Manage resources

Database workloads

NetApp
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Resource management in NetApp Workload Factory for Databases

Managing resources in NetApp Workload Factory for Databases allows you to use advanced features including database and clone creation, resource utilization and monitoring. Additionally, you can analyze the well-architected status of your database configurations and implement configuration best practices to improve performance and lower operational costs. Resource management is only for Microsoft SQL Server and Oracle environments running on FSx for ONTAP file system storage.

You must register resources to do any of the following management tasks.

Management tasks include:

- Viewing databases from the Inventory
- Creating a database
- Creating a database clone (sandbox)
- Implementing well-architected database configurations

Register resources in NetApp Workload Factory for Databases

Register instances for Microsoft SQL Server and databases for Oracle so that you can monitor instance and database status, resource utilization, protection, and storage performance in NetApp Workload Factory for Databases.

You can register your resources only if they run on FSx for ONTAP file system storage.

About the task

Registering an instance (SQL Server) or database (Oracle) has three steps - instance or database authentication, FSx for ONTAP authentication, and preparation. Preparation involves making sure that all AWS, NetApp, and PowerShell modules are installed on the instance or database, and that the minimum requirements for Workload Factory for Databases features like error log analysis or well-architected review are met.

Workload Factory supports only Microsoft SQL Server instance and Oracle database registration and management. Depending on the AWS account credentials you select in Workload Factory, PostgreSQL hosts might appear in the Inventory. Currently, Workload Factory supports unregistered PostgreSQL instances running only on Amazon Linux operating systems.

Before you begin

The host for the instance or database must appear in the Inventory. For hosts to appear in the inventory, you must grant *view, planning, and analysis* permissions in your AWS account.

Registering an instance in a private network

To register an instance (SQL Server) or database (Oracle) in a private network with no external connectivity, the following endpoints need to be available in the VPC with association to the subnets where SQL servers are present. Ensure the interface endpoints allow port 443 in the attached Security Group.

- `S3 Gateway/endpoint`
- `ssm`
- `ssmmessages`
- `fsx`

  If you use a proxy server for all outbound connections from EC2 instances, you must allow access to the following domains so that management operations work:

- `.microsoft.com` (SQL Server)
- `.powershellgallery.com` (SQL Server)
- `.aws.amazon.com`
- `.amazonaws.com`

Register a Microsoft SQL Server instance

Registering an instance has three steps - instance authentication, FSx for ONTAP authentication, and preparation to complete missing prerequisites. You can register single or multiple instances.

Workload Factory supports registration for Failover Cluster Instance (FCI) and Standalone deployment for SQL Server.

Steps

1. Log in using one of the console experiences.
2. Select the menu and then select **Databases**.
3. From the Databases menu, select **Inventory**.
4. In the Inventory, select **Microsoft SQL Server** as the engine type.
5. Select the **Instances** tab.
6. Select to register a single instance or multiple instances.
7. To Authenticate instances (step 1), do the following and then select **Next**:
   a. Select to **Use the same credentials for all instances** or **Manage credentials manually**.
   b. Authenticate SQL Server and Windows by providing user name and password information.

      If instances are authenticated, select **Next**.
8. To Authenticate FSx for ONTAP (step 2), do the following:
   a. Select to **Use the same credentials for all resources** or **Manage credentials manually**.
   b. Enter the FSx for ONTAP file system user name and password, and then select **Next**.

      If the FSx for ONTAP file system is authenticated, select **Next**.

9. To Prepare (step 3), make sure the instance(s) meets the minimum requirements.

   To meet the minimum requirements, the instance must have AWS and NetApp PowerShell modules and PowerShell 7 modules installed, and you must complete the prerequisites for at least one of the capabilities listed under Prerequisite check.

   a. Review the prerequisites in the **Prerequisite check view**.

      You must complete all prerequisites for a single capability like **Review well-architected issues and recommendations** to register the instance.

   b. Select **Setup details** for each capability to learn about the capability prerequisites and follow the on-screen instructions to complete any missing prerequisites for a capability.

      To have Workload Factory review and fix well-architected issues for your instances, complete all prerequisites listed under **Review well-architected issues and recommendations** and **Fix well-architected issues** capabilities.

10. When prerequisites are complete, **Register** the instance(s).

Result

Instance registration initiates. Select the **Job monitoring** tab to track progress.

Register an Oracle database

Registering an instance has three steps - database authentication, FSx for ONTAP authentication, and preparation to complete missing prerequisites. You can register single or multiple databases.

Steps

1. Log in using one of the console experiences.
2. Select the menu and then select **Databases**.
3. From the Databases menu, select **Inventory**.
4. In the Inventory, select **Oracle** as the engine type.
5. Select the **Databases** tab.
6. Select to register a single database or multiple databases.
7. To Authenticate databases (step 1), do the following:
   - Select to **Use the same credentials for all instances** or **Manage credentials manually**.
   - Authenticate Oracle user and Automatic Storage Management (ASM) grid user (if applicable) by providing user name and password information.

     If databases are authenticated, select **Next**.
8. To Authenticate FSx for ONTAP (step 2), do the following and then select **Next**:
   - Select to **Use the same credentials for all resources** or **Manage credentials manually**.
   - Enter the FSx for ONTAP file system user name and password.

     If the FSx for ONTAP file system is authenticated, select **Next**.
9. To Prepare (step 3), make sure the database(s) meets required prerequisites. If all required modules are installed and prerequisites are met, select **Next** to register the database. Otherwise, follow these steps.

a. Review the prerequisites in the **Prerequisite check view**.

   You must complete all prerequisites for a single capability like **Review well-architected issues and recommendations** to register the database.

b. Select **Setup details** for each capability to learn about the capability prerequisites and follow the on-screen instructions to complete any missing prerequisites for a capability.

   To have Workload Factory review and fix well-architected issues for your databases, complete all prerequisites listed under **Review well-architected issues and recommendations** and **Fix well-architected issues** capabilities.

10. When prerequisites are complete, **Register** the database(s).

Result

Database registration initiates. Select the **Job monitoring** tab to track progress.

What's next

After resource registration, you can perform the following tasks.

- View databases from the inventory
- Create a database
- Create a database clone (sandbox)
- Implement well-architected database configurations

Create a Microsoft SQL database in NetApp Workload Factory for Databases

Creating a new Microsoft SQL database enables you to manage the resource within NetApp Workload Factory for Databases.

About this task

Upon database creation, two new volumes are created in the FSx for ONTAP file system consisting of independent LUNs to host data and log files for the database. The database files in the new database are thin-provisioned and consume only a few MBs of the total size allocated for the new database.

If you want to segregate storage for the database, you can do this by using a *virtual mount point*. The virtual mount point lets you consolidate databases to a few common drives on the host.

Creating a database in workload factory requires *view, planning, and analysis* permissions. Alternatively, you can copy or download a partially completed code template to complete the operation outside workload factory. Learn about Workload Factory permissions to decide which mode you'd like to use.

Microsoft SQL Servers using SMB protocol don't support database creation.

Before you begin

Ensure you complete the following prerequisites before you create a new database.

- **Credentials and permissions**: You must have AWS account credentials and *view, planning, and analysis* permissions to create a new database in Workload Factory.

Alternatively, you can use the Codebox to copy a template so that you can deploy a database outside of workload factory using REST API. Learn more about Codebox automation.

- **Windows host**: You must have enough drive letters available on the Microsoft SQL Server to create new drives for the new database if you use *Quick create* mode.
- **Microsoft SQL Server**: You must have a managed Microsoft SQL Server in workload factory for Databases to host the new database.
- **AWS Systems Manager**: Ensure the `NT Authority\SYSTEM` user privilege is enabled in the Microsoft SQL host via AWS Systems Manager.

Create a database

You can use *Quick create* or *Advanced create* deployment modes to complete this task in Workload Factory.

Quick create

Steps

1. Log in using one of the console experiences.
2. Select the menu and then select **Databases**.
3. From the Databases menu, select **Inventory**.
4. In the Inventory, select **Microsoft SQL Server** as the database engine type.
5. Select a database server with a managed SQL server instance to create the database in.
6. Click the action menu of the managed instance and then select **Create user database**.
7. On the Create user database page, under Database information, provide the following:
   a. **Database name**: Enter name for the database.
   b. **Collation**: Select a collation for the database. The default collation SQL_Latin1_General_CP1_CI_AS" on Microsoft SQL Server is selected.
8. Under File settings, provide the following:
   a. **File settings mode**: Select **Quick create**.
   b. **File names & path**:
      - **Data file name**: Enter the data file name.
      - **Log file name**: Enter the log file name.
   c. **File sizes**: Enter the data size and log size for the database.
9. Click **Create**.

   Alternatively, if you want to change any of these default settings now, change the **File settings mode** to **Advanced create**.

Advanced create

Steps

1. Log in using one of the console experiences.
2. Select the menu and then select **Databases**.
3. From the Databases menu, select **Inventory**.
4. In the Inventory, select **Microsoft SQL Server** as the database engine type.
5. Select a database server with a managed SQL server instance to create the database in.
6. Click the action menu of the managed instance and then select **Create user database**.
7. Select **Create user database**.
8. On the Create user database page, under Database information, provide the following:
   a. **Database name**: Enter name for the database.
   b. **Collation**: Select the collation for the database. The default collation SQL_Latin1_General_CP1_CI_AS" on Microsoft SQL Server is selected.
9. Under File settings, provide the following:
   a. **File settings mode**: Select **Advanced create**.
   b. **File names & path**:

i. **Data file**: Select a drive letter and enter the data file name.

   Optionally, click the box for **Virtual mount point**.

ii. **Log file**: Select a drive letter and enter the log file name.

   Optionally, click the box for **Virtual mount point**.

c. **File sizes**: Enter the data size and log size for the database.

10. Click **Create**.

If you created the database host, you can check the job's progress in the **Job monitoring** tab.

Create a sandbox clone in NetApp Workload Factory for Databases

Creating a sandbox clone of a database in NetApp Workload Factory for Databases lets you use the clone for development, testing, integration, analytics, training, QA, and more without altering the source database.

About this task

A sandbox clone is created from the most recent snapshot on the source database. It may be cloned in the same Microsoft SQL Server as the source database or cloned in another Microsoft SQL Server as long as they share the same FSx for ONTAP file system.

Before you begin

Ensure you complete the following prerequisites before you create a sandbox clone.

- **Credentials and permissions**: You must have AWS account credentials and *view, planning, and analysis* permissions to create a sandbox clone in Workload Factory.

  Alternatively, you can use the Codebox to copy a partially completed template or create a completed template so that you can create the sandbox clone outside of Workload Factory using REST API. Learn more about Codebox automation.

- **Microsoft SQL Server**: You must have a managed Microsoft SQL Server in Workload Factory for Databases to host the new sandbox clone.
- **AWS Systems Manager**: Ensure the `NT Authority\SYSTEM` user privilege is enabled in the Microsoft SQL host via AWS Systems Manager.
- **Source database**: You need a source database available for the clone.

Steps

1. Log in using one of the console experiences.
2. Select the menu and then select **Databases**.
3. In Databases, select the **Sandboxes** tab.
4. In the Sandboxes tab, select **Create new sandbox**.
5. On the Create new sandbox page, under Database source, provide the following:

a. **Source database host**: Select the source database host.

b. **Source database instance**: Select the source database instance.

c. **Source database**: Select the source database to clone from.

6. Under Database target, provide the following:

   a. **Target database host**: Select a target database host for the sandbox clone that is in the same VPC and has the same FSx for ONTAP file system as the source host.

   b. **Target database instance**: Select the target database instance for the sandbox clone.

   c. **Target database**: Enter a name for the sandbox clone.

7. **Mount**: When cloning a SQL database that has multiple data and/or log files, Workload Factory clones all files under the auto-assigned or defined drive letter.

   Select one of the following options:

   a. **Auto-assign mount point**

   b. **Define mount point path**

      Provide the following to define the mount point path:

      - Enter the drive letter for the data file path.
      - Enter the drive letter for the log file path.

8. **Define tag**: Select a tag to define the sandbox clone.

9. Click **Create**.

To check the job's progress, go to the **Job monitoring** tab.

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