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DURATION : 1 HOUR
CLOUD PLATFORM : MICROSOFT AZURE

SECURE MULTI-TIER APPLICATION DEPLOYMENT USING NSGs & ASG ON AZURE

PROBLEM STATEMENT

In modern cloud environments, organizations need to segregate networks and control access to resources to prevent unauthorized access and potential breaches.
Many cloud setups leave Web, App, and Database servers exposed, allowing unrestricted traffic, which can compromise sensitive data.

PROJECT GOALS

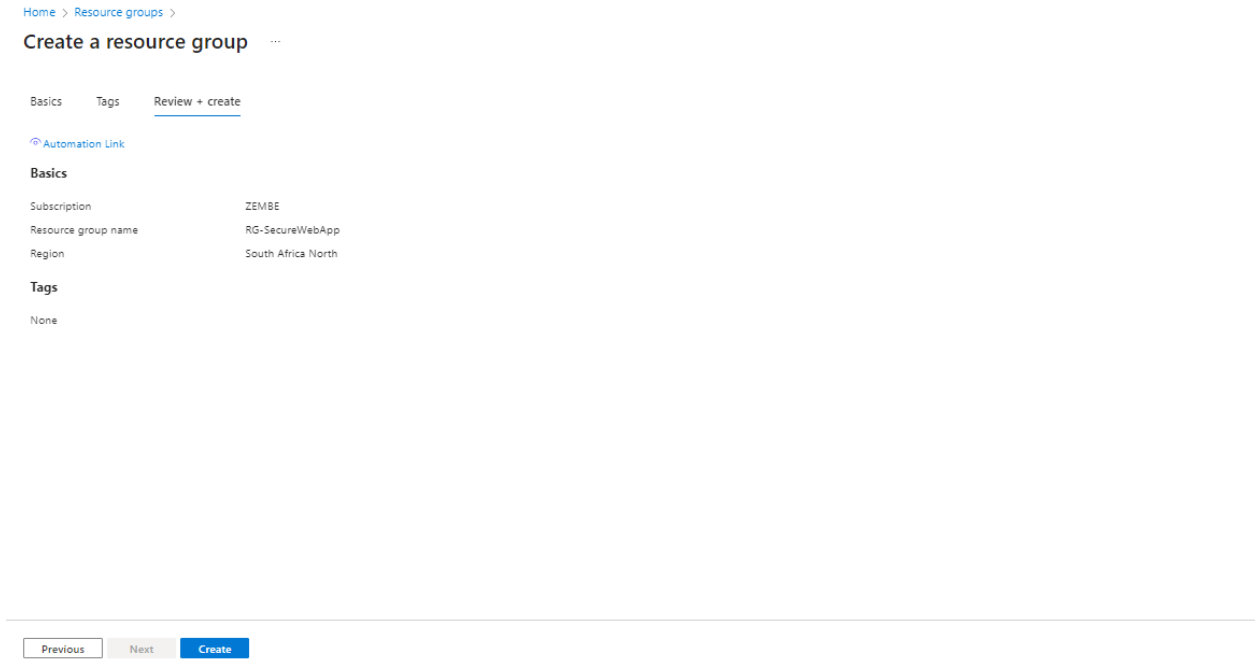
. Deploy a multi-tier network (Web, App, DB) in Azure.
. Use Network Security Groups to simplify traffic rules between VM groups.
. Implement least privilege access from the internet and internal network.
. Test and validate connectivity to ensure security policies work as intended.

AZURE SERVICES USED

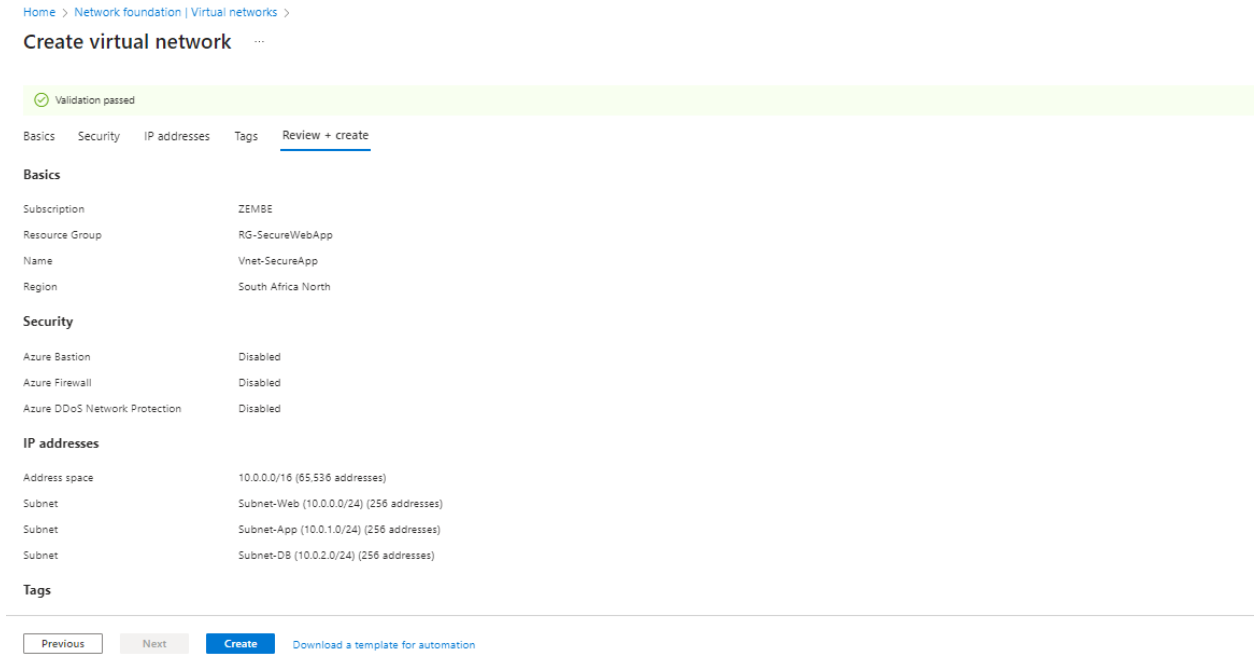
. Resource Group
Organize and manage project resources.
. Virtual Network (Vnet)
Network backbone for Web, App, and DB subnets
. Subnets
Segregate Web, App, and DB servers
. Network Security Groups
Control traffic to/from subnets or VMs
. Application Security Group
Group VMs logically to simplify NSG rules
. Virtual Machines
Deploy Web, App, DB, and Management servers

BUILD STEPS

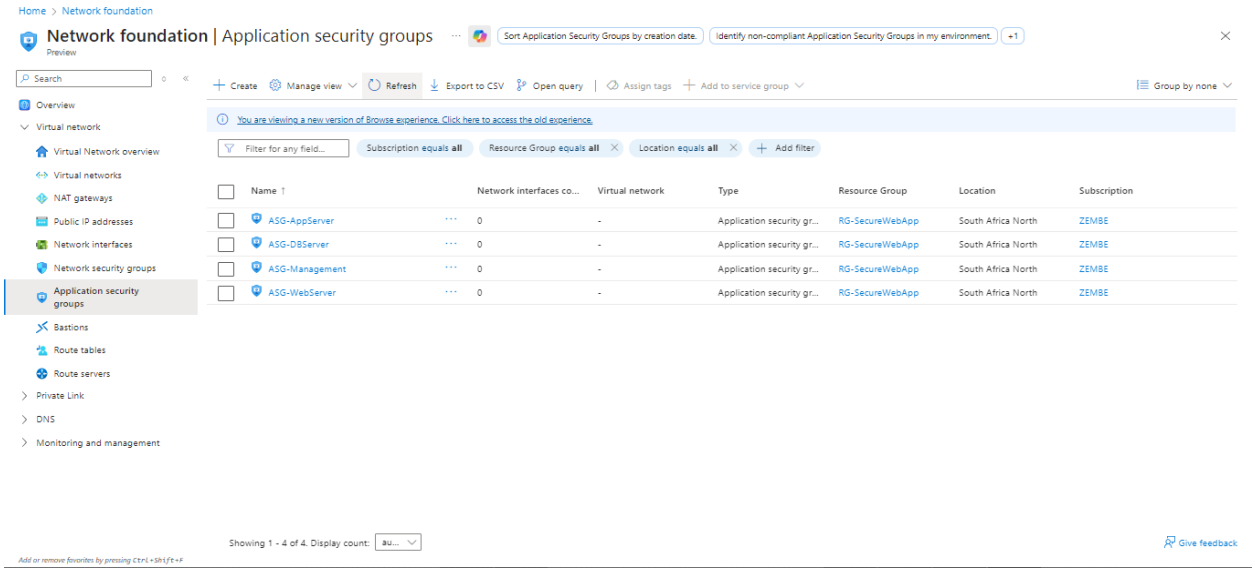
Step 1: Create Resource Group
Contains all projects resources in one organized structure



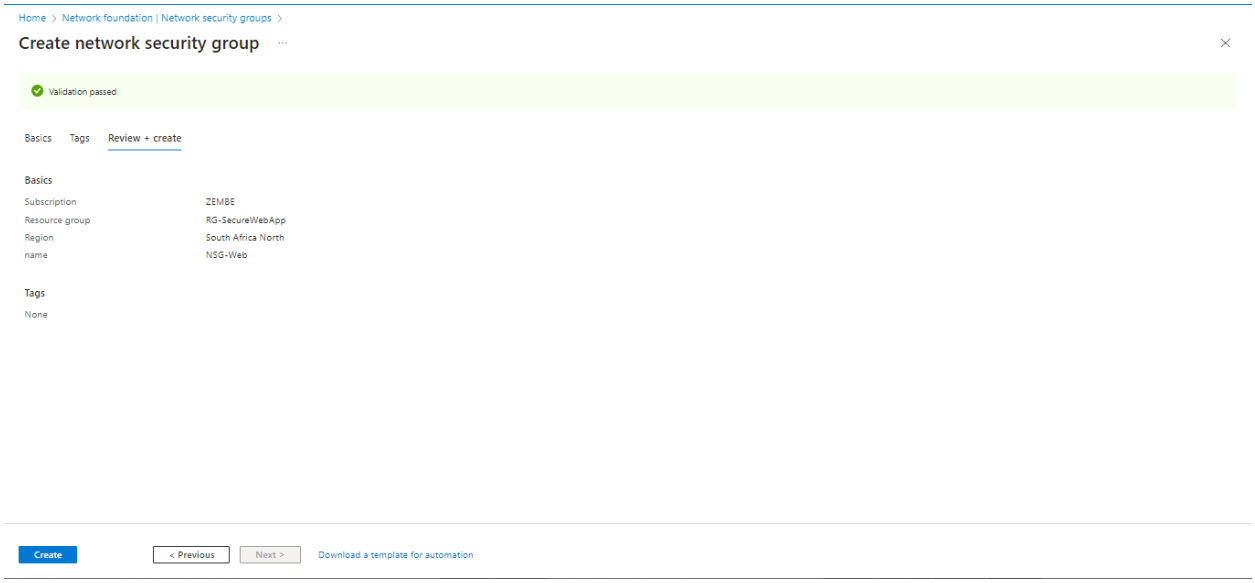
Step 2: Create Virtual Network



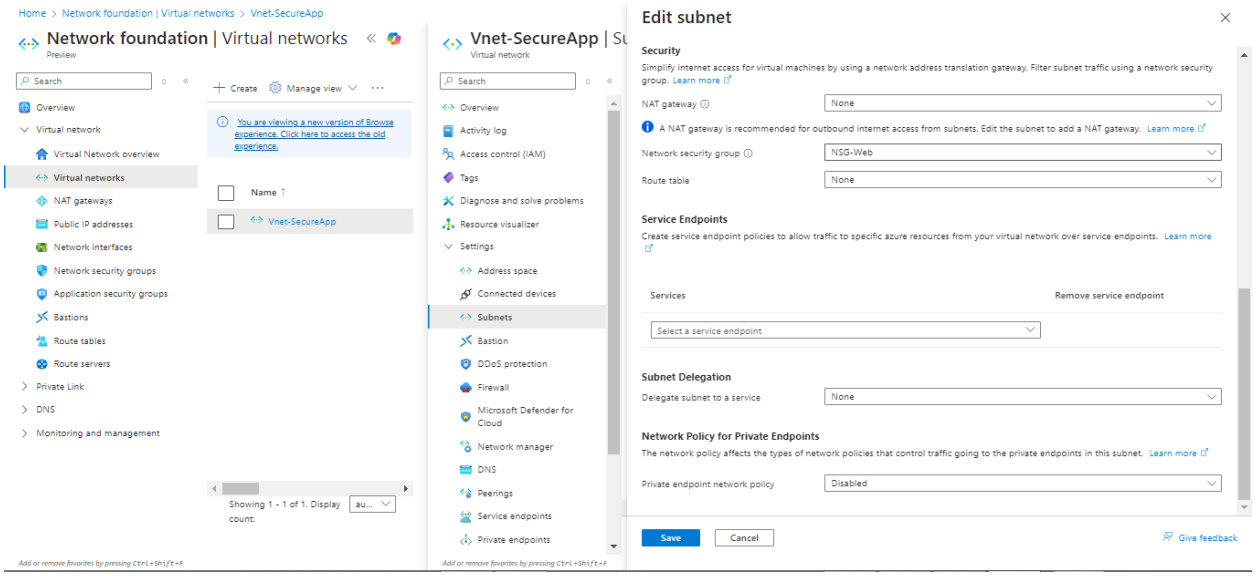
Step 3: Create Application Security Groups



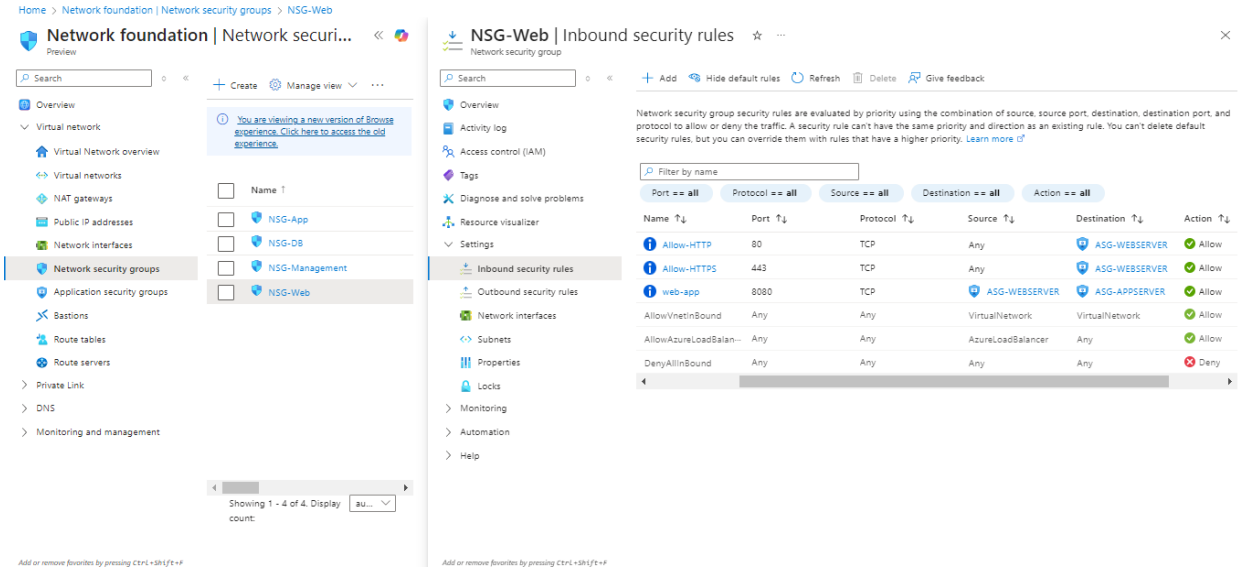
Step 4: Create Network Security Groups



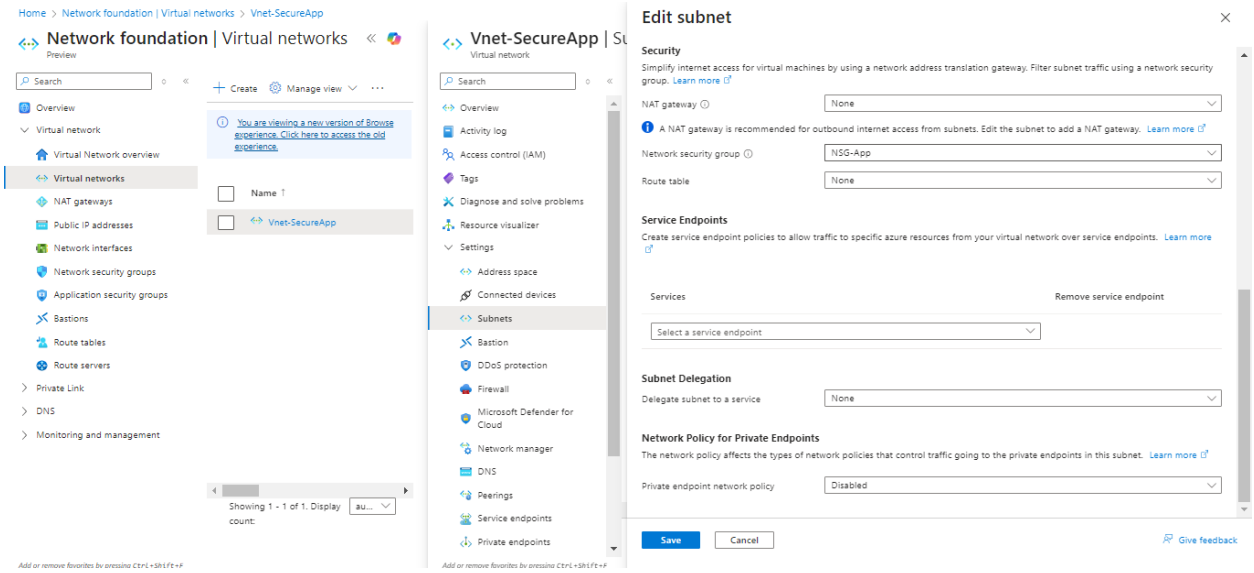
4.1 NSG-Web (Attach to subnet-web)



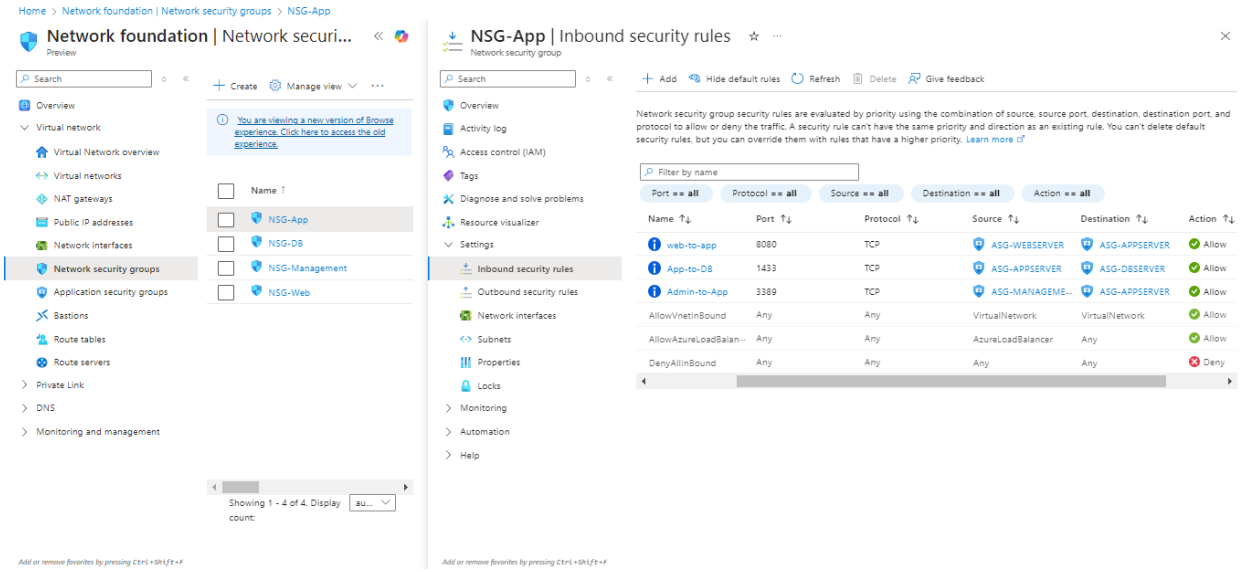
(NSG-WEB INBOUND RULES)



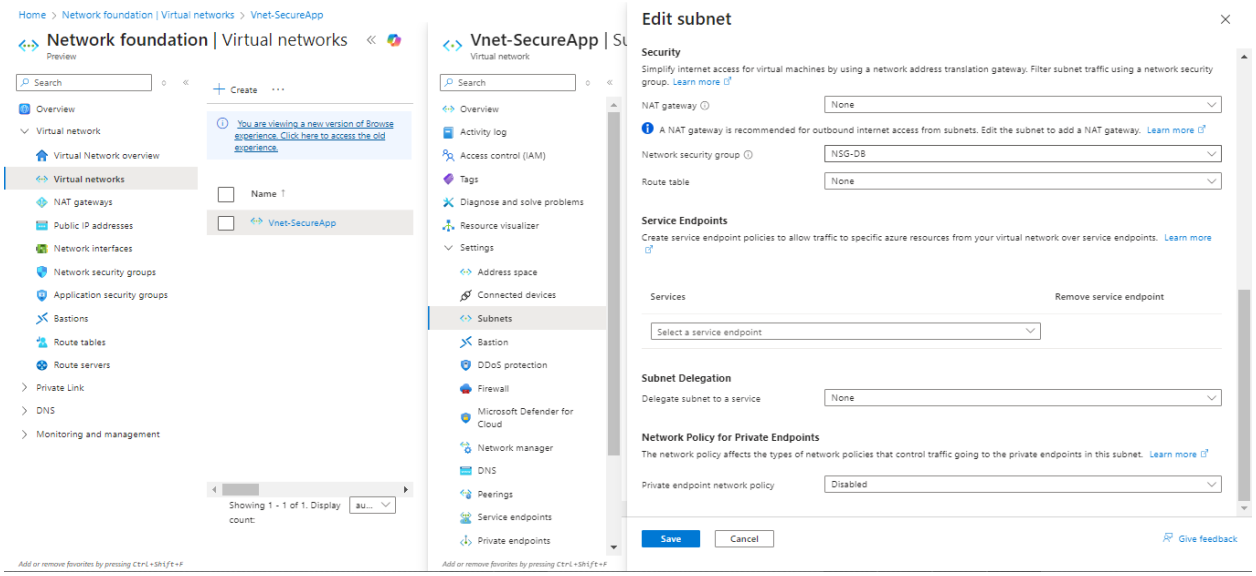
4.1 NSG-App (Attach to subnet-app)



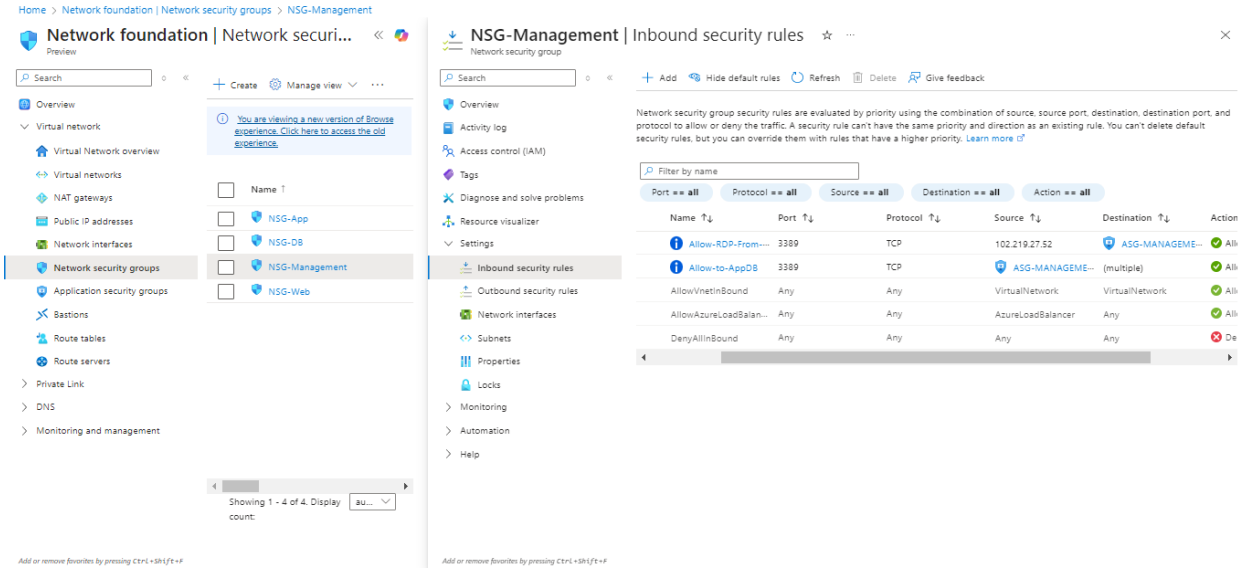
(NSG-APP INBOUND RULES)



4.3 NSG-DB (Attach to subnet-DB)



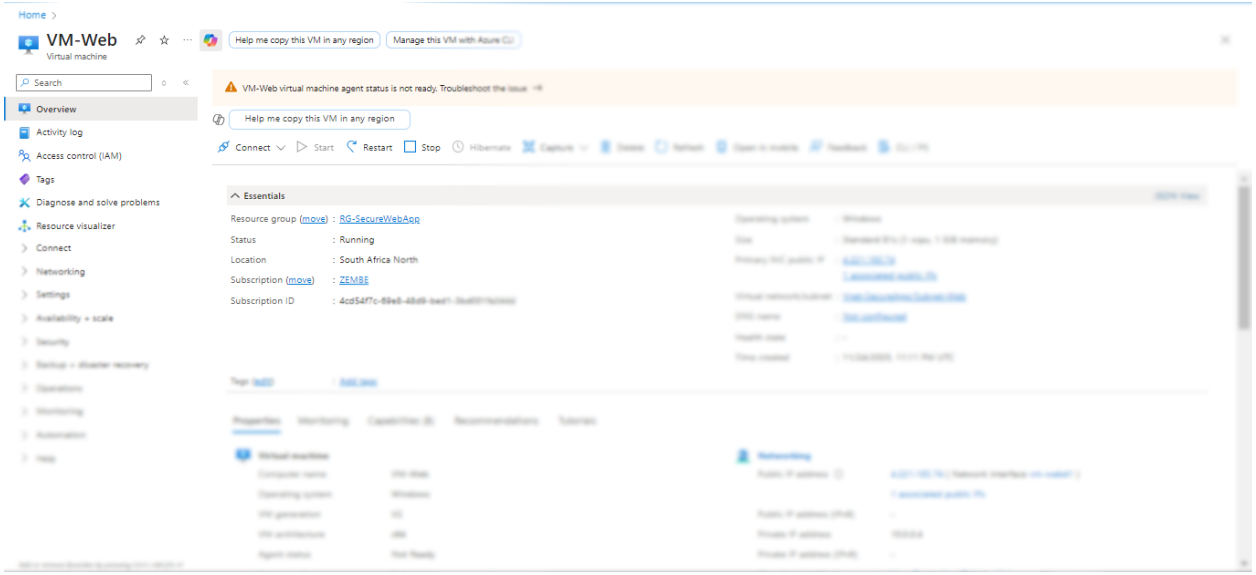
(NSG-MGMT INBOUND RULES)



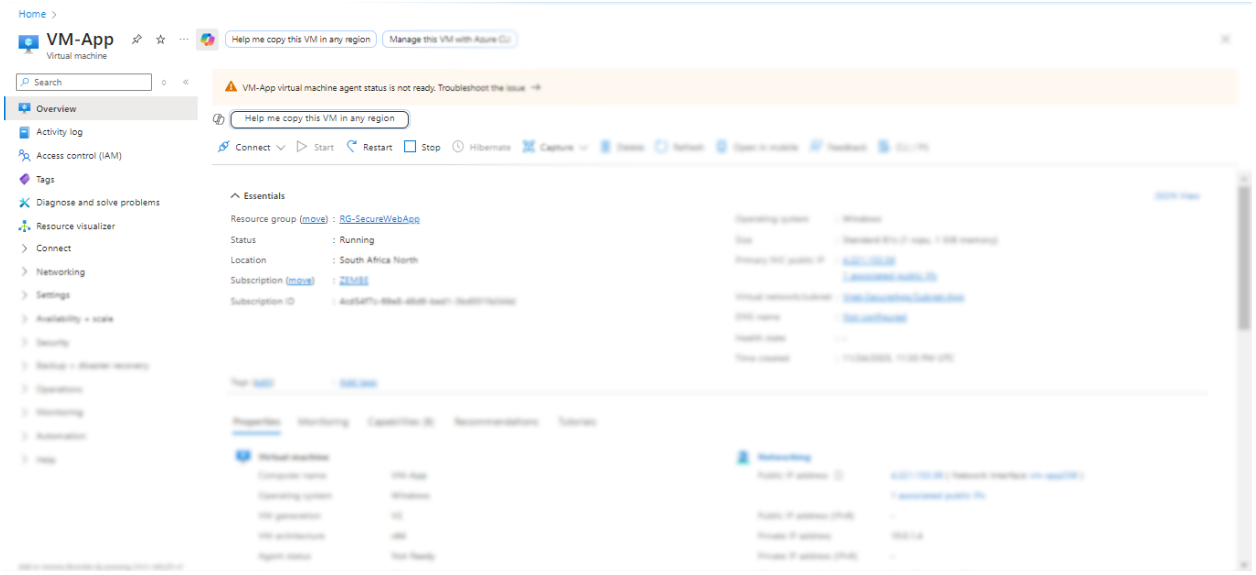
4.4 NSG-Management (Attached to VM NIC)

Step 5: Create VM

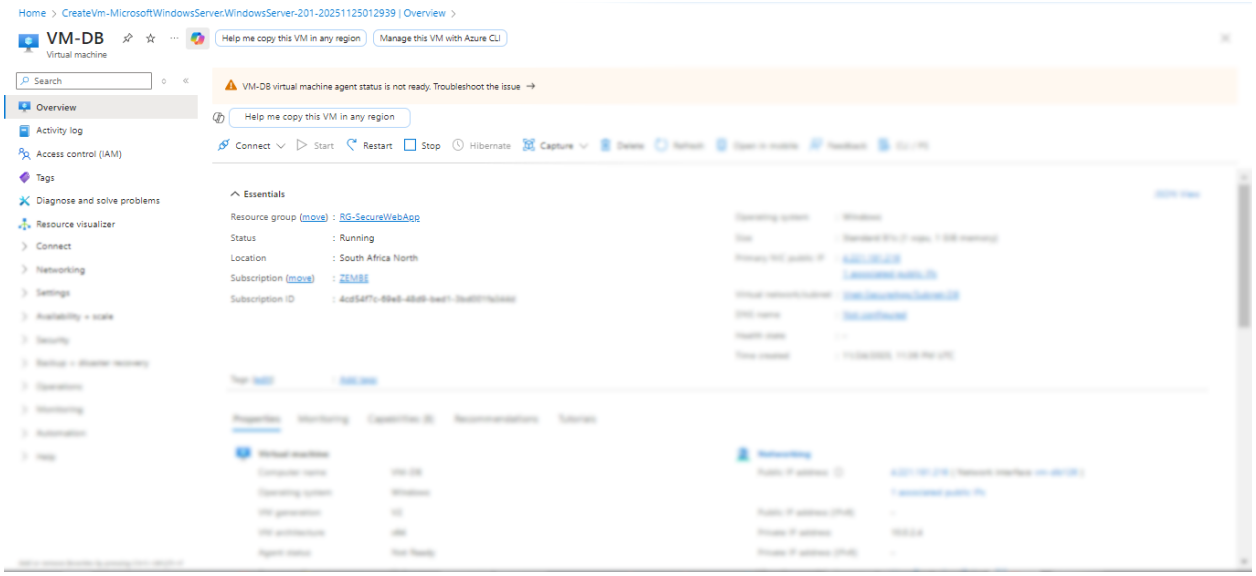
5.1 VM-Web



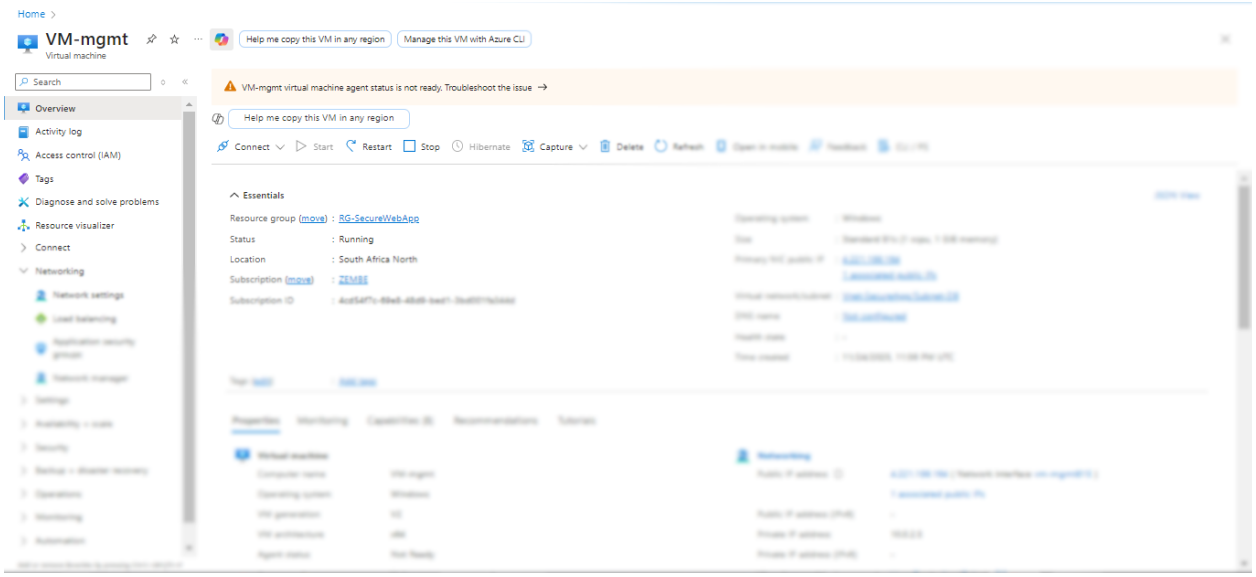
5.2 VM-App



5.3 VM- DB



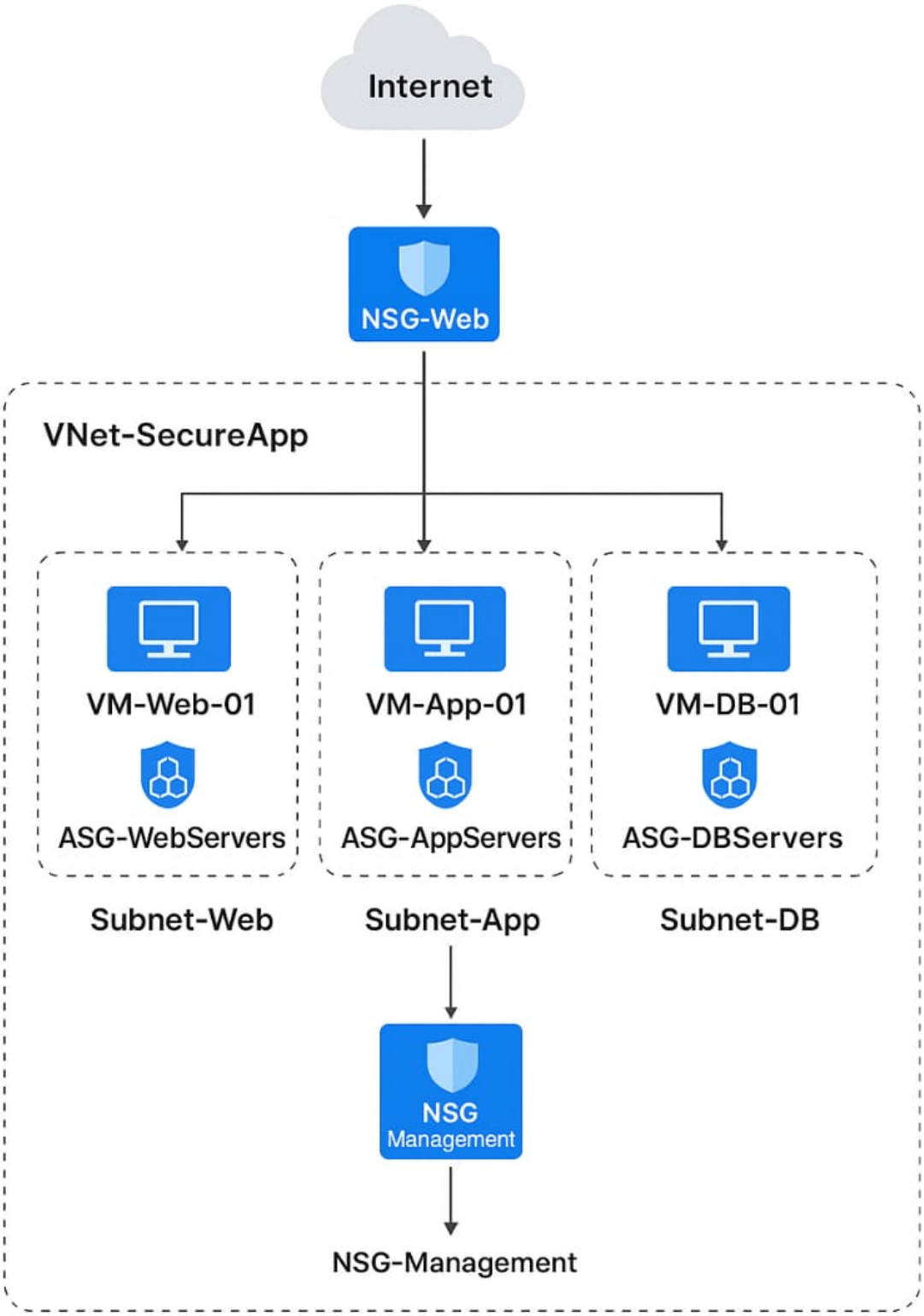
5.4 VM-Mgmt



Step 6: Testing Connectivity (Documented Steps)
Internet – Web = Allowed
Internet – App = Blocked
Internet – DB = Blocked
Web – App = Allowed
App – DB = Allowed
Management – DB = Allowed
Management – Internet = Blocked

DIAGRAM

Secure Multi-Tier Web Application Architecture Using NSGs and ASGs in Azure



Conclusion

This project demonstrates a fully functional, multi-tier, secure Azure network:

. Multi-tier architecture with Web, App, DB segregation
. NSGs and ASGs implemented for least privilege access
. Traffic control and segmentation validated via connectivity testing

Key Learnings

. Proper subnet segmentation improves security
. ASGs simplify NSG rule management for multiple VMs
. NSGs provide granular control over inbound and outbound traffic
. Real-world enterprise security best practices