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PROJECT TITLE

Microsoft Azure Final Capstone Project

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1. Establish AAD Access

1 SCREENSHOT showing the new user and the assigned role

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft Azure logo, a search bar, and user information (n01708857@assayabadi...). Below the navigation is a breadcrumb trail: Home > Default Directory | Users > Users > Assayn01708857. The main content area is titled "Assayn01708857 | Assigned roles". On the left, there's a sidebar with options like Overview, Audit logs, Sign-in logs, Diagnose and solve problems, Manage, and Assigned roles (which is selected and highlighted in blue). The main pane displays a table of administrative roles. One row is selected, showing the "Global Administrator" role with a description: "Can manage all aspects of Microsoft Entra ID and Microsoft services that use Microsoft Entra identities." The table includes columns for Role, Description, Resource Name, Resource Type, Assignment Path, and Type.

1 SCREENSHOT showing the new group and its membership

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft Azure logo, a search bar, and user information (n01708857@assayabadi...). Below the navigation is a breadcrumb trail: Home > Default Directory | Groups > Groups > All groups > n01708857-grp. The main content area is titled "n01708857-grp". On the left, there's a sidebar with options like Overview, Diagnose and solve problems, Manage, Activity, and Troubleshooting + Support. The main pane displays the "Overview" section for the group "n01708857-grp". It shows basic information such as Membership type (Assigned), Source (Cloud), Type (Security), Object ID (311c06b4-a8be-4490-bd15-3e722b600d0f), and Creation date (18/07/2024, 15:04). Below this, there are three summary cards: Group memberships (0), Owners (1), and Total members (1).

2. Add Subscriptions and Create Resource Groups

2 SCREENSHOTS (one per resource group) showing the Overview blade

Overview Blade: RG1-n01708857

Microsoft Azure Search resources, services, and docs (G+) ⋮ ? ? ? ? n01708857@assayabadi... DEFAULT DIRECTORY (ASSAYABA...)

Home > Resource groups > RG1-n01708857 ⋮ X

Resource group + Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move ⋮

Overview Essentials JSON View

Activity log Access control (IAM) Tags Resource visualizer Events Settings Cost Management Monitoring Insights (preview) Alerts Metrics

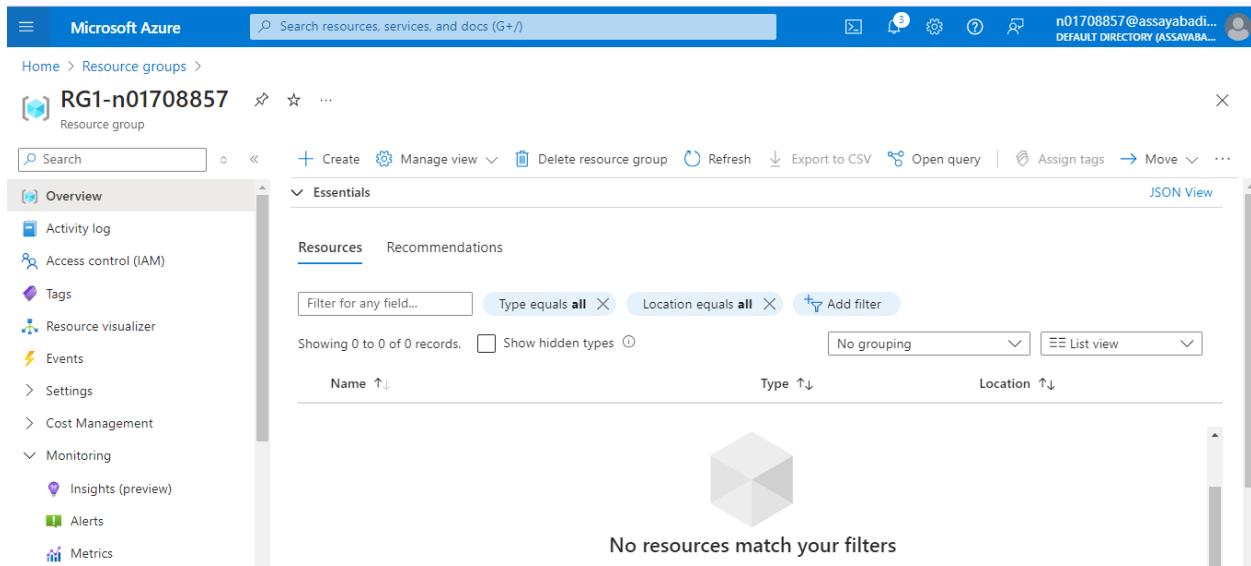
Resources Recommendations

Filter for any field... Type equals all X Location equals all X + Add filter

Showing 0 to 0 of 0 records. Show hidden types ① No grouping List view

Name ↑ Type ↑ Location ↑↓

No resources match your filters



Overview Blade: RG1-n01708857

Microsoft Azure Search resources, services, and docs (G+) ⋮ ? ? ? ? n01708857@assayabadi... DEFAULT DIRECTORY (ASSAYABA...)

Home > Resource groups > RG2-n01708857 ⋮ X

Resource group + Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move ⋮

Overview Essentials JSON View

Activity log Access control (IAM) Tags Resource visualizer Events Settings Cost Management Monitoring Insights (preview) Alerts Metrics

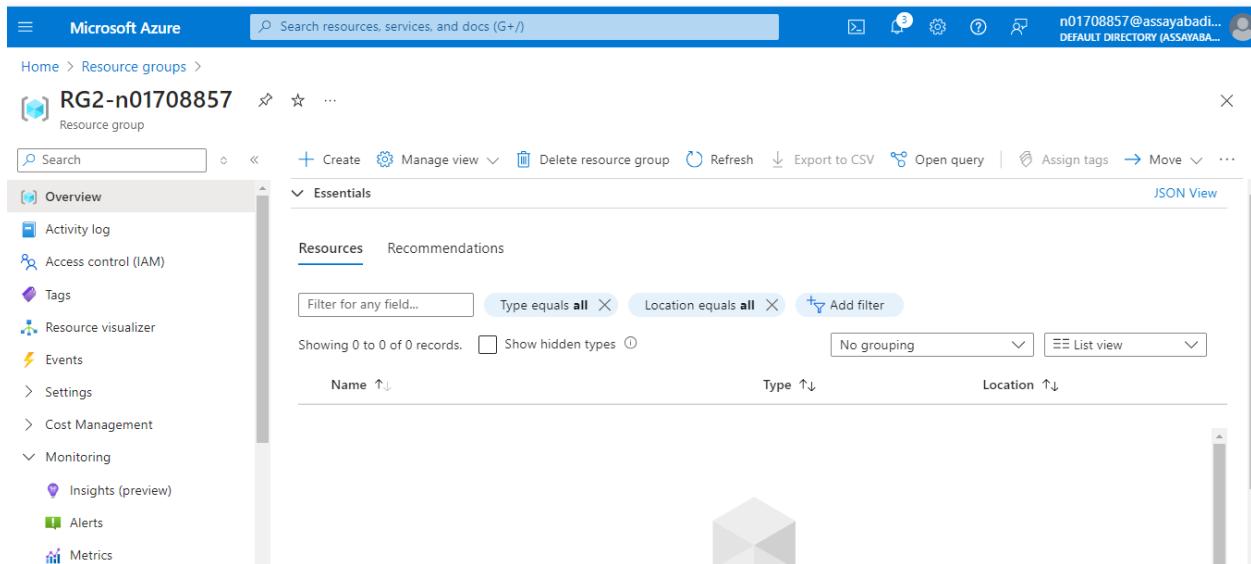
Resources Recommendations

Filter for any field... Type equals all X Location equals all X + Add filter

Showing 0 to 0 of 0 records. Show hidden types ① No grouping List view

Name ↑ Type ↑ Location ↑↓

No resources match your filters



3. Configure Networking – vnet1

3 SCREENSHOTS showing the Overview, Address space, and subnet blades of the virtual network

Overview- Blade

The screenshot shows the 'Overview' blade for the virtual network 'vnet1-n-01708857'. The 'Essentials' section displays basic information: Resource group (RG1-n-01708857), Location (Australia East), Subscription (Sub-n-01708857), and Subscription ID (cfedad4d-1410-457f-9857-c1a5ffaf6290). The 'Address space' is listed as 10.10.0.0/23. The 'Capabilities' tab is selected, showing four cards: 'DDoS protection' (Not configured), 'Azure Firewall' (Not configured), 'Peering' (1 networks), and 'Microsoft Defender for Cloud' (Strengthen the security posture of your environment).

Address Space – Blade

The screenshot shows the 'Address space' blade for the virtual network 'vnet1-n-01708857'. It displays the address range 10.10.0.0/23 with the range 10.10.0.0 - 10.10.1.255. A button to 'Add additional address range' is visible. The 'Peered virtual network address space' section is empty.

Subnet - Blade

The screenshot shows the 'Subnets' blade for the virtual network 'vnet1-n-01708857'. It lists two subnets: 'vnet1-subnet1-n-01708857' (IPv4: 10.10.0.0/24) and 'vnet1-subnet2-n-01708857' (IPv4: 10.10.1.0/24). Both subnets have 251 available IPs and are delegated to 'vnet1-nsg-n-01708857'. The 'Route table' column shows three entries for each subnet.

4. Configuring Vnet1-NSG

2 SCREENSHOTS showing the Overview and subnet blades of the network security group

Overview-Blade: vnet1- n01708857

The screenshot shows the Azure NSG Overview blade for the resource group RG1-n01708857. It displays the NSG name, location (Australia East), and associated subnets (vnet1-subnet1-n01708857 and vnet1-subnet2-n01708857). The blade includes sections for Inbound and Outbound Security Rules, both of which are currently empty.

Subnets – Blade: vnet1- n01708857

The screenshot shows the Azure NSG Subnets blade for the same NSG. It lists two subnets: vnet1-subnet1-n01708857 and vnet1-subnet2-n01708857, each with its respective address range (10.10.0.0/24 and 10.10.1.0/24) and associated virtual network (vnet1-n01708857).

5. Configure Networking – vnet2 and peering

2 SCREENSHOTS showing the Overview and Subnets blades of the virtual network

Overview – Blade: vnet2- n01708857

The screenshot shows the 'Overview' blade for the virtual network 'vnet2-n01708857'. The left sidebar lists other virtual networks: 'vnet1-n01708857' and 'vnet2-n01708857'. The main area displays the virtual network's configuration, including its name, resource group (RG2-n01708857), location (UK South), and subscription information. It also shows the address space (10.20.0.0/16), DNS servers, flow timeout, BGP community string, and virtual network ID. Below this, there are four cards: 'DDoS protection' (Not configured), 'Azure Firewall' (Not configured), 'Peering' (1 networks), and 'Private endpoints' (Not configured). A 'Capabilities' tab is selected.

Subnet – Blade: vnet2- n01708857

The screenshot shows the 'Subnets' blade for the virtual network 'vnet2-n01708857'. The left sidebar lists other subnets: 'vnet2-subnet1-n0170...', 'vnet2-subnet2-n0170...', and 'vnet2-subnet3-n0170...'. The main area displays a table of subnets with columns: Name, IPv4, IPv6, Available IPs, Delegated to, Security group, and Route. Two subnets are listed: 'vnet2-subnet1-n0170...' (IPv4 10.20.0.0/24, Available IPs 251) and 'vnet2-subnet2-n0170...' (IPv4 10.20.1.0/24, Available IPs 251). Both are delegated to 'vnet2-nsg-n01708857' and belong to the security group 'vnet2-nsg-n01708857'.

Name	IPv4	IPv6	Available IPs	Delegated to	Security group	Route
vnet2-subnet1-n0170...	10.20.0.0/24	-	251	-	vnet2-nsg-n01708857	-
vnet2-subnet2-n0170...	10.20.1.0/24	-	251	-	vnet2-nsg-n01708857	-

6. Configure Vnet2- NSG

2 SCREENSHOTS showing the Overview and Subnets blades of the network security group

Overview – Blade of vnet2-nsg - n01708857

The screenshot shows the 'Overview' blade for the Network Security Group 'vnet2-nsg-n01708857'. The left sidebar lists 'Activity log', 'Tags', 'Diagnose and solve problems', 'Settings', 'Monitoring', 'Automation', and 'Help'. The main area displays the 'Essentials' section with details like Resource group (RG2-n01708857), Location (UK South), Subscription (Sub-b-n01708857), and Tags (environment: project). It also shows 'Inbound Security Rules' and 'Outbound Security Rules' tables.

Priority	Action	Port	Protocol	Source	Destination	Action
100	AllowAnySSHinbound	22	TCP	Any	Any	Allow
65000	AllowVnetinbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerinB	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllinbound	Any	Any	Any	Any	Deny

Priority	Action	Port	Protocol	Source	Destination	Action
65000	AllowVnetOutbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowInternetOutbound	Any	Any	Any	Internet	Allow
65500	DenyAllOutbound	Any	Any	Any	Any	Deny

Subnet – Blade - vnet2-nsg- n01708857

The screenshot shows the 'Subnets' blade for the Network Security Group 'vnet2-nsg-n01708857'. The left sidebar lists 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings', 'Inbound security rules', 'Outbound security rules', 'Network interfaces', and 'Subnets'. The main area shows a table of associated subnets:

Name	Address range	Virtual network	Actions
vnet2-subnet1-n01708857	10.20.0.0/24	vnet2-n01708857	...
vnet2-subnet2-n01708857	10.20.1.0/24	vnet2-n01708857	...

2 SCREENSHOTS showing the Overview and Subnets blades of the network security group

Overview – Blade of vnet2-nsg - n01708857

The screenshot shows the 'Overview' blade for the Network security group 'vnet2-nsg-n01708857'. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (G+)', and a user account. The main content area displays the 'Overview' tab with the following details:

- Resource group:** RG2-n01708857
- Location:** UK South
- Subscription:** Sub-hc-n01708857
- Subscription ID:** e2ff18bd-cbdc-45df-a7f0-d5f1fc0baca5
- Tags:** environment:project
- Inbound Security Rules:**

Priority	Action	Port	Protocol	Source	Destination
100	AllowAnySSHinbound	22	TCP	Any	Any
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork
65001	AllowAzureLoadBalancerInbound	Any	Any	AzureLoadBalancer	Any
65500	DenyAllInbound	Any	Any	Any	Any
- Outbound Security Rules:**

Action	Port	Protocol	Source	Destination
Allow	65000	AllowVnetOutbound	Any	VirtualNetwork
Allow	65001	AllowInternetOutbound	Any	Internet
Deny	65500	DenyAllOutbound	Any	Any

Subnet – Blade - vnet2-nsg- n01708857

The screenshot shows the 'Subnets' blade for the Network security group 'vnet2-nsg-n01708857'. The top navigation bar includes 'Microsoft Azure', 'Search resources, services, and docs (G+)', and a user account. The main content area displays the 'Subnets' tab with the following details:

- Associate:** A button to associate subnets.
- Search subnets:** A search bar to find specific subnets.
- Table:** A list of subnets associated with the network security group.

Name	Address range	Virtual network
vnet2-subnet1-n01708857	10.20.0.0/24	vnet2-n01708857
vnet2-subnet2-n01708857	10.20.1.0/24	vnet2-n01708857

7. Configure Governance

1 SCREENSHOT showing the management group hierarchy

Overview – Blade: Management Group

The screenshot shows the 'Management groups' blade in the Microsoft Azure portal. It displays a tree view of management groups and their associated subscriptions. At the top, there's a search bar and several navigation links like 'Create', 'Add subscription', 'Refresh', 'Expand / Collapse all', 'Export to CSV', and 'Feedback'. A message box at the top right provides instructions on how to use management groups. Below the header, there are tabs for 'Overview', 'Get started', and 'Settings', with 'Overview' being the active tab. A search bar is also present. The main table lists three subscriptions across two groups:

Name	Type	ID	Total subscript
Tenant Root Group	Management group	f2be241e-0713-4528-a941-40ac93fe7a65	3
Azure subscription 1	Subscription	cd4da874-fc71-49af-ae25-274b5432a3d8	
Governance Management...	Management group	governance-n01708857	2
Sub-a-n01708857	Subscription	dfadab4d-1410-457f-9857-c1a5ffa62980	
Sub-b-n01708857	Subscription	e2ff918d-cbdc-45df-a7f0-d5f1fcfd6aca5	

2 SCREENSHOTS showing Compliance and Assignments from Azure Policy

Compliance – Blade

The screenshot shows the 'Policy | Compliance' blade in the Microsoft Azure portal. The left sidebar has a 'Compliance' section selected, along with other options like 'Remediation', 'Events', 'Authoring', 'Definitions', 'Assignments', and 'Exemptions'. The main area displays the following information:

- Overall resource compliance:** 0% (0 out of 7)
- Resources by compliance state:** 7 (0 - Compliant, 7 - Non-compliant)
- Non-compliant initiatives:** 1 (out of 1)
- Non-compliant policies:** 1 (out of 2)
- Table of non-compliant resources:**

Name	Scope	Compliance st...	Resource com...	Non-complian...	Non-complian...
project_initiative	governance-n01708857	Non-compliant	0% (0 out of 7)	7	1

Assignments - Blade

The screenshot shows the Microsoft Azure Assignments blade. At the top, there's a search bar and a navigation bar with icons for Home, Notifications, Settings, and Help. The main area has a sidebar with links like Overview, Getting started, Compliance, Remediation, Events, Authoring (Definitions, Assignments, Exemptions), and a star icon. The main content area shows a summary: Total Assignments (1), Initiative Assignments (1), Policy Assignments (0). Below this is a table with one row for 'project_initiative'. The table columns are Assignment name, Scope, and Type. The assignment details are: project_initiative, governance-n01708857, Initiative.

1 SCREENSHOT showing the list of policies in the initiative

The screenshot shows the Microsoft Azure Policy Definitions blade for the initiative 'project_initiative'. At the top, there's a search bar and a navigation bar with icons for Home, Notifications, Settings, and Help. The main content area shows the initiative definition details: Name (project_initiative), Description (Custom initiative to enforce tagging and allowed locations.), Category (Custom), and Version (--). Below this is a table with two policy definitions: 'Require a tag and its value on resources' and 'Allowed locations'. The table columns are Policy, Version, Reference ID, Type, Evaluation type, and Default effect. Both policies have a version of 1.*.* and are of type Builtin, with an Automated evaluation type and Deny default effect.

2 SCREENSHOTS showing definitions for both policies

Require a tag and its value on resources

The screenshot shows the Azure Policy Definition page for a policy named "Require a tag and its value on resources". The "Essentials" tab is selected, displaying the policy's name, version (1.0.1), description (Enforces a required tag and its value. Does not apply to resource groups.), available effects (Deny), and category (Tags). The "Definition" tab is selected, showing the JSON definition of the policy:

```
1 "properties": {  
2   "displayName": "Require a tag and its value on resources",  
3   "policyType": "BuiltIn",  
4   "mode": "Indexed",  
5   "description": "Enforces a required tag and its value. Does not apply to resource groups.",  
6   "metadata": {  
7     "version": "1.0.1",  
8     "category": "Tags"  
9   },  
10  },  
11  "version": "1.0.1",  
12  "parameters": {  
13    "tagname": {  
14      "type": "String",  
15      "metadata": {  
16        "displayName": "Tag Name",  
17        "description": "Name of the tag, such as 'environment'"  
18      }  
19    },  
20    "tagvalue": {  
21      "type": "String",  
22      "metadata": {  
23        "displayName": "Tag Value",  
24        "description": "Value of the tag, such as 'production'"  
25      }  
26    }  
27  },  
...  
}
```

Allowed Locations Definition

The screenshot shows the Azure Policy Definition page for a policy named "Allowed locations". The "Essentials" tab is selected, displaying the policy's name, version (1.0.0), description (This policy enables you to restrict the locations your organization can specify when deploying resources. Use to enforce your geo-compliance requirements. Excludes resource groups, Microsoft.Azure), available effects (Deny), and category (General). The "Definition" tab is selected, showing the JSON definition of the policy:

```
1 {  
2   "properties": {  
3     "displayName": "Allowed locations",  
4     "policyType": "BuiltIn",  
5     "mode": "Indexed",  
6     "description": "This policy enables you to restrict the locations your organization can specify when deploying resources. Use to enforce your geo-compliance requirements. Excludes resource groups, Microsoft.Azure",  
7     "metadata": {  
8       "version": "1.0.0",  
9       "category": "General"  
10    },  
11    "version": "1.0.0",  
12    "parameters": {  
13      "listOfAllowedLocations": {  
14        "type": "Array",  
15        "metadata": {  
16          "description": "The list of locations that can be specified when deploying resources.",  
17          "strongType": "location",  
18          "displayName": "Allowed locations"  
19        }  
20      }  
21    },  
22    "policyRule": {  
23      "if": {  
24        "allOf": [  
25          {  
26            "field": "location",  
27            "notIn": "[parameters('listOfAllowedLocations')]"  
28          }  
29        ]  
30      }  
31    }  
32  },  
33  "version": "1.0.0",  
34  "parameters": {  
35    "listOfAllowedLocations": {  
36      "type": "Array",  
37      "metadata": {  
38        "description": "The list of locations that can be specified when deploying resources.",  
39        "strongType": "location",  
40        "displayName": "Allowed locations"  
41      }  
42    }  
43  },  
44  "policyRule": {  
45    "if": {  
46      "allOf": [  
47        {  
48          "field": "location",  
49          "notIn": "[parameters('listOfAllowedLocations')]"  
50        }  
51      ]  
52    }  
53  }  
54}
```

8. Create Storage

2 SCREENSHOTS

Overview blade – n01708857storage1

The screenshot shows the Azure Storage Overview blade for the storage account 'n01708857storage1'. The left sidebar contains navigation links for Overview, Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data migration, Events, Storage browser, Storage Mover, Data storage (Containers, File shares, Queues, Tables), Security + networking, Data management, Settings, Monitoring, Monitoring (classic), Metrics (classic), Diagnostic settings (classic), Usage (classic), and Automation. The main content area is divided into sections: Essentials, Properties, Blob service, File service, Security, and Networking. The 'Properties' tab is selected.

Essentials

Setting	Value
Resource group (move)	RG1-n01708857
Location	australiaeast
Subscription (move)	Sub-a-n01708857
Subscription ID	dfadab4d-1410-457f-9857-c1a5ffa62980
Disk state	Available
Tags (edit)	: environment : project

Properties

Service	Setting	Value
Blob service	Hierarchical namespace	Disabled
Blob service	Default access tier	Hot
Blob service	Blob anonymous access	Disabled
Blob service	Blob soft delete	Enabled (7 days)
Blob service	Container soft delete	Enabled (7 days)
Blob service	Versioning	Disabled
Blob service	Change feed	Disabled
Blob service	NFS v3	Disabled
Blob service	Allow cross-tenant replication	Disabled
Blob service	Storage tasks assignments	None
File service	Large file share	Enabled
File service	Identity-based access	Not configured
File service	Default share-level permissions	Disabled
File service	Soft delete	Enabled (14 days)

Security

Setting	Value
Require secure transfer for REST API operations	Enabled
Storage account key access	Enabled
Minimum TLS version	Version 1.2
Infrastructure encryption	Disabled

Networking

Setting	Value
Allow access from	All networks
Number of private endpoint connections	1
Network routing	Microsoft network routing
Access for trusted Microsoft services	Yes
Endpoint type	Standard

Overview blade – n01708857storage2

The screenshot shows the Azure Storage Overview blade for the storage account 'n01708857storage2'. The left sidebar contains the same navigation links as the first screenshot. The main content area is divided into sections: Essentials, Properties, Blob service, File service, Security, and Networking. The 'Properties' tab is selected.

Essentials

Setting	Value
Resource group (move)	RG2-n01708857
Location	uksouth
Subscription (move)	Sub-b-n01708857
Subscription ID	e2f918d-cbdc-45df-a7f0-d5fffc6aca5
Disk state	Available
Tags (edit)	: environment : project

Properties

Service	Setting	Value
Blob service	Hierarchical namespace	Disabled
Blob service	Default access tier	Hot
Blob service	Blob anonymous access	Disabled
Blob service	Blob soft delete	Enabled (7 days)
Blob service	Container soft delete	Enabled (7 days)
Blob service	Versioning	Disabled
Blob service	Change feed	Disabled
Blob service	NFS v3	Disabled
Blob service	Allow cross-tenant replication	Disabled
Blob service	Storage tasks assignments	None
File service	Large file share	Enabled
File service	Identity-based access	Not configured
File service	Default share-level permissions	Disabled
File service	Soft delete	Enabled (7 days)

Security

Setting	Value
Require secure transfer for REST API operations	Enabled
Storage account key access	Enabled
Minimum TLS version	Version 1.2
Infrastructure encryption	Disabled

Networking

Setting	Value
Allow access from	All networks
Number of private endpoint connections	0
Network routing	Microsoft network routing
Access for trusted Microsoft services	Yes
Endpoint type	Standard

9. Build Compute Resources for Windows Then Create And Attach Public IP Address Resources

6 SCREENSHOTS (3 per VM) showing the Overview, Networking, and Serial Console blades of each VM (make sure that Overview also includes Availability and Extensions information)

Windows - VM1

Overview blade – n01708857-w-vm1

The screenshot shows the Microsoft Azure portal interface for a virtual machine named 'n01708857-w-vm1'. The left sidebar lists other virtual machines: 'n01708857-w-vm1' and 'n01708857-w-vm2'. The main content area displays the 'Overview' blade for 'n01708857-w-vm1'. Key details include:

- Agent version:** 2.7.1491.1131
- Hibernation:** Disabled
- Host group:** -
- Host:** -
- Proximity placement group:** -
- Colocation status:** N/A
- Capacity reservation group:** -
- Disk controller type:** SCSI
- Availability + scaling:** Availability zone (edit) -; Availability set: WINDOWS-AVS; Scale Set: -; Fault domain: 0
- Security type:** Security type: Trusted launch; Enable secure boot: Enabled; Enable vTPM: Enabled; Integrity monitoring: Disabled
- Health monitoring:** Health monitoring: Not enabled
- Extensions + applications:** Extensions: IaaSAntimalware, Microsoft.Insights.VMDiagnosticsSettings; Applications: -
- Disk:** OS disk: n01708857-w-vm1_OsDisk_1_6e19c4297f3d4f63b1bbfdcc3b6d43c9; Encryption at host: Disabled; Azure disk encryption: Not enabled; Ephemeral OS disk: N/A; Data disks: 0
- Auto-shutdown:** Auto-shutdown: Not enabled; Scheduled shutdown: -
- Azure Spot:** Azure Spot: -; Azure Spot eviction policy: -

Networking blade – n01708857-w-vm1

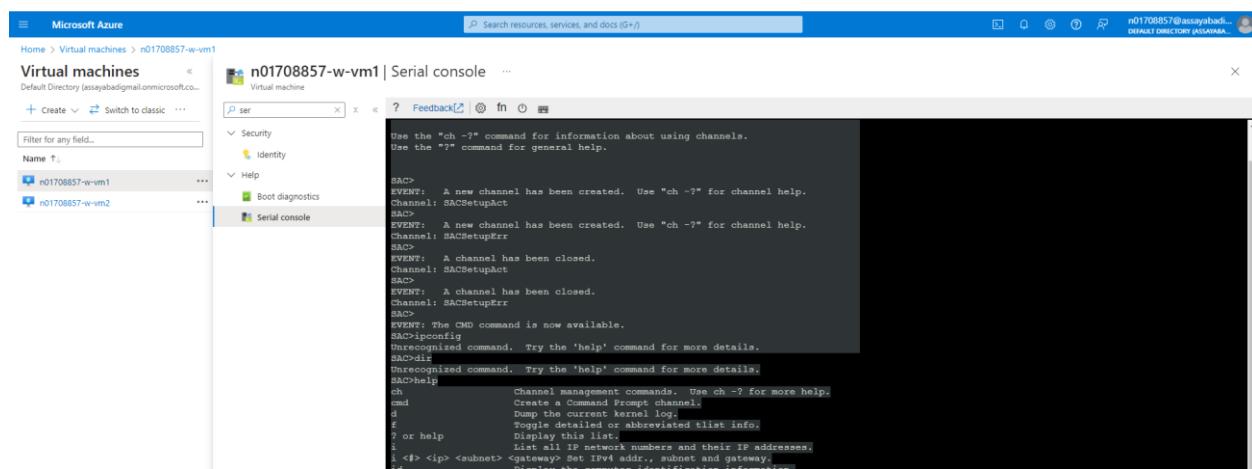
The screenshot shows the Microsoft Azure portal interface for the 'Network settings' blade of 'n01708857-w-vm1'. The left sidebar lists other virtual machines: 'n01708857-w-vm1' and 'n01708857-w-vm2'. The main content area displays the 'Network interface / IP configuration' section for 'n01708857-w-vm1480 (primary) / ipconfig1 (primary)'. Key details include:

- Network interface:** n01708857-w-vm1480
- Virtual network / subnet:** vnet1-n01708857 / vnet1-subnet1-n01708857
- Public IP address:** 4.200.52.80
- Private IP address:** 10.10.0.5
- Admin security rules:** : 0 (Configure)
- Load balancers:** : 0 (Configure)
- Application security groups:** : 0 (Configure)
- Network security group:** vnet1-nsg-n01708857 (attached to subnet: vnet1-subnet1-n01708857; Impacts 2 subnets, 0 network interfaces)
- Accelerated networking:** : Enabled
- Effective security rules:** : 0

Below this, a table shows 'Inbound port rules' (6 total):

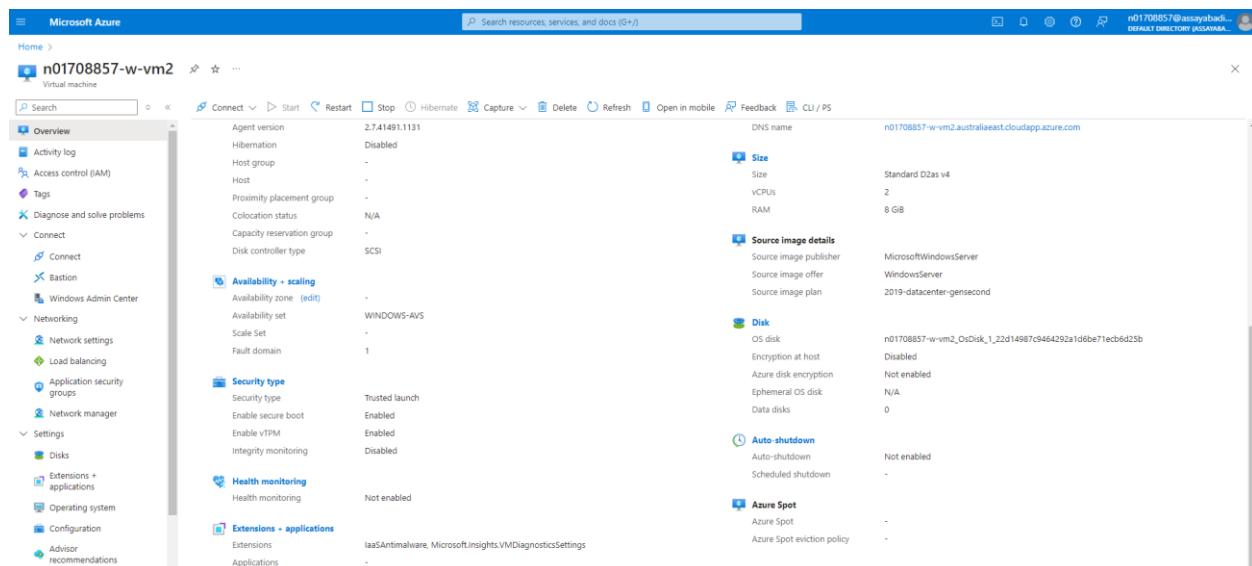
Priority	Name	Port	Protocol	Source	Destination	Action
100	AllowAnyRDPinbound	3389	TCP	Any	Any	Allow
110	AllowAnyHTTPinbound	80	TCP	Any	Any	Allow
120	AllowAnySMBinbound	445	Any	Any	Any	Allow
65000	AllowVnetinbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
						Block
						Drop

Serial Console blade – n01708857-w-vm1



Windows - VM2

Overview blade – n01708857-w-vm2



Networking blade – n01708857-w-vm2

The screenshot shows the Microsoft Azure Networking blade for the virtual machine n01708857-w-vm2. The main pane displays the Network interface / IP configuration for n01708857-w-vm2568 (primary). It lists details such as Network interface (n01708857-w-vm2568), Virtual network / subnet (vnet1-n01708857 / vnet1-subnet2-n01708857), Public IP address (4.195.132.89), Private IP address (10.10.1.4), and Admin security rules (0). Below this, a Network security group (vnet1-msg-n01708857) is attached to the subnet, impacting 2 subnets and 0 network interfaces. A table shows Inbound port rules (Priority 100, 110, 120) allowing RDP, HTTP, and SMB traffic respectively.

Serial Console blade – n01708857-w-vm2

The screenshot shows the Microsoft Azure Serial Console blade for the virtual machine n01708857-w-vm2. The terminal window displays the boot logs, which include messages like "Computer is booting, SAC started and initialized.", "Use the \"ch -?\" command for information about using channels.", "Use the \"?\" command for general help.", and various SAC events related to channel creation and closure.

10. Build Compute Resources for Linux Then Create And Attach Public IP Address Resources

6 SCREENSHOTS (3 per VM) showing the Overview, Networking, and Serial Console blades of each VM (make sure that Overview also includes Availability and Extensions information)

Unix-VM1

Overview blade – n01708857-u-vm1

The screenshot shows the Microsoft Azure Virtual Machines Overview blade for the VM 'n01708857-u-vm1'. The main pane displays various configuration details such as agent status (ready), size (Standard B1ms), and source image details (canonical). The left sidebar contains navigation links for Overview, Activity log, Tags, Diagnose and solve problems, Connect, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Disks, Extensions + applications, Operating system, Configuration, Advisor, Properties, and Locks.

Networking blade – n01708857-u-vm1

The screenshot shows the Microsoft Azure Virtual Machines Networking blade for the VM 'n01708857-u-vm1'. It displays network interface settings for 'n01708857-u-vm15 (primary) / ipconfig (primary)'. Key details include the network interface (n01708857-u-vm115), virtual network (vnet2-n01708857), and private IP address (10.20.0.4). The blade also shows a table for Inbound port rules, listing a single rule for port 22 (TCP) allowing SSH traffic from any source. The left sidebar includes links for Overview, Activity log, Tags, Diagnose and solve problems, Connect, Bastion, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Disks, Extensions + applications, Operating system, Configuration, and Advisor.

Serial Console blade – n01708857-u-vm1

Unix – VM2

Overview blade – n01708857-u-vm2

The screenshot shows the Microsoft Azure portal interface for managing virtual machines. The top navigation bar includes 'Microsoft Azure', a search bar ('Search resources, services, and docs (G+)'), and user information ('n01708857@asusbayda...'). The main area displays the 'Virtual machines' blade for the selected VM 'n01708857-u-vm2'. The left sidebar lists other VMs: 'n01708857-u-vm1', 'n01708857-u-vm2' (selected), 'n01708857-v-vm1', and 'n01708857-w-vm2'. The right pane provides detailed configuration for 'n01708857-u-vm2', including:

- Overview**: Agent version 2.11.1.4, Hibernation Disabled, Host group -, Host -, Proximity placement group -, Colocation status N/A, Capacity reservation group -, Disk controller type SCSI.
- Availability + scaling**: Availability zone (edit) -, Availability set LINUX-AVS, Scale Set -, Fault domain 1.
- Security type**: Security type Trusted launch, Enable secure boot Enabled, Enable vTPM Enabled, Integrity monitoring Disabled.
- Health monitoring**: Health monitoring Not enabled.
- Extensions + applications**: Extensions AzureNetworkWatcherExtension, Applications -.
- Size**: Standard B1ms, Size 1 vCPUs, RAM 2 GiB.
- Source image details**: canonical, Source image publisher 0001-com-ubuntu-minimal-focal, Source image offer minimal-20_04-hts-gen2.
- Disk**: OS disk n01708857-u-vm2_OsDisk_1_7fcff39fbf7041d180ae8264b08d81a9, Encryption at host Disabled, Azure disk encryption Not enabled, Ephemeral OS disk N/A, Data disks 0.
- Azure shutdown**: Auto-shutdown Not enabled, Scheduled shutdown -.
- Azure Spot**: Azure Spot -, Azure Spot eviction policy -.

Networking blade – n01708857-u-vm2

The screenshot shows the Microsoft Azure portal interface for a virtual machine named n01708857-u-vm2. The left sidebar navigation bar includes Home, Virtual machines, and a search bar. The main content area displays the 'Network settings' tab for the selected VM. It shows the network interface configuration (n01708857-u-vm2421) and attached network security group (vnet2-nsg-n01708857). Below this, a table lists inbound port rules, including one for port 22 allowing SSH traffic from any source.

Priority	Name	Port	Protocol	Source	Destination	Action
100	AllowAnySSHinbound	22	TCP	Any	Any	Allow

Serial

Console blade – n01708857-u-vm2

11. Create File Share and Mount it to Windows

1 SCREENSHOT showing the File Share under Azure Storage Account File Shares - blade

The screenshot shows the Microsoft Azure Storage accounts blade. The left sidebar lists 'Storage accounts' with two items: 'n01708857storage1' and 'n01708857storage2'. The main area is titled 'n01708857storage1 | File shares'. It includes a search bar, a navigation menu with 'File share', 'Refresh', and 'Give feedback' buttons, and a 'File share settings' section. The settings show 'Identity-based access: Not configured', 'Default share-level permissions: Disabled', 'Soft delete: 14 days', 'Maximum capacity: 100 TiB', and 'Security: Maximum compatibility'. A table lists one file share: 'n01708857-share1' with details: Name, Modified (25/07/2024, 21:02:29), Tier (Transaction optimized), and Quota (100 TiB). There is also a 'Show deleted shares' toggle.

1 SCREENSHOT showing the Overview blade of the private endpoint

Overview - blade

The screenshot shows the Microsoft Azure Private Endpoint Overview blade for 'h01708857-share1-pe'. The left sidebar has sections like 'Overview', 'Activity log', 'Access control (IAM)', 'Tags', 'Diagnose and solve problems', 'Settings', 'Application security groups', and 'DNS configuration'. The main area is titled 'Overview' and contains an 'Essentials' table with the following data:

Resource group (move)	: RG1-n01708857	Virtual network/subnet	: vnet1-n01708857/vnet1-subnet1-n01708857
Location	: Australia East	Network interface	: n01708857-share1-pe-nic
Subscription (move)	: Sub-a-n01708857	Private link resource	: n01708857storage1
Subscription ID	: dfadab4d-1410-457f-9857-c1a5ffa62980	Target sub-resource	: file
Provisioning state	: Succeeded	Connection status	: Approved
Tags (edit)	: environment : project	Request/Response	: Auto-Approved

1 SCREENSHOT showing the IP Configurations blade of the private endpoint network interface

IP Configurations - blade

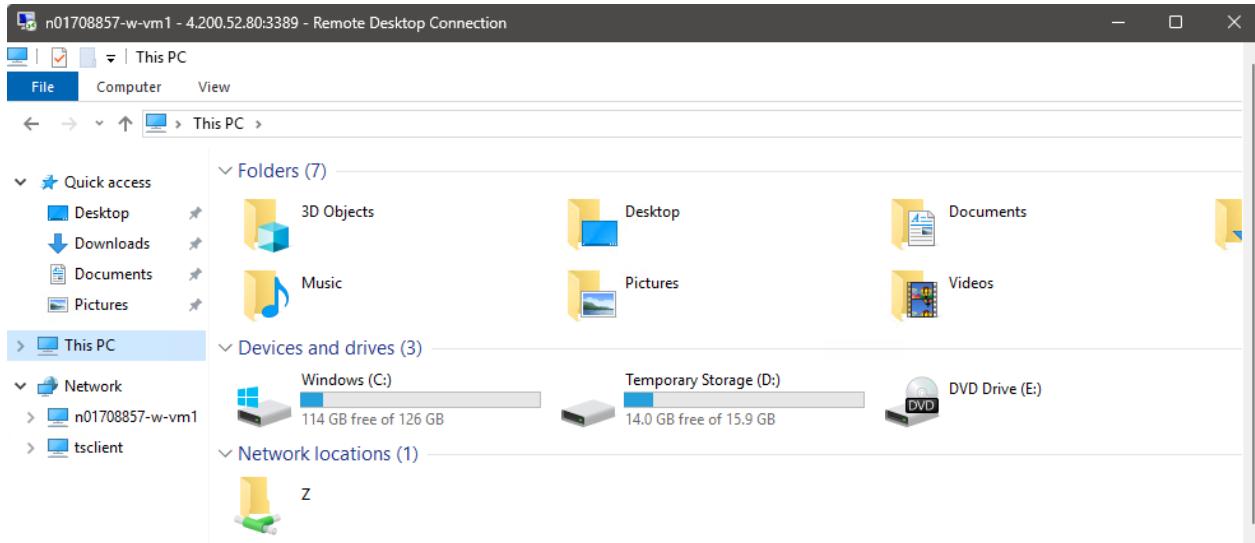
The screenshot shows the 'IP configurations' blade for a network interface named 'n01708857-share1-pe-nic'. The interface is associated with a virtual network 'vnet1' and a subnet 'vnet1-subnet1-n01708857'. A table lists one IP configuration entry:

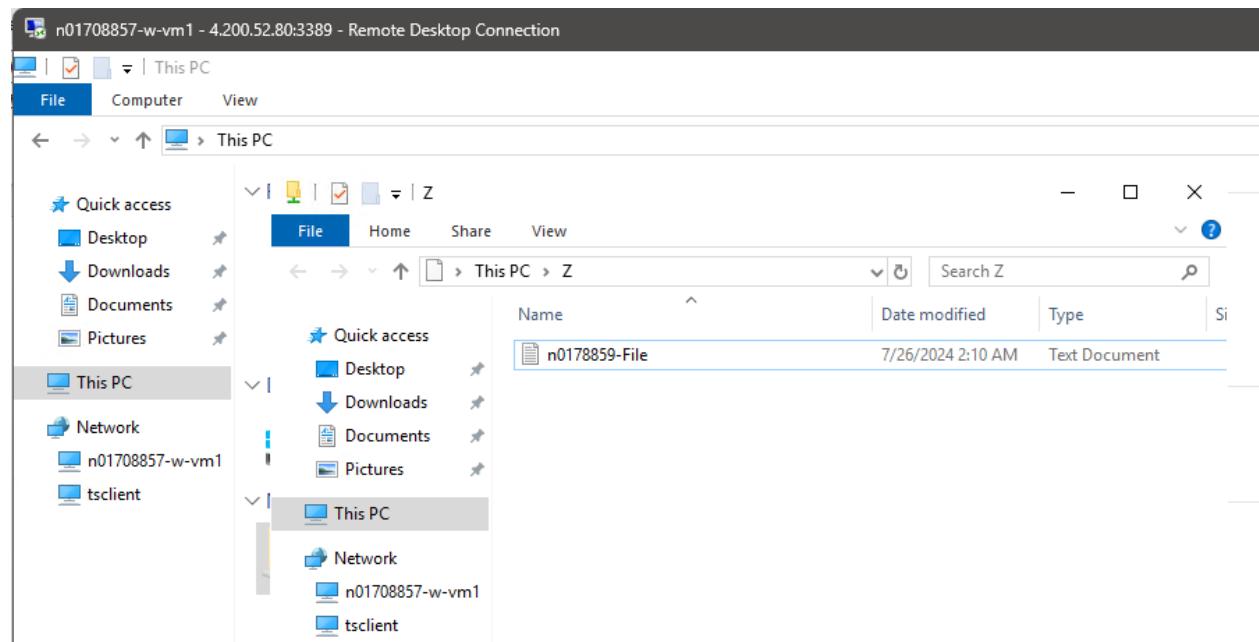
Name	IP Version	Type	Private IP Address	Public IP Address
privateEndpointipConfig.064cea21-93b9-4bbc-9a7e-0f2e9819e4e1	IPv4	Primary	10.10.0.6 (Dynamic)	-

A note at the bottom states: 'You cannot change the properties of this network interface because it is part of a private link.' with a link to 'Learn more about IP configuration'.

1 SCREENSHOT showing the Z: drive mounted on Windows VM (log in to the VM)

Z: drive mounted on Windows VM1





12. Configure Load Balancer

3 SCREENSHOTS showing the Overview, Frontend IP Configuration, and Backend Pools blades from Azure Load Balancer

Overview - blade

The screenshot shows the 'Overview' blade for a load balancer named 'n01708857-lb1'. The left sidebar includes links for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (Frontend IP configuration selected), and Backend pools. The main pane displays essential details:

Setting	Value
Resource group (move)	: RG1-n01708857
Location	: Australia East
Subscription (move)	: Sub-a-n01708857
Subscription ID	: dfadab4d-1410-457f-9857-c1a5ffa62980
SKU	: Standard
Tags (edit)	: environment : project
Backend pool	: n01708857-backend-pools (2 virtual machines)
Load balancing rule	: n01708857-loadbalancer-rule (Tcp:80)
Health probe	: n01708857-HealthProbe (Tcp:80)
NAT rules	: 0 inbound
Tier	: Regional

Frontend IP Configuration - blade

The screenshot shows the 'Frontend IP configuration' blade for the same load balancer. The left sidebar includes links for Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (Frontend IP configuration selected), and Backend pools. The main pane lists the frontend IP configuration:

Name	IP address	Rules count
frontend-ip	4.147.233.99 (loadbalancer-pip)	1

Backend - Pools blade

The screenshot shows the 'Backend pools' section of the Azure Load Balancer blade. On the left, a navigation menu includes options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings (with Frontend IP configuration, Backend pools selected), Health probes, Load balancing rules, Inbound NAT rules, and Outbound rules. The main area displays a table of backend pools:

Backend pool	Resource Name	IP address	Network interface	Availability zone	Rules count	Resource Status	Admin state	
n01708857-backend-pools (2)	n01708857-w-vm1	10.10.0.5	n01708857-w-vm148	-	1	Running	None	
	n01708857-backend-	n01708857-w-vm2	10.10.1.4	n01708857-w-vm256	-	1	Running	None

2 SCREENSHOTS showing the Health Probes and Load Balancing Rules configuration from Azure Load Balancer

Health Probes - blade

The screenshot shows the 'Health probes' section of the Azure Load Balancer blade. The left navigation menu is identical to the previous screenshot. The main area displays a table of health probes:

Name	Protocol	Port	Path	Used By
n01708857-HealthProbe	Tcp	80	-	n01708857-loadb-rule

Load Balancing Rules

The screenshot shows the 'Load balancing rules' blade for a specific load balancer. The left sidebar has a 'Load balancing rules' section selected. The main area displays a table of existing rules:

Name	Protocol	Backend pool	Health probe
n01708857-loadb-rule	TCP/80	n01708857-backend-pools	n01708857+HealthProbe

13. Create Data Disk and Mount it to Linux

1 SCREENSHOT showing the Overview blade of the data disk from Azure Disks

Overview - blade

The screenshot shows the 'Disks' blade. A checkbox is selected next to the 'n01708857-manage-disk' entry. The table lists five data disks:

Name	Storage type	Size (GB)	Owner	Resource group	Location
n01708857-manage-disk	Premium SSD LRS	10	-	RG2-n01708857	UK South
n01708857-u-vm1_OsDisk_1_ecbde576cdac46acbb5db01174b15...	Premium SSD LRS	30	n01708857-u-vm1	RG2-N01708857	UK South
n01708857-u-vm2_OsDisk_1_7fcff39bf70f41d180ae8264b08d81a9	Premium SSD LRS	30	n01708857-u-vm2	RG2-N01708857	UK South
n01708857-w-vm1_OsDisk_1_6e19c42973d4f63b1bbfdc38d643c9c	Premium SSD LRS	127	n01708857-w-vm1	RG1-N01708857	Australia East
n01708857-w-vm2_OsDisk_1_22d14987c9464292a1d6be71ecb6d...	Premium SSD LRS	127	n01708857-w-vm2	RG1-N01708857	Australia East

3 SCREENSHOTS showing the outputs of “lsblk”, “cat /etc/fstab”, and “df -h” commands (log in to the Linux VM is required) Shares blade

lsblk

```
n01708857@n01708857-u-vm1:~$ lsblk
NAME   MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sda      8:0    0   30G  0 disk 
├─sda1   8:1    0 29.9G  0 part /
└─sda14  8:14   0     4M  0 part 
└─sda15  8:15   0  106M  0 part /boot/efi
sdb      8:16   0     4G  0 disk 
└─sdb1   8:17   0     4G  0 part /mnt
sdc      8:32   0   10G  0 disk 
└─sdc1   8:33   0   10G  0 part /mydisk01
n01708857@n01708857-u-vm1:~$
```

cat /etc/fstab

```
n01708857@n01708857-u-vm1:~$ cat /etc/fstab
# CLOUD_IMG: This file was created/modified by the Cloud Image build process
UUID=60317bf9-69a6-42ca-bd96-867c818alc33      /          ext4  defaults,discard
0 1
UUID=93C3-880C /boot/efi      vfat      umask=0077      0 1
/dev/disk/cloud/azure_resource-part1  /mnt      auto      defaults,nofail,x-system
d.requires=cloud-init.service,_netdev,comment=cloudconfig      0      2
/dev/sdc1  /mydisk01  ext4  defaults,nofail  0  0
n01708857@n01708857-u-vm1:~$
```

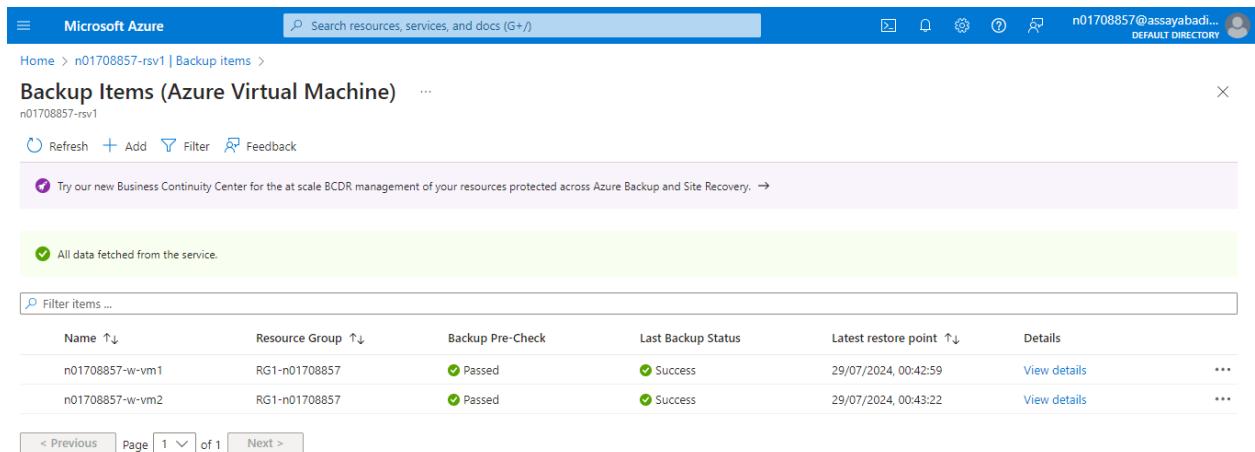
df -h

```
n01708857@n01708857-u-vm1:~$ 
n01708857@n01708857-u-vm1:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        29G  1.3G   28G  5% /
devtmpfs        921M  4.0K  921M  1% /dev
tmpfs           926M    0  926M  0% /dev/shm
tmpfs           186M  664K  185M  1% /run
tmpfs           5.0M    0  5.0M  0% /run/lock
tmpfs           926M    0  926M  0% /sys/fs/cgroup
/dev/sda15       105M  6.1M   99M  6% /boot/efi
/dev/sdb1        3.9G  28K   3.7G  1% /mnt
tmpfs           186M    0  186M  0% /run/user/1000
/dev/sdc1        9.8G  24K   9.3G  1% /mydisk01
n01708857@n01708857-u-vm1:~$
```

14. Configure Backups

1 SCREENSHOT1 showing Backup Center | Backup Instances

Backup Instances

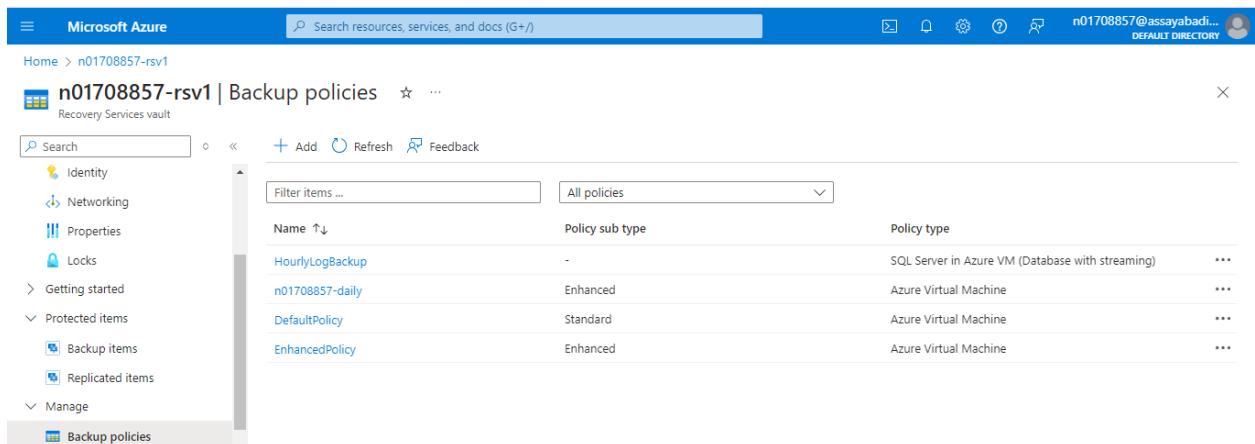


This screenshot shows the 'Backup Instances' blade in the Microsoft Azure portal. The top navigation bar includes 'Microsoft Azure', a search bar, and user information. Below the navigation is a breadcrumb trail: 'Home > n01708857-rsv1 | Backup items >'. The main title is 'Backup Items (Azure Virtual Machine) ...'. A note at the top right encourages using the Business Continuity Center for BCDR management. A green status bar indicates 'All data fetched from the service'. A table lists two backup items: 'n01708857-w-vm1' and 'n01708857-w-vm2', both with 'Passed' backup pre-check results and 'Success' last backup status. The latest restore point for both was on 29/07/2024. Buttons for 'View details' and '...' are shown for each item. Navigation controls at the bottom include '< Previous', 'Page 1 of 1', and 'Next >'.

Name	Resource Group	Backup Pre-Check	Last Backup Status	Latest restore point	Details
n01708857-w-vm1	RG1-n01708857	Passed	Success	29/07/2024, 00:42:59	View details ...
n01708857-w-vm2	RG1-n01708857	Passed	Success	29/07/2024, 00:43:22	View details ...

1 SCREENSHOT1 showing Backup Center | Backup Policies | *HumberID-daily*

Backup Policies -blade



This screenshot shows the 'Backup Policies' blade in the Microsoft Azure portal. The top navigation bar includes 'Microsoft Azure', a search bar, and user information. Below the navigation is a breadcrumb trail: 'Home > n01708857-rsv1 | Backup policies > ...'. The main title is 'h01708857-rsv1 | Backup policies'. A sidebar on the left lists navigation options: Identity, Networking, Properties, Locks, Getting started, Protected items, Backup items, Replicated items, Manage, and Backup policies (which is selected). The main area displays a table of backup policies. The table columns are 'Name', 'Policy sub type', and 'Policy type'. It lists four policies: 'HourlyLogBackup' (Policy sub type: -, Policy type: SQL Server in Azure VM (Database with streaming)), 'n01708857-daily' (Policy sub type: Enhanced, Policy type: Azure Virtual Machine), 'DefaultPolicy' (Policy sub type: Standard, Policy type: Azure Virtual Machine), and 'EnhancedPolicy' (Policy sub type: Enhanced, Policy type: Azure Virtual Machine). Each policy has a '...' button for more options.

Name	Policy sub type	Policy type
HourlyLogBackup	-	SQL Server in Azure VM (Database with streaming)
n01708857-daily	Enhanced	Azure Virtual Machine
DefaultPolicy	Standard	Azure Virtual Machine
EnhancedPolicy	Enhanced	Azure Virtual Machine

15. Azure Container Instances

1 SCREENSHOT showing the Overview blade of Azure Container Instance Overview - blade

The screenshot shows the Azure portal's Overview blade for a container instance named "n01708857-ac1". Key details include:

- Resource group: RG2-n01708857
- Status: Running
- Location: UK South
- Subscription: Sub-b-n01708857
- Subscription ID: e2ff91bd-cbdc-45df-a7f0-d5ff1fc06aca5
- Tags: environment: project

Monitoring charts show:

- CPU Usage (Avg): 0% (0.00MB)
- Memory Usage (Avg): 17.00MB
- Network Bytes Received Per Second (Avg): 98

1 SCREENSHOT showing the web page when the DNS label is entered in a browser window

Web Page Accessed Using DNS label

The screenshot shows a web browser displaying the URL `n01708857-ac1.dnbmdzede2bdaxfp.ksouth.azurecontainer.io`. The page content is:

Welcome to Azure Container Instances!

The page features a large blue cloud icon with a white arrow pointing upwards, containing a purple server rack icon.

16. Hub and Spoke Architectural Diagram of The Project

