**IT Infrastructure Management**

**Week 11 Assignment**

1.What are the major Performance metrics commonly collected in a server environment during the P and T process? Explain each noe of them.

## Answer 1: Performance Metrics

Performance metrics are quantitative indicators that measure the performance of a system or an application in terms of speed, reliability, availability, scalability, etc. Performance metrics help to identify and resolve performance issues, optimize performance, and ensure service level agreements.

**Server Environment**

A server environment is the set of hardware and software components that run a server application and provide services to clients over a network. A server environment can include physical or virtual servers, operating systems, applications, databases, networks, etc.

**Performance Metrics for Server Environment**

There are many performance metrics that can be collected in a server environment during the performance and tuning process. Some of the major ones are:

* **CPU utilization**: This metric measures the percentage of CPU time that is used by the server application or process. It indicates how busy the CPU is and how much processing power is available. A high CPU utilization can indicate a CPU bottleneck or a CPU-intensive application or process. A low CPU utilization can indicate an underutilized CPU or a poorly configured application or process.
* **Memory usage**: This metric measures the amount of physical or virtual memory that is used by the server application or process. It indicates how much memory is available and how much memory is allocated or freed. A high memory usage can indicate a memory leak or a memory-intensive application or process. A low memory usage can indicate an underutilized memory or a poorly configured application or process.
* **Disk space**: This metric measures the amount of disk space that is used or free on the server. It indicates how much storage capacity is available and how much storage space is consumed by the server application or data. A high disk space usage can indicate a disk bottleneck or a disk-intensive application or data. A low disk space usage can indicate an underutilized disk or a poorly configured application or data.
* **Disk I/O**: This metric measures the amount of data that is read from or written to the disk by the server application or process. It indicates how fast the disk can perform input/output operations and how much disk activity is generated by the server application or data. A high disk I/O can indicate a disk bottleneck or a disk-intensive application or data. A low disk I/O can indicate an underutilized disk or a poorly configured application or data.
* **Network bandwidth**: This metric measures the amount of data that is sent from or received by the server over the network. It indicates how fast the network can transfer data and how much network traffic is generated by the server application or data. A high network bandwidth can indicate a network bottleneck or a network-intensive application or data. A low network bandwidth can indicate an underutilized network or a poorly configured application or data.
* **Network latency**: This metric measures the time it takes for data to travel from one point to another over the network. It indicates how responsive the network is and how much delay is experienced by the server application or data. A high network latency can indicate a network bottleneck or a network-intensive application or data. A low network latency can indicate an optimized network or a well-configured application or data.
* **Requests per second**: This metric measures the number of requests that are received by the server from clients over a period of time. It indicates how busy the server is and how much load it can handle. A high requests per second can indicate a high demand for the server service or a well-performing server application. A low requests per second can indicate a low demand for the server service or a poorly performing server application.
* **Response time**: This metric measures the time it takes for the server to process and respond to a request from a client. It indicates how fast the server is and how satisfied the clients are with the server service. A low response time can indicate a high performance of the server application or process. A high response time can indicate a low performance of the server application or process.

2.An online banking application encompasses a complete IT infrastructure management system. For such an application, analyze the possibility of introducing the following two scenarios. One, usage of Storage Area Networks as part of the application. Second, usage of Network Attached Storage as part of the application. Compare the impact of these two scenarios.

## Answer 2: SAN and NAS

SAN and NAS are two types of network-based storage solutions that provide shared access to data for multiple users or applications. SAN stands for Storage Area Network, which is a dedicated network of storage devices that provides block-level access to data. NAS stands for Network Attached Storage, which is a file-level storage server that connects to a common network.

**SAN Scenario**

In this scenario, an online banking application can use a SAN to store and manage its data on a separate network from the application servers. This can provide the following benefits:

* High performance: A SAN can deliver fast and low-latency data access and transfer using high-speed Fibre Channel or Fibre Channel over Ethernet protocols. A SAN can also support parallel processing and load balancing for multiple applications or servers.
* High availability: A SAN can provide redundancy and fault tolerance for data storage using RAID, mirroring, replication, or backup techniques. A SAN can also ensure data availability even if an application server or a network device fails.
* High scalability: A SAN can provide large storage capacity and easy expansion by adding more storage devices or switches to the network. A SAN can also support storage virtualization and consolidation by pooling and allocating storage resources dynamically.

However, a SAN scenario can also have some drawbacks, such as:

* High cost: A SAN can be expensive to acquire, maintain, and operate due to the need for specialized hardware, software, cables, and personnel. A SAN can also consume more power and space than other storage solutions.
* High complexity: A SAN can be complex to configure, manage, and secure due to the need for multiple components, protocols, standards, and policies. A SAN can also pose compatibility or interoperability issues with different vendors or devices.

**NAS Scenario**

In this scenario, an online banking application can use a NAS to store and manage its data on the same network as the application servers. This can provide the following benefits:

* Low cost: A NAS can be affordable and easy to deploy and maintain due to the use of standard hardware, software, and network protocols. A NAS can also consume less power and space than other storage solutions.
* Low complexity: A NAS can be simple to configure, manage, and secure due to the use of common file systems, interfaces, and access controls. A NAS can also support compatibility or interoperability with different platforms or devices.

However, a NAS scenario can also have some drawbacks, such as:

* Low performance: A NAS can deliver slow or inconsistent data access and transfer due to the use of Ethernet or TCP/IP protocols. A NAS can also suffer from network congestion or latency due to the shared network bandwidth with other applications or servers.
* Low availability: A NAS can provide limited redundancy and fault tolerance for data storage due to the reliance on a single device or server. A NAS can also face data unavailability if the network device or connection fails.
* Low scalability: A NAS can provide limited storage capacity and difficult expansion due to the dependence on a single device or server. A NAS can also face storage fragmentation or isolation due to the lack of storage virtualization or consolidation.

**Comparison**

The table below summarizes the comparison between the SAN and NAS scenarios for an online banking application.

| **Criteria** | **SAN Scenario** | **NAS Scenario** |
| --- | --- | --- |
| Performance | High | Low |
| Availability | High | Low |
| Scalability | High | Low |
| Cost | High | Low |
| Complexity | High | Low |