Amirkabir University of Technology
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Cloud Computing

Benefits and Drawbacks

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Benefits of Cloud Computing

No up-front commitments

- IT assets are turned into utility costs, which are paid for as long as they are used, ***not paid for up front***.

Reduced capital and operational cost

- Capital costs are costs associated with assets that need to be paid in advance to start a business activity.

Reduced capital and operational cost (cont.)

Before cloud

- IT infrastructure and software generated capital costs.
- The revenue of the business is the utilized to compensate over time for theses costs.
- A server bought today for $1,000 will have a market value less than its original price when it is eventually replaced by new hardware.

Reduced capital and operational cost (cont.)

Cloud computing

- CC significantly contributing to increasing a company's net gain.
- Small organizations and start-ups ***do not need large investments*** to start their business.
- Maintenance costs are significantly reduced.

On-demand access

- “Users can automatically arrange for cloud computing resources according to their needs and demands, without needing to communicate first with their cloud service provider”

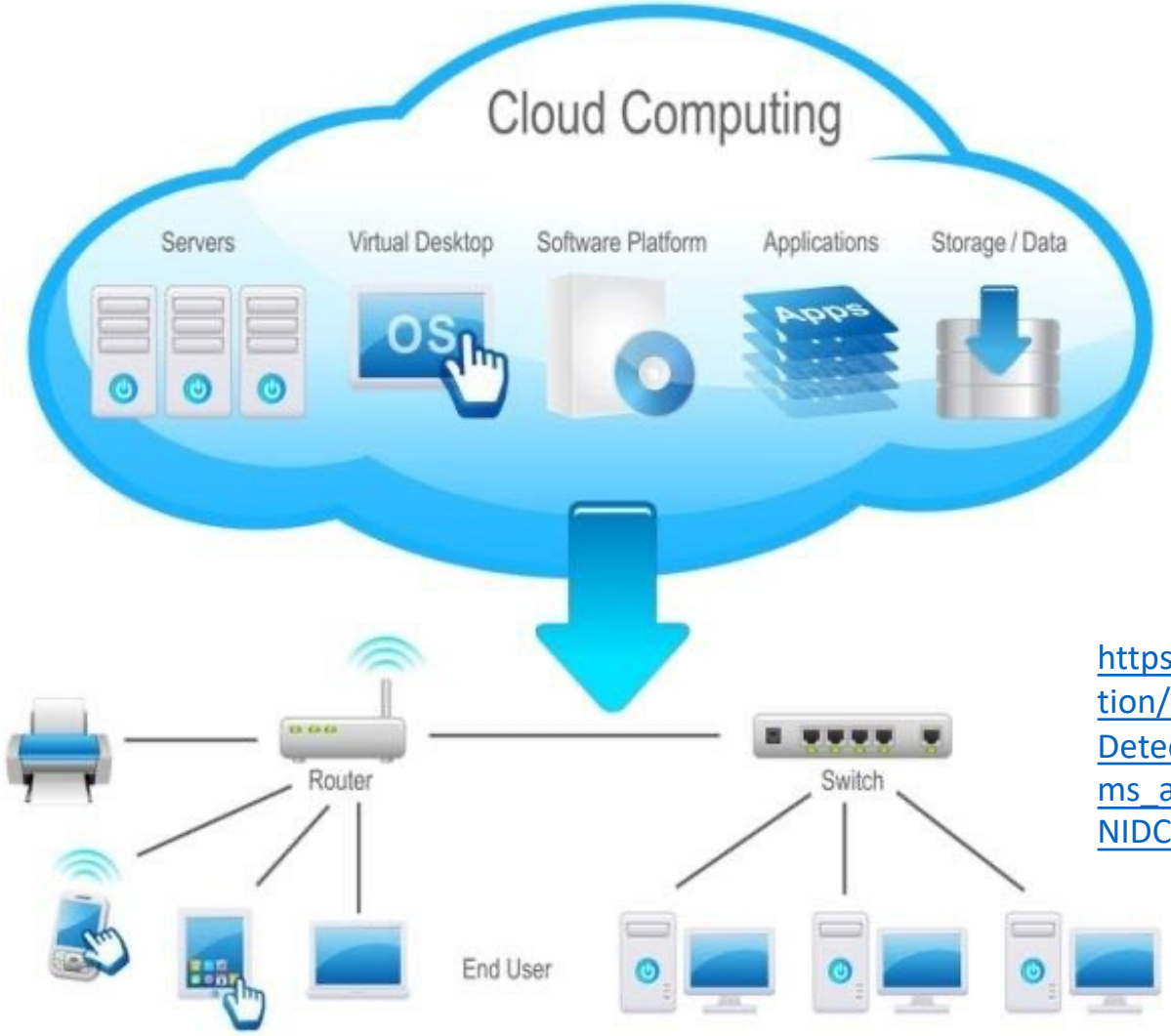
https://www.trendmicro.com/vinfo/id/security/news/security-technology/the-cloud-what-it-is-and-what-it-s-for

Scalability

- By leveraging the potentially huge capacity of cloud computing, organizations can ***extend their IT capability more easily***.
  - PaaS providers offer runtime environment and programming models ***designed to scale applications***.
  - SaaS offerings can be ***elastically size on demand*** without requiring users to provision hardware or to program application for scalability.

https://www.bluepiit.com/blog/on-demand-scalability-one-of-the-pre-dominant-advantages-of-cloud-migration/

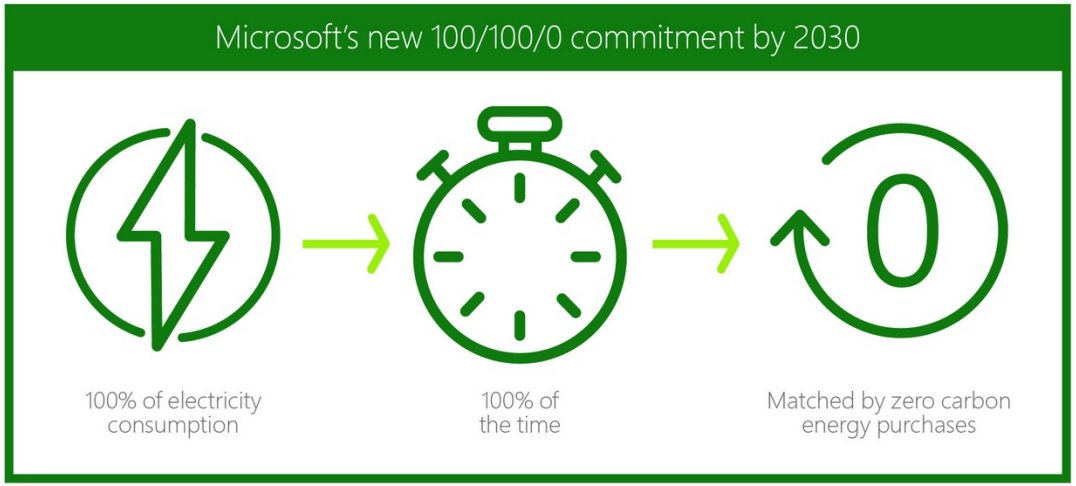
Availability of vast cloud resources for every kind of application



https://www.researchgate.net/publication/270992697_Network_Intrusion_Detection_in_Virtual_Network_Systems_and_Countermeasure_Selection_NIDCS/figures?lo=1

Efficient resource allocation and energy efficiency

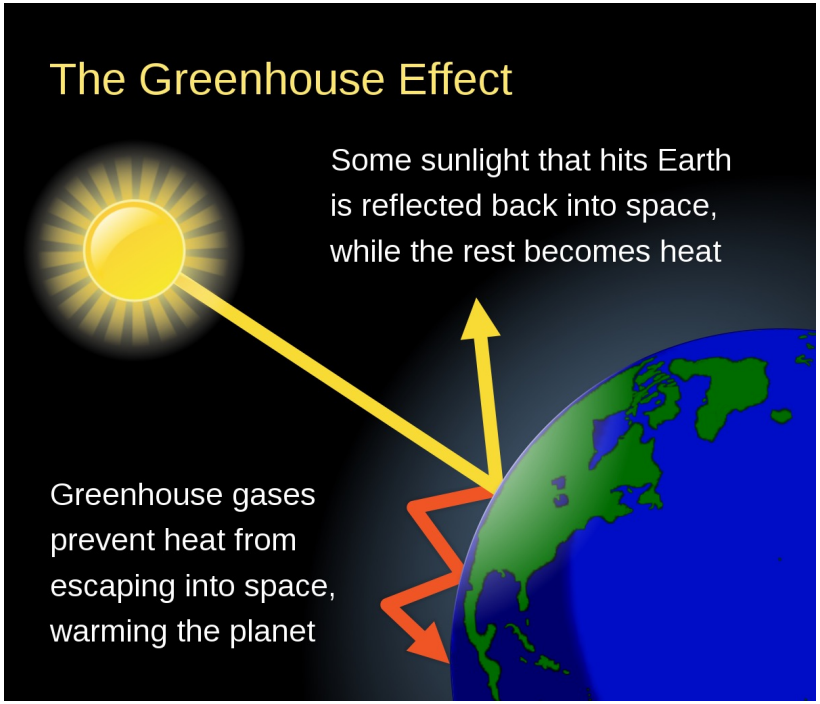
- ***Multitenancy*** allows for better utilization of the shared infrastructure that is kept operational and fully active.
- The ***concentration of IT infrastructure*** and services into ***large data centers*** also provides opportunity ***for considerable optimization in terms of resource allocation and energy efficiency.***



https://blogs.microsoft.com/blog/2021/07/14/made-to-measure-sustainability-commitment-progress-and-updates/

Efficient resource allocation and energy efficiency

- *The energy efficiency benefit* can eventually lead to a ***less impacting approach on the environment***.
  - Please learn and contribute to ***green computing***.



Drawbacks of Cloud Computing

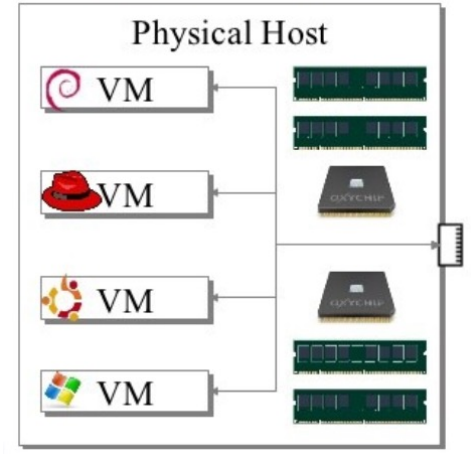
Security and Privacy

- Organizations ***do not own the infrastructure*** they use to process data and store information.
  - What if cloud provider is ***untrusted or malicious***?
- ***This condition poses challenges for confidential data***, which organizations cannot afford to reveal.

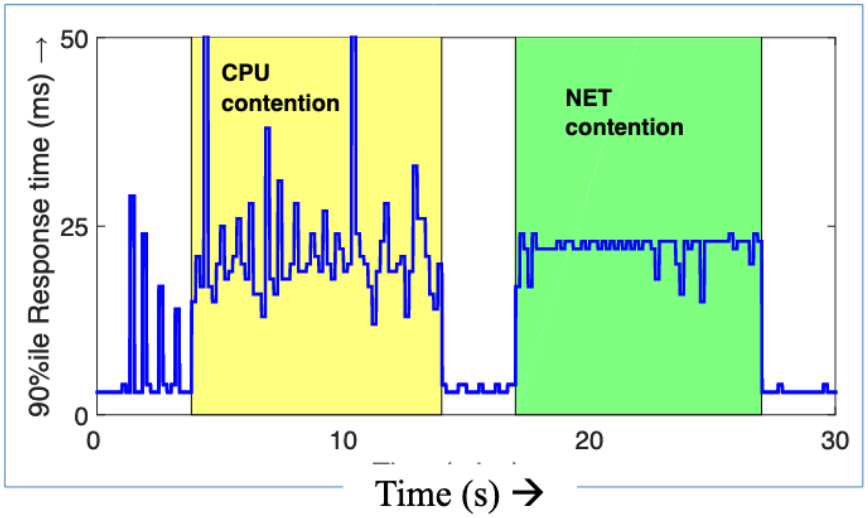
https://searchcloudsecurity.techtarget.com/tip/Top-cloud-security-challenges-and-how-to-combat-them

Performance unpredictability

- Virtual Machines (VM) share underlying Physical Machine (PM) resources.
- VMs requests might contend for shared resources.



Web application under interference on OpenStack



Other drawbacks

- Interoperability and standardization
- Availability and reliability of service
- Vendor lock-in
- Need for a reliable, high-speed network access