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**CTI 140. 0001 Virtualization Concepts**

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**Topic Assignment: Capacity Planning -CPUs**

**Question 1:**

**Given Information:**

* The virtualization host has **4 processors**, each with **4 cores**.
* Each core supports **18 vCPUs**.
* **20% of the total CPU capacity must be reserved** for growth and performance spikes.

**Step 1: Calculate the Total Number of Cores**

To determine the total number of cores available on the host:

4 CPUs×4 cores per CPU=16 total cores

**Step 2: Calculate the Total vCPU Capacity**

Since each core supports **18 vCPUs**, the total vCPU capacity is calculated as follows:

16 cores×18 vCPUs per core=288 total vCPUs

**Step 3: Reserve 20% of the CPU Capacity**

To account for the required 20% reserve:

288×0.20=57.6 vCPUs reserved

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**Step 4: Determine the Number of Single vCPU Virtual Machines**

Since each virtual machine (VM) requires **1 vCPU**, the total number of single vCPU VMs that can be deployed is:

**230 VMs**

So, the final answer to question 1 will be **230 single vCPU virtual machines.**

**Question 2**

**Given Information:**

* The upgraded virtualization host now has **4 processors**, each with **8 cores**.
* Each core still supports **18 vCPUs**.
* **20% of the total CPU capacity must be reserved**.
* The system must also support **17 virtual machines**, each requiring **4 vCPUs**.

**Step 1: Calculate the Total Number of Cores**

The total number of cores on the upgraded host is:

4 CPUs×8 cores per CPU=32 total cores

**Step 2: Calculate the Total vCPU Capacity**

Since each core supports **18 vCPUs**, the total vCPU capacity is:

32 cores×18 vCPUs per core=576 total vCPUs

**Step 3: Reserve 20% of the CPU Capacity**

To reserve 20% for growth and performance spikes:

576×0.20=115.2 vCPUs reserved

576−115.2=460.8≈460 usable vCPUs

**Step 4: Subtract the vCPUs Required for the 17 Larger VMs**

Each of the **17 VMs** requires **4 vCPUs**, so the total vCPU allocation for these VMs is:

17 ×4=68 vCPUs

After allocating resources for these VMs, the remaining vCPUs available are:

460 − 68=392 usable vCPUs

**Step 5: Determine the Number of Single vCPU Virtual Machines**

Since each remaining VM requires **1 vCPU**, the total number of single vCPU VMs that can be deployed is:

**392 VMs**

So, the final answer to question 2 will be **392 single vCPU virtual machines.**

**Final Answer:**

1. **230 single vCPU VMs** with quad-core processors
2. **392 single vCPU VMs** with eight-core processors after accounting for the **17 four-vCPU VMs**

As a **Cloud Infrastructure student, Olashile Agaba**, I approached these virtualization capacity problems with a structured calculation method to determine the number of virtual machines (VMs) that can be deployed while maintaining a **20% CPU reserve**.

By carefully following the math and understanding **virtualization constraints**, I determined the **optimal number of VMs** deployed on each host while ensuring **performance reserves for future growth**.

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