



# **Workload Factory setup and administration documentation**

## **Setup and administration**

NetApp  
September 02, 2024

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# Workload Factory setup and administration documentation

# Release notes

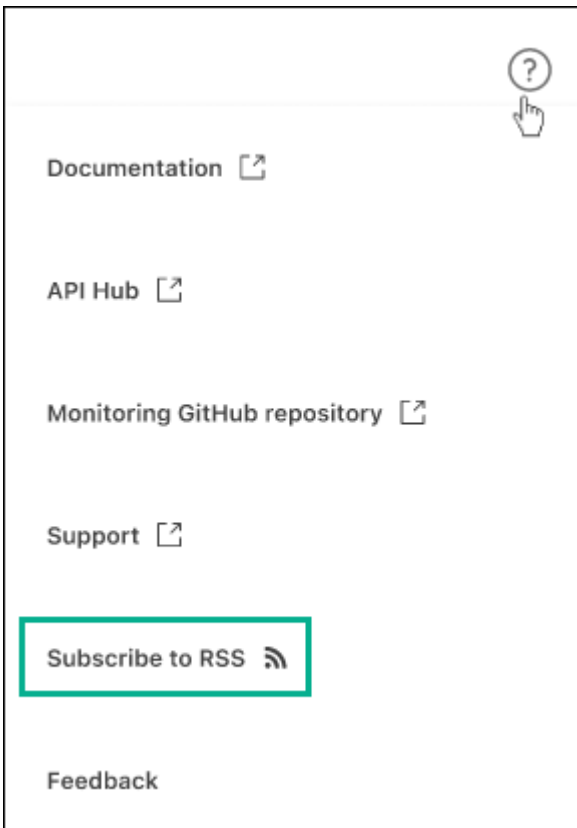
## What's new

Learn what's new with Workload Factory administration features: cloud provider credentials, Codebox enhancements, and more.

### 1 September 2024

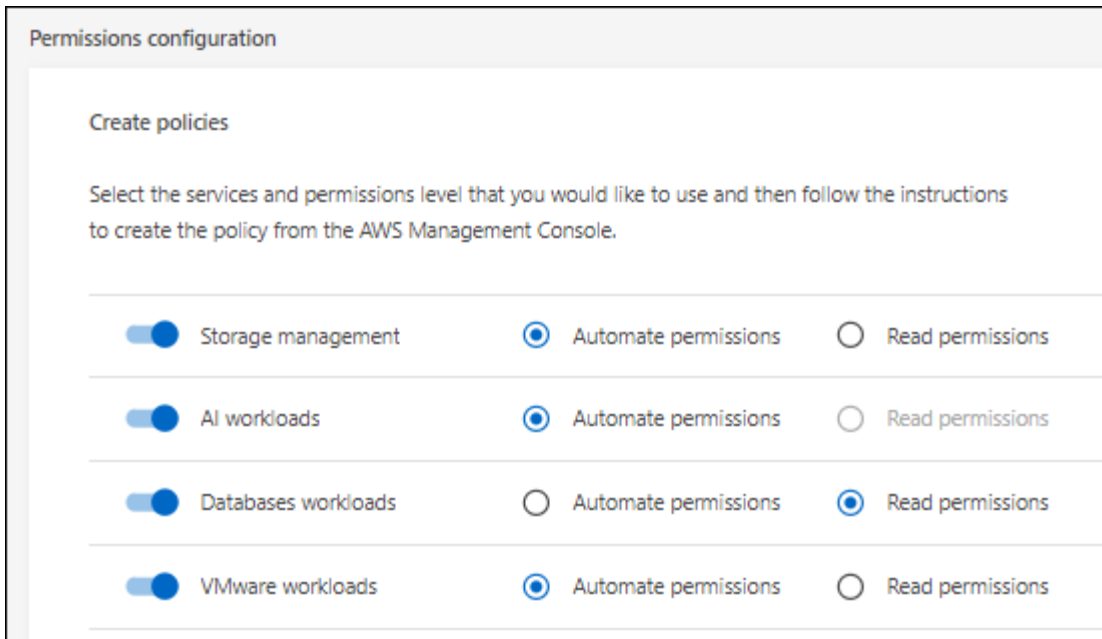
#### RSS subscription

RSS subscription is available from the [Workload Factory console](#). Using an RSS feed is an easy way to consume and be aware of changes in BlueXP Workload Factory.



#### Support for a single permission policy per workload

When adding AWS credentials in Workload Factory, you can now select a single permission policy, either read or automate mode, for each workload and storage management.



[Add AWS credentials to Workload Factory](#)

## 4 August 2024

### Terraform support

Terraform support is available for Amazon FSx for NetApp ONTAP file system deployment and storage VM creation. The setup and admin guide now has instructions for how to use Terraform from the Codebox.

[Use Terraform from Codebox](#)

## 7 July 2024

### Initial release of Workload Factory

BlueXP Workload Factory for AWS is a powerful life-cycle management platform designed to help you optimize your workloads using Amazon FSx for NetApp ONTAP file systems. Workloads that can be streamlined using Workload Factory and FSx for ONTAP include databases, VMware migrations to VMware Cloud on AWS, AI chatbots, and more.

# Get started

## Learn the basics

### Learn about Workload Factory

NetApp Workload Factory is a powerful life-cycle management platform designed to help you optimize your workloads using Amazon FSx for NetApp ONTAP file systems. Workloads that can be streamlined using Workload Factory and FSx for ONTAP include databases, VMware migrations to VMware Cloud on AWS, AI chatbots, and more.

A workload encompasses a combination of resources, code, and services or applications, designed to serve a business goal. This could be anything from a customer-facing application to a backend process. Workloads may involve a subset of resources within a single AWS account or span across multiple accounts.

Amazon FSx for NetApp ONTAP provides fully managed, AWS-native NFS, SMB/CIFS, and iSCSI storage volumes for mission-critical applications, databases, containers, VMware Cloud datastores, and user files. You can manage FSx for ONTAP through Workload Factory and by using native AWS management tools.

### Features

The Workload Factory platform provides the following major capabilities.

#### Flexible and low cost storage

Discover, deploy, and manage Amazon FSx for NetApp ONTAP file systems in the cloud. FSx for ONTAP brings the full capabilities of ONTAP to a native AWS managed service delivering a consistent hybrid cloud experience.

#### Migrate on-premises vSphere environments to VMware Cloud on AWS

The VMware Cloud on AWS migration advisor enables you to analyze your current virtual machine configurations in on-premises vSphere environments, generate a plan to deploy recommended VM layouts to VMware Cloud on AWS, and use customized Amazon FSx for NetApp ONTAP file systems as external datastores.

#### Optimized database deployment

Deploy Microsoft SQL Servers, databases, and database clones including AWS resources provisioning, storage provisioning, networking, and OS configurations, utilizing optimized deployment configurations ensuring a consistent and error-free setup process.

#### AI chatbot development

Leverage your FSx for ONTAP file systems for storing your organizations chatbot sources and the AI Engine databases. This allows you to embed your organization's unstructured data into an enterprise chatbot application.

#### Storage calculators to save costs

Analyze your current deployments that use Amazon Elastic Block Store (EBS) or Elastic File System (EFS) storage, or Amazon FSx for Windows File Server, to see how much money you can save by moving to Amazon FSx for NetApp ONTAP. You can also use the calculator to perform a "what if" scenario for a future deployment that you're planning.

## Supported cloud providers

Workload Factory enables you to manage cloud storage and use workload capabilities in Amazon Web Services.

## Cost

Workload Factory is free to use. The cost that you pay to Amazon Web Services (AWS) depends on the storage and workload services that you plan to deploy. This includes the cost of Amazon FSx for NetApp ONTAP file systems, VMware Cloud on AWS infrastructure, AWS services, and more.

## How Workload Factory works

Workload Factory includes a web-based console that's provided through the SaaS layer, an account, operational modes that control access to your cloud estate, links that provide segregated connectivity between Workload Factory and an AWS account, and more.


## Software-as-a-service

Workload Factory is accessible through a [web-based console](#). This SaaS experience enables you to automatically access the latest features as they're released and to easily switch between your Workload Factory accounts and links.

## Accounts

When you log in to Workload Factory for the first time, you're prompted to create an account. This account enables you to organize your resources, workloads, and workload access for your organization using credentials.

**Hello Richard,**  
Let's get started by creating an account.



An account is the top-level element in NetApp's identity platform. It enables you to add and manage permissions and credentials.

[Learn more about accounts.](#)

Account name

To help us organize menu options that best suit your objectives, we suggest that you provide us with some background about your job.

My job description Optional

When you create an account, you are the single Account Admin user for that account.

If your organization requires additional account or user management, reach out to us by using the in-product chat.



If you use NetApp BlueXP, then you'll already belong to an account because Workload Factory leverages BlueXP accounts.

## Operational modes

Workload Factory provides three operational modes that enables you to carefully control access to your cloud estate, and assign incremental trust to Workload Factory based on your IT policies.

- **Basic mode** represents a zero-trust relationship and is designed for early exploration of Workload Factory and usage of the various wizards to create the needed Infrastructure as Code. This code can be copied and used manually by the user along with their relevant AWS credentials.
- **Read mode** enhances the experience of Basic mode by assisting the user in detecting various resources and tools, and consequently, helping to complete relevant wizards.
- **Automate mode** represents a full-trust relationship and is designed to execute and automate on behalf of the user along with the assigned credentials that have the needed and validated permissions for execution.

[Learn more about Workload Factory operational modes.](#)

## Connectivity links

A Workload Factory link creates a trust relationship and connectivity between Workload Factory and one or more FSx for ONTAP file systems. This enables you to monitor and manage certain file system features directly from the ONTAP REST API calls that are not available through the Amazon FSx for ONTAP API.

You don't need a link to get started with Workload Factory, but in some cases you'll need to create a link to unlock all Workload Factory features and workload capabilities.

Links currently leverage AWS Lambda.

[Learn more about Links](#)

## Codebox automation

Codebox is an Infrastructure as Code (IaC) co-pilot that helps developers and DevOps engineers generate the code needed to execute any operation supported by Workload Factory. Code formats include Workload Factory REST API, AWS CLI, and AWS CloudFormation.

Codebox is aligned with the Workload Factory operation modes (Basic, Read, and Automate) and sets a clear path for execution readiness as well as an automation catalog for quick future reuse.

The Codebox pane shows the IaC that is generated by a specific job flow operation, and is matched by a graphical wizard or conversational chat interface. While Codebox supports color coding and search for easy navigation and analysis, it does not allow editing. You can only copy or save to the Automation Catalog.

[Learn more about Codebox.](#)

## Savings calculators

Workload Factory provides a savings calculator so you can compare the costs of storage on FSx for ONTAP file systems against Elastic Block Store (EBS), Elastic File Systems (EFS), and FSx for Windows File Server. Depending on your storage requirements, you might find that FSx for ONTAP file systems are the most cost effective option for you.

The criteria that is compared between the different types of storage systems includes the total required capacity and the total performance, which includes the required IOPS and required throughput.

[Learn how to explore savings using storage calculators](#)



## REST APIs

Workload Factory enables you to optimize, automate, and operate your FSx for ONTAP file systems for specific workloads. Each workload exposes an associated REST API. Collectively, these workloads and APIs form a flexible and extensible development platform you can use to administer your FSx for ONTAP file systems.

There are several benefits when using the Workload Factory REST APIs:

- The APIs have been designed based on REST technology and current best practices. The core technologies include HTTP and JSON.
- Workload Factory authentication is based on the OAuth2 standard. NetApp relies on the Auth0 service implementation.
- The Workload Factory web-based console uses the same core REST APIs so there is consistency between the two access paths.

[View the Workload Factory REST API documentation](#)

## Learn about operational modes and AWS credentials

Workload Factory provides three operational modes that enable you to carefully control access between Workload Factory and your cloud estate based on your IT policies. The operational mode that you use is determined by the level of AWS permissions that you provide to Workload Factory.

### Operational modes

Operational modes provide a logical organization of the functionality and capabilities delivered by Workload Factory, as correlated to the trust level that you assign. The main objective in operational modes is to clearly communicate which tasks Workload Factory can or cannot perform within your AWS account.

#### Basic mode

Represents a zero-trust relationship where no AWS permissions are assigned to Workload Factory. It is designed for early exploration of Workload Factory and usage of the various wizards to create the needed Infrastructure as Code (IaC). You can copy the code and use it in AWS by entering your AWS credentials manually.

#### Read mode

Enhances the experience of basic mode by adding read-only permissions so that the IaC templates are filled with your specific variables (for example, VPC, security groups, etc.). This enables you to execute the IaC directly from your AWS account without providing any modify permissions to Workload Factory.

#### Automate mode

Represents a full trust relationship so that Workload Factory gets assigned with full permissions. This allows Workload Factory to execute and automate operations in AWS on your behalf along with the assigned credentials that have the needed permissions for execution.

### Operational mode features

The features available using each of the modes grows with each mode.

Mode	Automation from Workload Factory	Automation within AWS using IaC	AWS resource discovery and auto-complete	Progress monitoring
Basic	No	Minimally complete IaC template	No	No
Read	No	Moderately complete IaC template	Yes	Yes
Automate	Full automation	Complete IaC template with full automation	Yes	Yes

### Operational mode requirements

There is no selector that you need to set in Workload Factory to identify which mode you are planning to use. The mode is determined based on the AWS credentials and permissions that you assign to your Workload Factory account.

Mode	AWS account credentials	Link
Basic	Not required	Not required
Read	Read-only	Not required
Automate	Read-write credentials	Required

[Learn more about links](#)

### Operational mode examples

You can set up your credentials to provide one mode for one workload component and another mode for another component. For example, you can configure automate mode for operations where you are deploying and managing FSx for ONTAP file systems, but only configure read mode for creating and deploying database workloads using Workload Factory.

You can provide these capabilities within a single set of credentials in a Workload Factory account, or you can create multiple sets of credentials when each credential provides unique workload deployment capabilities.

### Example 1

Account users who use the credentials that have been given the following permissions will have full control (automate mode) for creating FSx for ONTAP file systems, deploying databases, and viewing other types of AWS storage used in the account.

**Create policies**

Select the services and permissions level that you would like to use and then follow the instructions to create the policy from the AWS Management Console.

---

Storage management       Automate permissions       Read permissions

---

AI workloads

---

Databases workloads       Automate permissions       Read permissions

---

VMware workloads

However, they will have no automation controls for creating and deploying VMware workloads (basic mode) from Workload Factory. If they want to create VMware workloads, they'll need to copy the code from the Codebox, log in to their AWS account manually, and manually populate missing entries in the generated code to use this functionality.

### Example 2

Here the user has created two sets of credentials to allow different operational capabilities depending on which set of credentials has been selected. Typically, each set of credentials is paired to a different AWS account.

The first set of credentials includes permissions that give users full control for creating FSx for ONTAP file systems (and the ability to view other types of AWS storage used in the account), but only read permissions when working with VMware workloads.

**Create policies**

Select the services and permissions level that you would like to use and then follow the instructions to create the policy from the AWS Management Console.

---

Storage management       Automate permissions       Read permissions

---

AI workloads

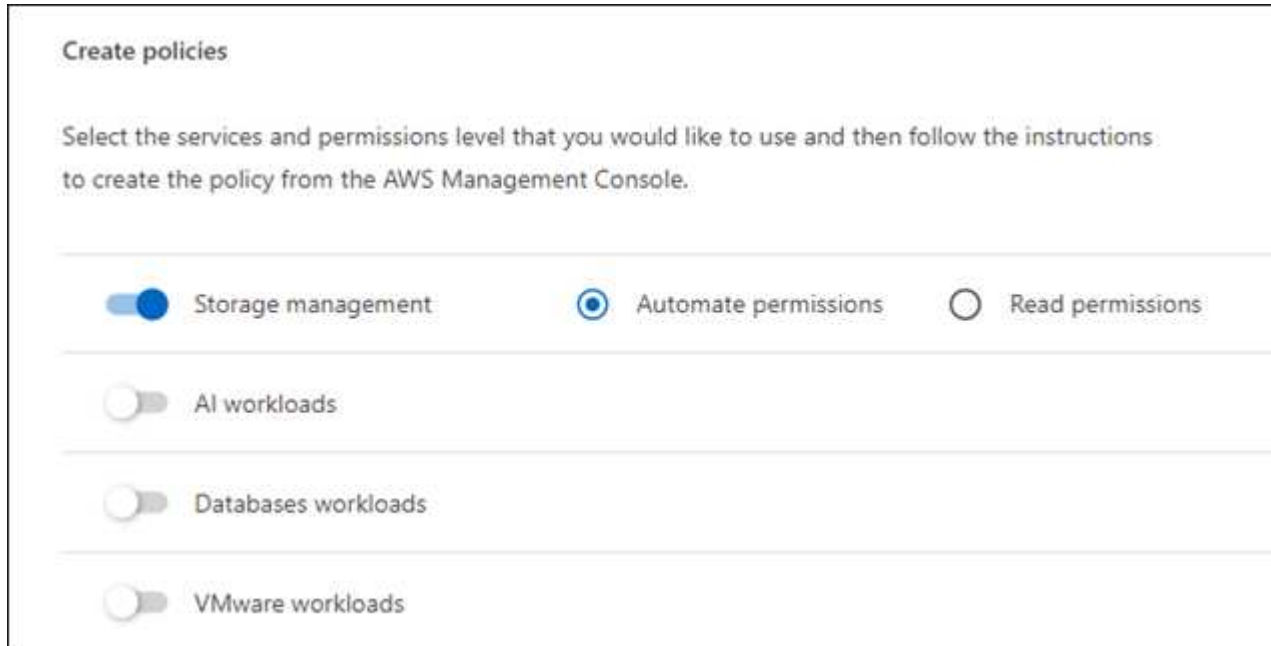
---

Databases workloads

---

VMware workloads       Automate permissions       Read permissions

The second set of credentials only provides permissions that give users full control for creating FSx for ONTAP file systems, and viewing other types of AWS storage used in the account.



**Create policies**

Select the services and permissions level that you would like to use and then follow the instructions to create the policy from the AWS Management Console.

Storage management       Automate permissions       Read permissions

AI workloads

Databases workloads

VMware workloads

## AWS credentials

We have designed an AWS assume role credentials registration flow that:

- Supports more aligned AWS account permissions by allowing you to specify the workload capabilities that you want to use and providing IAM policy requirements according to those selections.
- Allows you to adjust the granted AWS account permissions as you opt-in or opt-out of specific workload capabilities.
- Simplifies manual IAM policy creation by providing tailored JSON policy files that you can apply in the AWS console.
- Further simplifies the credentials registration process by offering users with an automated option for required IAM policy and role creation using AWS CloudFormation stacks.
- Aligns better with FSx for ONTAP users who strongly prefer to have their credentials stored within the boundaries of the AWS cloud ecosystem by allowing storage of the FSx for ONTAP services credentials in an AWS-based secret management backend.

### One or more AWS credentials

When you use your first Workload Factory capability (or capabilities), you'll need to create the credentials using the permissions required for those workload capabilities. You'll add the credentials to Workload Factory, but you'll need to access the AWS Management Console to create the IAM role and policy. These credentials will be available within your account when using any capability in Workload Factory.

Your initial set of AWS credentials can include an IAM policy for one capability or for many capabilities. It just depends on your business requirements.

Adding more than one set of AWS credentials to Workload Factory provides additional permissions needed to use additional capabilities, such as FSx for ONTAP file systems, deploy databases on FSx for ONTAP, migrate VMware workloads, and more.

[Learn how to add AWS credentials to Workload Factory.](#)

## Quick start for Workload Factory

Get started with Workload Factory by signing up and creating an account, adding credentials so that Workload Factory can manage AWS resources directly, and then optimize your workloads by using Amazon FSx for NetApp ONTAP.

Workload Factory is accessible to users as a cloud service from the web-based console. Before you get started, you should have an understanding of [Workload Factory](#) and [operational modes](#).

1

### Sign up and create an account

Go to the [Workload Factory console](#), sign up, and create an account.

[Learn how to sign up and create an account.](#)

2

### Add AWS credentials to Workload Factory

This step is optional. You can use Workload Factory in *Basic* mode without adding credentials to access your AWS account. Adding AWS credentials to Workload Factory in either *Read* mode or *Automate* mode gives your Workload Factory account the permissions needed to create and manage FSx for ONTAP file systems and to deploy and manage specific workloads, such as databases and GenAI.

[Learn how to add credentials to your account.](#)

3

### Optimize your workloads using FSx for ONTAP

Now that you've signed up, created an account, and optionally added AWS credentials, you can start using Workload Factory to optimize your workloads using FSx for ONTAP. Use the links below to follow step-by-step instructions for each type of workload.

- [Amazon FSx for NetApp ONTAP](#)

Assess and analyze current data estates for potential cost savings by using FSx for ONTAP as the storage infrastructure, provision and templatize FSx for ONTAP deployments based on best practices, and access advanced management capabilities.

- [GenAI](#)

Deploy and manage a Retrieval-Augmented Generation (RAG) infrastructure to improve the accuracy and uniqueness of your AI applications. Create a RAG knowledge base on FSx for ONTAP with built-in data security and compliance.

- [Database workloads](#)

Detect your existing database estate on AWS, assess potential cost savings with FSx for ONTAP, deploy databases end-to-end with built-in best practices for optimization, and automate thin cloning for CI/CD pipelines.

- [VMware workloads](#)

Streamline migrations and operations with smart recommendations and automatic remediation. Deploy efficient backups and robust disaster recovery. Monitor and troubleshoot your VMs.

## Sign up to Workload Factory

Workload Factory is accessible from a web-based console. When you get started with Workload Factory, your first step is to sign up using your existing NetApp Support Site credentials or by creating a NetApp cloud login.

### About this task

You can sign up to Workload Factory using one of the following options:

- Your existing NetApp Support Site (NSS) credentials
- A NetApp cloud login by specifying your email address and a password

### Steps


1. Open a web browser and go to the [Workload Factory console](#)
2. If you have a NetApp Support Site account, enter the email address associated with your NSS account directly on the **Log in** page.

You can skip the sign up page if you have an NSS account. Workload Factory will sign you up as part of this initial login.

3. If you don't have an NSS account and you want to sign up by creating a NetApp cloud login, select **Sign up**.

## Sign up to Workload Factory

---

Already signed up? [Log in](#)

4. On the **Sign up** page, enter the required information to create a NetApp cloud login and select **Next**.

Note that only English characters are allowed in the sign up form.


5. Enter the detailed information for your company and select **Sign up**.
6. Check your inbox for an email from NetApp that includes instructions to verify your email address.

This step is required before you can log in.

7. When prompted, review the End User License Agreement and accept the terms, and select **Continue**.
8. On the **Account** page, enter a name for your account, and optionally select your job description.

An account is the top-level element in NetApp's identity platform, and it enables you to add and manage permissions and credentials.

**Hello Richard,**  
Let's get started by creating an account.



An account is the top-level element in NetApp's identity platform. It enables you to add and manage permissions and credentials.  
[Learn more about accounts.](#)

Account name

To help us organize menu options that best suit your objectives, we suggest that you provide us with some background about your job.

My job description Optional

9. Select **Create** and the Workload Factory home page is displayed.

### Result

You now have a Workload Factory login and an account. You are considered an Account Admin and you have access to all Workload Factory functionality.

## Add AWS credentials to Workload Factory

Add and manage AWS credentials so that Workload Factory has the permissions that it needs to deploy and manage cloud resources in your AWS accounts.

### Overview

Workload Factory will operate in *basic* mode unless you add AWS account credentials. You can add credentials to enable other operation modes, such as Read mode and Automate mode. [Learn more about operational modes.](#)

You can add AWS credentials to an existing Workload Factory account from the Credentials page. This provides Workload Factory with the permissions needed to manage resources and processes within your AWS cloud environment.

You can add credentials using two methods:

- **Manually:** You create the IAM policy and the IAM role in your AWS account while adding credentials in Workload Factory.
- **Automatically:** You capture a minimal amount of information about permissions and then use a CloudFormation stack to create the IAM policies and role for your credentials.

### Add credentials to an account manually

You can add AWS credentials to Workload Factory manually to give your Workload Factory account the permissions needed to manage the AWS resources that you'll use to run your unique workloads. Each set of credentials that you add will include one or more IAM policies based on the workload capabilities you want to use, and an IAM role that is assigned to your account.



There are three parts to creating the credentials:

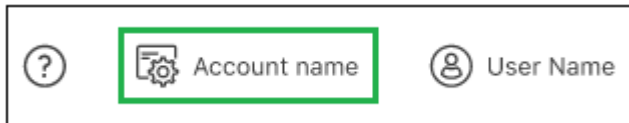
- Select the services and permissions level that you would like to use and then create IAM policies from the AWS Management Console.
- Create an IAM role from the AWS Management Console.
- From Workload Factory, enter a name and add the credentials.

### Before you begin

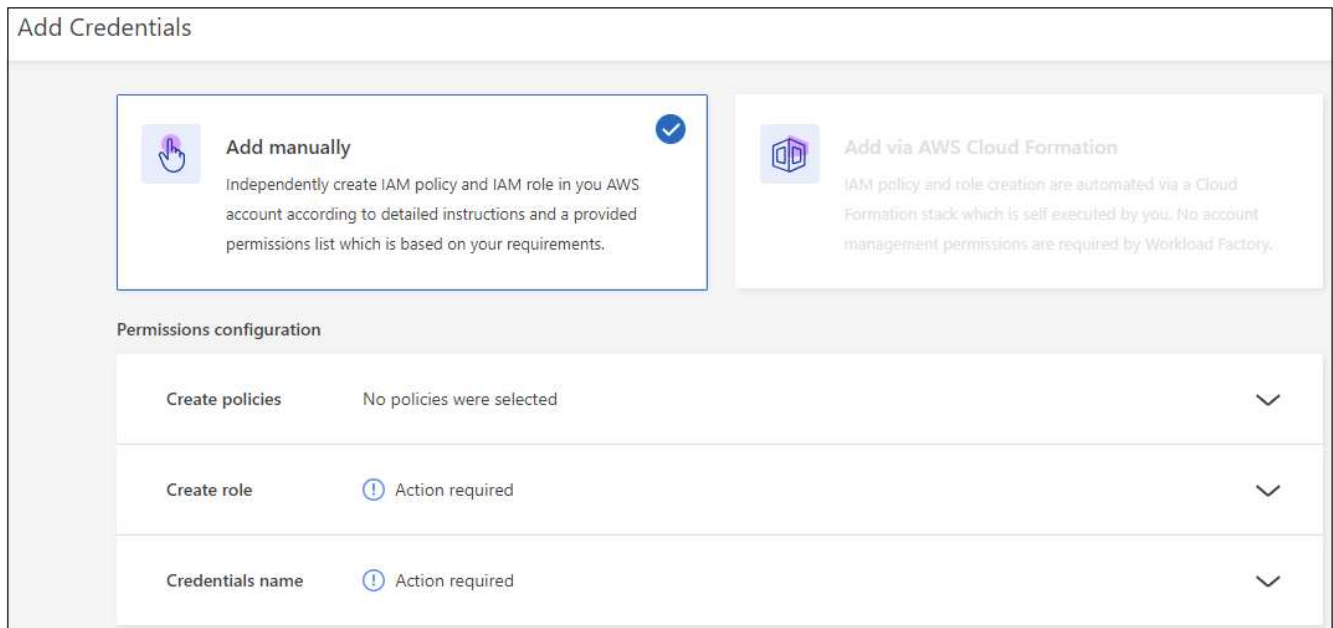
You'll need to have credentials to log in to your AWS account.

### Steps

1. In the Workload Factory console, select the **Account** icon, and select **Credentials**.

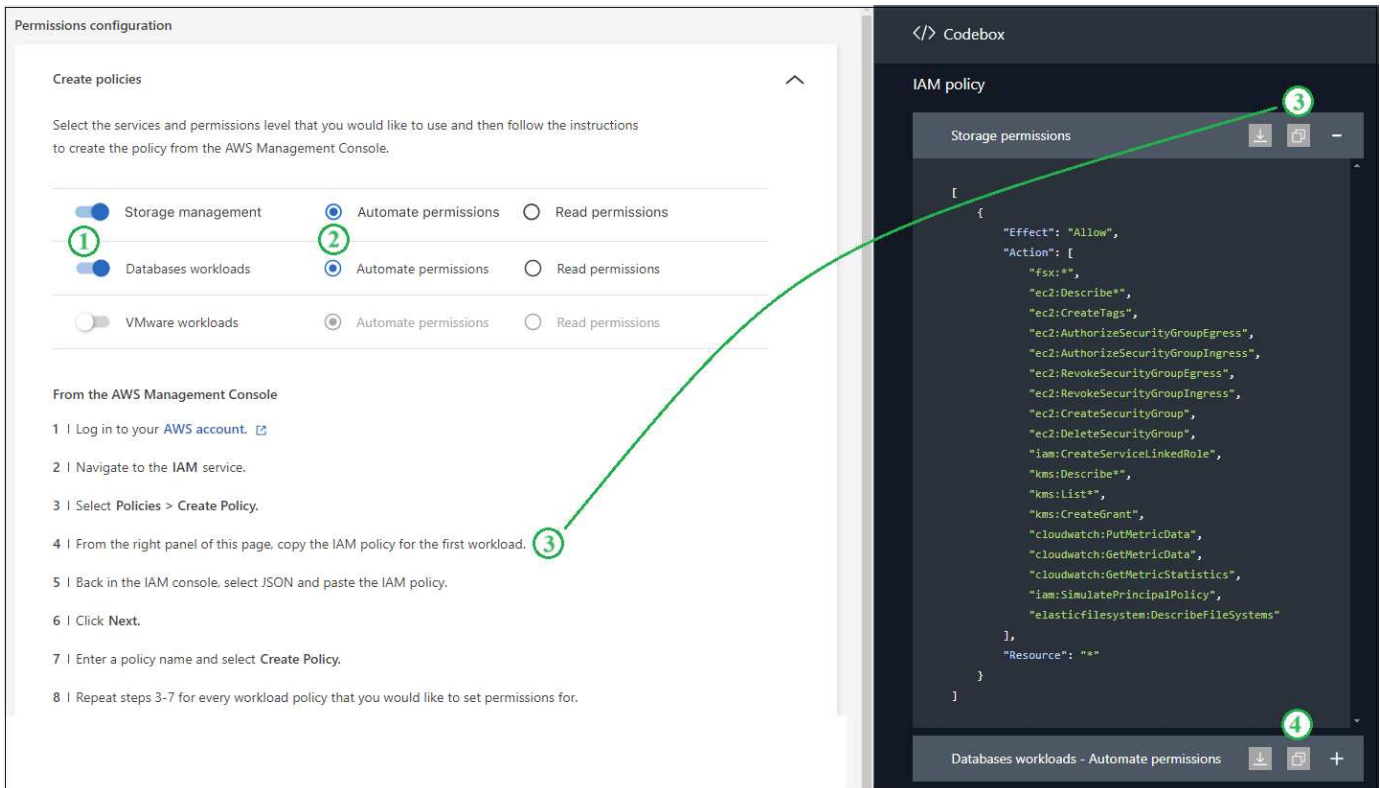


2. On the **Credentials** page, select **Add credentials** and the Add credentials page is displayed.
3. Select **Add manually** and then follow the steps below to fill out the three sections under *Permissions configuration*.



### Step 1: Select the workload capabilities and create the IAM policies

In this section you'll choose which types of workload capabilities will be manageable as part of these credentials, and the permissions enabled for each workload. You'll need to copy the policy permissions for each selected workload from the Codebox and add them into the AWS Management Console within your AWS account to create the policies.



## Steps

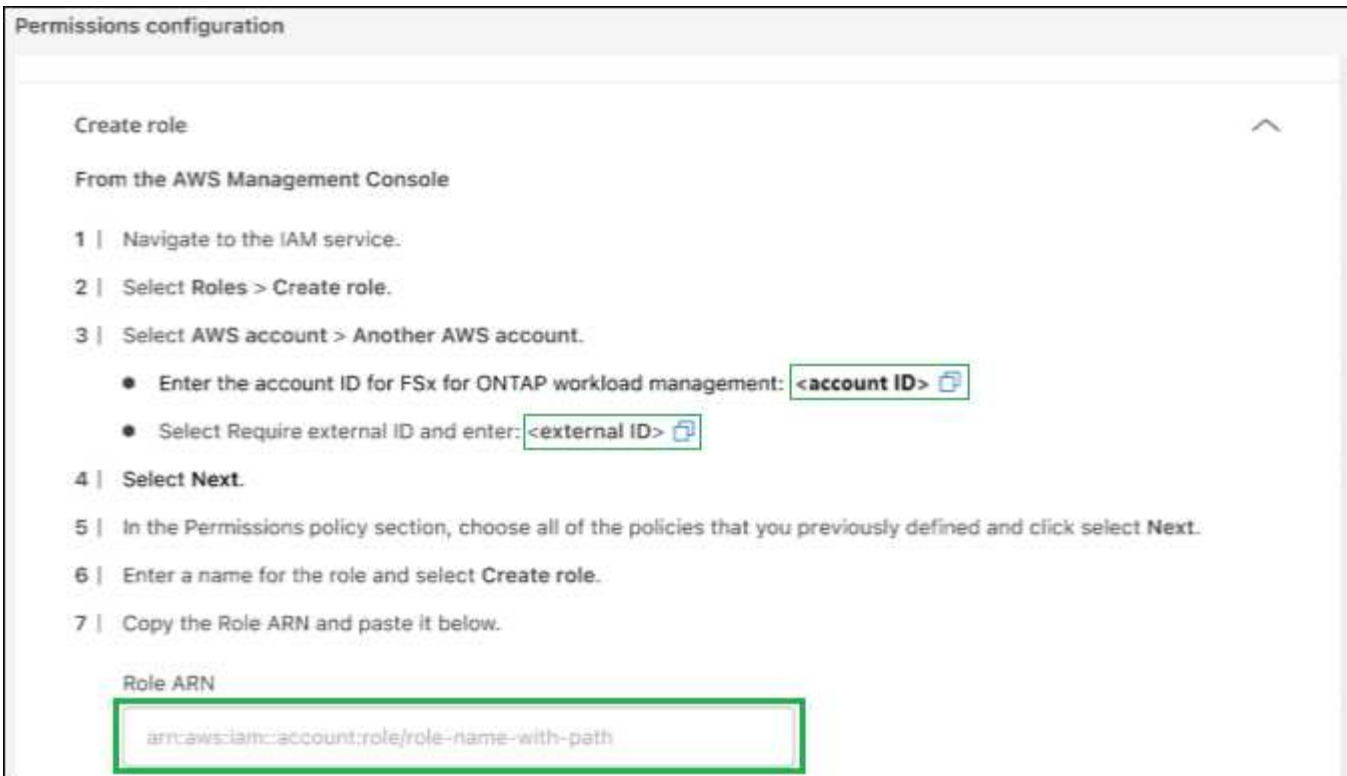
1. From the **Create policies** section, enable each of the workload capabilities that you want to include in these credentials.

You can add additional capabilities later, so just select the workloads that you currently want to deploy and manage.

2. For those workload capabilities that offer a choice of permission levels (operate, view, and so on), select the type of permissions that will be available with these credentials.
3. In the Codebox window, copy the permissions for the first IAM policy.
4. Open another browser window and log in to your AWS account in the AWS Management Console.
5. Open the IAM service, and then select **Policies > Create Policy**.
6. Select JSON as the file type, paste the permissions you copied in step 3, and select **Next**.
7. Enter the name for the policy and select **Create Policy**.
8. If you've selected multiple workload capabilities in step 1, repeat these steps to create a policy for each set of workload permissions.

## Step 2: Create the IAM role that uses the policies

In this section you'll set up an IAM role that Workload Factory will assume that includes the permissions and policies that you just created.



### Steps

1. In the AWS Management Console, select **Roles > Create Role**.
2. Under **Trusted entity type**, select **AWS account**.
  - a. Select **Another AWS account** and copy and paste the account ID for FSx for ONTAP workload management from the Workload Factory UI.
  - b. Select **Required external ID** and copy and paste the external ID from the Workload Factory UI.
3. Select **Next**.
4. In the Permissions policy section, choose all the policies that you defined previously and select **Next**.
5. Enter a name for the role and select **Create role**.
6. Copy the Role ARN.
7. Return to Workload Factory, expand the **Create role** section, and paste the ARN in the *Role ARN* field.

### Step 3: Enter a name and add the credentials

The final step is to enter a name for the credentials in Workload Factory.

### Steps

1. From Workload Factory, expand **Credentials name**.
2. Enter the name that you want to use for these credentials.
3. Select **Add** to create the credentials.

### Result

The credentials are created and you are returned to the Credentials page.

## Add credentials to an account using CloudFormation

You can add AWS credentials to Workload Factory using an AWS CloudFormation stack by selecting the Workload Factory capabilities that you want to use, and then launching the AWS CloudFormation stack in your AWS account. CloudFormation will create the IAM policies and IAM role based on the workload capabilities you selected.

### Before you begin

- You'll need to have credentials to log in to your AWS account.
- You'll need to have the following permissions in your AWS account when adding credentials using a CloudFormation stack:

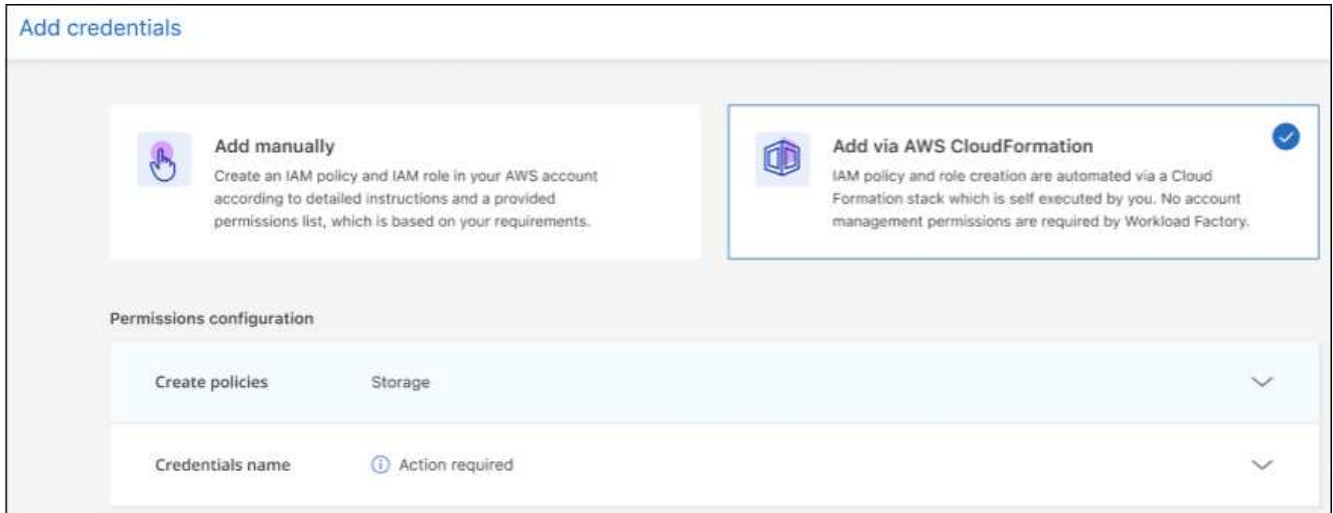
```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "cloudformation:CreateStack",
        "cloudformation:UpdateStack",
        "cloudformation>DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:DescribeChangeSet",
        "cloudformation:ExecuteChangeSet",
        "cloudformation:ListStacks",
        "cloudformation:ListStackResources",
        "cloudformation:GetTemplate",
        "cloudformation:ValidateTemplate",
        "lambda:InvokeFunction",
        "iam:PassRole",
        "iam:CreateRole",
        "iam:UpdateAssumeRolePolicy",
        "iam:AttachRolePolicy",
        "iam:CreateServiceLinkedRole"
      ],
      "Resource": "*"
    }
  ]
}
```

### Steps

1. In the Workload Factory console, select the **Account** icon, and select **Credentials**.



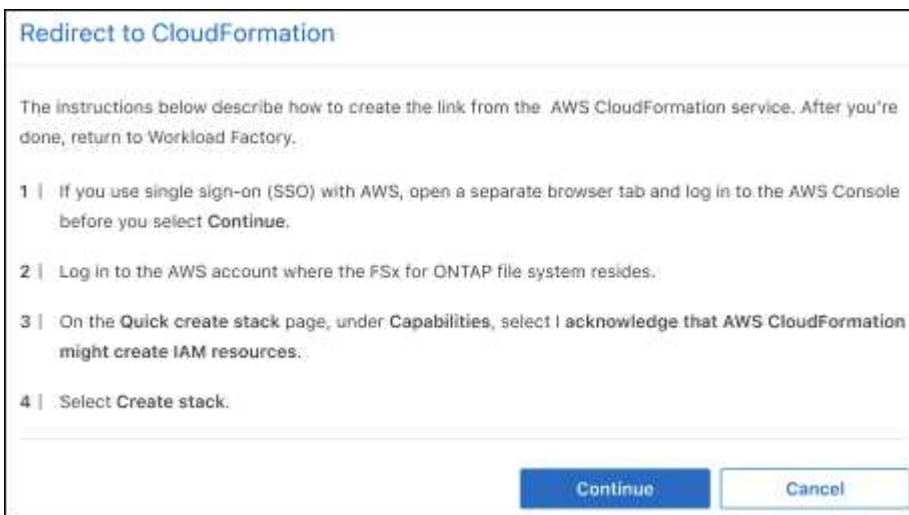
2. On the **Credentials** page, select **Add credentials**.
3. Select **Add via AWS CloudFormation**.



4. Under **Create policies**, enable each of the workload capabilities that you want to include in these credentials and choose a permission level for each workload.

You can add additional capabilities later, so just select the workloads that you currently want to deploy and manage.

5. Under **Credentials name**, enter the name that you want to use for these credentials.
6. Add the credentials from AWS CloudFormation:
  - a. Select **Add** (or select **Redirect to CloudFormation**) and the Redirect to CloudFormation page is displayed.



- b. If you use single sign-on (SSO) with AWS, open a separate browser tab and log in to the AWS Console before you select **Continue**.

You should log in to the AWS account where the FSx for ONTAP file system resides.

- c. Select **Continue** from the Redirect to CloudFormation page.
- d. On the Quick create stack page, under Capabilities, select **I acknowledge that AWS CloudFormation might create IAM resources**.
- e. Select **Create stack**.
- f. Return to Workload Factory and monitor to Credentials page to verify that the new credentials are in progress, or that they have been added.

## What you can do next

Now that you've logged in and set up Workload Factory, you can start using several Workload Factory capabilities, such as creating Amazon FSx for ONTAP file systems, deploying databases on FSx for ONTAP file systems, and migrating virtual machine configurations to VMware Cloud on AWS using FSx for ONTAP file systems as external datastores.

- [Amazon FSx for NetApp ONTAP](#)

Assess and analyze current data estates for potential cost savings by using FSx for ONTAP as the storage infrastructure, provision and templatize FSx for ONTAP deployments based on best practices, and access advanced management capabilities.

- [GenAI](#)

Deploy and manage a Retrieval-Augmented Generation (RAG) infrastructure to improve the accuracy and uniqueness of your AI applications. Create a RAG knowledge base on FSx for ONTAP with built-in data security and compliance.

- [Database workloads](#)

Detect your existing database estate on AWS, assess potential cost savings by moving to FSx for ONTAP, deploy databases end-to-end with built-in best practices for optimization, and automate thin cloning for CI/CD pipelines.

- [VMware workloads](#)

Streamline migrations and operations with smart recommendations and automatic remediation. Deploy efficient backups and robust disaster recovery. Monitor and troubleshoot your VMs.

# Administer Workload Factory

## Log in to Workload Factory

After you sign up to Workload Factory, you can log in at any time from the web-based console to start managing your workloads and FSx for ONTAP file systems.

### About this task

You can log in to the Workload Factory web-based console using one of the following options:

- Your existing NetApp Support Site (NSS) credentials
- A NetApp cloud login using your email address and a password

### Steps

1. Open a web browser and go to the [Workload Factory console](#).
2. On the **Log in** page, enter the email address that's associated with your login.
3. Depending on the authentication method associated with your login, you'll be prompted to enter your credentials:
  - NetApp cloud credentials: Enter your password
  - Federated user: Enter your federated identity credentials
  - NetApp Support Site account: Enter your NetApp Support Site credentials
4. Select **Log in**.

If you have successfully logged in in the past, you'll see the Workload Factory home page and you'll be using the default account.

If this is the first time that you've logged in, you'll be directed to the **Account** page.

- If you are a member of a single account, select **Continue**.
- If you are a member of multiple accounts, select the account and select **Continue**.

### Result

You're now logged in and can start using Workload Factory to manage FSx for ONTAP file systems and your workloads.

## Automate tasks using Codebox

### Learn about codebox automation

Codebox is an Infrastructure as Code (IaC) co-pilot that helps developers and DevOps generate the code needed to execute any operation supported by Workload Factory. Codebox is aligned with the Workload Factory operation modes (Basic, Read, and Automate) and it sets a clear path for execution readiness as well as providing an automation catalog for quick future reuse.

## Codebox capabilities

Codebox provides two key IaC capabilities:

- *Codebox Viewer* shows the IaC that is generated by a specific job flow operation by matching entries and selections from the graphical wizard or from the conversational chat interface. While Codebox Viewer supports color coding for easy navigation and analysis, it does not allow editing—only copying or saving code to the Automation Catalog.
- *Codebox Automation Catalog* shows all saved IaC jobs, allowing you to easily reference them for future use. Automation catalog jobs are saved as templates and shown in context of the resources that apply to them.

Additionally, when setting up Workload Factory credentials, Codebox dynamically displays the AWS permissions that are needed to create IAM policies. The permissions are provided for each Workload Factory capability that you plan to use (databases, AI, FSx for ONTAP, and so on), and they are customized based on whether the users of the policy will get read-only permissions or full operate permissions. You just copy the permissions from Codebox and then paste them in the AWS Management Console so that Workload Factory has the correct permissions to manage your workloads.

## Supported code formats

The supported code formats include:

- Workload Factory REST APIs
- AWS CLI
- AWS CloudFormation


[Learn how to use Codebox.](#)

## Use Codebox for automation

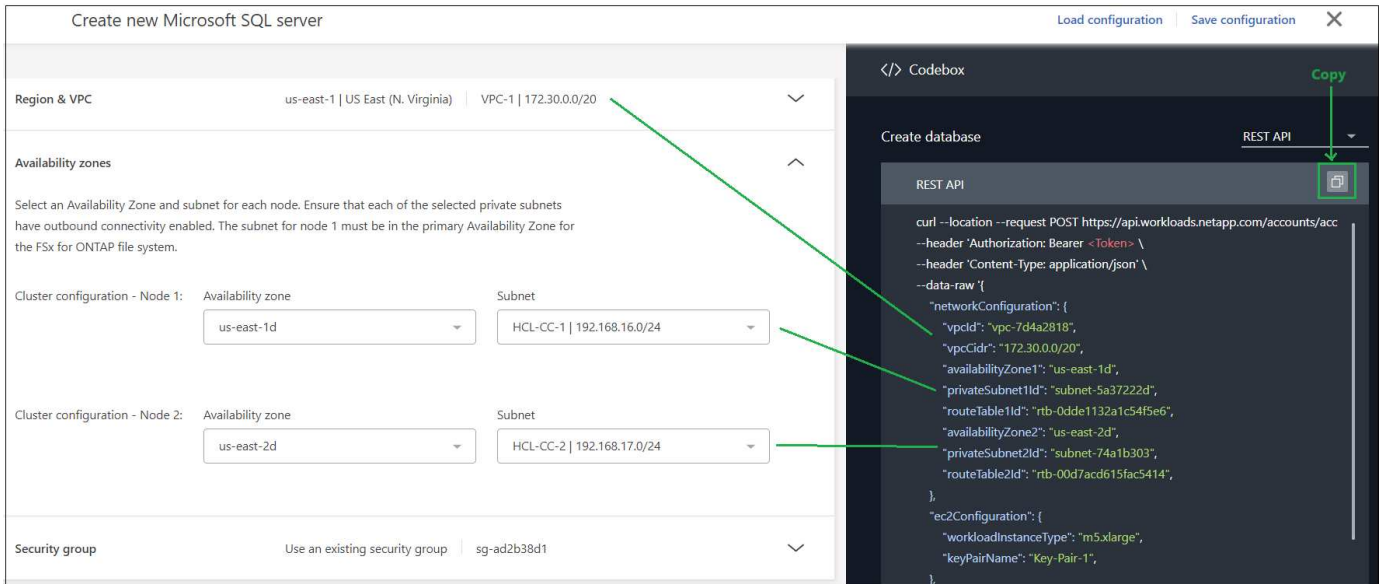
You can use Codebox to generate the code needed to execute any operation supported by Workload Factory. You can generate code that can be consumed and run using Workload Factory REST APIs, the AWS CLI, and AWS CloudFormation.

Codebox is aligned with the Workload Factory operation modes (Basic, Read, and Automate) by populating the appropriate data in the code based on the AWS permissions provided in the Workload Factory account for each user. The code can be used like a template where you can fill in missing information (for example, credentials) or customize certain data before running the code.

## How to use Codebox

As you enter values in the Workload Factory UI wizards, you can see the data update in Codebox as you complete each field. When you complete the wizard, but before you select the **Create** button at the bottom of the page, select  to copy in Codebox to capture the code required to build your configuration. For example, this screenshot from creating a new Microsoft SQL Server shows the wizard entries for VPC and availability zones and the equivalent entries in Codebox for a REST API implementation.





With some code formats you can also select the Download button to save the code in a file that you can bring to another system. If required, you can edit the code after it has been downloaded so that you can adapt it to other AWS accounts.

### Use CloudFormation code from Codebox

You can copy the CloudFormation code generated from Codebox and then launch the Amazon Web Services CloudFormation stack in your AWS account. CloudFormation will perform the actions that you defined in the Workload Factory UI.

The steps to use the CloudFormation code might be different depending on whether you are deploying an FSx for ONTAP file system, creating account credentials, or performing other Workload Factory actions.

Note that the code within a CloudFormation-generated YAML file expires after 7 days for security reasons.

### Before you begin

- You'll need to have credentials to log in to your AWS account.
- You'll need to have the following user permissions to use a CloudFormation stack:

```

{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "cloudformation:CreateStack",
        "cloudformation:UpdateStack",
        "cloudformation>DeleteStack",
        "cloudformation:DescribeStacks",
        "cloudformation:DescribeStackEvents",
        "cloudformation:DescribeChangeSet",
        "cloudformation:ExecuteChangeSet",
        "cloudformation:ListStacks",
        "cloudformation:ListStackResources",
        "cloudformation:GetTemplate",
        "cloudformation:ValidateTemplate",
        "lambda:InvokeFunction",
        "iam:PassRole",
        "iam:CreateRole",
        "iam:UpdateAssumeRolePolicy",
        "iam:AttachRolePolicy",
        "iam:CreateServiceLinkedRole"
      ],
      "Resource": "*"
    }
  ]
}

```

## Steps

1. After you have used the UI to define the operation that you want to perform, copy the code in the Codebox.
2. Select **Redirect to CloudFormation** and the Redirect to CloudFormation page is displayed.
3. Open another browser window and log in to the AWS Management Console.
4. Select **Continue** from the Redirect to CloudFormation page.
5. Log in to the AWS account where the code should be run.
6. On the Quick create stack page, under Capabilities, select **I acknowledge that AWS CloudFormation might ....**
7. Select **Create stack**.
8. Monitor the progress from AWS or from Workload Factory.

## Use REST API code from Codebox

You can use the Workload Factory REST APIs generated from Codebox to deploy and manage your FSx for ONTAP file systems and other AWS resources.

You can run the APIs from any host that supports curl and that has internet connectivity.

Note that the authentication tokens are hidden in Codebox, but they are populated when you copy and paste the API call.

### Steps

1. After you have used the UI to define the operation that you want to perform, copy the API code in the Codebox.
2. Paste the code and run it on your host system.

## Use AWS CLI code from Codebox

You can use the Amazon Web Services CLI generated from Codebox to deploy and manage your FSx for ONTAP file systems and other AWS resources.

### Steps

1. After you have used the UI to define the operation that you want to perform, copy the AWS CLI in the Codebox.
2. Open another browser window and log in to the AWS Management Console.
3. Paste the code and run it.

## Use Terraform from Codebox

You can use Terraform to deploy and manage your FSx for ONTAP file systems and other AWS resources.

### Before you begin

- You'll need a Terraform server to run the commands from.
- You'll need to have credentials to log in to your AWS account.

### Steps

1. After you have used the UI to define the operation that you want to perform, copy or download the Terraform code in the Codebox.
2. Connect to your server.
3. Paste the code and run it.

## Remove credentials

If you no longer need a set of credentials, you can delete them from Workload Factory. You can only delete credentials that aren't associated with an FSx for ONTAP file system.

### Steps

1. In the Workload Factory console, select the **Account** icon, and select **Credentials**.
2. On the **Credentials** page, select the action menu for a set of credentials and then select **Remove**.
3. Select **Remove** to confirm.

# Knowledge and support

## Register for support

Support registration is required to receive technical support specific to Workload Factory and its storage solutions and services. You must register for support from the BlueXP console, which is a separate web-based console from Workload Factory.

Registering for support does not enable NetApp support for a cloud provider file service. For technical support related to a cloud provider file service, its infrastructure, or any solution using the service, refer to "Getting help" in the Workload Factory documentation for that product.

[Amazon FSx for ONTAP](#)

## Support registration overview

Registering your account ID support subscription (your 20 digit 960xxxxxxx serial number located on the Support Resources page in BlueXP) serves as your single support subscription ID. Each BlueXP account-level support subscription must be registered.

Registering enables capabilities like opening support tickets and automatic case generation. Registration is completed by adding NetApp Support Site (NSS) accounts to BlueXP as described below.

## Register your account for NetApp support

To register for support and activate support entitlement, one user in your account must associate a NetApp Support Site account with their BlueXP login. How you register for NetApp support depends on whether you already have a NetApp Support Site (NSS) account.

### Existing customer with an NSS account

If you're a NetApp customer with an NSS account, you simply need to register for support through BlueXP.

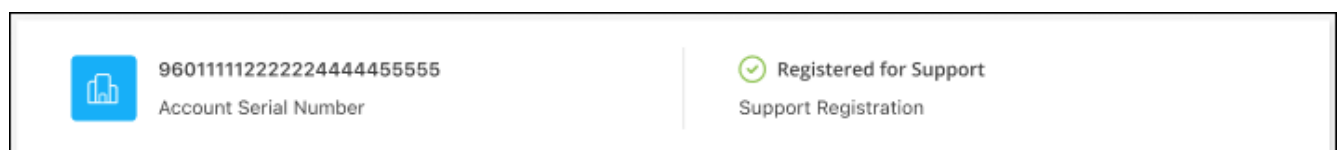
### Steps

1. In the upper right of the Workload Factory console, select **Help > Support**.

Selecting this option opens the BlueXP console a new browser tab and loads the Support dashboard.

2. In the upper right of the BlueXP console, select the Settings icon, and select **Credentials**.
3. Select **User Credentials**.
4. Select **Add NSS credentials** and follow the NetApp Support Site (NSS) Authentication prompt.
5. To confirm that the registration process was successful, select the Help icon, and select **Support**.

The **Resources** page should show that your account is registered for support.



Note that other BlueXP users will not see this same support registration status if they have not associated a NetApp Support Site account with their BlueXP login. However, that doesn't mean that your BlueXP account is not registered for support. As long as one user in the account has followed these steps, then your account has been registered.

### Existing customer but no NSS account

If you're an existing NetApp customer with existing licenses and serial numbers but *no* NSS account, you need to create an NSS account and associate it with your BlueXP login.

#### Steps

1. Create a NetApp Support Site account by completing the [NetApp Support Site User Registration form](#)
  - a. Be sure to select the appropriate User Level, which is typically **NetApp Customer/End User**.
  - b. Be sure to copy the BlueXP account serial number (960xxxx) used above for the serial number field. This will speed up the account processing.
2. Associate your new NSS account with your BlueXP login by completing the steps under [Existing customer with an NSS account](#).

### Brand new to NetApp

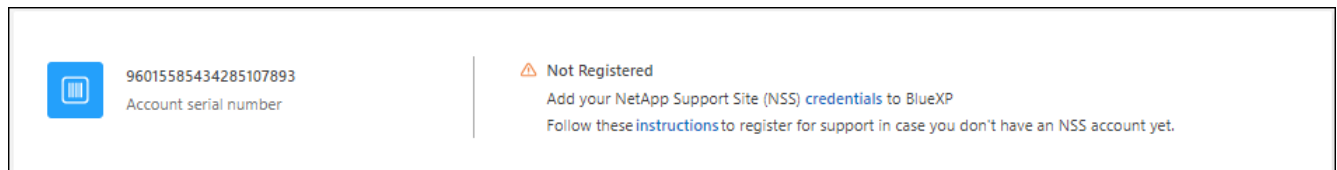
If you are brand new to NetApp and you don't have an NSS account, follow each step below.

#### Steps

1. In the upper right of the Workload Factory console, select **Help > Support**.

Selecting this option opens the BlueXP console a new browser tab and loads the Support dashboard.

2. Locate your account ID serial number from the Support Resources page.



3. Navigate to [NetApp's support registration site](#) and select **I am not a registered NetApp Customer**.
4. Fill out the mandatory fields (those with red asterisks).
5. In the **Product Line** field, select **Cloud Manager** and then select your applicable billing provider.
6. Copy your account serial number from step 2 above, complete the security check, and then confirm that you read NetApp's Global Data Privacy Policy.

An email is immediately sent to the mailbox provided to finalize this secure transaction. Be sure to check your spam folders if the validation email doesn't arrive in few minutes.

7. Confirm the action from within the email.

Confirming submits your request to NetApp and recommends that you create a NetApp Support Site account.

8. Create a NetApp Support Site account by completing the [NetApp Support Site User Registration form](#)
  - a. Be sure to select the appropriate User Level, which is typically **NetApp Customer/End User**.

- b. Be sure to copy the account serial number (960xxxx) used above for the serial number field. This will speed up the account processing.

### After you finish

NetApp should reach out to you during this process. This is a one-time onboarding exercise for new users.

Once you have your NetApp Support Site account, associate the account with your BlueXP login by completing the steps under [Existing customer with an NSS account](#).

## Get help

NetApp provides support for Workload Factory and its cloud services in a variety of ways. Extensive free self-support options are available 24x7, such as knowledgebase (KB) articles and a community forum. Your support registration includes remote technical support via web ticketing.

### Get support for FSx for ONTAP

For technical support related to FSx for ONTAP, its infrastructure, or any solution using the service, refer to "Getting help" in the Workload Factory documentation for that product.

#### [Amazon FSx for ONTAP](#)

To receive technical support specific to Workload Factory and its storage solutions and services, use the support options described below.

### Use self-support options

These options are available for free, 24 hours a day, 7 days a week:

- Documentation

The Workload Factory documentation that you're currently viewing.

- [Knowledge base](#)

Search through the Workload Factory knowledge base to find helpful articles to troubleshoot issues.

- [Communities](#)

Join the Workload Factory community to follow ongoing discussions or create new ones.

### Create a case with NetApp support

In addition to the self-support options above, you can work with a NetApp Support specialist to resolve any issues after you activate support.

#### Before you get started

To use the **Create a Case** capability, you must first register for support. associate your NetApp Support Site credentials with your Workload Factory login. [Learn how to register for support](#).

#### Steps

1. In the upper right of the Workload Factory console, select **Help > Support**.

Selecting this option opens the BlueXP console a new browser tab and loads the Support dashboard.

2. On the **Resources** page, choose one of the available options under Technical Support:

a. Select **Call Us** if you'd like to speak with someone on the phone. You'll be directed to a page on netapp.com that lists the phone numbers that you can call.

b. Select **Create a Case** to open a ticket with a NetApp Support specialist:

- **Service:** Select **Workload Factory**.

- **Case Priority:** Choose the priority for the case, which can be Low, Medium, High, or Critical.


To learn more details about these priorities, hover your mouse over the information icon next to the field name.

- **Issue Description:** Provide a detailed description of your problem, including any applicable error messages or troubleshooting steps that you performed.

- **Additional Email Addresses:** Enter additional email addresses if you'd like to make someone else aware of this issue.

- **Attachment (Optional):** Upload up to five attachments, one at a time.

Attachments are limited to 25 MB per file. The following file extensions are supported: txt, log, pdf, jpg/jpeg, rtf, doc/docx, xls/xlsx, and csv.


ntapitdemo 

NetApp Support Site Account

---

Service Working Environment


Select Select

Case Priority 



Low - General guidance



Issue Description

Provide detailed description of problem, applicable error messages and troubleshooting steps taken.

Additional Email Addresses (Optional) 

Type here

Attachment (Optional)  Upload 

No files selected  

### After you finish

A pop-up will appear with your support case number. A NetApp Support specialist will review your case and get back to you soon.

For a history of your support cases, you can select **Settings > Timeline** and look for actions named "create support case." A button to the far right lets you expand the action to see details.

It's possible that you might encounter the following error message when trying to create a case:

"You are not authorized to Create a Case against the selected service"

This error could mean that the NSS account and the company of record it's associated with is not the same company of record for the BlueXP account serial number (ie. 960xxxx) or the working environment serial number. You can seek assistance using one of the following options:

- Use the in-product chat
- Submit a non-technical case at <https://mysupport.netapp.com/site/help>



## Manage your support cases (Preview)

You can view and manage active and resolved support cases directly from BlueXP. You can manage the cases associated with your NSS account and with your company.

Case management is available as a Preview. We plan to refine this experience and add enhancements in upcoming releases. Please send us feedback by using the in-product chat.

Note the following:

- The case management dashboard at the top of the page offers two views:
  - The view on the left shows the total cases opened in the past 3 months by the user NSS account you provided.
  - The view on the right shows the total cases opened in the past 3 months at your company level based on your user NSS account.

The results in the table reflect the cases related to the view that you selected.

- You can add or remove columns of interest and you can filter the contents of columns like Priority and Status. Other columns provide just sorting capabilities.

View the steps below for more details.

- At a per-case level, we offer the ability to update case notes or close a case that is not already in Closed or Pending Closed status.

### Steps

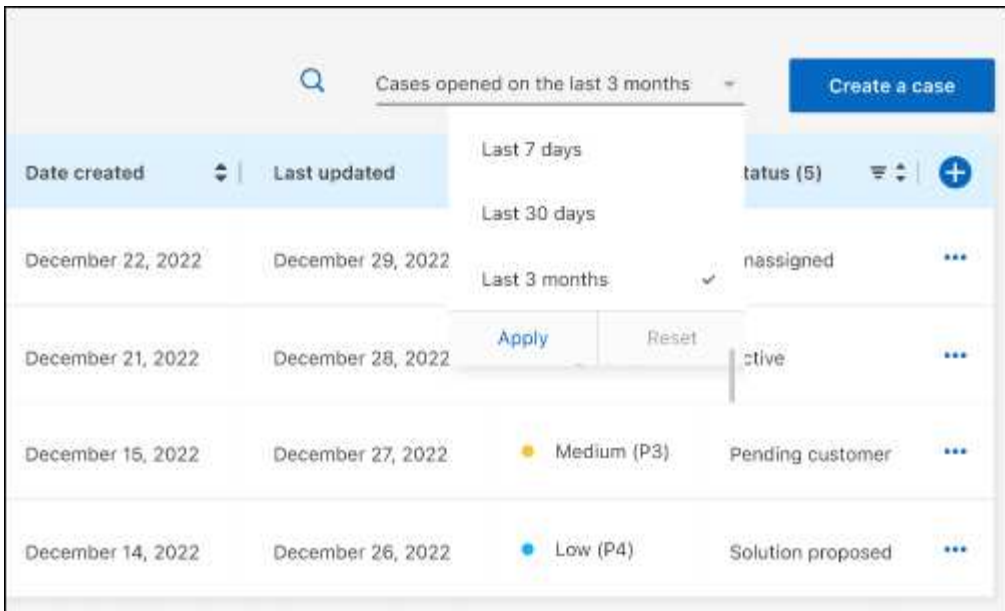
1. In the upper right of the Workload Factory console, select **Help > Support**.

Selecting this option opens the BlueXP console a new browser tab and loads the Support dashboard.

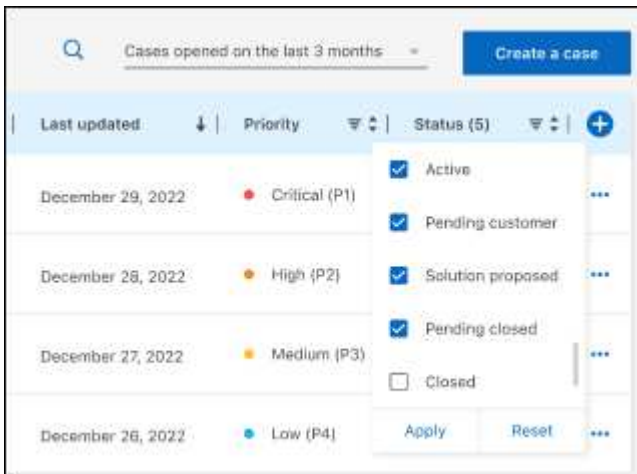
2. Select **Case Management** and if you're prompted, add your NSS account to BlueXP.

The **Case management** page shows open cases related to the NSS account that is associated with your BlueXP user account. This is the same NSS account that appears at the top of the **NSS management** page.

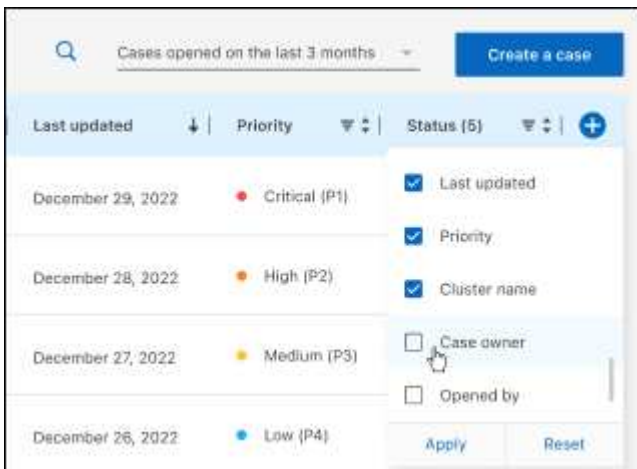
3. Optionally modify the information that displays in the table:
  - Under **Organization's cases**, select **View** to view all cases associated with your company.
  - Modify the date range by choosing an exact date range or by choosing a different time frame.



- Filter the contents of the columns.



- Change the columns that appear in the table by selecting  and then choosing the columns that you'd like to display.

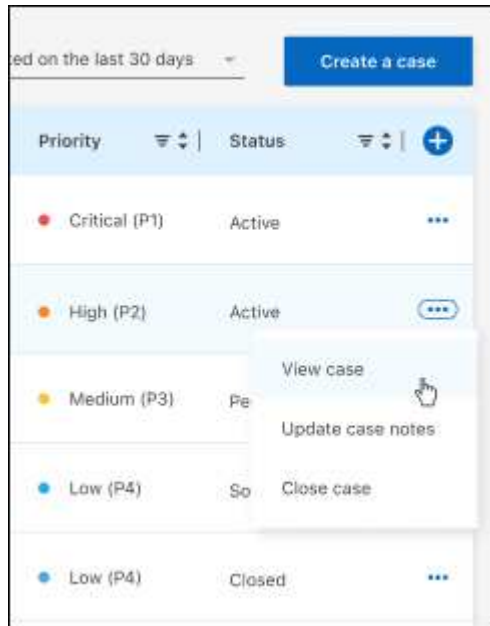


4. Manage an existing case by selecting **...** and selecting one of the available options:

- **View case:** View full details about a specific case.
- **Update case notes:** Provide additional details about your problem or select **Upload files** to attach up to a maximum of five files.

Attachments are limited to 25 MB per file. The following file extensions are supported: txt, log, pdf, jpg/jpeg, rtf, doc/docx, xls/xlsx, and csv.

- **Close case:** Provide details about why you're closing the case and select **Close case**.



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- [Workload Factory for Databases](#)
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