**Simple Demo to illustrate resource utilization**

Server Hardware:

Central Processing Unit (CPU)

Memory

Disk

Network

The CPU is the brain of the computer. As it gets more requests, it must work harder and faster at answering the queries

The memory is the ‘space’ that is needed for the application for to ‘OPEN’. Analogy: a small physical desk can hold two or three pages of Time magazine. As you get into opening larger newspaper, you will need more ‘space on that desk’

The disk is the warehouse and placing the boxes next to each other for retrieval is easier than scatters around the large warehouse. That is the I/O of the system. The less I/Os the better for performance

Network is the ‘highway’ for sending and getting data bits. The NIC card and the channels for communication between resources gets bottle necked if there are large amounts of data to be sent or retrieved. A faster highway lane with many booths can handle the traffic better than a single booth

One of the prime purpose of the Perfmon is to discover bottlenecks. Thus, we must first understand what is a bottleneck?

A bottleneck occurs when simultaneous access BY APPLICATION OR USERS to shared resources such as (CPU, memory, disk, network or other resources) causes an overload for the resources. This demand on shared resources can cause poor response time and must be identified and tuned by the DBA. The tuning can be either hardware upgrade, application tuning or both. Monitoring SQL Server performance is a complex task, as performance depends on many parameters, both hardware and software

What causes bottleneck:

* Insufficient hardware resources which may require upgrade or replacement
* Resources are not distributed evenly; an example being one disk is being monopolized
* Incorrectly configured resources such as application or ill designed databases

Some of the key areas to monitor to identify bottlenecks are as follows:

* CPU utilization
* Memory usage
* Disk input/output (I/O)
* User connections
* Blocking locks

**So now that we know what resources to monitor, how should we begin?**

Before going out and buying a faster server or upgrading the existing server with faster CPUS, more memory and faster disks, obtain a baseline of metrics. And always rule out software issues first such as poorly designed databases and insufficient indexes

**Start with obtaining a performance baseline.**

You monitor the server over time so that you can determine Server average performance, identify peak usage, determine the time required for backup and restore activities, and so on. This gives you a baseline from which you can judge the server against to determine if you have a performance bottleneck. This may be a weekly or monthly set of metrics that you obtain. Each depends upon you environment.