**A. Schedule Daily VM Backup at 3:00 AM Using Recovery Services Vault**

**1. Create a Recovery Services Vault**

A Recovery Services Vault is a management entity that stores recovery points created over time and provides an interface to perform backup-related operations.

- **Azure Portal**:
    1. Sign in to the Azure Portal.
    2. Navigate to **All services** > **Backup Center** > **+ Backup**.
    3. Select **Recovery Services Vault** as the backup goal.
    4. Provide a name, select a subscription, resource group, and region.
    5. Click **Review + create**, then **Create**.
- **Azure CLI**:

az backup vault create --name MyRecoveryVault --resource-group MyResourceGroup --location eastus

**2. Register the VM with the Vault and Enable Backup**

- **Azure Portal**:
    1. In the Recovery Services Vault, go to **Backup** > **Backup Goal** > **Azure Virtual Machines**.
    2. Select the VM you want to back up.
    3. Choose a backup policy (e.g., DefaultPolicy) or create a new one.
    4. Click **Enable backup**.
- **Azure CLI**:

az backup protection enable-for-vm --resource-group MyResourceGroup --vault-name MyRecoveryVault --vm MyVM --policy-name DefaultPolicy

**3. Create a Custom Backup Policy with a 3:00 AM Schedule**

- **Azure Portal**:
    1. In the Recovery Services Vault, navigate to **Backup Policies** > **+ Add**.
    2. Define the backup schedule:
        - **Frequency**: Daily
        - **Time**: 3:00 AM (UTC)
    3. Set the retention range (e.g., 30 days).
    4. Click **Create**.
- **Azure CLI**:

az backup policy create --name DailyPolicy3AM --resource-group MyResourceGroup --vault-name MyRecoveryVault --policy '{"schedulePolicy": {"schedulePolicyType": "SimpleSchedulePolicy", "scheduleRunFrequency": "Daily", "scheduleRunTimes": ["2024-01-01T03:00:00Z"]}, "retentionPolicy": {"retentionPolicyType": "SimpleRetentionPolicy", "dailySchedule": {"retentionTimes": ["2024-01-01T03:00:00Z"], "retentionDuration": {"count": 30, "durationType": "Days"}}}}'

**4. Assign the Backup Policy to the VM**

- **Azure Portal**:
    1. In the Recovery Services Vault, go to **Backup Items** > **Azure Virtual Machine**.
    2. Select the VM.
    3. Under **Backup Policy**, choose the newly created policy.
    4. Click **Save**.
- **Azure CLI**:

az backup protection set-policy --resource-group MyResourceGroup --vault-name MyRecoveryVault --item-name MyVM --policy-name DailyPolicy3AM

**B. Create an Alert Rule for CPU Usage > 80% with Email Notification**

**1. Create an Action Group**

An Action Group defines the actions to take when an alert is triggered.

- **Azure Portal**:
    1. Navigate to **Monitor** > **Action Groups** > **+ Add**.
    2. Provide a name and short name for the action group.
    3. Under **Notifications**, select **Email**.
    4. Enter the email address to receive alerts.
    5. Click **Review + create**, then **Create**.
- **Azure CLI**:

az monitor action-group create --resource-group MyResourceGroup --name CPUAlertGroup --short-name alertgrp --email-receiver name=AdminEmail email=admin@example.com

**2. Create a Metric Alert Rule for CPU Usage**

- **Azure Portal**:
    1. Navigate to **Monitor** > **Alerts** > **+ New Alert Rule**.
    2. Under **Scope**, select the target VM.
    3. Under **Condition**, choose **Percentage CPU** and set the threshold to **Greater than 80**.

4. Under **Actions**, select the action group created earlier.
5. Provide a name and description for the alert.
6. Click **Review + create**, then **Create**.

- **Azure CLI**:

az monitor metrics alert create --name HighCPUAlert --resource-group MyResourceGroup --scopes $(az vm show --name MyVM --resource-group MyResourceGroup --query id -o tsv) --condition "avg Percentage CPU > 80" --description "Alert when CPU > 80%" --action-group CPUAlertGroup

**C. Provision Backups Using Backup Center**

**1. Navigate to Backup Center**

- **Azure Portal**:
    1. Go to **All services** > **Backup Center**.
    2. Click on **+ Backup**.

**2. Configure Backup**

- **Azure Portal**:
    1. Under **Where is your workload running?**, select **Azure**.
    2. Under **What do you want to back up?**, select **Azure Virtual Machines**.
    3. Select the Recovery Services Vault created earlier.
    4. Under **Backup policy**, select the policy created earlier.
    5. Under **Virtual Machines**, select the VM to back up.
    6. Click **Enable backup**.

**D. Configure Retention Period and Retain Old Backups**

**1. Modify the Backup Policy**

- **Azure Portal**:
    1. In the Recovery Services Vault, go to **Backup Policies**.
    2. Select the policy to modify.
    3. Under **Retention Range**, adjust the retention duration as needed.
    4. Click **Save**.

- **Azure CLI**:

az backup policy set --resource-group MyResourceGroup --vault-name MyRecoveryVault --policy-name DailyPolicy3AM --retention-policy '{"retentionPolicyType": "SimpleRetentionPolicy", "dailySchedule": {"retentionTimes": ["2024-01-01T03:00:00Z"], "retentionDuration": {"count": 30, "durationType": "Days"}}}'

**2. Apply the Modified Policy to the VM**

- **Azure Portal**:
    1. In the Recovery Services Vault, go to **Backup Items** > **Azure Virtual Machine**.
    2. Select the VM.
    3. Under **Backup Policy**, choose the modified policy.
    4. Click **Save**.
- **Azure CLI**:

az backup protection set-policy --resource-group MyResourceGroup --vault-name MyRecoveryVault --item-name MyVM --policy-name DailyPolicy3AM

**Summary**

| Task | Tool | Description |
|---|---|---|
| Create Recovery Services Vault | Azure Portal | Management entity for backup data |
| Register VM and Enable Backup | Azure Portal | Associate VM with the vault and enable backup |
| Create Custom Backup Policy | Azure Portal | Define schedule and retention for backups |
| Assign Policy to VM | Azure Portal | Apply the backup policy to the VM |
| Create Action Group | Azure Portal | Define actions for alert notifications |
| Create Metric Alert Rule | Azure Portal | Set up alert for CPU usage exceeding 80% |
| Provision Backups in Backup Center | Azure Portal | Centralized management of backup operations |
| Configure Retention Policy | Azure Portal | Define how long backups are retained |