**📝 Test Design Document (TDD)**

**Project:** Azure Databricks Workspace Setup and Validation  
**Prepared By:** [Your Name]  
**Date:** [Date]  
**Version:** 1.0

**1. Objective**

To validate the successful deployment, configuration, and access controls of an Azure Databricks Workspace ensuring it is ready for development and production workloads.

**2. Scope**

This TDD covers:

* Workspace provisioning in Azure.
* Network configuration (VNet, NSG).
* Cluster creation and policy enforcement.
* Access and authentication.
* Library installation validation.
* Integration with Azure services (e.g., Key Vault, Data Lake Storage).

**3. Test Items**

* Azure Databricks Workspace
* Resource Group
* Azure Active Directory (AAD)
* VNet/Subnet
* Clusters
* Notebooks
* Access Roles and Permissions

**4. Features to be Tested**

| **Feature Category** | **Features** |
| --- | --- |
| Workspace Provisioning | Creation in specified region, SKU validation |
| Networking | VNet injection, subnet and NSG validation |
| Authentication & Authorization | AAD integration, role assignments, SCIM provisioning |
| Cluster Management | Cluster policies, auto-scaling, auto-termination |
| Library Management | Install PyPI, Maven libraries |
| Data Access | Mount Azure Data Lake Storage Gen2 |
| Integration | Link Key Vault for secret management |
| Monitoring & Logging | Diagnostic logs and metrics configuration |

**5. Features Not to be Tested**

* Billing configuration.
* Marketplace integrations.
* MLflow and Feature Store usage (unless explicitly required).

**6. Test Approach**

Testing is structured in phases:

1. **Deployment Validation**
   * Confirm ARM deployment success.
   * Verify workspace URL accessibility.
2. **Networking Validation**
   * Validate VNet/subnet associations.
   * Test outbound internet connectivity restrictions if configured.
3. **Authentication Validation**
   * Test AAD user/group assignment.
   * Validate SCIM synchronization (if enabled).
4. **Cluster Testing**
   * Create clusters using policy.
   * Validate auto-scaling and termination.
   * Run sample jobs.
5. **Library Installation**
   * Install libraries via UI and CLI.
   * Validate installation success.
6. **Data Access Validation**
   * Mount ADLS Gen2.
   * Read/write test files.
7. **Integration Testing**
   * Access secrets from Key Vault.
   * Validate diagnostic logs in Log Analytics.

**7. Test Cases**

Below are **sample test cases**:

**Test Case 1: Workspace Deployment**

* **Objective:** Validate workspace deployment.
* **Pre-Conditions:** Azure subscription with sufficient quota.
* **Steps:**
  1. Deploy using ARM template.
  2. Open workspace URL.
* **Expected Result:** Workspace loads successfully with no errors.

**Test Case 2: VNet Injection**

* **Objective:** Ensure workspace is attached to specified VNet.
* **Steps:**
  1. Check networking configuration in Azure Portal.
  2. Validate subnet and NSG settings.
* **Expected Result:** Correct VNet/Subnet are attached.

**Test Case 3: AAD Integration**

* **Objective:** Confirm user assignment and login.
* **Steps:**
  1. Assign AAD user.
  2. Log in as that user.
* **Expected Result:** User can access workspace.

**Test Case 4: Cluster Policy Enforcement**

* **Objective:** Verify cluster policies.
* **Steps:**
  1. Create cluster with policy.
  2. Attempt to override policy settings.
* **Expected Result:** Policy restrictions enforced.

**Test Case 5: Library Installation**

* **Objective:** Validate library installation.
* **Steps:**
  1. Install pandas from PyPI.
  2. Install Maven coordinate com.databricks:spark-xml\_2.12:0.14.0.
* **Expected Result:** Libraries installed successfully.

**Test Case 6: Data Mount**

* **Objective:** Test ADLS Gen2 mount.
* **Steps:**
  1. Mount storage container.
  2. List files and read sample data.
* **Expected Result:** Data accessible.

**Test Case 7: Secret Access**

* **Objective:** Validate Key Vault secret retrieval.
* **Steps:**
  1. Access secret scope.
  2. Retrieve secret value.
* **Expected Result:** Secret retrieved without error.

**Test Case 8: Diagnostic Logs**

* **Objective:** Confirm diagnostic logs configuration.
* **Steps:**
  1. Trigger notebook job.
  2. Check Log Analytics workspace.
* **Expected Result:** Logs appear in workspace.

**8. Test Data**

| **Data Element** | **Description** |
| --- | --- |
| AAD Users | Test users with Owner, Contributor |
| Storage Account | ADLS Gen2 container path |
| Key Vault Secrets | Test secrets (e.g., test-secret) |
| Libraries | pandas, spark-xml, delta |

**9. Entry Criteria**

* Azure subscription provisioned.
* Required permissions granted.
* ARM templates or Terraform scripts ready.

**10. Exit Criteria**

* All critical test cases passed.
* No blocking defects.
* Workspace approved for production use.

**11. Test Deliverables**

* Completed Test Case Results.
* Defect Reports.
* Final Test Summary Report.

**12. Environment**

* **Azure Region:** e.g., East US 2
* **Databricks Runtime:** 12.2 LTS (or specified)
* **Test Tools:** Azure CLI, Databricks CLI