 Memory
- TDP 253W

SYNNEFO
SOLUTIONS

Intel® Core™ Ultra 9 285K

- 24 Cores & 24 Threads
- 3.7 GHz Clock Speed
- 5.7 GHz Maximum Turbo Frequency
- LGA 1851 Socket
- 36MB Cache Memory
- Intel® Graphics
- Supports DDR5 Memory
- TDP 250W
- NPU Intel® Al Boost (neural processing unit)

SYNNEFO
SOLUTIONS

AMD Ryzen™ 9 9950X3D

- 16 Cores & 32 Threads
- 4.3 GHz Clock Speed
- 5.7 GHz Maximum Turbo Frequency
- AM5 Socket
- 128MB Cache Memory
- AMD Radeon™ Graphics
- Supports DDR5 Memory
- TDP 170W

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Visit intel and AMD websites(ark.intel.com & amd.com)

List and review following:

1. **Name**
2. **Generation**
3. **Code name for generations**
4. **Core and thread**
5. **Base and turbo frequency**
6. **Cache memory**
7. **Integrated GPU, if present model number**
8. **TDP**
9. **Overclocking**

Motherboard

The motherboard is a printed circuit board and foundation of a computer. It is the largest board inside the computer chassis. It allocates power and allows communication to and between the CPU, RAM, and all other computer hardware components.

Key factors when selecting a motherboard

- *Processor Socket*
- *Form factor*
- *Chipset*

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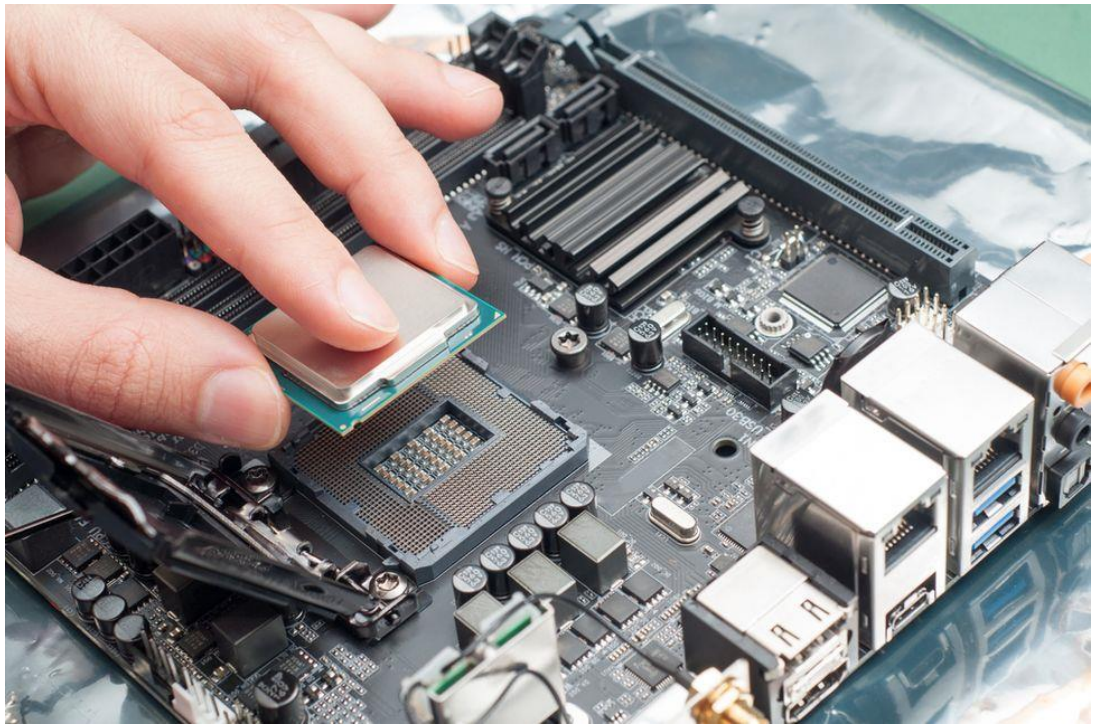
Socket

A **socket** is the interface on the motherboard that features an array of pins or holes, along with a securing mechanism, designed to hold the processor in place. It facilitates the connection between the CPU and th e motherboard, enabling communication and power delivery to the processor.



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Motherboard Form Factors

Form Factor refers to the size, shape, and layout of a motherboard, determining how components are arranged and how it fits inside a computer case. The form factor ensures compatibility with standard cases and affects the overall design of the computer system. There are various types of form factors, each suited to different types and sizes of computers, such as **ATX**, **microATX**, and **miniITX**, with each providing different levels of expandability and component placement based on their size and design.

1. *Extended-ATX - For Servers*
2. *Standard-ATX – For Workstation/Desktop*
3. *Micro-ATX – For Small Form Factor*
4. *Mini-ITX – For Small Form Factor*

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Motherboard Form Factors

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Chipset

*A **Chipset** group of electronic components on the motherboard that manages data between the processor, RAM, sto rage and other connected hardware. Multiple chipsets are available per socket, allowing you to choose between bu dget and performance, with the more expensive motherboards sporting more capable components.*

Intel Supported Chipset

H series : budget chipsets for basic computing.

B series : Mid-range chipsets offering good performance.

Z series : High-end chipsets with overclocking support.

AMD supported Chipset

A series : budget chipsets for basic computing.

B series : Mid-range chipsets offering good performance.

X series :High-end chipsets with overclocking support.

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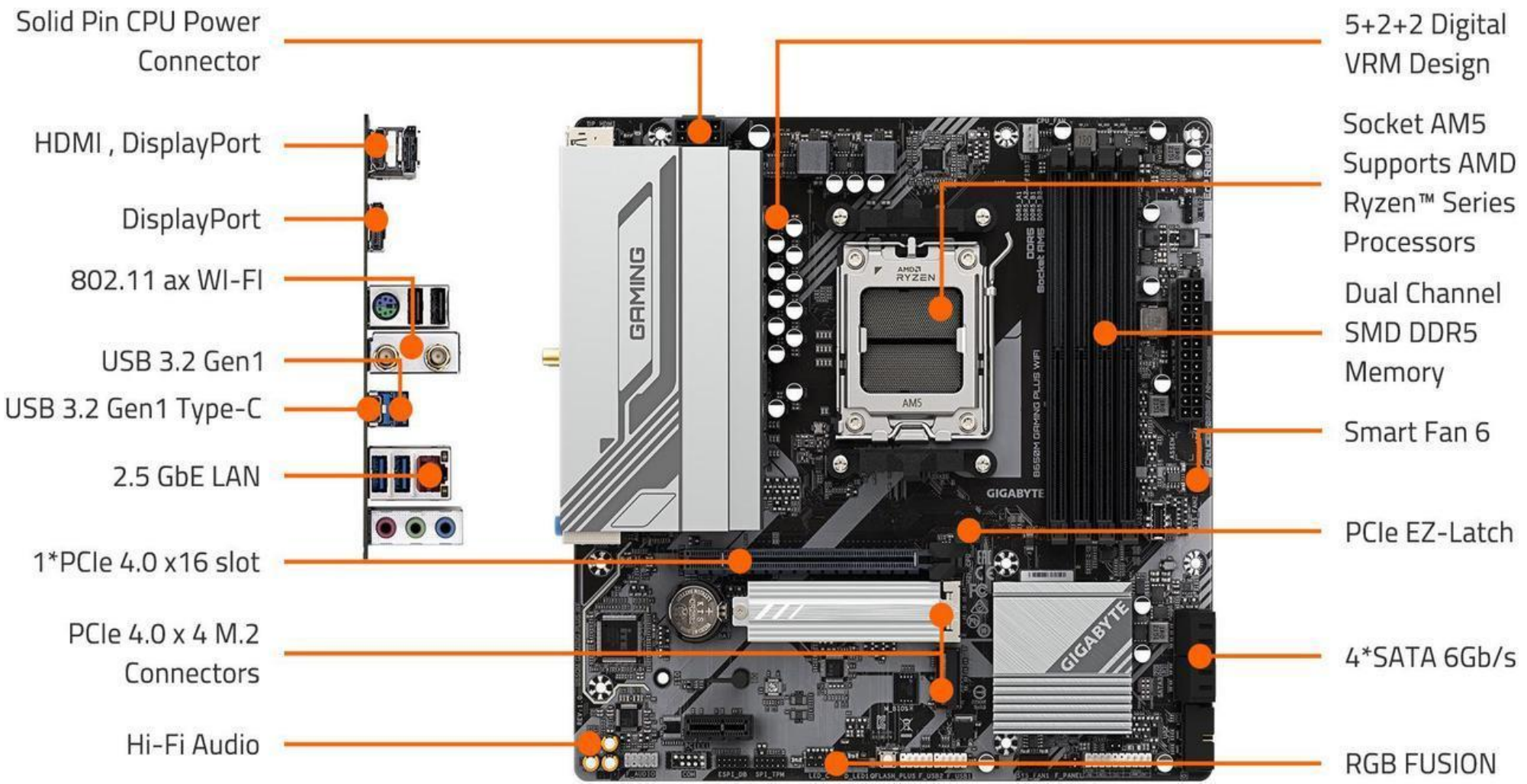
Motherboard



Motherboard Manufacture

ASUS:

Example: ASUS ROG Strix Z790-E Gaming WiFi.

Gigabyte:

Example: Gigabyte B650 Aorus Elite AX.

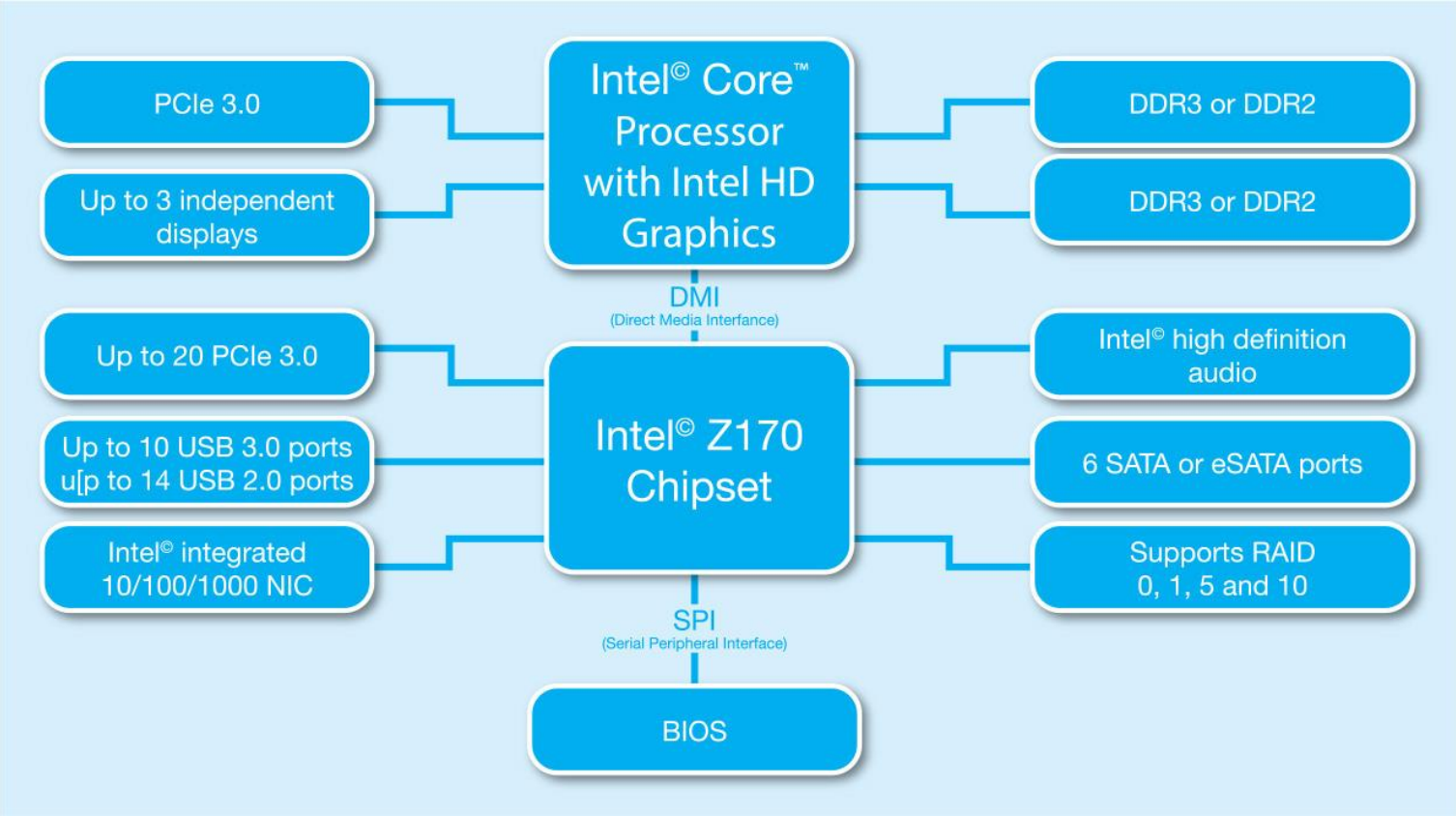
MSI (Micro-Star International):

Example: MSI MAG B760 Tomahawk WIFI.

ASRock:

Example: ASRock B650E Steel Legend WiFi.

Motherboard (New)



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Find compactable motherboards for selected processors

Primary Memory

Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is generally made up of semicon ductor device.

- It is known as the main memory.
- Usually volatile memory & non-volatile memory.
- It is the working memory of the computer.
- Faster than secondary memories.
- A computer cannot run without the primary memory

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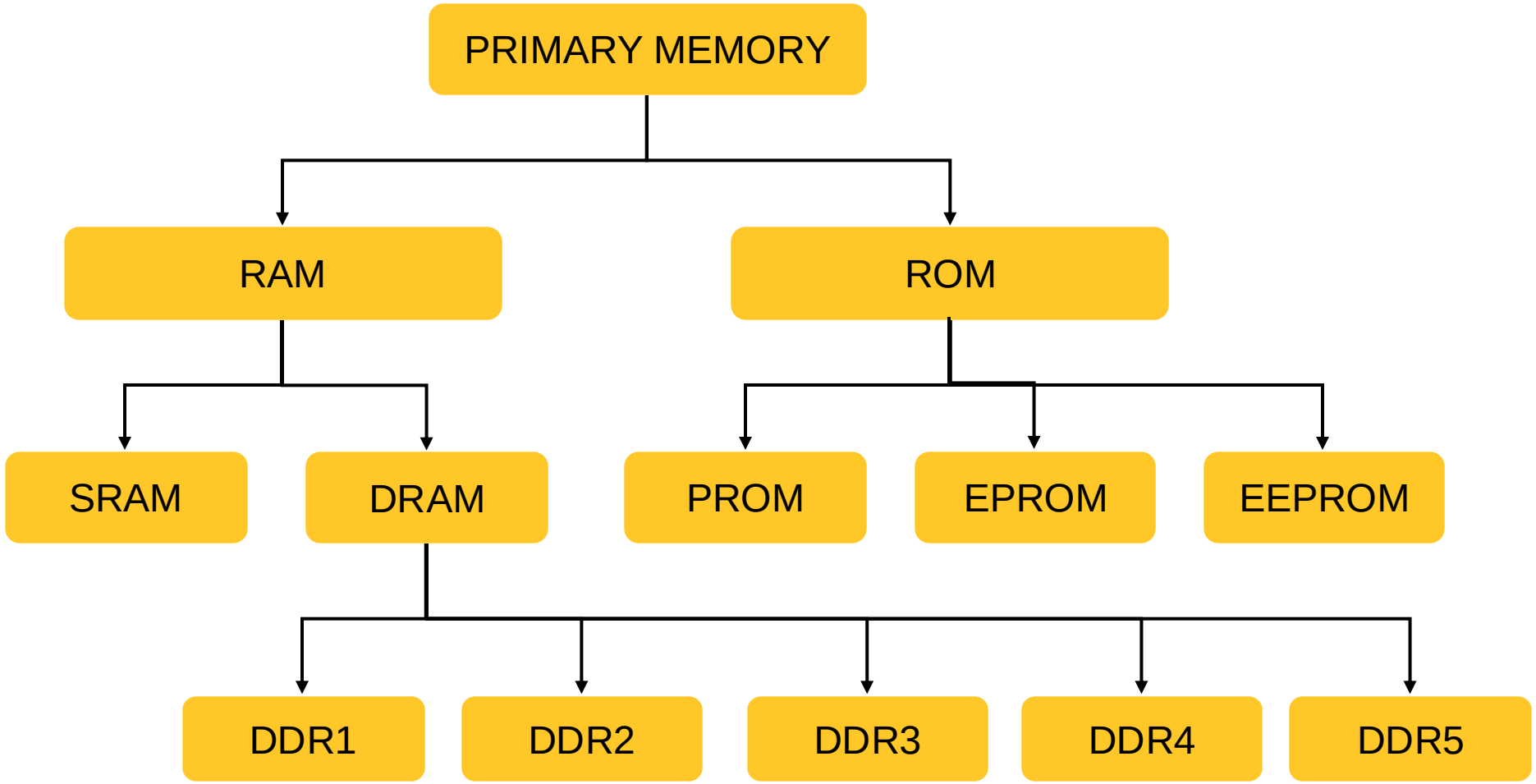
Primary Memory



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Primary Memory

Random Access Memory

Random Access Memory is volatile. That means data is retained in RAM as l ong as the computer is on, but it is lost when the computer is turned off. Whe n the computer is rebooted, the OS and other files are reloaded into RAM, us ually from an HDD or SSD.

The term random access as applied to RAM comes from the fact that any storage location, also known as any memory address, can be accessed directly. Originally, the term Random Access Memory was used to distinguish regular core memory from offline memory (magnetic tape).

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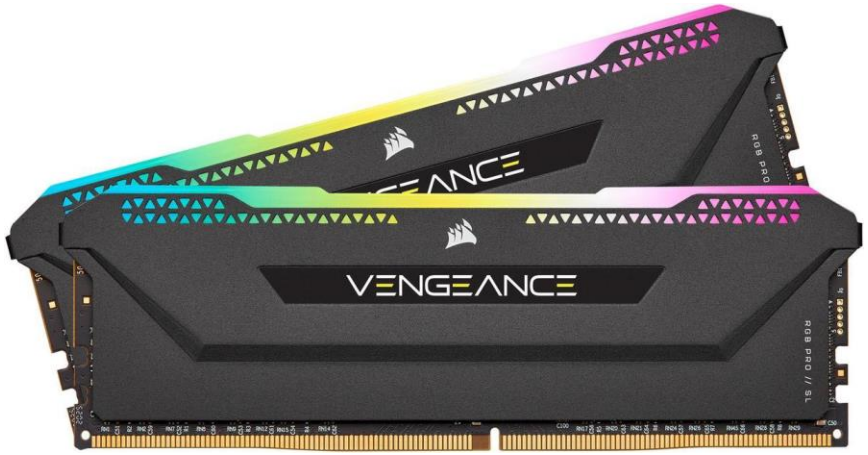
Primary Memory

Types of RAM

Static RAM (SRAM)

Dynamic RAM (DRAM)

Both types of RAM are volatile, as both lose their content when the power is turn ed off



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Random access memory

Static RAM

- SRAM is commonly used for a computer's cache memory, such as a processor's L2 or L3 cache.
- It is not used for a computer's main memory because of its cost and size.
- It might be part of a RAM digital-to-analog converter (RAMDAC) on a computer's video or graphic card.
- It retains data bits in its memory as long as power is being supplied.
- Static RAM provides faster access to data.
- Need not be refreshed on a regular basis.

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Random access memory

Dynamic RAM

DRAM stores each bit of data in a separate passive electronic component that is inside an integrated circuit board.

DRAMs are made up of memory cells, which are composed of one capacitor and one transistor.

This captivator needs to be refreshed often otherwise information fades.

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Random Access Memory

Difference between static RAM and Dynamic Ram

SRAM	DRAM
Long life time	Short life time
Less power consumption	More power consumption
More speed	Less speed
More access time	Less access time
More cost	Less cost
Low density	High density
Less capacity as it is a complex circuitry	More capacity due to simple circuitry

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Dynamic Random Access Memory

Asynchronous DRAM

Asynchronous DRAM does not use a system clock to synchronize or coordinate memory accessing.

Synchronous DRAM

Synchronizes" the memory speed with CPU clock speed so that the memory controller knows the exact c lock cycle when the requested data will be ready.
This allows the CPU to perform more instructions at a given time.

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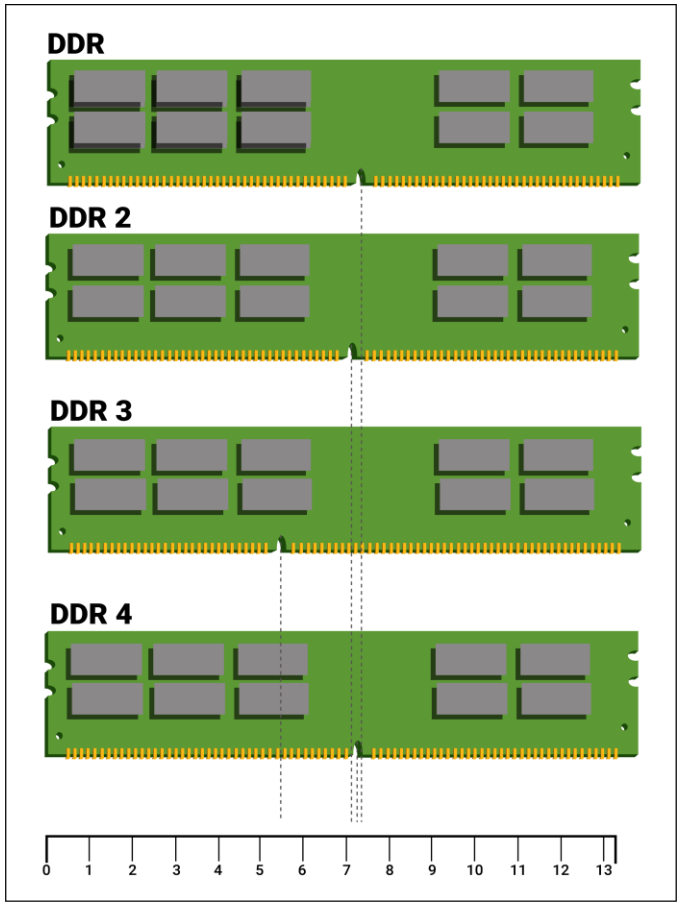
Dynamic Random Access Memory

DDR SDRAM(Double Data Rate Dynamic Random Access Memory)

The next generation of SDRAM is DDR, which achieves greater bandwidth than the preceding single data rate SDRAM by transferring data on the rising and falling edges of the clock signal (double pumped).

DDR1 SDRAM has been succeeded by DDR2, DDR3, and most recently, DDR5 SDRAM.



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Random Access Memory

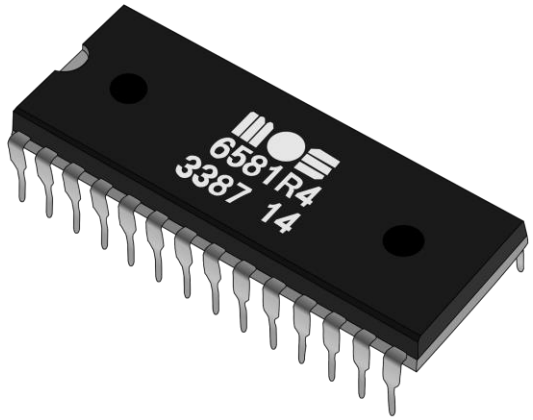
DRAM

DRAM Names	Release Year	BUS Clock (frequency in MHz)	Data Transfer Rate (MT/S)	Operating Voltage
SDRAM	1993	100~166	100~166	3.3V
DDR	2000	133~200	266~400	2.5V
DDR2	2003	266~400	533~800	1.8V
DDR3	2007	533~800	1066~1600	1.5V
DDR4	2014	1066~1600	2133~3200	1.2V
DDR5	2019	1600~3200	3200~6400	1.1V

Read Only Memory

The memory from which we can only read but cannot write on it.

ROM is **a non-volatile memory type**.
This means it receives data and permanently writes it on a chip, and it lasts even after you turn off your computer



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Read Only Memory

PROM (Programmable Read Only Memory)

PROM is read-only memory that can be modified only once by a user.

Inside the PROM chip, there are small fuses which are burnt open during programming.

It can be programmed only once and is not erasable

Read Only Memory

EPROM (Erasable & Programmable Read Only Memory)

EPROM is a type of ROM that can be reprogramed and erased many times

EPROM can be erased by exposing it to ultra-violet light for a duration of up to 40 minutes.

Need a special device called a PROM programmer or PROM burner to reprogram the EPROM.

Read Only Memory

EEPROM (Electrically Erasable & Programmable Read Only Memory)

EEPROM is programmed and erased electrically.

It can be erased and reprogrammed about ten thousand times.

Both erasing and programming take about 4 to 10 ms (millisecond).

EEPROMs can be erased one byte at a time, rather than erasing the entire chip. Hence, the process of reprogramming is flexible but slow.

RAM vs ROM

Feature	RAM	ROM
Read/Write	Can be read from and written to	Primarily read-only
Speed	Faster	Slower than RAM, but faster than hard drives
Capacity	Generally larger (measured in GB)	Typically smaller (measured in MB)
Usage	Temporary data storage for active processes	Permanent storage for essential instructions
Cost	More expensive per GB	Less expensive per GB
Accessibility	Directly accessible by CPU	Not directly accessible by CPU
Data Retention	Short-term	Long-term

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- Provide 5 motherboard and ask them to list out
- Maximum ram capacity, frequency and no. of slots supported
- Number of SATA ports.
- Video output supported.

Secondary Memory

A secondary storage device refers to any non-volatile storage device that is internal or external to the co mputer.

Secondary storage allows for the storage of data ranging from a few megabytes to petabytes.

The fundamental characteristics of secondary storage are high capacity and low cost, although speed, re liability and portability might also be important

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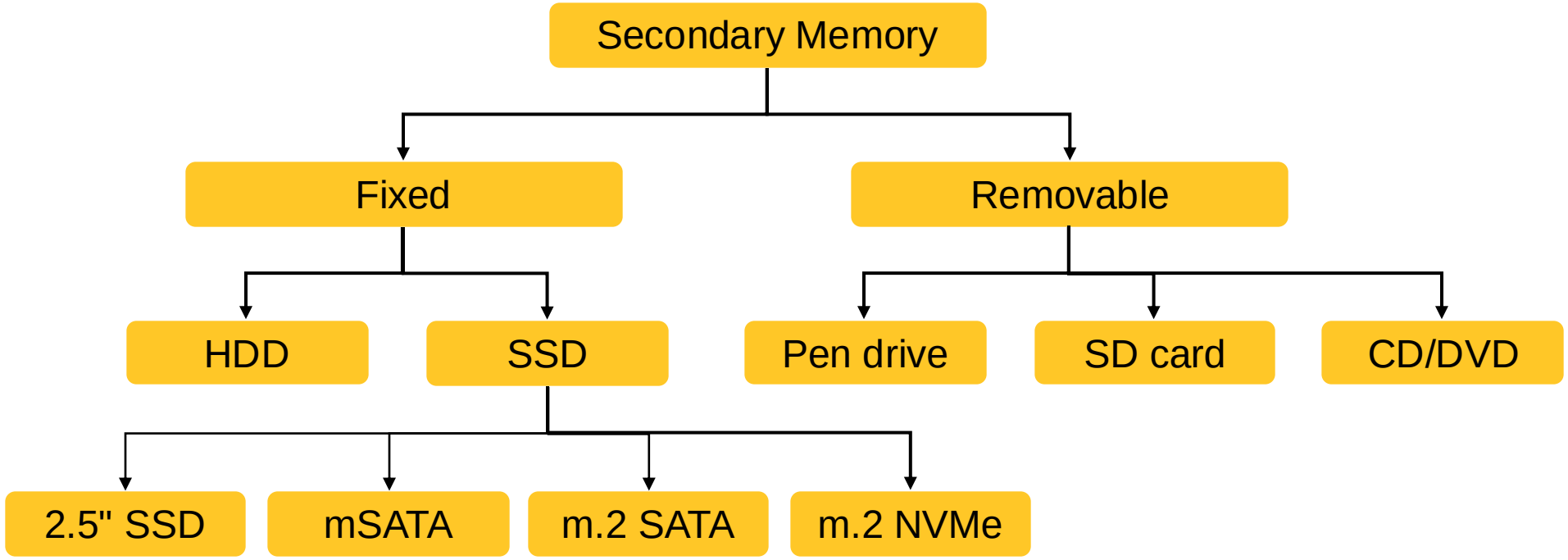
Secondary Memory



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Secondary Memory

Hard Disk Drive(HDD)

A computer hard disk drive (HDD) is **a non-volatile data storage device**.

Non-volatile refers to storage devices that maintain stored data when turned off.

All computers need a storage device, and HDDs are just one example of a type of storage device.

Hard disks are available up to a capacity as large as 36 TB.

Hard Disks do come in two different versions such as external and internal

SYNNEFO SOLUTIONS

Secondary Memory

Solid State Drive(SSD)

A solid-state drive (SSD) is a solid-state storage device that uses integrated circuit assemblies to store data persistently.

Types of SSD

- 2.5-Inch SATA SSD
- mSATA
- M.2 SATA SSD
- M.2 NVMe SSD

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Secondary Memory

2.5-Inch SATA SSD

This is the most common SSD type and should be compatible with the widest range of PCs, even old ones. “2.5-Inch” refers to the form factor of the SSD enclosure, and there are actually 2.5-Inch HDDs, too.

2.5-inch SSDs use SATA bandwidth and connectors, just like HDDs. Because of this, they should be compatible with any PC or laptop that’s already using a hard drive.

SSD has no moving parts like HDD, which gives it advantages, such as faster access time, noiseless operation, higher reliability, and lower power consumption.

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Secondary Memory

Mini-Serial ATA

mSATA is a smaller, thinner version of the full-size SATA SSD.

Read and write speeds can reach up to around 551 Mbps and 304 Mbps, respectively.

MSATAs have a maximum bandwidth of 6 Gbps

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Secondary Memory

M.2 SATA SSD

An M.2 SSD is a small form factor solid-state drive (SSD) that is used in internally mounted storage expansion cards.

Its small and slim size makes it ideal for computers that are lightweight and portable like laptops, notebooks and ultra books.

They take up less room than 2.5-inch SSDs or hard drives and can go up to 2TB in capacity.

SYNNEFO SOLUTIONS

Secondary Memory

M.2 NVMe SSD

That “NVMe” stands for “Non-Volatile Memory Express”.

The most important word to take note of there is “Express” because it reveals what bandwidth NVMe drives are actually using: your PCI Express bandwidth, rather than your SATA bandwidth. Drives and can go up to 8TB in capacity.

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Secondary Memory

	Type	Read Speed	Write Speed
SATA	1.0	150MB/s	
	2.0	300MB/s	
	3.0	600MB/s	
	M.2 + SATA 3.0	600MB/s	
NVME	M.2 + PCI-E 3.0 x 4	3500MB/s	3100MB/s
	M.2 + PCI-E 4.0 x 4	4950MB/s	4250MB/s

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Graphics Card

Graphics card is a hardware which is used to increase the video memory of a comp uter, and make its display quality more high-definition.

It makes the computer more powerful and gives it the capacity to do more high-leve l work. The quality of the image depends on the quality of the graphics card.

It is very much important for gaming and video editing on a PC. Every game needs a graphics memory to start and it depends on the type of the game, and the require ments are mentioned on the game box.

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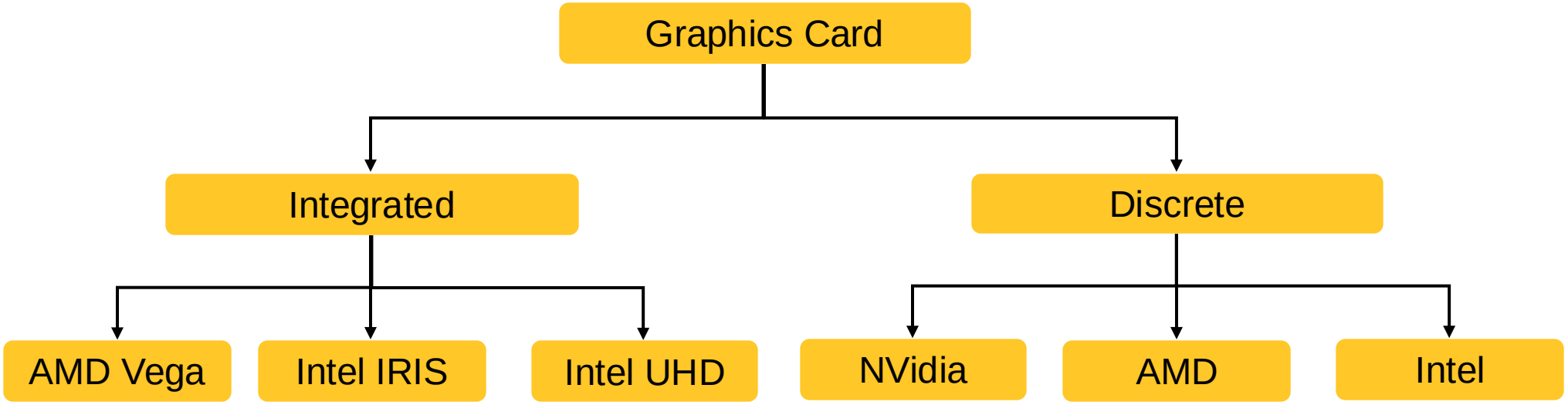
SOLUTIONS

Graphics Card

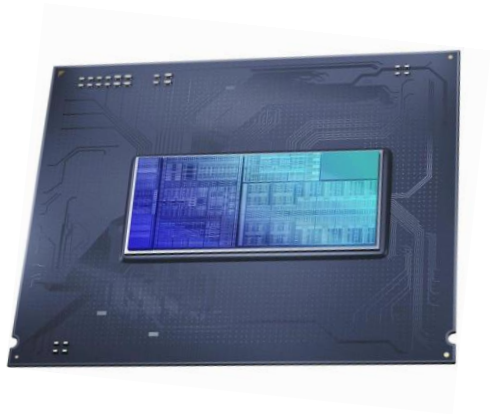


SYNNEFO SOLUTIONS

Graphics Card

Types of Graphics Card

Integrated Graphics: These are built directly into the processor, meaning they don't require a separate graphics card. They are commonly found in most laptops and are suitable for everyday tasks like br owsing, office work, or media consumption. Since they share the system's memory (RAM), they can not be upgraded or replaced.



SYNNEFO
SOLUTIONS

Graphics Card

Types of Graphics Card

Discrete Graphics: This refers to an external graphics card that is added to the motherboard as a separate component. While basic tasks like file creation, office work, or media consumption don't require a discrete GPU, more demanding activities like high-resolution gaming, 3D rendering, or video editing benefit from the power of a discrete graphics card. These cards have their own dedicated memory and can be upgraded or replaced as needed.

Intel Arc B580

Radeon RX 9070 XT

GeForce RTX 5090

How to choose a GPU?

video memory (VRAM) in a graphics card is crucial for handling graphics tasks, storing image data, textures, and frame buffers for faster access. More VRAM allows for better performance in high-resolution, detailed, and complex graphics.(8GB,16GB,24GB..etc)

GDDR (Graphics Double Data Rate) is the common type of VRAM used in modern cards. Versions like **GDDR5** and **GDDR6** offer faster speeds and higher bandwidth, with **GDDR6** providing improved performance for demanding tasks like gaming and video editing.

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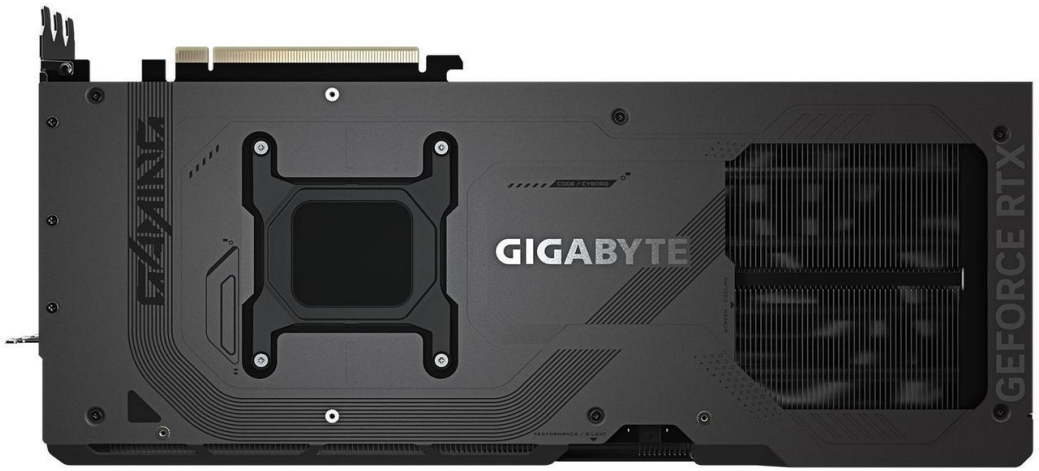
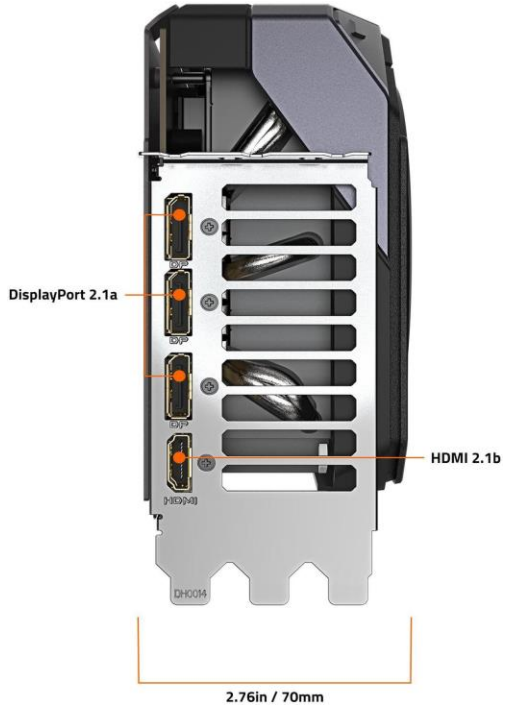
SOLUTIONS

Graphics Card





SYNNEFO SOLUTIONS

Cooling System

- **Stoke Processor cooling**
- **Air cooling**
- **Liquid cooling – AIO,Custom**
- **Water Cooling – AIO,Submerge/Immersion Cooling**

SYNNEFO
SOLUTIONS

Cooling System

Stock processor cooling refers to the cooling solution that comes bundled with the processor when purchased

SYNNEFO SOLUTIONS

Cooling System

Air Cooling

An **air cooling** is a type of cooling solution that uses a **heatsink** and **fan** to cool down the CPU or other components in a computer. It works by transferring heat from the component (like the processor) to a metal heatsink, which has a large surface area to dissipate the heat.

SYNNEFO SOLUTIONS

Cooling System

Water Cooling System (AIO)

Water cooling systems circulate coolant (usually a liquid) through **water blocks** that sit directly on top of the chip being cooled. The cooler liquid absorbs the heat from the chip and carries it away through the water block. This process helps maintain lower temperatures by transferring heat more efficiently than air-based cooling systems.

SYNNEFO SOLUTIONS

Cooling System

Liquid Cooling System(Custom cooling)

Custom liquid cooling systems use water blocks, pumps, tubing, and radiators to circulate coolant, efficiently cooling the CPU, GPU, and other components. They offer superior cooling, quieter operation, and customization options for performance and aesthetics.

SYNNEFO SOLUTIONS

Cooling System

Submerged/Immersion cooling (Custom cooling)

Submerged cooling for custom PCs involves immersing components, like the motherboard and GPU, in a non-conductive liquid (e.g., mineral oil or engineered coolants). This method efficiently dissipates heat, reducing the need for fans and improving thermal performance.

SYNNEFO SOLUTIONS

SMPS

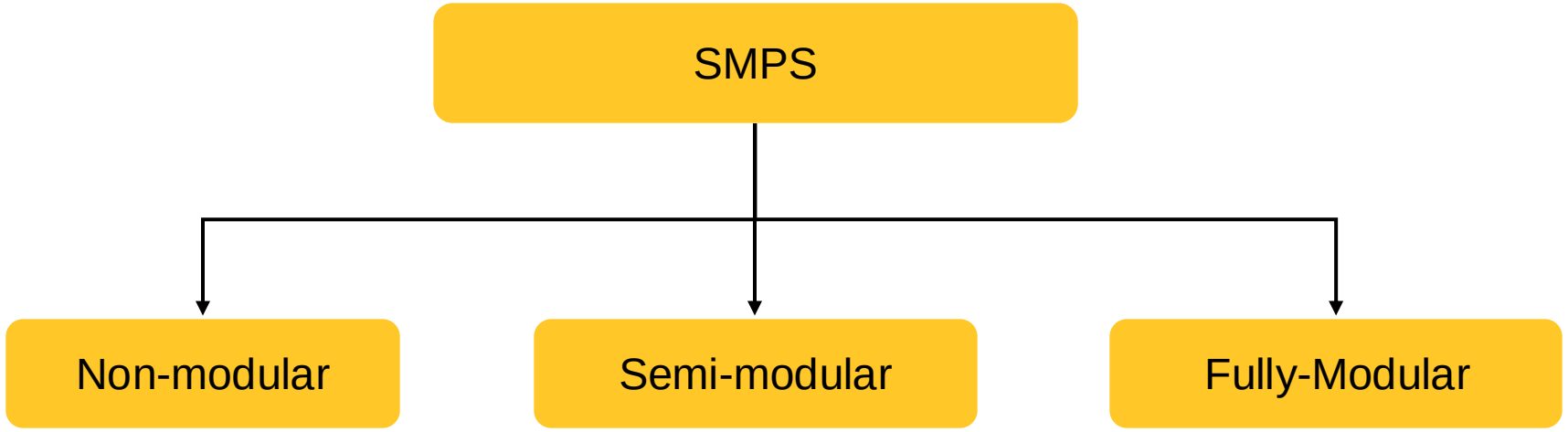
*SMPS stands for **Switched-Mode Power Supply**.*

SMPS - Switched Mode Power Supply.
It's main task is to provide Power supply to all the components of the PC.

It is an electronics device that is used to convert AC to DC, AC to AC, DC to DC and D C to AC voltages.
The SMPS used in computers is of AC to DC type supply.

SYNNEFO
SOLUTIONS

Power Supply Unit



SYNNEFO SOLUTIONS

Power Supply Unit

NON - MODULAR SMPS

A non-modular PSU comes with all the cables that you will need for your build already installed and attached to the power supply.

SYNNEFO SOLUTIONS

Power Supply Unit

SEMI MODULAR SMPS

Semi modular units have a few power cables that are permanently fused to the power supply while the remaining ones can be detached

SYNNEFO SOLUTIONS

Power Supply Unit

FULLY MODULAR SMPS

Fully modular indicates that every power connector is detachable and removable. High end power supplies tend to have a full modular design

SYNNEFO SOLUTIONS

SMPS connectors

SYNNEFO SOLUTIONS

PSU Certifications

PSU certification refers to **Power Supply Unit (PSU)** certification, which ensures that a power supply meets specific standards of quality, efficiency, and safety. These certifications typically include:

80 Plus Certification: Indicates the efficiency of the PSU. The higher the rating (e.g., 80 Plus Bronze, Silver, Gold, Platinum, Titanium), the more energy-efficient the power supply is.

	Loading	80 Plus	Bronze	Silver	Gold	Platinum	Titanium
Efficiency	20%	80%	82%	85%	87%	90%	90%
	50%	80%	85%	88%	90%	92%	92%
	100%	80%	82%	85%	87%	89%	94%

SYNNEFO SOLUTIONS

PSU Calculator

https://outervision.com/power-supply-calculator
https://www.coolermaster.com/power-supply-calculator/
https://www.newegg.com/tools/power-supply-calculator/

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Cabinet

A computer case, also known as a computer chassis, is ***the enclosure that contains most of the components of a personal computer*** *(usually excluding the display, keyboard, and mou se).*

Types of Cabinet :

- *Full tower*
- *Mid tower*
- *Mini tower*
- *SFF(Small form factor)*

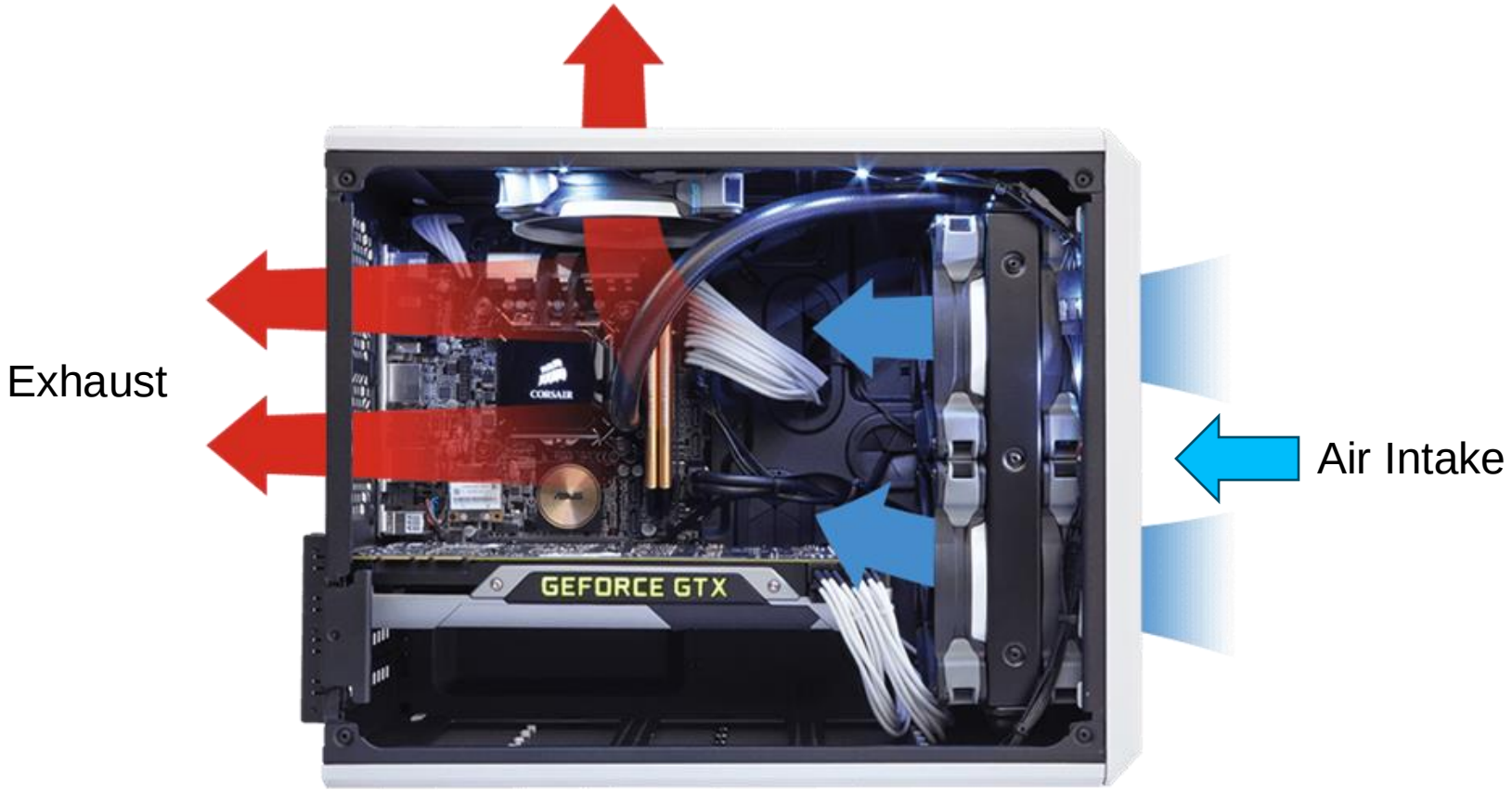
SYNNEFO SOLUTIONS

Cabinet

SYNNEFO SOLUTIONS

Cabinet

Air flow



SYNNEFO SOLUTIONS

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SOLUTIONS

- **Build 5 PC's within allocated budget for each**
- **Dream PC(∞ budget)**
- **250k**
- **100k**
- **50k**
- **25k**

Firmware

BIOS/UEFI

- ***BIOS and UEFI*** *are forms of software that kickstart the hardware of your computer before your operating system loads.*

  BIOS is a software stored on a small memory chip in the motherboard.
  It is used to start the computer system after it is turned on.

  Unified Extensible Firmware Interface (UEFI) is a specification for a software program that connects a computer's firmware to its operating system (OS). UEFI is expected to eventually replace BIOS(basic input/output system) but is compatible with it.

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BIOS/UEFI

Secure Boot *helps to make sure that your PC boots using only firmware that is trusted by the manufacturer.*

CSM *stands for C****ompatibility Support Module.*** *It's an optional tool included in the UEFI firmware that allows legacy BIOS compatibility.* CSM offers backward compatibility by booting the machine as if you were running a legacy BIOS system

SYNNEFO SOLUTIONS

Partition

A partition refers to a logically defined section of a physical storage device, such as a hard disk drive (HDD) or solid-state drive (SSD).

Partitions are used to separate the storage into isolated sections, which can be formatted with different file systems and used for different purposes.

Types of Partitioning Schemes

There are two common partitioning schemes used to define how the storage is organized: MBR (Master Boot Record) and GPT (GUID Partition Table).

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What is a File System ?

File system *is a method of organizing and retrieving files from a storage medium.*

OR

A process that manages how and where data on a storage disk.

- *FAT (File Allocation Table)*
- *NTFS (New Technology File System)*
- *EXT4 (Fourth extended File system)*
- *HFS (Hierarchical File System)*
- *APFS (Apple File System)*

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Basic Commands (Windows)

Windows make use of Command Prompt or PowerShell for running commands.

Window commands are not case sensitive.

- ipconfig: Gives IP address.
- getmac: Gives MAC address.
- dir: Listing directories and files.
- cd <folder_name>: Switches to the specified folder.
    - cd - Shows present working directory.
    - cd../cd .. - To move one directory up.
- mkdir <folder_name>:Creates folder.
- rmdir <folder_name>:Removes folder.

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- net user: Give the users.
- net user <username>:Give specific user details.
- hostname: Give the machine name.
- move <source> <destination>:To move files and folders.
- rename <old name> <new name>:To rename files and folders.
- cls: Clear.
- shutdown /s /f /t <time in seconds>: Poweroff

Basic Commands (Linux)

In Linux, commands are case-sensitive. This means that uppercase and lowercase letters are treated as different characters.

- ifconfig – Displays IP address and network configuration.
- ifconfig or ip link – Displays MAC address.
- pwd – Displays the present working directory.
- ls – Lists files and directories in the current directory.
- cd <directory_name> – Switches to the specified directory.
- cd .. – Moves one directory up.
- mkdir <directory_name> – Creates a new directory.
- rmdir <directory_name> – Removes an empty directory.

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