Learn the basics

Setup and administration

NetApp
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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

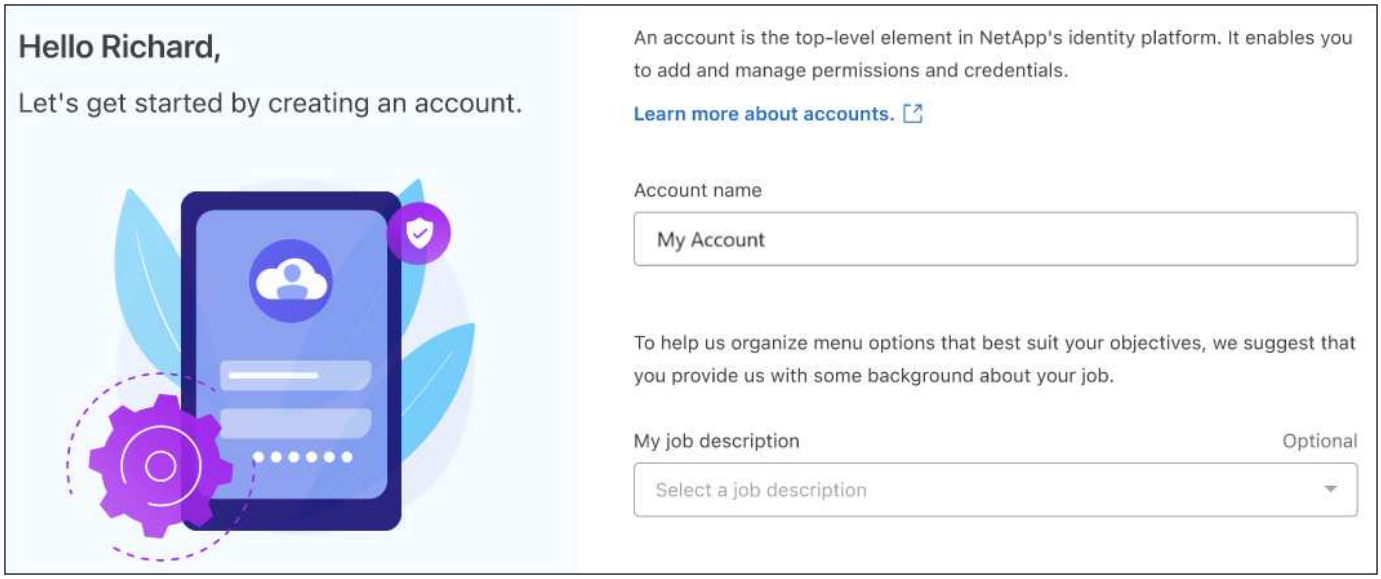
Workload Factory includes a web-based console that's provided through the SaaS layer, an account, operational modes that control access to your cloud estate, links that provide segregated connectivity between Workload Factory and an AWS account, and more.

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.



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

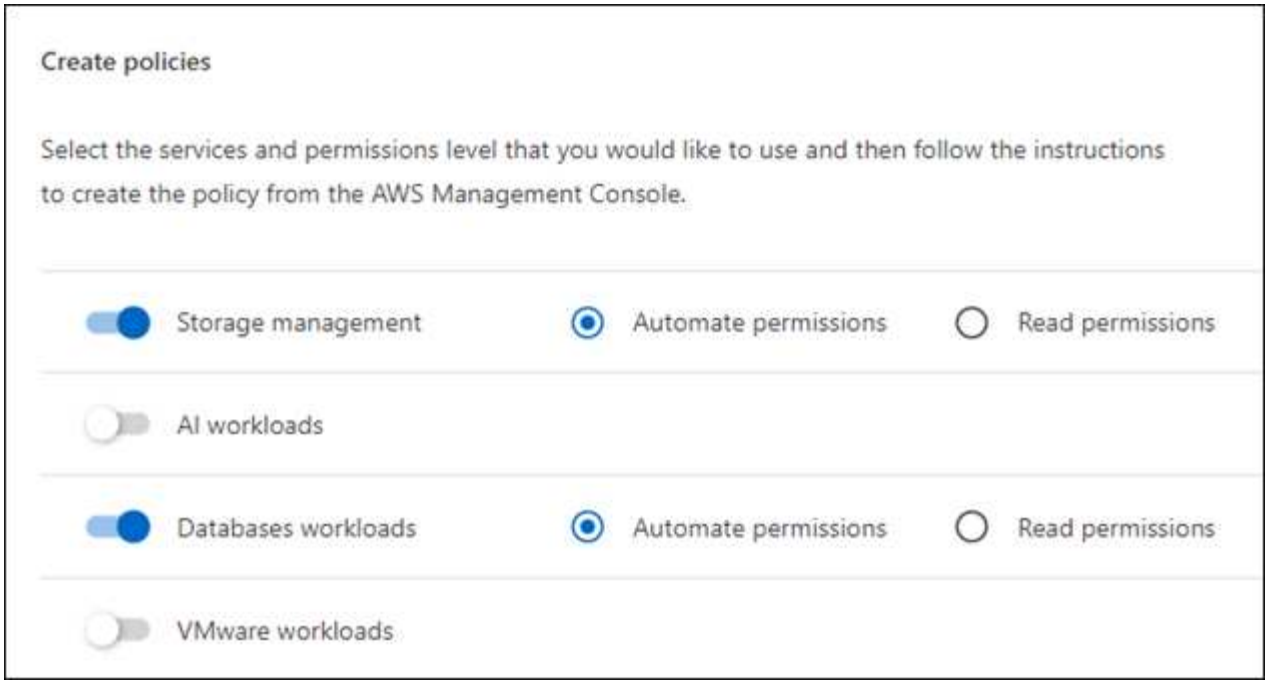
Operational mode examples

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.

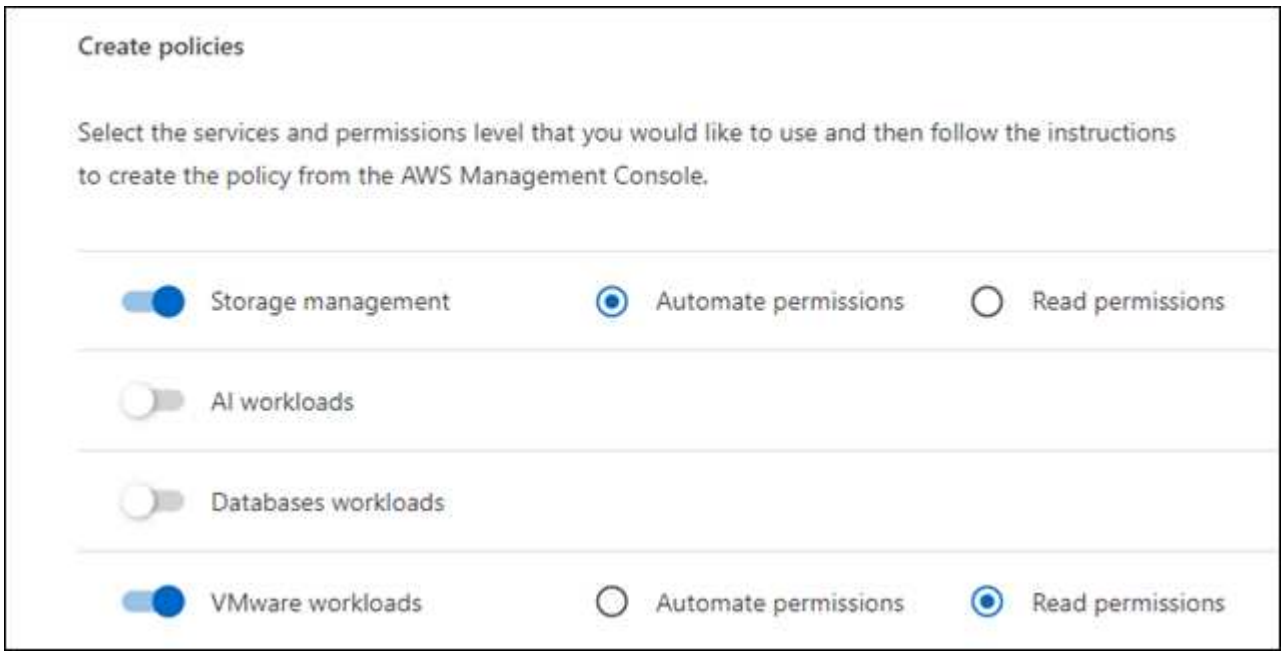


However, they will have no automation controls for creating and deploying VMware workloads (basic mode) from Workload Factory. If they want to create VMware workloads, they'll need to copy the code from the Codebox, log in to their AWS account manually, and manually populate missing entries in the generated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

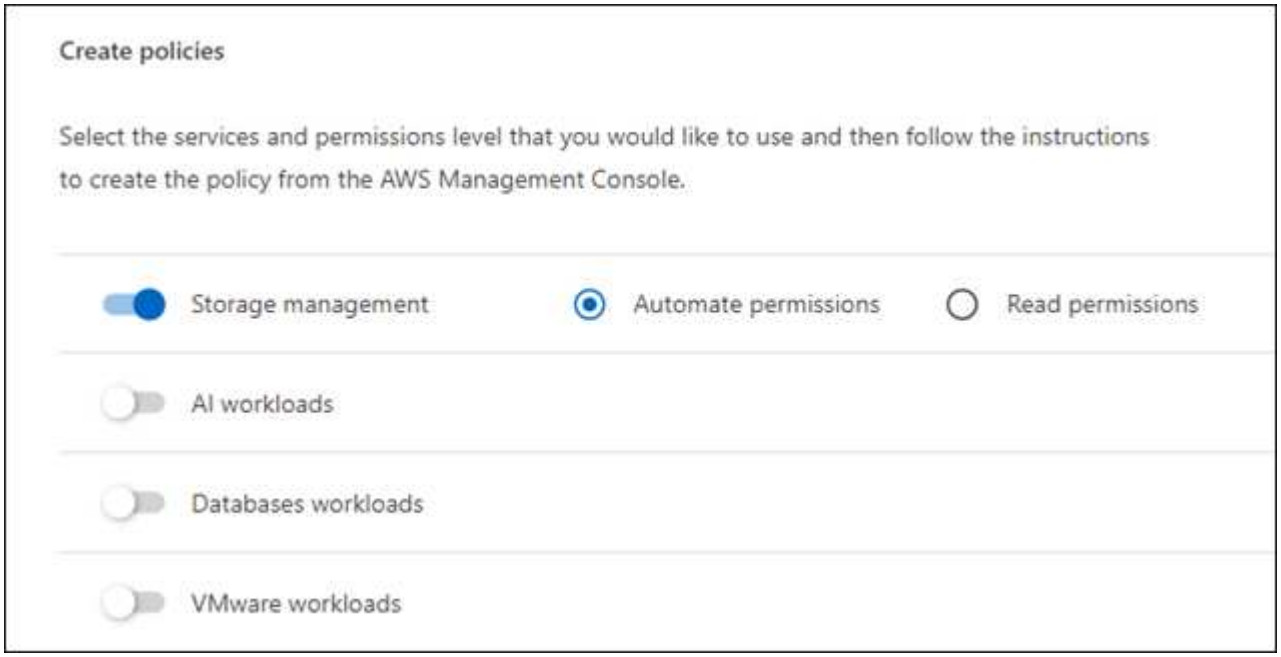
Example 2

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.



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.



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.

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