KT0901 Power supply units, uninterruptible power supplies

Redundant Power Supply vs Uninterruptible Power Supply (RPS vs UPS)

Have you ever seen redundant power supplies (RPS) in the servers or some switches, such as Cisco switches, HPE servers, etc.? What is the difference between RPS and ordinary power supply?

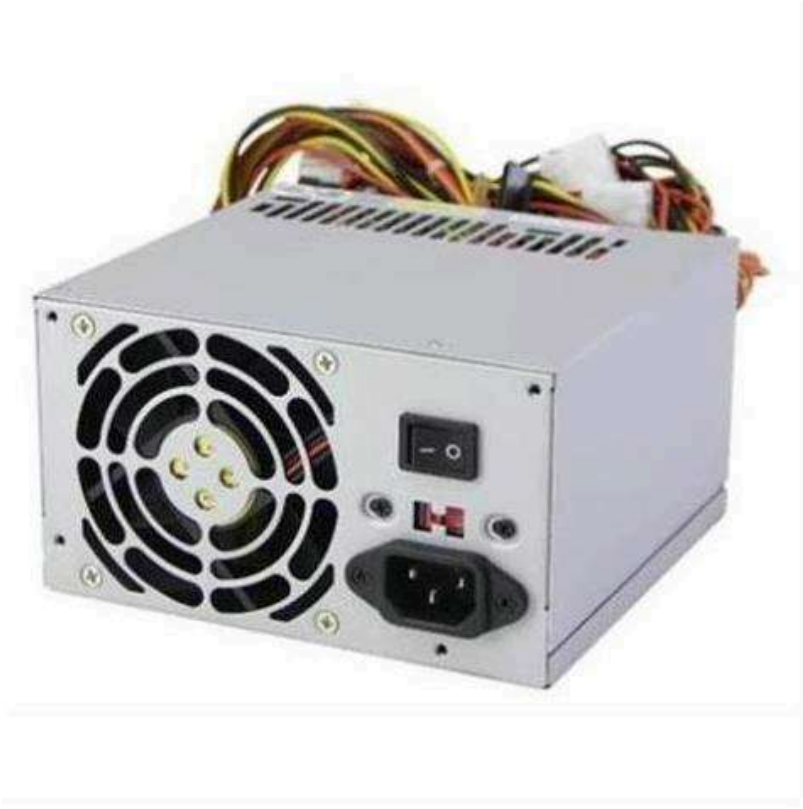
Maybe you know the meaning and application of RPS, but do you know UPS, the Unplugged power supply?

In this article, let's discuss the difference between RPS and UPS.

Redundant power supply

The redundant power supply (RPS) is a kind of power supply used in the server. It is composed of two identical power supplies. The chip control power supply performs load balancing. When one power supply fails, the other power supply can take over its work immediately. Replace the power supply. Later, two power supplies work together. The redundant power supply is to achieve high availability of the server system. In addition to servers, disk array systems are also widely used.

The RPS power supply (Redundant Power System) is used as an external DC power supply for some switches.



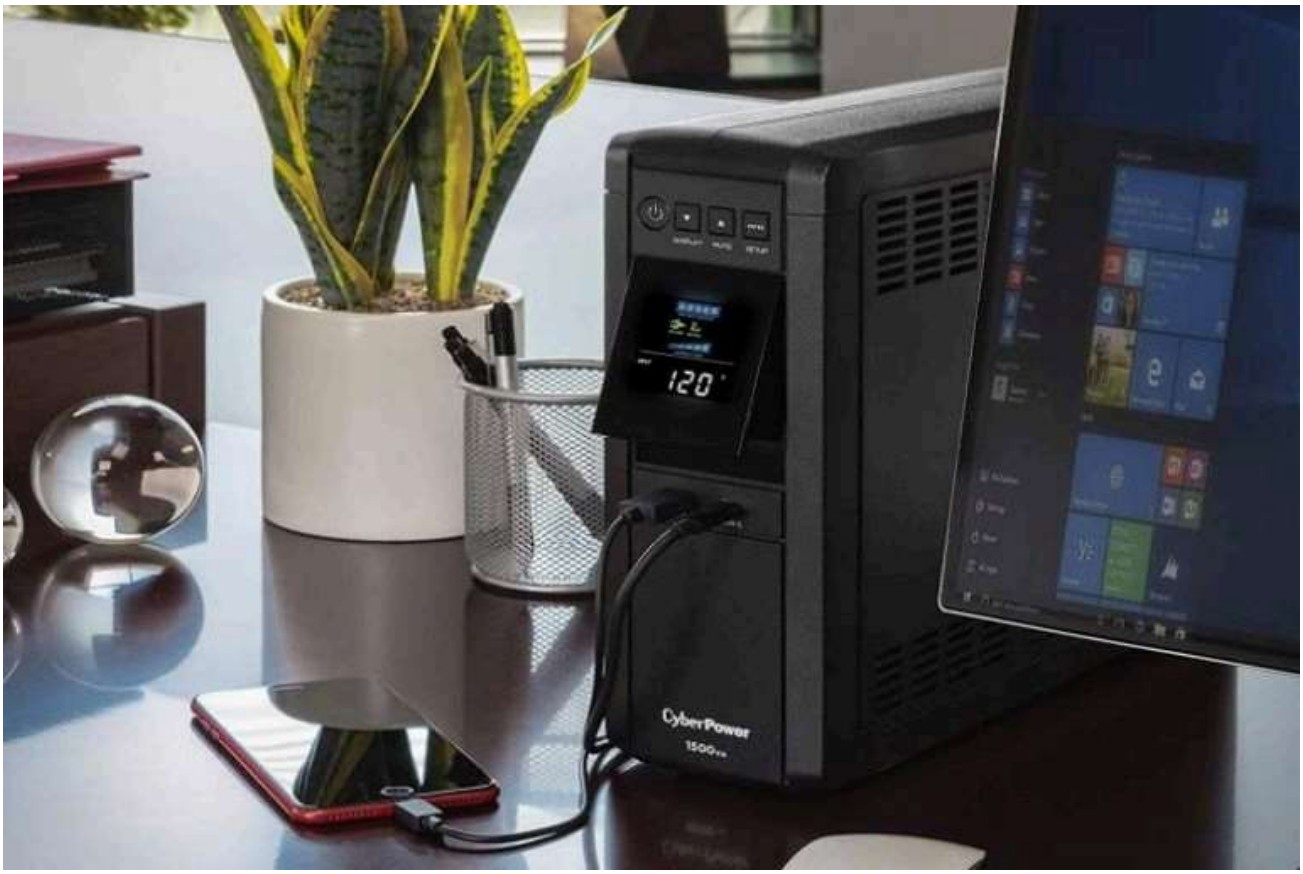
RPS can be used as a redundant power supply for switches or routers:

If the RPS and the power receiving equipment use the same AC power supply system, when the internal power supply of the power receiving equipment is abnormal, the RPS can continue to supply DC power to the failed equipment to ensure the continuous normal operation of the equipment;

If the RPS and the powered device use different AC power supply systems, DC power supply can continue to be provided when the external AC power supply of the powered device fails, ensuring continuous normal operation of the device.

Uninterruptible Power Supply

UPS, that is, uninterruptible power supply, is a system device that connects the battery (mostly lead-acid maintenance-free battery) to the host, and converts the DC power into commercial power through the module circuit of the host inverter. It is mainly used to provide a stable and uninterrupted power supply to a single computer, computer network system or other power electronic equipment such as solenoid valves and pressure transmitters.



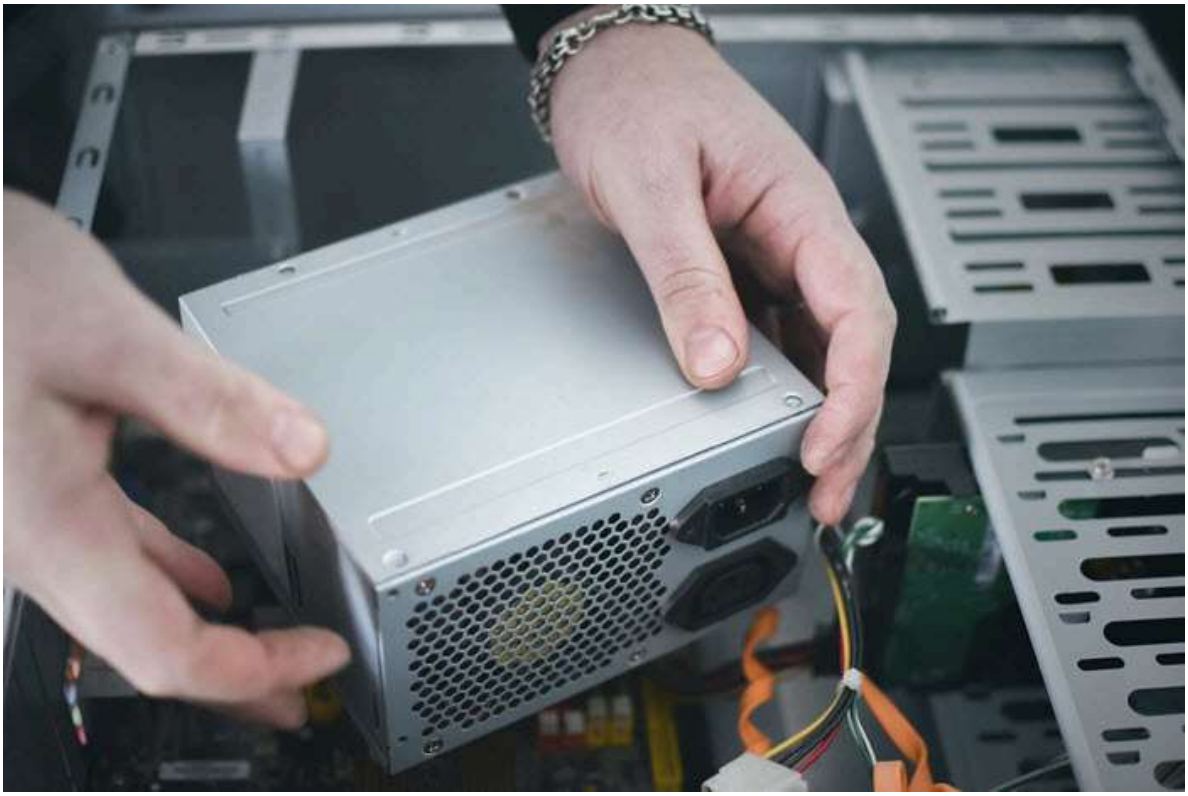
When the mains power input is normal, the UPS supplies the mains power to the load after it is stabilized. At this time, the UPS is an AC power stabilizer, and it also charges the battery in the machine; when the mains power is interrupted (accident power outage), the UPS immediately supplies the DC power of the battery to the load through the inverter switching method to continue to supply 220V AC power to the load to maintain normal work and protect the load software and hardware from damage. UPS equipment usually provides protection against too high or too low voltage.

UPS is the third generation developed with brand-new digital technology to meet the reliability requirements of power supply for network monitoring, network systems, medical systems, etc., to overcome the increasingly poor power grid environment caused by the centralized power supply of medium and large computer network systems. Industrial frequency pure online intelligent UPS. A DC power supply is a device that maintains a constant current in the circuit. Such as dry batteries, accumulators, DC generators, etc.

UPS and DC power supply are important power supply equipment for enterprises. The traditional maintenance management includes:

① daily inspection appearance, regular replacement of wearing parts such as batteries, filter capacitors, fans, etc., and battery activation during overhaul;

② modification or use of replacement equipment , Use advanced tools to test battery performance. This kind of management method has high investment costs, heavy maintenance staff workload, it is not easy to grasp the equipment operating status and key data in real time, and the equipment accident prevention ability is low. Implementing online maintenance management can avoid the shortcomings of traditional methods and obtain good benefits.



The difference between Redundant power supply and UPS power supply

Power redundancy can be adopted in capacity redundancy, redundant cold backup, parallel current sharing N 1 backup, redundant hot backup and other methods. Capacity redundancy means that the maximum load capacity of the power supply is greater than the load, which is of little significance for improving reliability.

Redundant cold backup means that the power supply is composed of modules with multiple functions, which are normally powered by one of them. When it fails, the backup module immediately starts to work. The disadvantage of this method is that there is a time interval for power switching, which causes a voltage gap.

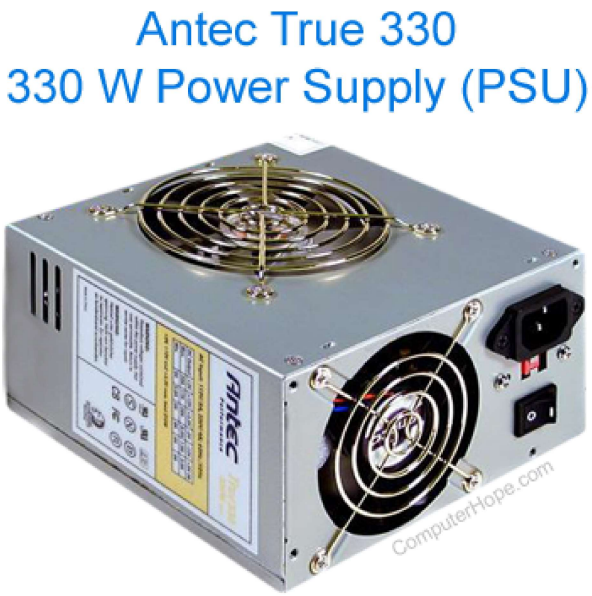
N 1 backup mode with parallel current sharing means that the power supply is composed of multiple units, and each unit is connected in parallel through an OR gate diode, and each unit supplies power to the equipment. This scheme will not affect the power supply of the load when a power supply fails, but will affect the unit when the load end is short-circuited. Redundant hot backup means that the power supply is composed of multiple units and works, but only one of them supplies power to the equipment, and the other is no-load. When the main power fails, the backup power can be immediately turned on, and the output voltage fluctuation is very small.

For a long-term uninterrupted operation, highly reliable systems, such as base station communication equipment, servers, etc., often highly reliable power supply. Redundant power supply design is a key part of it and plays an important role in high systems. The redundant power supply is configured with 2 power supplies. When one power supply fails, other power supplies can be turned on immediately without interrupting the normal operation of the equipment. This is similar to the working principle of the UPS power supply: when the mains power is cut off, the battery replaces the power supply.

The difference between a redundant power supply and a UPS is mainly powered by different power supplies, while the UPS is powered by one power supply and the other is backed up at any time, sometimes automatically switched.

KT0902 Identifying power supplies

How to find the size of a computer power supply

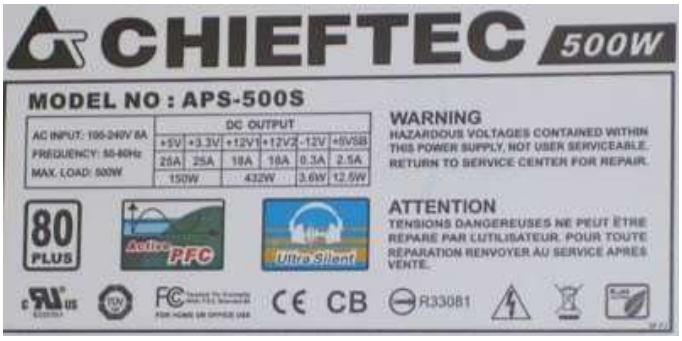


Unfortunately, your power supply does not interact with your motherboard in any way that would communicate its model information. Consequently, you can only determine the total output of a power supply by physically examining it. All power supplies, like the one shown to the right, have a sticker that gives all important specifications. For example, this power supply lists the total output as 330W (watts).

What if my power supply is already installed?

If you have a computer that is already assembled, you can determine how big the power supply is by opening the computer case and examining the unit.

How to open a computer case.



As shown in the image above, this Chief Tec power supply is rated at 500 Watts. Many power supply manufacturers also use the wattage of the power supply in the model number. For example, this power supply's model number is APS-500S, which indicates 500W of total output.

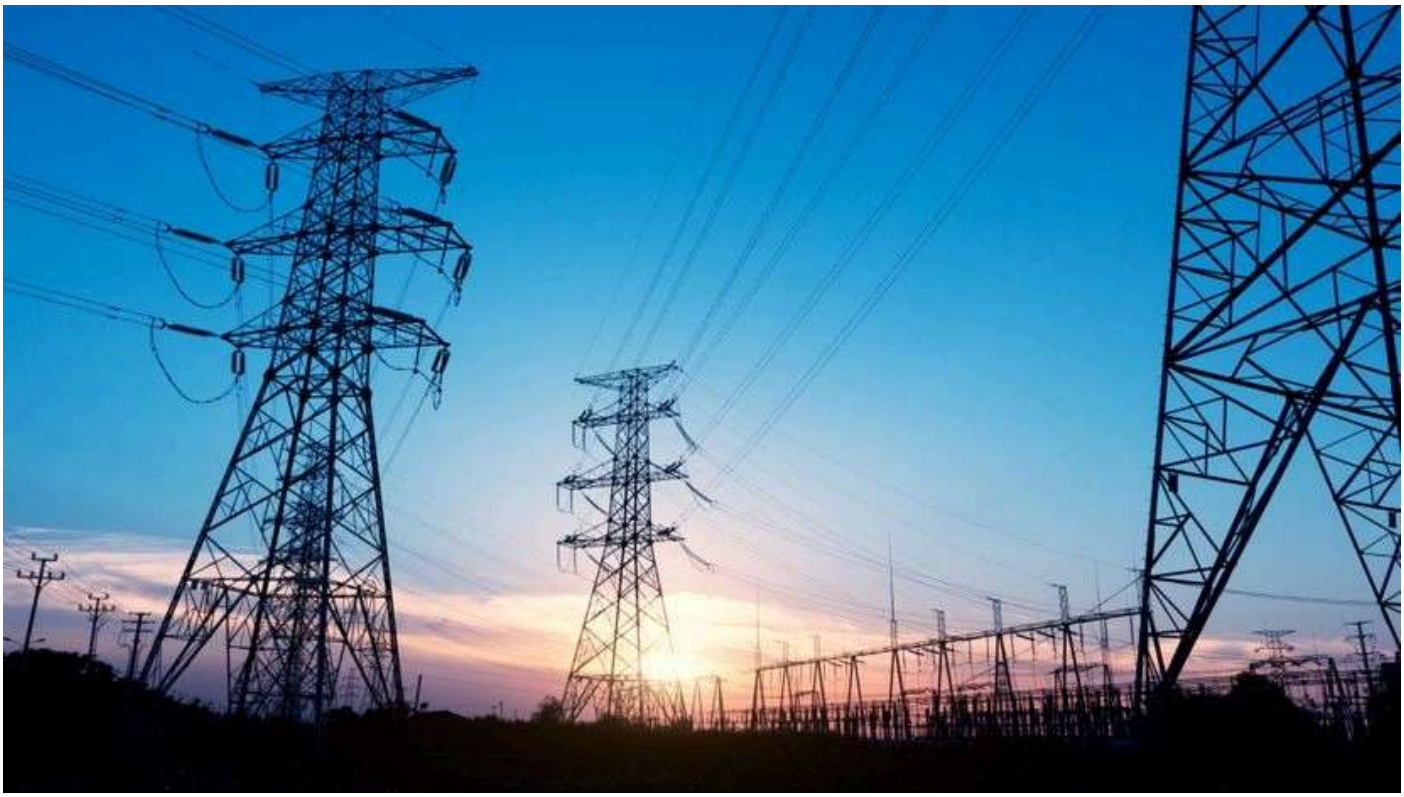
What if I can't see the power supply sticker?

All power supplies are required by UL (formerly known as Underwriters Laboratories) to include a sticker with power ratings on it. If you're unable to locate a sticker on your power supply, the identification may be on the side that is not visible. If this is the case, you need to remove the power supply before being able to identify it. The steps in doing so are listed in the additional information links listed in the next section of this page.

After removing the power supply, if you are still unable to find a sticker with the power ratings, we recommend purchasing a new power supply. A power supply without a sticker on it is dangerous to use. It could be a very low-quality unit and cause damage to your computer

KT0903 Amps, ohms, volts, and watts

What Are Amps, Watts, Volts and Ohms?



Some pylons near a power transform station at sunrise. More voltage in an electrical system makes more current flow. DOWELL/GETTY IMAGES

So much of our daily lives runs on electricity, yet most of us don't know the difference between a 60-watt and 75-watt light bulb, or how voltage from the wall socket supplies enough juice to run both a small desk lamp and a powerful microwave.

The three most basic units in electricity are voltage (V), current (I, uppercase "i") and resistance (R). Voltage is measured in volts, current is measured in amps and resistance is measured in ohms.

A neat analogy to help understand these terms is a system of plumbing pipes. The voltage is equivalent to the water pressure, the current is equivalent to the flow rate, and the resistance is like the pipe size.

There is a basic equation in electrical engineering that states how the three terms relate. It says that the current is equal to the voltage divided by the resistance or I = V/R. This is known as Ohm's law.

Let's see how this relation applies to the plumbing system. Let's say you have a tank of pressurized water connected to a hose that you are using to water the garden.

What happens if you increase the pressure in the tank? You probably can guess that this makes more water come out of the hose. The same is true of an electrical system: Increasing the voltage will make more current flow.

Let's say you increase the diameter of the hose and all of the fittings to the tank. You probably guessed that this also makes more water come out of the hose. This is like decreasing the resistance in an electrical system, which increases the current flow.

Electrical power is measured in watts. In an electrical system power (P) is equal to the voltage multiplied by the current.

The water analogy still applies. Take a hose and point it at a waterwheel like the ones that were used to turn grinding stones in watermills. You can increase the power generated by the waterwheel in two ways. If you increase the pressure of the water coming out of the hose, it hits the waterwheel with a lot more force and the wheel turns faster, generating more power. If you increase the flow rate, the waterwheel turns faster because of the weight of the extra water hitting it.

On the next page, we'll talk more about electrical efficiency.

Electrical Efficiency

Electrical systems are more efficient when a higher voltage is used to reduce current.

In an electrical system, increasing either the current or the voltage will result in higher power. Let's say you have a system with a 6-volt light bulb hooked up to a 6-volt battery. The power output of the light bulb is 100 watts. Using the equation, I = P/V, we can calculate how much current in amps would be required to get 100 watts out of this 6-volt bulb.

You know that P = 100 W, and V = 6 V. So, you can rearrange the equation to solve for I and substitute in the numbers.

I = 100 W/6 V = 16.67 amps

What would happen if you use a 12-volt battery and a 12-volt light bulb to get 100 watts of power?

I = 100 W/12 V = 8.33 amps

So, this latter system produces the same power, but with half the current. There is an advantage that comes from using less current to make the same amount of power. The resistance in electrical wires consumes power, and the power consumed increases as the current going through the wires increases. You can see how this happens by doing a little rearranging of the two equations. What you need is an equation for power in terms of resistance and current. Let's rearrange the first equation:

I = V/R can be restated as V = I*R

Now you can substitute the equation for V into the other equation:

P = V*I substituting for V we get P = I*R*I, or P = I2*R

What this equation tells you is that the power consumed by the wires increases if the resistance of the wires increases (for instance, if the wires get smaller or are made of a less conductive material). But it increases dramatically if the current going through the wires increases. So, using a higher voltage to reduce the current can make electrical systems more efficient. The efficiency of electric motors also improves at higher voltages.

This improvement in efficiency is what drove the automobile industry to consider switching from 12-volt electrical systems to 42-volt systems in the 1990s. As more cars shipped with electric-powered amenities — video displays, seat heaters, "smart" climate control — they required thick bundles of wiring to supply enough current. Switching to a higher-voltage system would provide more power with thinner-gauge wiring.

The switch never happened, because carmakers were able to boost efficiencies with digital technology and more efficient electric pumps at 12 volts. But some new models employ hybrid systems with a separate 48-volt generator to power advanced features like idle shut-off while increasing overall system efficiency.

KT0904 Affecting system hardware and components

Whatever you use your PC for, from playing mini roulette to browsing for the latest bargains, there will always come the point when it behaves unexpectedly. When it’s slow, often people feel powerless to do anything about it. Most of this stems from ignorance about the workings of their PC. This article will help you understand computer speed and what affects it. After reading this article, you’ll know what to look for when you want to increase computer speed and have a machine that runs as smoothly as possible.

NUMBER OF CORES (PROCESSORS)

The CPU is where you’ll find the processing units, each one known as a core. Every core will contain a control unit, ALU, and registers. Usually, a PC will have either two or four cores, and the more you have, the more programs you can run at the same time.

However, if you think that you can double your computer speed by doubling the number of cores, then think again! As they have to communicate with each other, this takes some of the speed away, but in general, increasing the number of cores is a great idea and will boost performance.

MULTIPLE APPLICATIONS AFFECTING COMPUTER SPEED

Any kind of computer speed test will indicate a decrease in performance with an increase in the number of tasks running. Multitasking slows down your PC because applications have less memory to themselves. The more apps running at the same time, the slower your PC will be. It's something to keep in mind when optimizing performance on your machine.

GRAPHICS CARD TYPE

When it comes to visuals, the user interface, pictures, videos, and more, a powerful graphics card is imperative to good performance. If you are using your PC to process a lot of graphics, you may want to know how to speed up computer performance by optimizing your graphics card in the BIOS, or you could purchase a more up-to-date one and swap the old one out. Graphics cards can be used to perform nonvisual computations, too, so don't forget that they are important for general performance.

DATA BUS WIDTH

Between the processor and main memory, you have a series of connectors or wires known as the data bus. This is what helps transport data between these two components. When you increase your bus from 32 to 64 bit, you will be able to transfer at least twice as much at any given time. If you want to improve performance, think about increasing the size of your data bus.

MEMORY CACHE

Computers often reuse actions, so in light of this, the cache is a type of memory that holds temporary instructions so that they needn't be computed unnecessarily. The CPU automatically makes checks in the cache for any instructions before requesting data from the RAM. By doing this, performance is increased because it saves using data unnecessarily. These transfers take a lot less time than a transfer to and from the RAM. The larger the cache, the more data can be stored close to the CPU.

CLOCK SPEED

The clock rate, or clock speed, shows how fast the central processing unit can run. You will find this measured in gigahertz or megahertz, depending on the computer you have. The measurement is an indication of how many instruction cycles the CPU deals with every second. As an example, a 2 GHz CPU can perform 2 billion calculations every second. The larger this number is, the faster the CPU is, and the more heat is produced.

Maximum clock settings are hardcoded by default in PCs. However, you can tweak these by manipulating the computer's BIOS. If you manipulate to increase your clock speed faster than what is advertised, this is known

as overclocking. We would not recommend doing this because there are genuine limits to how fast your CPU can run. There is no guarantee that its circuitry will be able to meet the demands of overclocked speeds. If the speed is too fast, you run the risk of not completing a computation before the next one is carried out. Data can therefore become corrupted if the CPU is not able to keep up with the pace of its clock, and damage can come from overheating the machine.

MALWARE

One of the best ways to speed up computer performance is actually to eliminate malware. Malware, spyware, and viruses can monitor your activity, take control of your computer, and create all sorts of complications that reduce performance.

Anything unwanted and malicious is going to seriously affect performance, so make sure that you invest in a good antivirus to prevent such attacks on your computer. It will seriously help in the long run, and make sure that you scan your computer at least once every week to keep your antivirus updated and remove any unwanted junk from affecting the performance of your computer.

DEFRAGMENTING

Sometimes memory isn't stored efficiently. When you run a defragmenter, fragmented data is rearranged so that your drives and disks can work more productively. With more space on them, this will also improve performance. Most defragmenters run on a schedule, so if you haven't configured defragmentation to run regularly on your computer, then do so today.

Internal Assessment Criteria and Weight

• IAC0901 Power supply and the effect on system hardware and components are explained

(Weight 5%)

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