

كلية المنصور الجامعة



Al-Mansour University College

قسم الإعلام الرقمي
المرحلة الرابعة

اساسيات الحوسبة السحابية

2023– 2022

4

1000

Al-Mansour University College





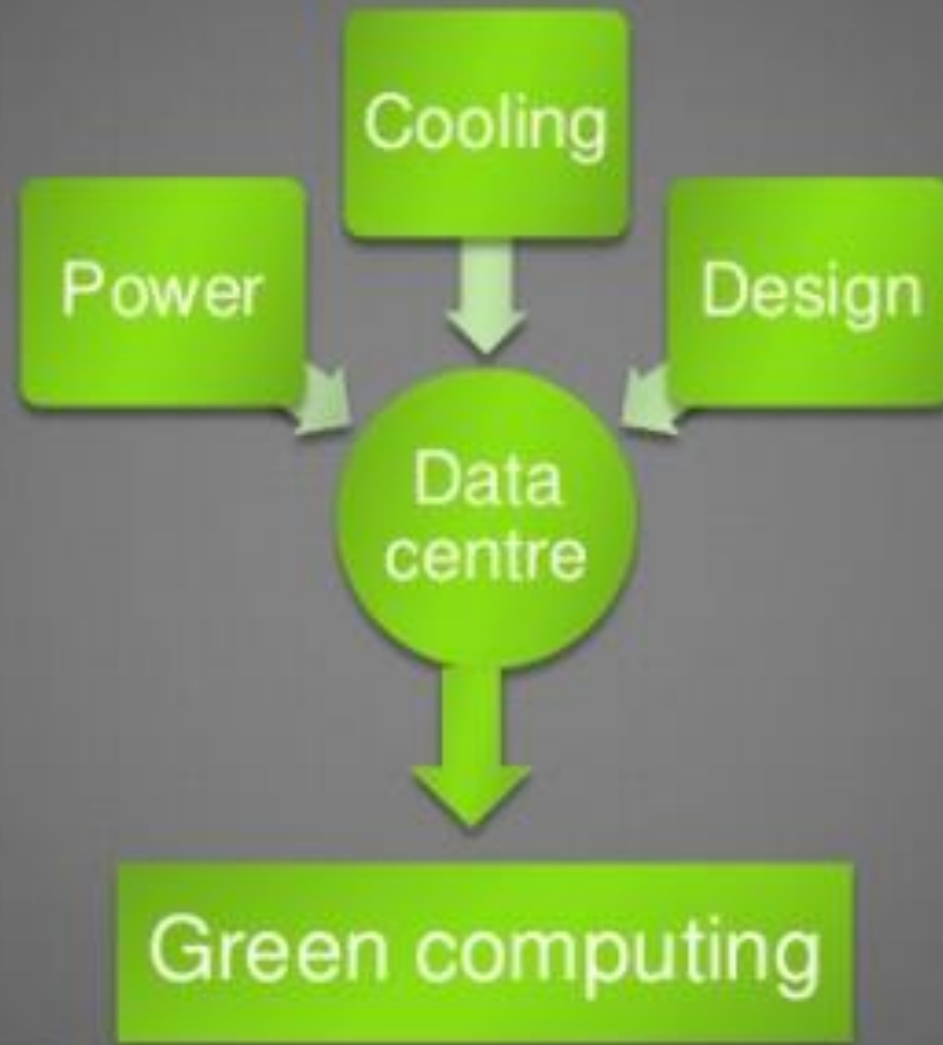
- Green cloud computing is simply an approach where companies can use what they already have smartly to minimize energy consumption and overall carbon footprint.

You can observe green cloud computing from two perspectives:

- Green hardware.** This includes energy-efficient and environmentally friendly information and communications technology (ICT) tools such as servers, network appliances, and storage devices used in datacenters. It also comprises the power supply units, the cooling equipment, and the building that houses these components.

- Green software engineering methodologies.** This includes all the applications that manage datacenters and other cloud-based services. The main idea behind green software engineering methodologies is to build reliable applications that not only meet organizations' requirements but are also energy efficient. For example, developers can implement code and architectural changes that reduce GHG emissions consumed by the applications.

GREEN CLOUD COMPUTING MODEL



OBJECTIVES OF GREEN CLOUD COMPUTING :

- Minimizing energy consumption
- To design an advance securable cloud environment
- Enhanced Scalability and performance simulations
- Purchasing Green energy
- Minimizing equipment and disposal requirement

Optimizes Efficient Resource Provisioning

- Traditionally, IT teams deployed more servers, network appliances, and storage devices than needed in an on-premises IT infrastructure. Sometimes organizations had difficulties understanding and predicting peak loads and demand growth, so they simply bought enough IT components to be safe.
- With cloud computing, an organization can achieve more efficient server utilization rates, enhanced workload flexibility, and more energy-efficient infrastructures than in on-premises IT environments. According to Accenture, organizations that have transitioned their workloads to efficient cloud solutions can save between [30% and 40% on the total cost of ownership \(TCO\)](#) compared to those that use on-premises IT infrastructures.

Offers Multi-tenancy Advantages

- Shared IT infrastructures—or [multi-tenancy environments](#)—are more efficient in their operations than autonomous components. Just as many tenants in an apartment building often utilize less electricity than the same number of people residing in their own homes, multiple tenants in a cloud-based infrastructure minimize the energy consumption and associated carbon footprint.
- Cloud computing can also save energy by enhancing server utilization—the percentage of time that applications actively use the server’s capacity. Usually, large-scale cloud service providers (CSPs) run their infrastructures at higher utilization rates than corresponding on-premises IT architectures.

Dematerializes and Decreases Overall Carbon Emissions

- When you opt for an on-premises IT setup, the materials you'll use to build it go a long way in generating GHG emissions in their lifecycles. You also emit gases when you assemble and transport the equipment at the on-premises datacenter. As users utilize the equipment, more energy gets consumed, and the associated carbon emissions increase.**

- **Cloud computing allows companies to decrease their carbon emissions through dematerialization, replacing physical products with virtualized alternatives. Replacing physical IT components with virtual ones can significantly reduce energy consumption levels and associated GHG emissions. The environmental argument for cloud-based services is strong, especially for companies that migrate their services to public clouds such as Azure, Google Cloud Platform, or Amazon Web Services (AWS). According to Accenture, public clouds can help the world reduce total carbon emissions by approximately [5.9%](#). This is akin to taking 22 million vehicles off the road. These findings echo the [metrics](#) that Google has published, showing how clean its cloud regions are worldwide.**

How Can You Migrate to Sustainable Green Cloud Computing?

- You can use these three strategies to migrate to a sustainable green cloud:
- **Virtualization.** Virtualization is the solution that resolves the problem of enormous electricity consumption by on-premises datacenters. For example, an organization can leverage [server virtualization](#) to run multiple virtual machines (VMs) on the same physical server. This essentially partitions the physical host into numerous virtual servers, allowing the organization to achieve significant cost savings.
- An organization can also use [desktop virtualization](#) solutions such as Parallels® Remote Application Server (RAS) to deliver virtual applications and desktops to employees in remote locations. Employees can, in turn, use low-end devices that don't consume much power, such as [thin clients](#), to access these resources from any location.