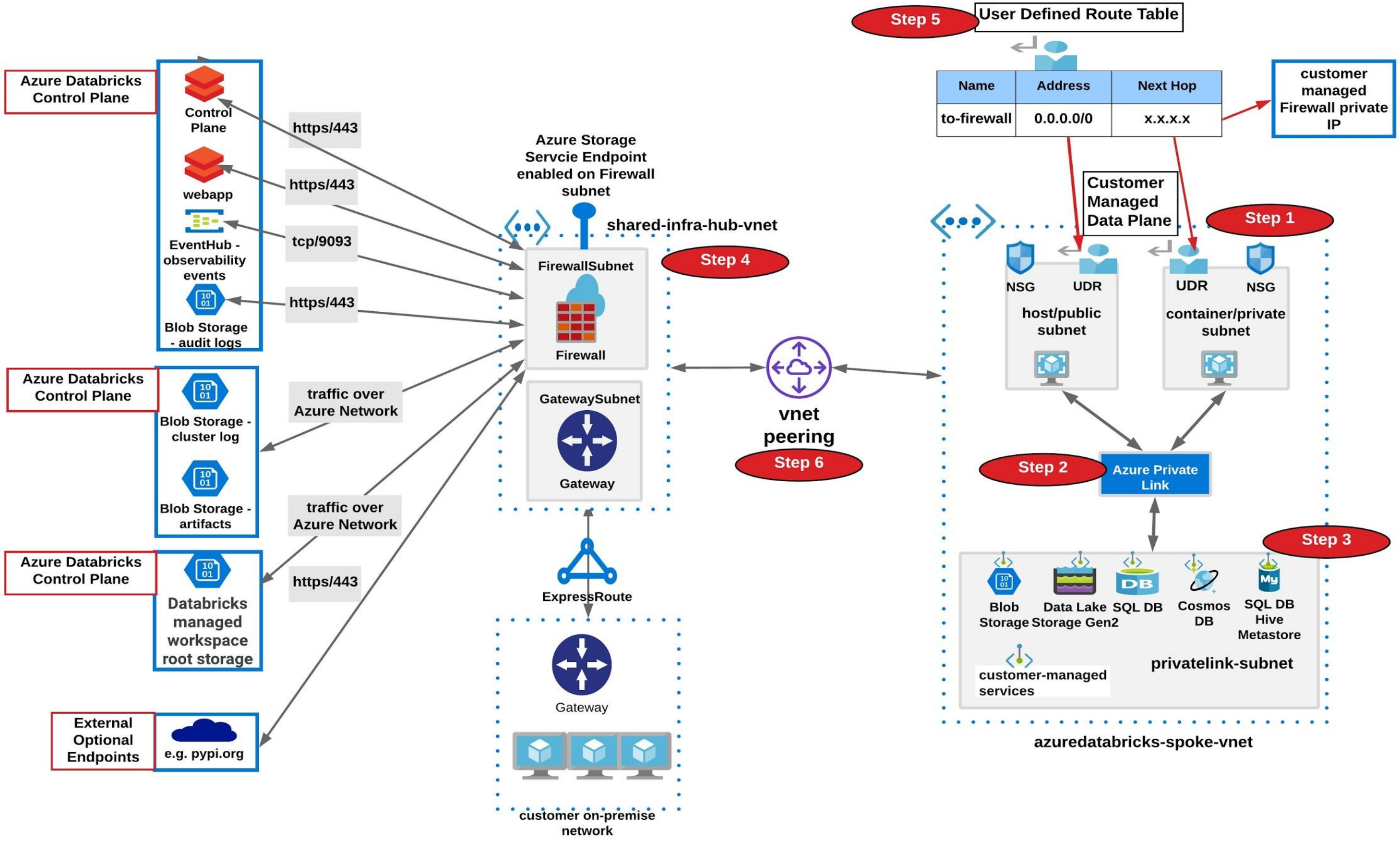
# Azure Databricks

## (Data Exfiltration Prevention)

- Restrict inbound communication to Azure Databricks clusters (data plane)
- Filter outbound communication using an egress appliance (Firewall)
- Traffic to Azure hosted services stays on Azure backbone

# Deploy Azure Databricks to prevent data exfiltration



| Name | Address | Next Hop |
|---|---|---|
| to-firewall | 0.0.0.0/0 | x.x.x.x |

Step 5
User Defined Route Table
customer managed Firewall private IP
Azure Databricks Control Plane
Control Plane
webapp
EventHub - observability events
Blob Storage - audit logs
https/443
https/443
tcp/9093
https/443
Azure Storage Servcie Endpoint enabled on Firewall subnet
shared-infra-hub-vnet
Step 4
FirewallSubnet
Firewall
GatewaySubnet
Gateway
Azure Databricks Control Plane
Blob Storage - cluster log
Blob Storage - artifacts
traffic over Azure Network
traffic over Azure Network
Azure Databricks Control Plane
Databricks managed workspace root storage
https/443
External Optional Endpoints
e.g. pypi.org
ExpressRoute
Gateway
customer on-premise network
vnet peering
Step 6
Customer Managed Data Plane
Step 1
NSG
UDR
UDR
NSG
host/public subnet
container/private subnet
Step 2
Azure Private Link
Step 3
Blob Storage
Data Lake Storage Gen2
SQL DB
Cosmos DB
SQL DB Hive Metastore
customer-managed services
privatelink-subnet
azuredatabricks-spoke-vnet

# Prerequisites - Azure Databricks(ADB) Workspace

- Bring your own Virtual Network (VNET) i.e. create a brand new or use an existing one.
    - CIDR range between ***/16 to /24***
- Network Security Group (dedicated to ADB subnets)
    - With default rules
- A pair of subnets, used by Azure Databricks only, 1 workspace requires 2 subnets.
    - CIDR range between ***/18 to /26***
    - Subnet delegation set to Azure Databricks
    - Azure Databricks NSG associated with these subnets
- ***Multiple ADB workspaces*** could reside in the ***same VNET***
- ***Pair of subnet's*** used by Azure Databricks can only be associated with ***1 workspace***

# Prerequisites - Egress firewall configuration

- Azure Firewall (you could also use any other Azure hosted egress appliance)
  - Deployed in a separate VNET or in the same VNET as ADB
  - Dedicated subnet called AzureFirewallSubnet with CIDR /26
  - Egress rules for Azure Databricks Control Plane services
    - Get your regional endpoints from here

# Firewall Egress Rules - Checklist

| **Azure Databricks Control Plane Services** | **Type** | **Endpoint Address** | **Transport** | **Port** |
|---|---|---|---|---|
| Relay (used by no public ip enabled workspaces) | | | https | 443 |
| artifacts (runtime images) | blob storage | | https | 443 |
| logs (audit and cluster) | blob storage | | https | 443 |
| health-check (observability) | eventhub | | tcp | 9093 |
| webapp | | | https | 443 |
| dbfs (customer owned) | blob storage | | https | 443 |
| managed-hive | mysql | | tcp | 3306 |
| | | | | |
| **External lib dependency provider services required by application code** | | | | |
| python lib repo | public repo | *pypi.org, *pythonhosted.org | https | 443 |
| r package repo | public repo | cran.r-project.org, cran.rstudio.com | https | 443 |
| | | | | |
| content delivery / required by Ganglia UI | cdn | cdnjs.cloudflare.com | https | 443 |
| | | | | |
| **Optional Services** | | | | |
| demo-datasets-mounts token service, to get temporary token from STS to access the databricks-datasets S3 bucket | | sts.amazonaws.com | https | 443 |
| demo-datasets-mounts storage bucket, to access the /databricks-datasets folder on DBFS in ADB | | databricks-datasets-oregon.s3.us-west-2.amazonaws.com/ | https | 443 |

# Deployment Sequence

- Make a list of Azure Databricks regional control plane service endpoints, we'll need them to configure firewall egress rules. Please use this checklist template.
- For Azure Databricks Workspace
  - Create VNET and a pair of Subnets if not exists (spoke-vnet)
    - Enable Azure Active Directory service endpoint on both subnets
  - Create NSG if not exists
    - Associate NSG to Subnets
- Delegate Subnet to Azure Databricks
- Create Azure Databricks Workspace using VNET and Subnets created earlier (ARM template)
  - Note down DBFS storage account address post workspace deployment
- For Azure Firewall
  - Create Firewall VNET and Subnet (hub-vnet)
  - Deploy Azure Firewall
- Configure Firewall egress rules (ARM Template)
- Peer spoke and hub vnets
- Create a user defined route table
  - Add a default (0.0.0.0/0) route which forwards all of the traffic originating from Azure Databricks subnets to Azure Firewall private ip address
  - Attach route table to Azure Databricks Subnets
- Launch Workspace and create cluster (test deployment)

# Further reading

- Understand ADB security
- Data exfiltration strategy and guide
- ARM templates used in this video

github.com/bhavink/adb4u