Clock synchronization is a topic in computer science and engineering that aims to coordinate otherwise independent clocks. Even when initially set accurately, real clocks will differ after some amount of time due to clock drift, caused by clocks counting time at slightly different rates.

Various Applications where Time Synchronization is Essential?

- **Banking**
- **Finance**
- **Power**
- **Telecom**
- **IT & Networking**
- **Defence**
- **Broadcast and Media**
- **R&D Labs & Industrial Automation**

Different ways of getting Timing Data

1. **Internet or Public Time server**
2. **Dedicated or In-house Time server**

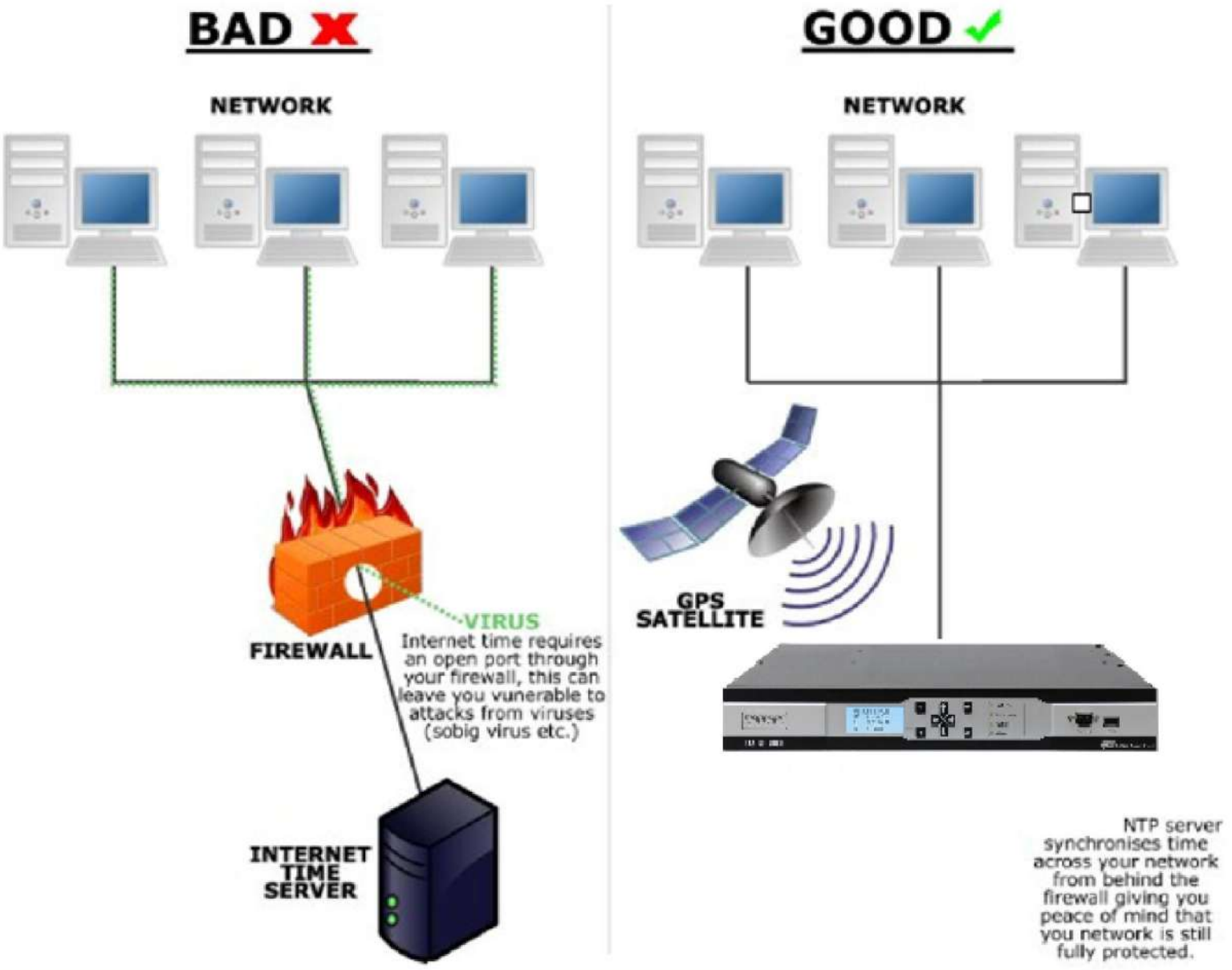
Internet Time server:

Internet Time Server (or a Public Time Server) is a time server connected to the Internet that is available for public use to provide timing data.

Dedicated Time server :

A Time server is an appliance that is synchronized by a high precision time source like GPS or other types of radio clocks. The Network Time Server then distributes the time information to a computer network.

COMPARISON



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Factors of consideration while choosing Time server

The decision between using a public time server or an in-house time server depends on different factors and actions:

- **Availability**
  Does your own network have a connection to the internet? An unblocked UDP port 123 is absolutely necessary to be able to use a public time server (firewall, DMZ, etc.)

- **Reliability**
  Would you rather trust a public time source, which can easily be manipulated by an attacker, or your own hardware which is more or less save from manipulation, since it is installed in your own company and you are the only one who can control it and has access to it? Not to forget that the redundancy due to several time sources, would guarantee you a permanent time signal reception.

- **Possibilities of notification**
  By using an in-house time server you have the possibility to detect reception disturbances or other problems and receive notifications via SNMP or E-mail. This fact allows you to receive notifications contemporary, so that you have enough time to fix the occurred disturbance. Public time servers will sometimes not even send you a notification if there is a disturbance and if they do it might already be too late for you to react in time.

- **Accuracy**
  Compared to a public time server the package lead times of an in-house time server are relatively stable by using a single time server or more time servers in your own network, which in general enables a higher accuracy. Although public time servers use very good filter mechanisms to reduce the impact of disturbances, you should choose an in-house time server to be on the safe site.