In Microsoft Azure, **ACU (Azure Compute Unit)** and **vCPU (Virtual CPU)** are key metrics used to describe and measure the computing power and performance of virtual machines (VMs). Here's what they mean:

**1. ACU (Azure Compute Unit)**

* **Purpose**: ACU provides a performance benchmark to compare the relative processing power of different VM sizes in Azure.
* **Meaning**: It helps users understand how much computational power a specific VM type offers relative to a standard baseline. The ACU baseline is generally defined as the performance of an older processor, like an Intel Xeon E5-2673 v3.
* **Example**:
  + A VM with 100 ACU is roughly equivalent to the baseline processor's performance.
  + A VM with 200 ACU provides about twice the performance of the baseline.
  + Higher ACU values mean more powerful processors, often equipped with newer generations of CPUs.
* **Use**: Use ACU to make informed decisions when selecting VM sizes for workloads, especially when performance comparisons are necessary.

**2. vCPU (Virtual CPU)**

* **Purpose**: vCPU refers to the number of logical CPUs allocated to a virtual machine in Azure.
* **Meaning**: Each vCPU corresponds to a thread in the physical CPU core of the host machine.
  + For example, if the underlying physical CPU has Hyper-Threading enabled, each core might support two vCPUs.
* **Implications**:
  + More vCPUs generally allow a VM to handle more tasks simultaneously or execute tasks faster, assuming sufficient memory and other resources.
  + The number of vCPUs affects licensing costs for software that is licensed per CPU core.
* **Example**:
  + A VM with 2 vCPUs can handle twice the number of threads simultaneously compared to a VM with 1 vCPU, under ideal conditions.

**Differences and Relationship**

* **ACU** measures performance relative to a baseline, while **vCPU** specifies the count of logical processors available to the VM.
* Two VMs with the same vCPU count can have different ACU scores, depending on the type of physical CPU, clock speed, and architecture.

**How to Choose Between VM Sizes**

When selecting an Azure VM size:

1. Use **ACU** for performance comparisons if you are running CPU-intensive workloads.
2. Use **vCPU count** to determine the concurrency capacity and software licensing requirements.

By considering both metrics together, you can optimize the cost-performance ratio for your Azure deployments.