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# Introduction to troubleshooting and the future of networking

**General Terminologies :**
- **Error Detection :** The ability for a protocol or program to determine that something went wrong.
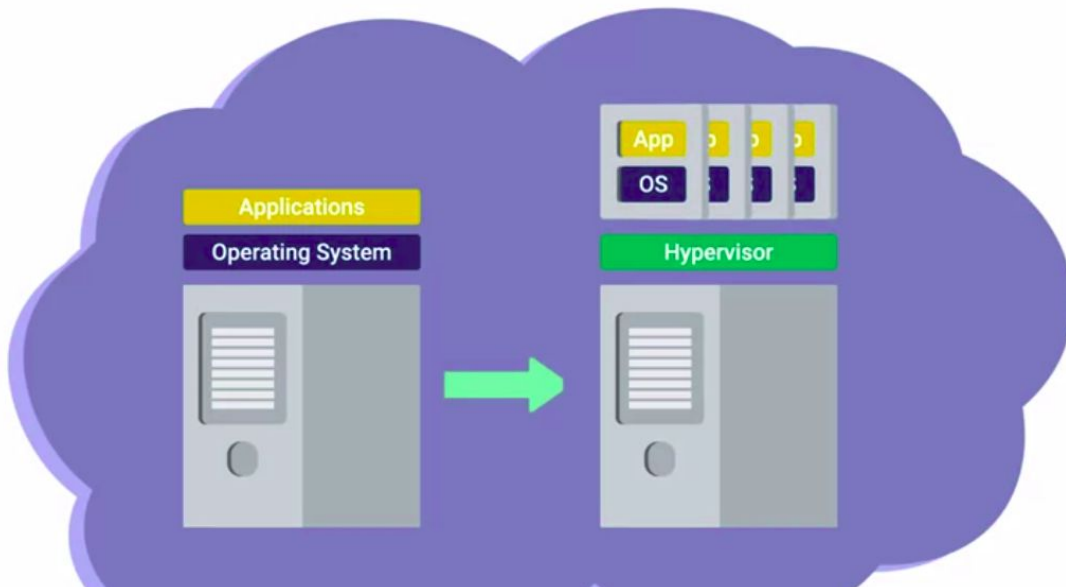- **Error Recovery :** The ability for a protocol or program to fix it.

**Verifying Connectivity**
- **Ping :** It is a Internet Connect Message Protocol (ICMP). Ping lets you send a special type of ICMP message called an "*echo request*". If the destination is up and running and able to communicate on the network, it'll send back an ICMP echo reply message type.
- **Traceroute :** A utility that lets you discover the path between two nodes, and gives you information about each hop along the way.

**Cloud Computing**

A technological approach where computing resources are provisioned in a shareable way, so that lots of users get what they need, when they need it. Heart of cloud computing is a technology known as hardware virtualization. Hardware virtualization is a core concept of how cloud technologies work.
- **Virtualization :** A single physical machine called a *host,* could run many individual virtual instances called *guests.*
- **Hypervisor :** A piece of software that runs and manages virtual machines, while also offering thes guests a virtual operating platform that's indistinguishable from actual hardware.



- **Types of Cloud**
  - **Public cloud :** A large cluster of machines run by another company.
  - **Private cloud :** Used by a single large corporation & generally physically hosted on its own premises.

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- ○ **Hybrid cloud :** A term used to describe situations where companies might run important on private cloud, less sensitive things in a public cloud.

**IPv6 Addressing & Subnetting**

The big difference between IPv4 & IPv6 is the number of bits reserved for an address.

- **IPv4** : 32 bits (Four Octets of decimal : 8 bits * 4 = 32 bits)
- **IPv6** : 128 bits (8 Groups of 16 bit each : 16 bits * 8 = 128 bits)

Two rules are followed to shorten the IPv6 addresses

1. Remove leading zeros from every octets.
2. Replace zero with **":".**

   **Eg :** 2001;0db8:0000:0000:0000:ff00:0012:3456

   **First rule :**

   2001: db8:0:0:0:ff00:12:3456

   **Second rule :**

   2001:db8::ff00:12:3456