Cloud Infrastructure Week#3

Emrah Mutlu

January 2024

AGENDA – WEEK#3

- Cloud Computing Services
  - Virtual Machines (VMs)
  - Virtual Machine Scale Sets (VMSS)
  - Dedicated Hosts
  - Virtual Desktop Solutions & RDS
  - Azure VMWare Cloud Solution
  - High Performance Computing (HPC)
  - App Services

- Lab Sessions:
  - Lab: Testing compute instances on Cloud

Orion Innovation

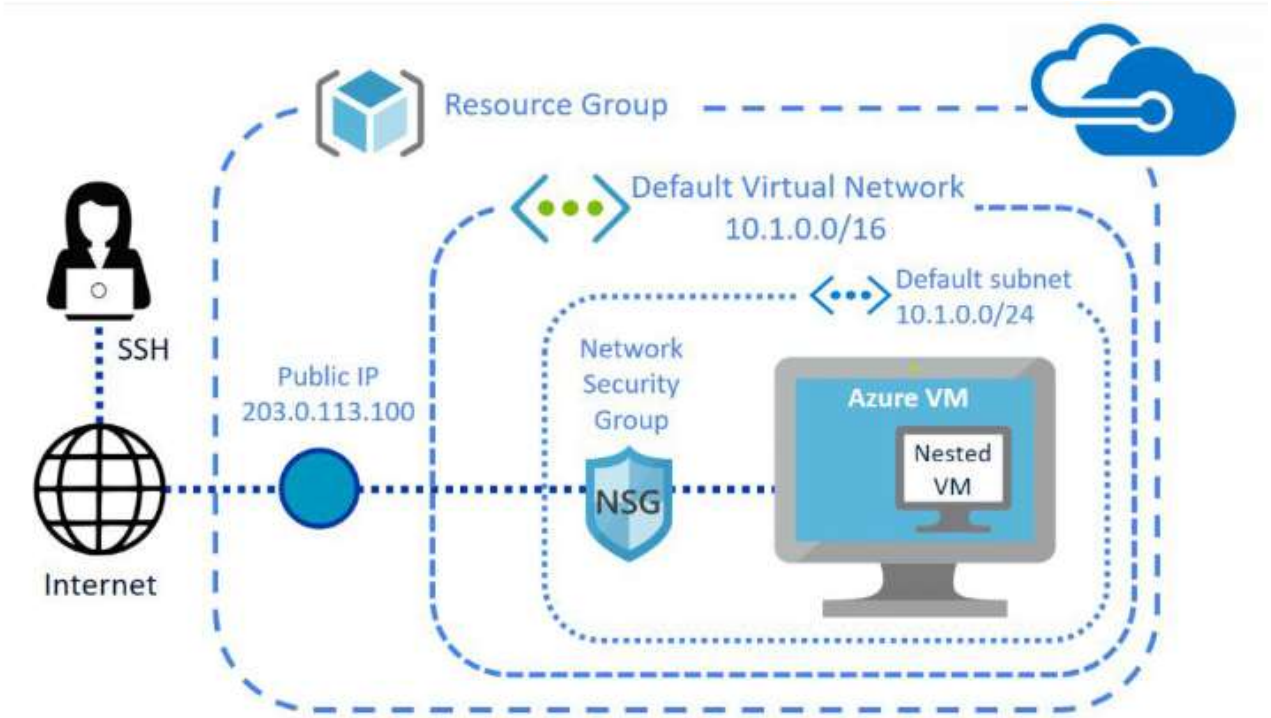
Computing Services

CLOUD COMPUTING

- Cloud vendors (Azure) provide the following Compute resources:
  - Virtual Machines (VMs)
  - Virtual Machine Scale Sets (VMSS)
  - Dedicated Hosts
  - Virtual Desktop Solutions & RDS
  - Azure VMWare Cloud Solution
  - High Performance Computing (HPC)
  - App Services
- Week#4:
  - Container Instances
  - Kubernetes (K8s) Services / AKS
  - Serverless Solutions
- Infrastructure Automation:
  - Homework

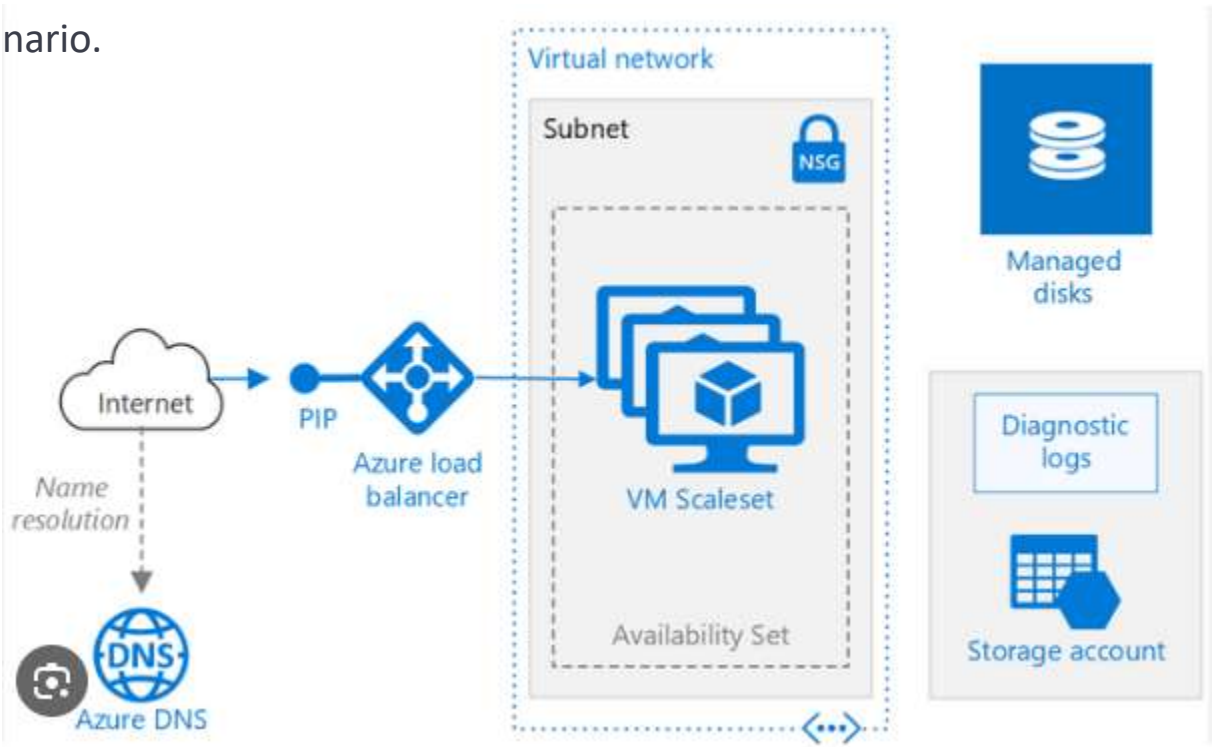
VIRTUAL MACHINES

- The simplest way to use the cloud compute resources. You could build and use virtual machines in the Cloud in a few minutes.
- The type is IaaS; therefore, the user needs to maintain the O/S, middleware, application, etc.
- VMs are ideal when you need;
  - Total control of the O/S
  - The ability to run the custom software
  - To use custom hosting configurations
- Use cases:
  - Testing and Development
  - Running apps on Cloud
  - Extending the existing datacenter to the Cloud
  - Disaster recovery purposes
- Moving to VM Method: Lift & Shift



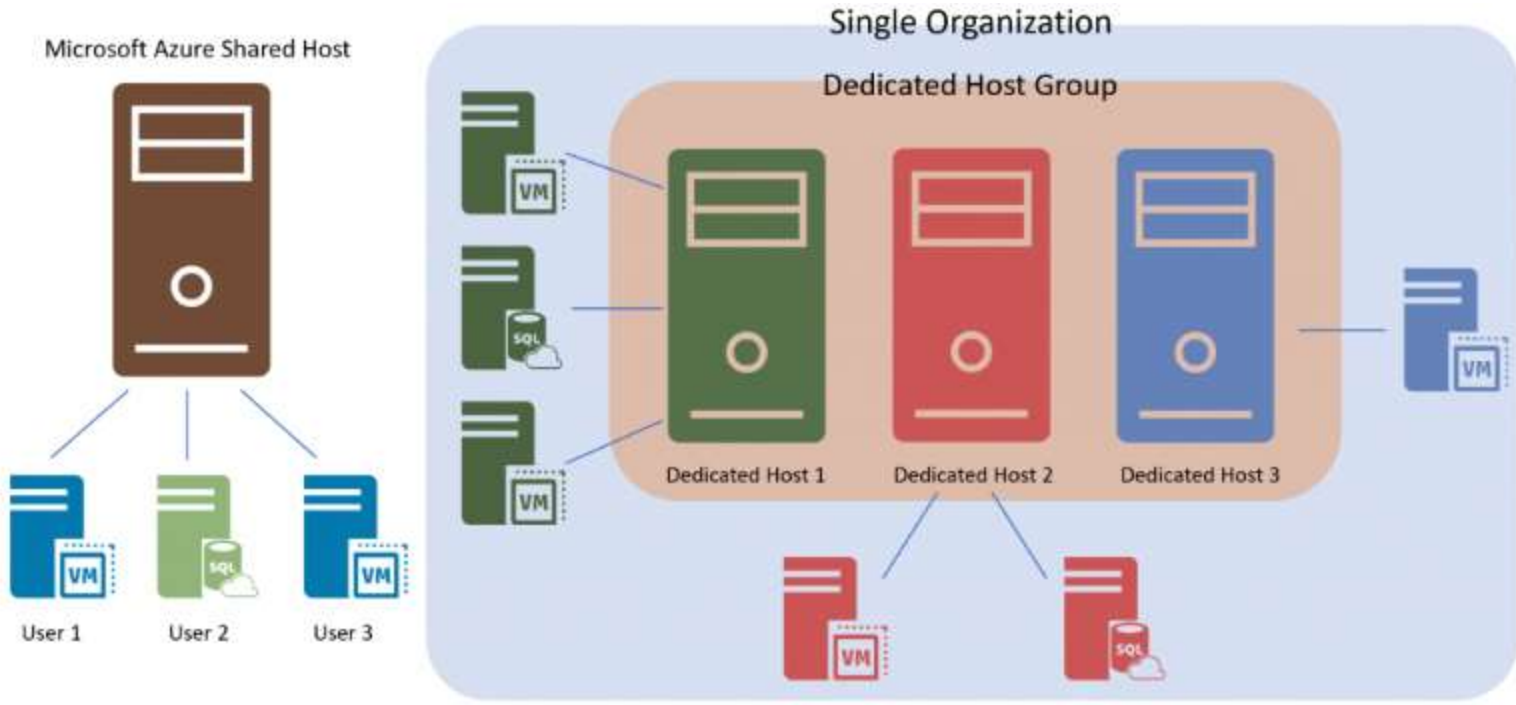
VIRTUAL MACHINES SCALE SETS (VMSS)

- The simplest way to use the scaling mechanism on VMs.
- The type is IaaS; therefore, the user needs to maintain the O/S, middleware, application, etc.
- VMs should be identical and supports load-balancing (max. VM capacity is 1000 VMs).
- Allows HA (High-Available) solution with auto-scaling and scheduled scaling options.
  - Auto scaling depends on the metrics available on the Cloud (i.e. CPU, Memory, I/O usage).
  - Scheduled scaling is to support forecasted high demand scenario.
- VMSS is ideal when you need;
  - Still a VM but also need auto-scaling
  - The workload could be shared across identical VMs
  - Large scale services to process big data



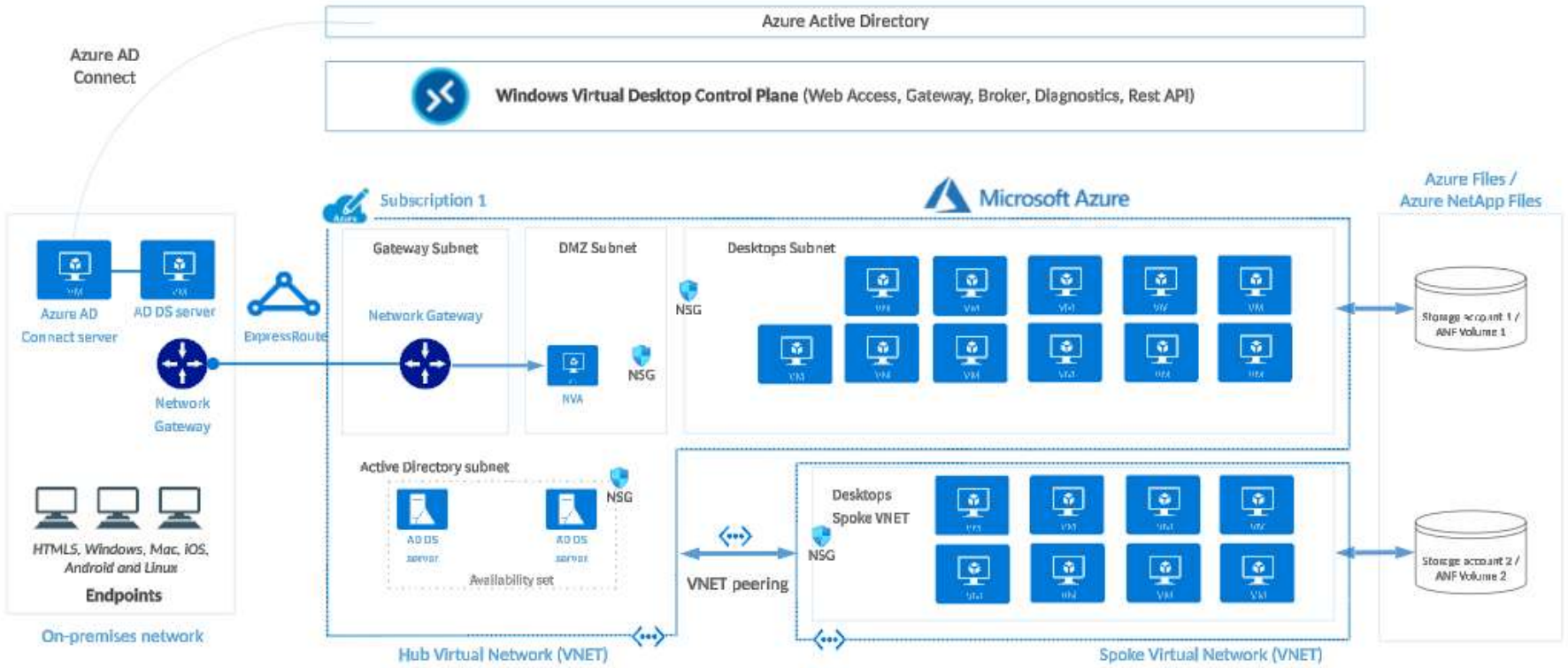
DEDICATED HOST

- Normally, VMs are in Shared Host services.
- Dedicated host service allows to dedicate the whole host to your organization.
- Dedicated host is ideal when you need;
  - Improved security & Hardware isolation.
  - Generally looking for a long term contract with Cloud vendor / CapEx.
  - Control over support events initiated by the Cloud vendor.
  - Control the whole host maintenance.
  - Business critical applications are on a single host environment.
  - Different O/S on a single host.
  - Comply with your organization’s corporate policies.
  - Bring your own license (BYoL) feature on Azure for both O/S and databases.



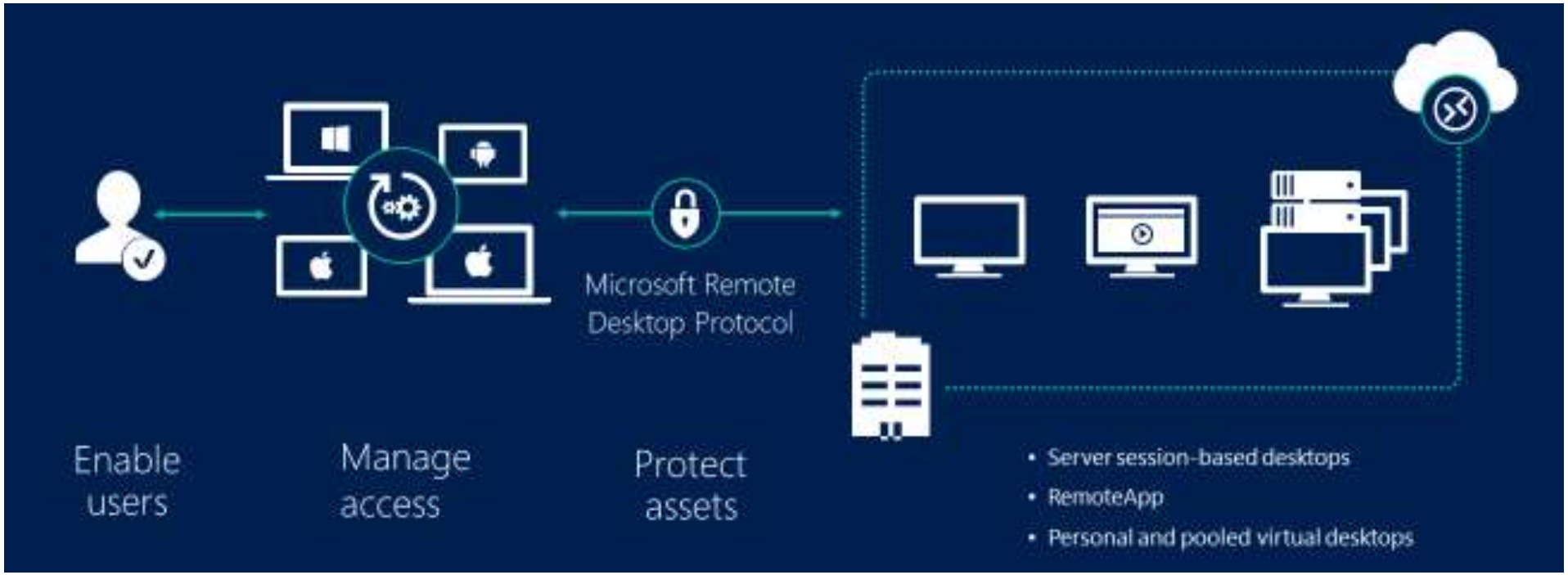
VIRTUAL DESKTOP SOLUTIONS

- Azure provides Virtual Desktops to the Enterprises; therefore, they can manage the VMs, data and the clients.
- Ideal for;
  - Security and regulation applications, such as financial services, healthcare, and government.
  - Elastic workforce needs, such as remote work, mergers and acquisitions, short-term employees, contractors, and partner access.
  - Specific employees, such as bring your own device (BYOD) and mobile users, call centers, and branch workers.
  - Specialized workloads, such as design and engineering, legacy apps, and software development testing.



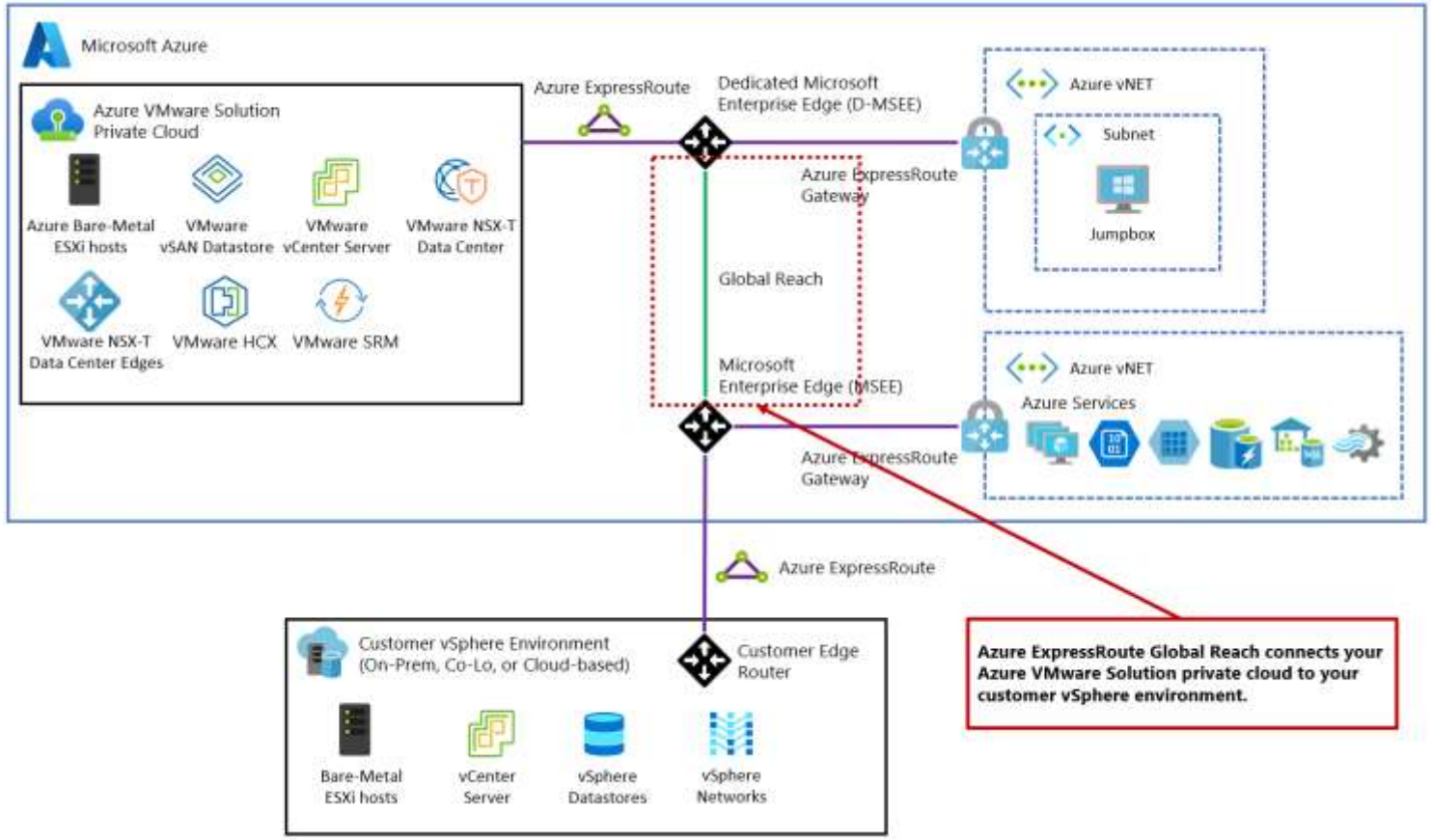
RDS (REMOTE DESKTOP SERVICES)

- Azure provides Remote Desktop Services for;
  - Better security with Session-based authentication
  - Keep the data in Cloud
  - Keep the VMs in the DMZ



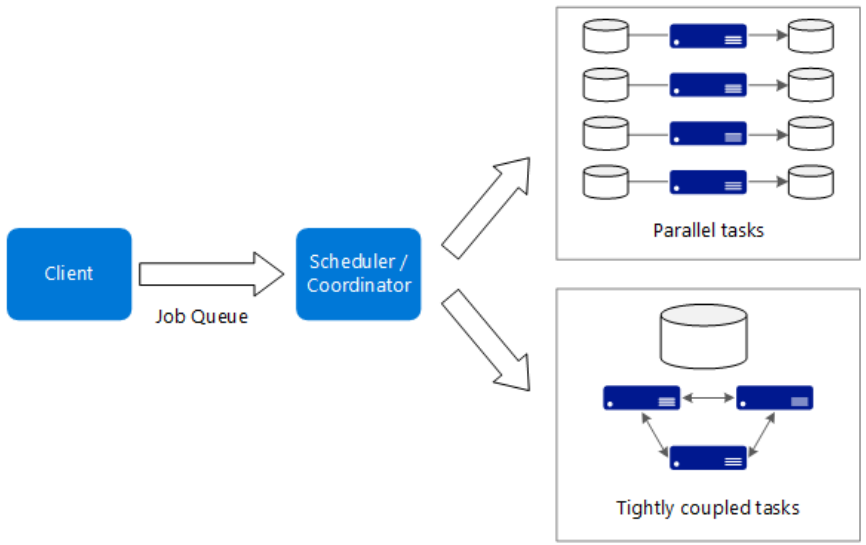
AZURE VMWARE CLOUD SOLUTION

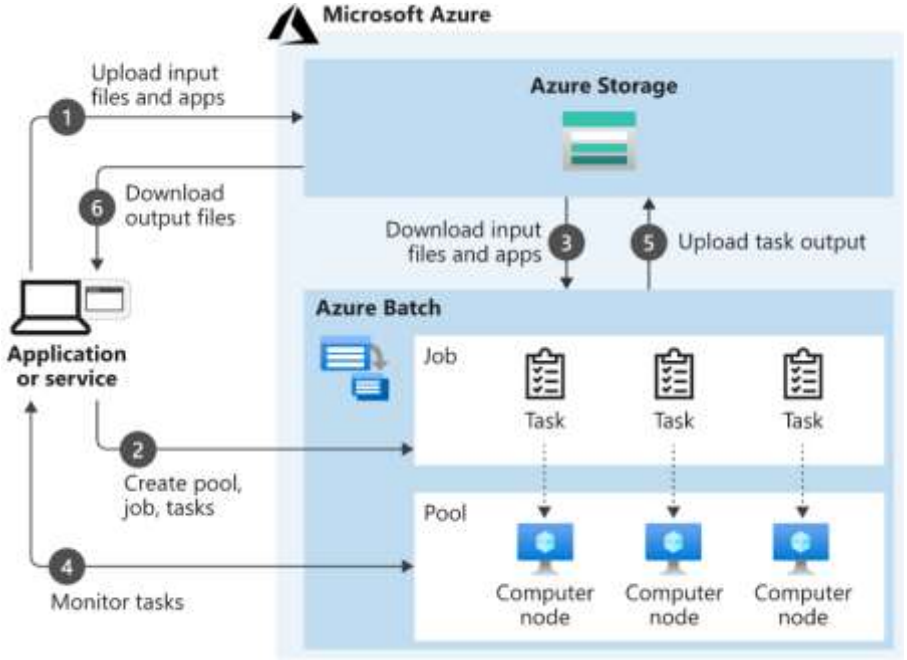
- Azure provides dedicated, VMWare private cloud solution on Azure for the specific VMWare workloads.
- Ideal for;
  - Migrating the existing VMWare solution to the Cloud.
  - Increasing the existing VMWare capacity.
  - Building the VMWare and Azure native solution architecture.



HIGH PERFORMANCE COMPUTING (HPC)

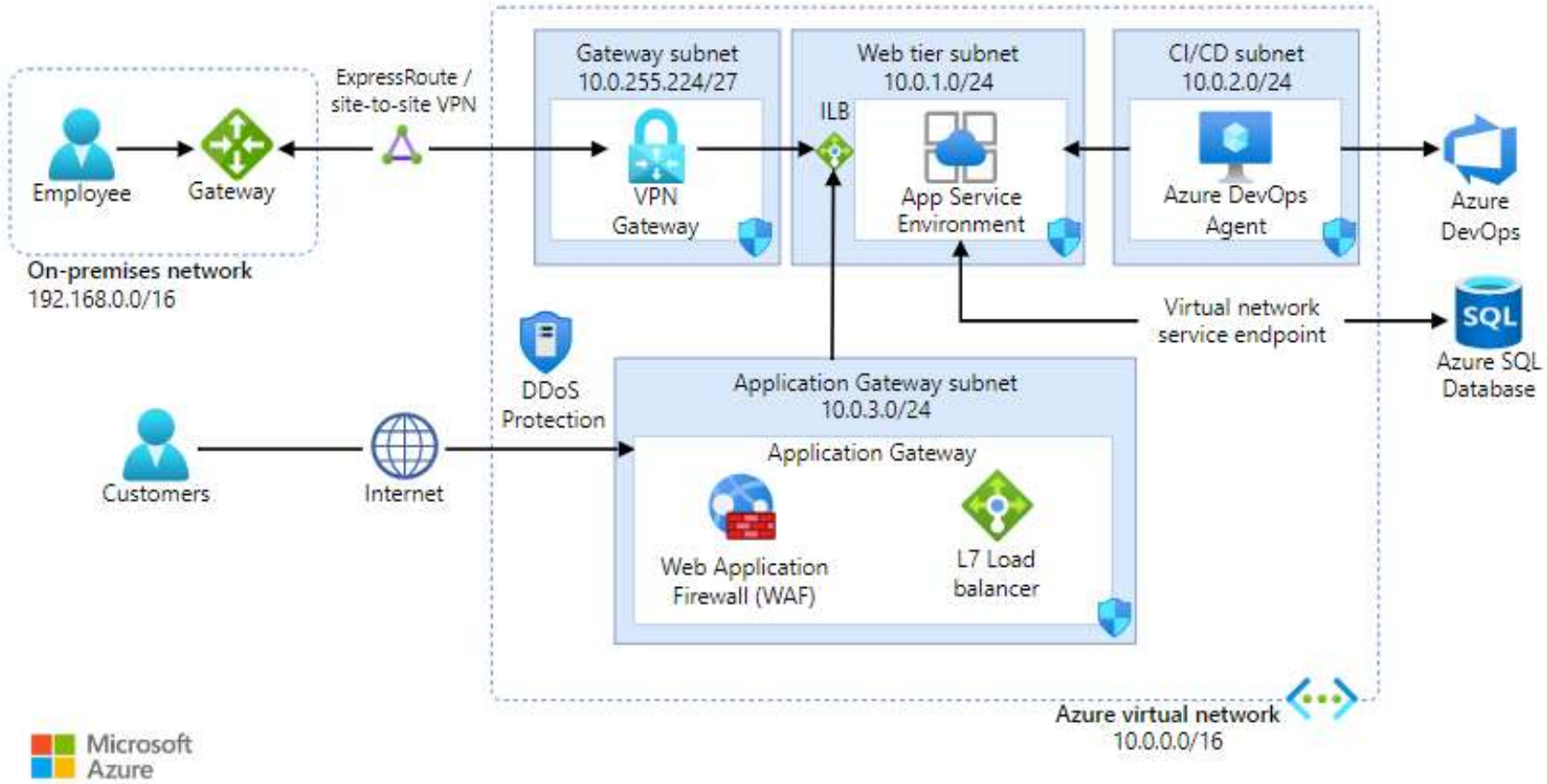
- High-performance computing (HPC), also called "big compute", uses a large number of CPU or GPU-based computers to solve complex mathematical tasks.
- Many industries use HPC to solve some of their most difficult problems. These include workloads such as; Genomics, Oil and gas simulations, Finance, Semiconductor design, Engineering, Weather modeling, etc.
- Specific H-Series (High CPU load) or N-Series (NVIDIA supported high GPU load) VMs are used for this purpose.
- Azure Batch service is used to manage tasks and parallel computing.
- Some use cases are; finite element analysis, computer aided design, 3D model rendering, DNA analysis, fluid dynamics…





APP SERVICES

- HTTP based App Service enables you to build and host web apps, background jobs, mobile back-ends, and RESTful APIs in the programming language of your choice without managing infrastructure.
- App Service is a PaaS platform and despite IaaS solutions, infrastructure is managed by Azure.
- Supports auto scaling with built-in auto scale mechanism.
- Supports CI/CD processes with direct connections to various code sources like Azure DevOps, GitHub, Bitbucket, Dropbox, etc.



Orion Innovation

Lab Session

LAB#6: TESTING COMPUTE INSTANCES ON CLOUD

- VM Creation
- Changing the VM type
- Changing the VM image && Backup & Re-use of the VM Image
- Follow the provided instructions.

LAB#7: TESTING COMPUTE INSTANCES ON CLOUD

- VMSS Setup and test
- Follow the provided instructions.

LAB#8: TESTING COMPUTE INSTANCES ON CLOUD

- App Service installation and test
- Follow the instructions: https://learn.microsoft.com/en-gb/training/modules/host-a-web-app-with-azure-app-service/1-introduction

HOMEWORK

- Compare AWS and Azure’s Compute services (except serverless). Provide a short summary.
- Research and provide a summary about Cloud Infrastructure automation solutions.
- Search about Unikernel infrastructures and provide a short summary.
- Try to learn more about Network:
  - IPv4 Addressing #1: https://www.youtube.com/watch?v=3ROdsfEUuhs (40 min. watch)
  - IPv4 Addressing #2: https://www.youtube.com/watch?v=FiAatRd84XI (30 min. watch)

Thank You

orioninc.com