Configure a Virtual Network for Azure Databricks (Private Preview)

Learn how to deploy Azure Databricks service to your own virtual network. This deployment enables the following scenarios:

- Connecting to Databricks directly from an on-premises network.
- Connecting Databricks to other Azure resources through service endpoints.

Note. This feature is in **private preview.** To request access, contact channel.sa@databricks.com.

Workflow overview

1. Prepare a virtual network to which you would like to deploy a Databricks workspace. Two subnets are required in the virtual network:

   a. Private subnet with an associated network security group that allows cluster-internal communication.
   b. Public subnet with an associated network security group that allows communication with the Databricks control plane.

2. Create a Databricks workspace with the configured virtual network.

Prepare a virtual network

We recommend that you create a new virtual network to host each Databricks workspace, but you can use an existing virtual network if you prefer.

The virtual network requirements are as follows:

1. **Location:** The virtual network must be in the same region as the Databricks workspace you plan to create.

2. **Subnets:** Two subnets are required to host clusters:
    a. Subnet named “Private”, with an associated network security group that allows cluster-internal communication.
    b. Subnet named “Public”, with an associated network security group that allows communication with the Databricks control plane.

    Certain network security rules must be associated with the subnets (covered in next section). It is recommended to create dedicated subnets for Databricks workspace, but you could also use existing subnets.

3. **Address space**: A /16 CIDR block is required for the virtual network. A /18 CIDR block is required for the private and public subnets.

To ensure proper cluster setup and communication, you must whitelist the following traffic on the subnets. It’s recommended to whitelist all outbound traffic because the Webapp IP could change.

Direction	**Protocol**	**Source**	**Source Port**	**Destination**	**Destination Port**
Inbound	*	VirtualNetwork	*	*	*
Inbound	*	Control Plane IP	*	*	22
Inbound	*	Control Plane IP	*	*	5557
Outbound	*	*	*	*	*

The control plane IP depends on the region:

Region	**Control Plane IP**

australiaeast	13.70.105.50/32
australiasoutheast	13.70.105.50/32
centralus	23.101.152.95/32
eastasia	52.187.0.85/32
eastus	23.101.152.95/32
eastus2	23.101.152.95/32
northcentralus	23.101.152.95/32
northeurope	23.100.0.135/32
southcentralus	40.83.178.242/32
southeastasia	52.187.0.85/32
uksouth	51.140.203.27/32
ukwest	51.140.203.27/32
westeurope	23.100.0.135/32
westus	40.83.178.242/32
westus2	40.83.178.242/32

You can use the attached template to deploy a network security group that meets the above requirements, and then use the network template to deploy a virtual network with subnets protected by the network security group. This will give you a new virtual network that's ready for Databricks workspace creation.

Create a workspace with a custom virtual network

Three parameters are required in order to create a Databricks workspace with the custom virtual network.

Name	**Type**	**Description**
customVirtualNetworkId	String	Resource ID of the custom virtual network, e.g., "/subscriptions/36f75872-9ace-4c20-911c-aea8eba2945c/resourceGroups/tianyi-dev/providers/Microsoft.Network/virtualNetworks/tianyi-dev-vnet".
customPrivateSubnetName	String	Name of the private subnet in the custom virtual network, e.g., "private-subnet".

customPublicSubnetName	String	Name of the public subnet in the custom virtual network, e.g., “public-subnet”.

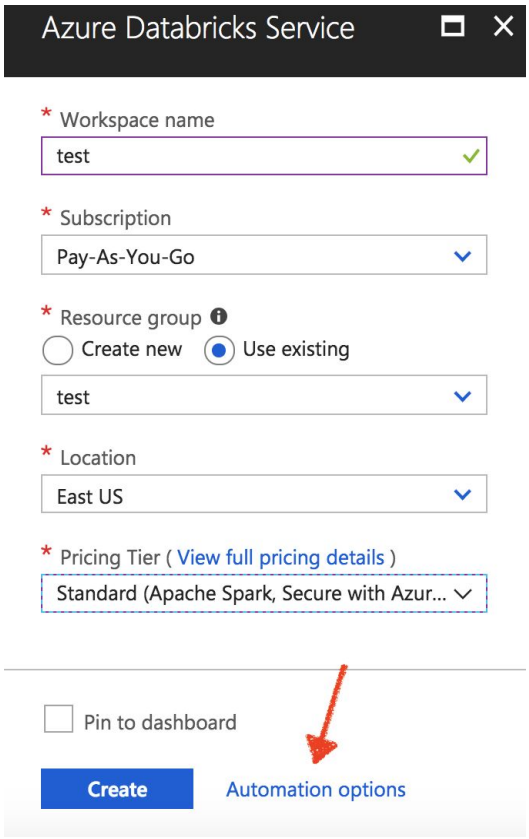
Create a workspace using the deployment template

You can use the attached template to deploy the Databricks workspace.

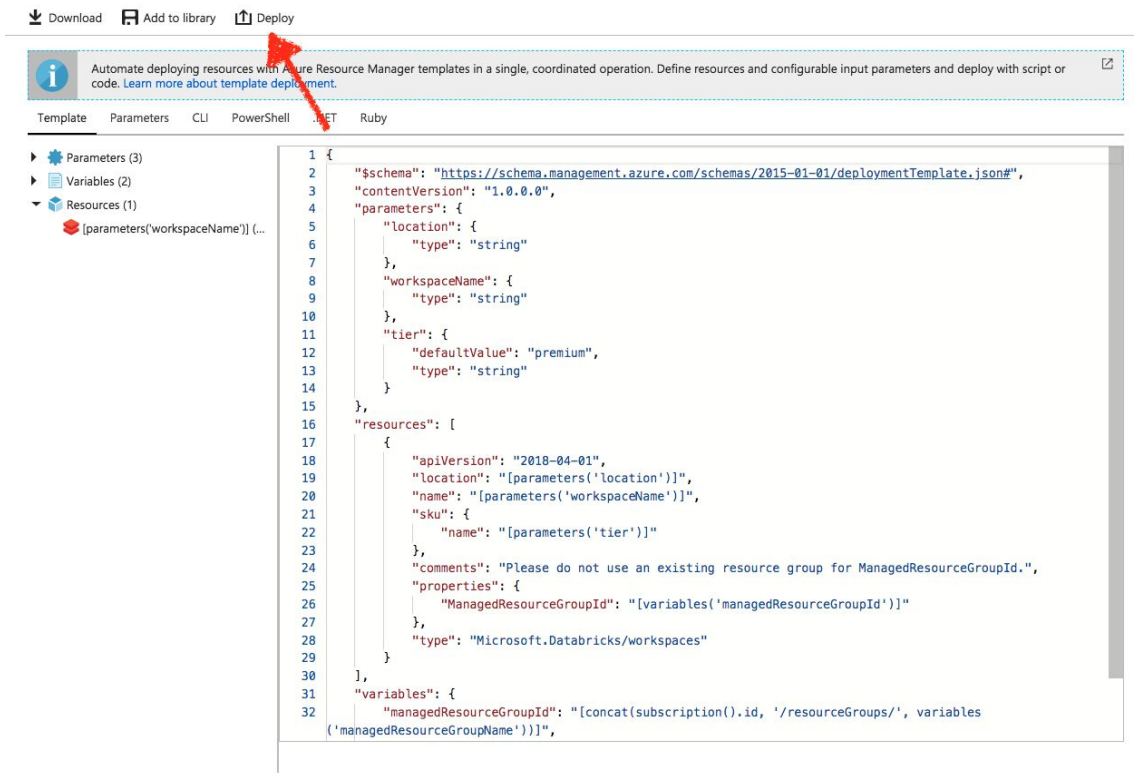
Create a workspace on the Azure Portal

You can create the Databricks workspace using deployment template on Azure Portal by following these steps.

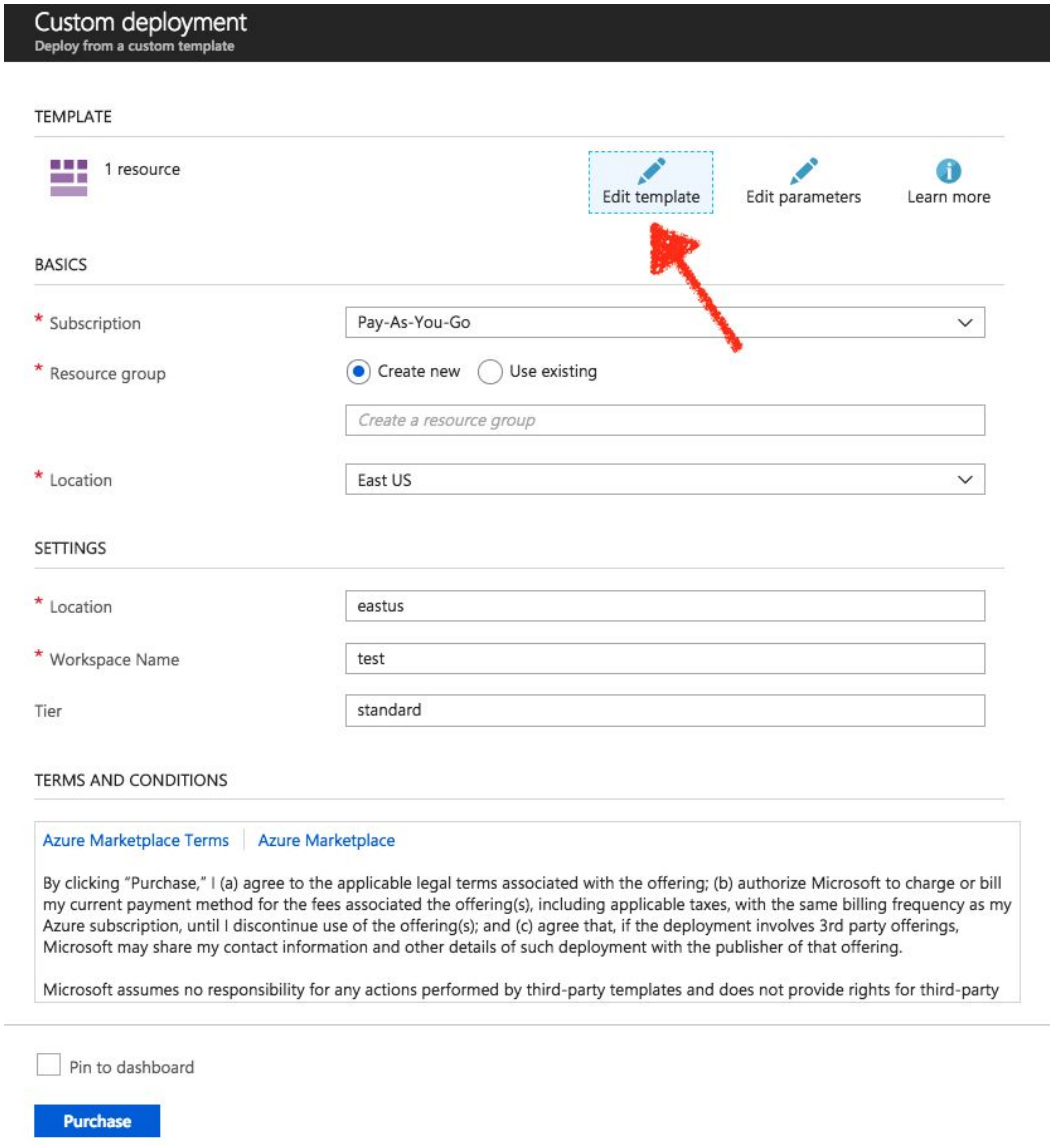
1. In the **Azure Portal**, create an Azure Databricks service. On the Azure Databricks Service form, click **Automation options**.



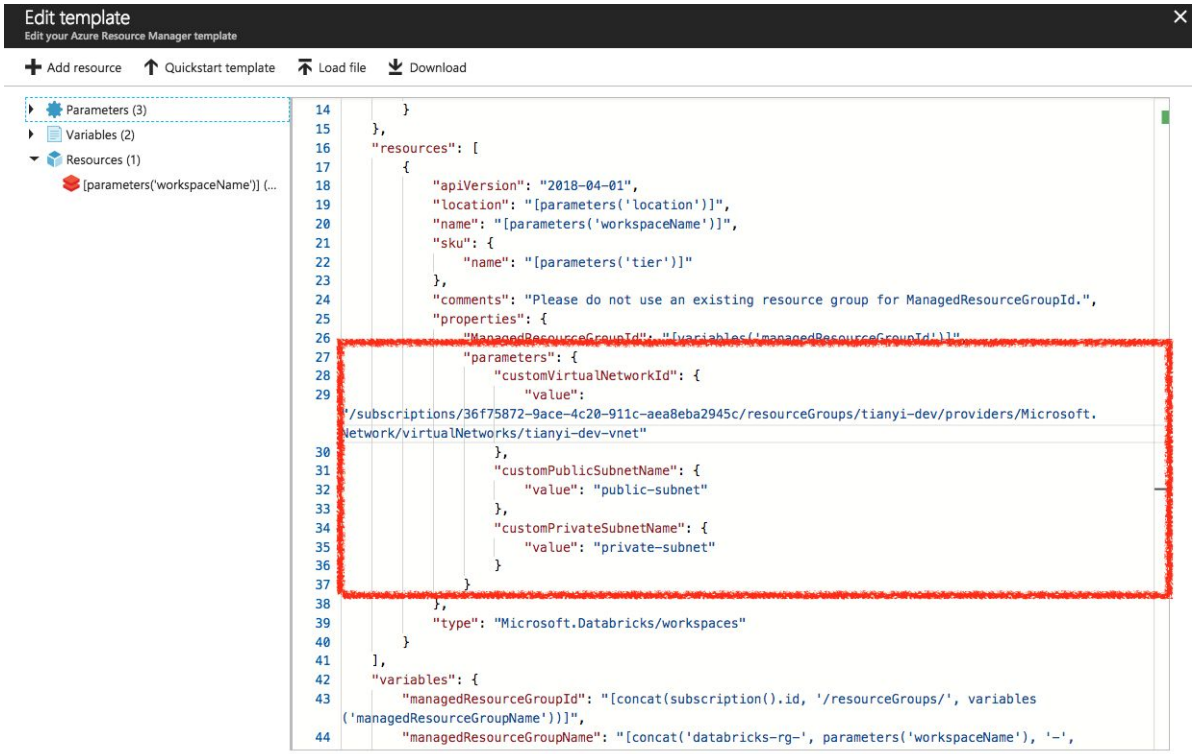
2. Click **Deploy**.



3. On the **Custom deployment** page, click **Edit template**.



4. Edit the template to include the custom virtual network parameters.



5. Click **Save**.

6. Fill out the required fields and click **Purchase**.

Appendix

Option 1 - All-in-one Template

Deploy using Azure CLI 2.0

```
az group deployment create --name $deployment --resource-group
$resourceGroup --template-file $file --parameters nsgName=$nsgName
vnetName=$vnetName vnetAddressPrefix=$vnetAddressPrefix
workspaceName=$workspaceName
```

```
{
   "$schema":
"https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
   "contentVersion": "1.0.0.0",
   "parameters": {
      "nsgName": {
        "defaultValue": "databricks-nsg",
        "type": "string"
      },
```

```
      "vnetName": {
         "defaultValue": "databricks-vnet",
         "type": "string"
      },
      "workspaceName": {
         "type": "string"
      },
      "vnetAddressPrefix": {
         "defaultValue": "10.179",
         "type": "string"
      },
      "privateSubnetName": {
         "defaultValue": "private-subnet",
         "type": "string"
      },
      "publicSubnetName": {
         "defaultValue": "public-subnet",
         "type": "string"
      },
      "workspaceTier": {
         "defaultValue": "premium",
         "type": "string"
      }
   },
   "resources": [
      {
         "apiVersion": "2018-02-01",
         "type": "Microsoft.Network/networkSecurityGroups",
         "location": "[resourceGroup().location]",
         "name": "[parameters('nsgName')]",
         "properties": {
            "securityRules": [
               {
                  "name": "databricks-worker-to-worker",
                  "properties": {
                     "access": "Allow",
                     "description": "Required for worker nodes communication within
a cluster.",
                     "destinationAddressPrefix": "*",
                     "destinationPortRange": "*",
                     "direction": "Inbound",
                     "priority": 200,
                     "protocol": "*",
                     "sourceAddressPrefix": "VirtualNetwork",
                     "sourcePortRange": "*"
                  }
               },
               {
                  "name": "databricks-control-plane-ssh",
                  "properties": {
                     "access": "Allow",
                     "description": "Required for Databricks control plane
management of worker nodes.",
                     "destinationAddressPrefix": "*",
                     "destinationPortRange": "22",
                     "direction": "Inbound",
                     "priority": 100,
                     "protocol": "*",
                     "sourceAddressPrefix": "[variables('controlPlaneIp')]",
                     "sourcePortRange": "*"
```

```
                }
            },
            {
                "name": "databricks-control-plane-worker-proxy",
                "properties": {
                    "access": "Allow",
                    "description": "Required for Databricks control plane
communication with worker nodes.",
                    "destinationAddressPrefix": "*",
                    "destinationPortRange": "5557",
                    "direction": "Inbound",
                    "priority": 110,
                    "protocol": "*",
                    "sourceAddressPrefix": "[variables('controlPlaneIp')]",
                    "sourcePortRange": "*"
                }
            },
            {
                "name": "databricks-worker-to-internet",
                "properties": {
                    "access": "Allow",
                    "description": "Required for workers communication with
Internet.",
                    "destinationAddressPrefix": "*",
                    "destinationPortRange": "*",
                    "direction": "Outbound",
                    "priority": 120,
                    "protocol": "*",
                    "sourceAddressPrefix": "*",
                    "sourcePortRange": "*"
                }
            }
        ]
      }
    },
    {
        "apiVersion": "2018-02-01",
        "type": "Microsoft.Network/virtualNetworks",
        "location": "[resourceGroup().location]",
        "name": "[parameters('vnetName')]",
        "dependsOn": [
          "[concat('Microsoft.Network/networkSecurityGroups/',
parameters('nsgName'))]"
        ],
        "properties": {
          "addressSpace": {
            "addressPrefixes": [
              "[variables('vnetCidr')]"
            ]
          },
          "subnets": [
            {
              "name": "[parameters('publicSubnetName')]",
              "properties": {
                "addressPrefix": "[variables('publicSubnetCidr')]",
                "networkSecurityGroup": {
                  "id": "[variables('nsgId')]"
                }
              }
            },
```

```
                {
                   "name": "[parameters('privateSubnetName')]",
                   "properties": {
                      "addressPrefix": "[variables('privateSubnetCidr')]",
                      "networkSecurityGroup": {
                         "id": "[variables('nsgId')]"
                      }
                   }
                }
             ]
          }
       },
       {
          "apiVersion": "2018-04-01",
          "type": "Microsoft.Databricks/workspaces",
          "location": "[resourceGroup().location]",
          "name": "[parameters('workspaceName')]",
          "dependsOn": [
            "[concat('Microsoft.Network/networkSecurityGroups/',
parameters('nsgName'))]",
            "[concat('Microsoft.Network/virtualNetworks/', parameters('vnetName'))]"
          ],
          "sku": {
             "name": "[parameters('workspaceTier')]"
          },
          "comments": "Please do not use an existing resource group for
ManagedResourceGroupId.",
          "properties": {
             "ManagedResourceGroupId": "[variables('managedResourceGroupId')]",
             "parameters": {
                "customVirtualNetworkId": {
                   "value": "[variables('vnetId')]",
                },
                "customPublicSubnetName": {
                   "value": "[parameters('publicSubnetName')]",
                },
                "customPrivateSubnetName": {
                   "value": "[parameters('privateSubnetName')]",
                }
             }
          }
       }
    ],
    "variables": {
       "azureRegionToControlPlaneIp": {
          "australiaeast": "13.70.105.50/32",
          "australiasoutheast": "13.70.105.50/32",
          "centralus": "23.101.152.95/32",
          "eastasia": "52.187.0.85/32",
          "eastus": "23.101.152.95/32",
          "eastus2": "23.101.152.95/32",
          "northcentralus": "23.101.152.95/32",
          "northeurope": "23.100.0.135/32",
          "southcentralus": "40.83.178.242/32",
          "southeastasia": "52.187.0.85/32",
          "uksouth": "51.140.203.27/32",
          "ukwest": "51.140.203.27/32",
          "westeurope": "23.100.0.135/32",
          "westus": "40.83.178.242/32",
          "westus2": "40.83.178.242/32"
```

```
      },
      "controlPlaneIp":
"[variables('azureRegionToControlPlaneIp')[resourceGroup().location]]",
      "privateSubnetCidr": "[concat(parameters('vnetAddressPrefix'), '.64.0/18')]",
      "publicSubnetCidr": "[concat(parameters('vnetAddressPrefix'), '.0.0/18')]",
      "vnetCidr": "[concat(parameters('vnetAddressPrefix'), '.0.0/16')]",
      "nsgId": "[resourceId('Microsoft.Network/networkSecurityGroups',
parameters('nsgName'))]",
      "vnetId": "[resourceId('Microsoft.Network/virtualNetworks',
parameters('vnetName'))]",
      "managedResourceGroupId": "[concat(subscription().id, '/resourceGroups/',
variables('managedResourceGroupName'))]",
      "managedResourceGroupName": "[concat('databricks-rg-',
parameters('workspaceName'), '-', uniqueString(parameters('workspaceName'),
resourceGroup().id))]"
   }
}
```

Option 2 - Separate Templates

Network Security Group Template

Deploy using Azure CLI 2.0

```
az group deployment create --name $deployment --resource-group
$resourceGroup --template-file $file --parameters nsgName=$nsgName
```

```
{
   "$schema":
"https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
   "contentVersion": "1.0.0.0",
   "parameters": {
      "nsgName": {
        "defaultValue": "databricks-nsg",
        "type": "string"
      }
   },
   "resources": [
      {
         "apiVersion": "2018-02-01",
         "location": "[resourceGroup().location]",
         "name": "[parameters('nsgName')]",
         "properties": {
            "securityRules": [
               {
                  "name": "databricks-worker-to-worker",
                  "properties": {
                     "access": "Allow",
                     "description": "Required for worker nodes communication within
a cluster.",
                     "destinationAddressPrefix": "*",
                     "destinationPortRange": "*",
                     "direction": "Inbound",
                     "priority": 200,
```

```
                    "protocol": "*",
                    "sourceAddressPrefix": "VirtualNetwork",
                    "sourcePortRange": "*"
                 }
              },
              {
                 "name": "databricks-control-plane-ssh",
                 "properties": {
                    "access": "Allow",
                    "description": "Required for Databricks control plane
management of worker nodes.",
                    "destinationAddressPrefix": "*",
                    "destinationPortRange": "22",
                    "direction": "Inbound",
                    "priority": 100,
                    "protocol": "*",
                    "sourceAddressPrefix": "[variables('controlPlaneIp')]",
                    "sourcePortRange": "*"
                 }
              },
              {
                 "name": "databricks-control-plane-worker-proxy",
                 "properties": {
                    "access": "Allow",
                    "description": "Required for Databricks control plane
communication with worker nodes.",
                    "destinationAddressPrefix": "*",
                    "destinationPortRange": "5557",
                    "direction": "Inbound",
                    "priority": 110,
                    "protocol": "*",
                    "sourceAddressPrefix": "[variables('controlPlaneIp')]",
                    "sourcePortRange": "*"
                 }
              },
              {
                 "name": "databricks-worker-to-internet",
                 "properties": {
                    "access": "Allow",
                    "description": "Required for workers communication with
Internet.",
                    "destinationAddressPrefix": "*",
                    "destinationPortRange": "*",
                    "direction": "Outbound",
                    "priority": 120,
                    "protocol": "*",
                    "sourceAddressPrefix": "*",
                    "sourcePortRange": "*"
                 }
              }
           ]
        },
        "type": "Microsoft.Network/networkSecurityGroups"
     }
  ],
  "variables": {
     "azureRegionToControlPlaneIp": {
        "australiaeast": "13.70.105.50/32",
        "australiasoutheast": "13.70.105.50/32",
        "centralus": "23.101.152.95/32",
```

```
         "eastasia": "52.187.0.85/32",
         "eastus": "23.101.152.95/32",
         "eastus2": "23.101.152.95/32",
         "northcentralus": "23.101.152.95/32",
         "northeurope": "23.100.0.135/32",
         "southcentralus": "40.83.178.242/32",
         "southeastasia": "52.187.0.85/32",
         "uksouth": "51.140.203.27/32",
         "ukwest": "51.140.203.27/32",
         "westeurope": "23.100.0.135/32",
         "westus": "40.83.178.242/32",
         "westus2": "40.83.178.242/32"
      },
      "controlPlaneIp":
"[variables('azureRegionToControlPlaneIp')[resourceGroup().location]]"
   }
}
```

Virtual Network Template

Deploy using Azure CLI 2.0

```
az group deployment create --name $deployment --resource-group
$resourceGroup --template-file $file --parameters vnetName=$vnetName
nsgId=$nsgId
```

```
{
   "$schema":
"https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
   "contentVersion": "1.0.0.0",
   "parameters": {
      "vnetName": {
         "defaultValue": "databricks-vnet",
         "type": "string"
      },
      "vnetAddressPrefix": {
         "defaultValue": "10.179",
         "type": "string"
      },
      "privateSubnetName": {
         "defaultValue": "private-subnet",
         "type": "string"
      },
      "publicSubnetName": {
         "defaultValue": "public-subnet",
         "type": "string"
      },
      "nsgId": {
        "defaultValue": "",
        "type": "string"
      }
   },
   "resources": [
      {
         "apiVersion": "2018-02-01",
         "location": "[resourceGroup().location]",
```

```
         "name": "[parameters('vnetName')]",
         "properties": {
            "addressSpace": {
               "addressPrefixes": [
                  "[variables('vnetCidr')]"
               ]
            },
            "subnets": [
               {
                  "name": "[parameters('publicSubnetName')]",
                  "properties": {
                     "addressPrefix": "[variables('publicSubnetCidr')]",
                     "networkSecurityGroup": {
                           "id": "[parameters('nsgId')]"
                     }
                  }
               },
               {
                  "name": "[parameters('privateSubnetName')]",
                  "properties": {
                     "addressPrefix": "[variables('privateSubnetCidr')]",
                     "networkSecurityGroup": {
                           "id": "[parameters('nsgId')]"
                     }
                  }
               }
            ]
         },
         "type": "Microsoft.Network/virtualNetworks"
      }
   ],
   "variables": {
      "privateSubnetCidr": "[concat(parameters('vnetAddressPrefix'), '.64.0/18')]",
      "publicSubnetCidr": "[concat(parameters('vnetAddressPrefix'), '.0.0/18')]",
      "vnetCidr": "[concat(parameters('vnetAddressPrefix'), '.0.0/16')]"
   }
}
```

Databricks Workspace Template

Deploy using Azure CLI 2.0

```
az group deployment create --name $deployment --resource-group
$resourceGroup --template-file $file --parameters
workspaceName=$workspaceName customVirtualNetworkId=$vnetId
```

```
{
    "$schema":
"https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
        "workspaceName": {
            "type": "string"
        },
        "tier": {
            "defaultValue": "premium",
```

```
            "type": "string"
        },
        "customVirtualNetworkId": {
            "type": "string",
            "defaultValue": "",
        },
        "customPublicSubnetName": {
            "type": "string",
            "defaultValue": "public-subnet",
        },
        "customPrivateSubnetName": {
            "type": "string",
            "defaultValue": "private-subnet",
        }
    },
    "resources": [
        {
            "apiVersion": "2018-04-01",
            "location": "[resourceGroup().location]",
            "name": "[parameters('workspaceName')]",
            "sku": {
                "name": "[parameters('tier')]"
            },
            "comments": "Please do not use an existing resource group for
ManagedResourceGroupId.",
            "properties": {
                "ManagedResourceGroupId": "[variables('managedResourceGroupId')]",
                "parameters": {
                    "customVirtualNetworkId": {
                        "value": "[parameters('customVirtualNetworkId')]",
                    },
                    "customPublicSubnetName": {
                        "value": "[parameters('customPublicSubnetName')]",
                    },
                    "customPrivateSubnetName": {
                        "value": "[parameters('customPrivateSubnetName')]",
                    }
                }
            },
            "type": "Microsoft.Databricks/workspaces"
        }
    ],
    "variables": {
        "managedResourceGroupId": "[concat(subscription().id, '/resourceGroups/',
variables('managedResourceGroupName'))]",
        "managedResourceGroupName": "[concat('databricks-rg-',
parameters('workspaceName'), '-', uniqueString(parameters('workspaceName'),
resourceGroup().id))]"
    }
}
```