



Element Unify for AWS IoT TwinMaker

Reference Deployment

This Quick Start was created by Element in collaboration with Amazon Web Services (AWS). [Quick Starts](#) are automated reference deployments that use AWS CloudFormation templates to deploy key technologies on AWS, following AWS best practices.

Overview

This Quick Start reference deployment guide provides step-by-step instructions for deploying Element Unify cloud-based connectors on the AWS Cloud so that you can quickly start building digital twins using Unify and IoT TwinMaker.

This Quick Start uses AWS Lambda, Amazon S3, and AWS CloudFormation to launch Element Unify cloud-based connectors for AWS IoT SiteWise, AWS IoT TwinMaker, Amazon S3, and Amazon RDS.

Element Unify on AWS

Element Unify transforms siloed IT/OT data into contextualized, knowledge graph-based models to support diverse analytical use cases including those using a digital twin approach. Built with industrial organizations in mind, the Element Unify data platform uses automated, no-code data pipelines to integrate and contextualize IT/OT data delivering speed, quality, governance, and scale benefits.

Using this Quick Start, you can launch Element Unify cloud-based connectors for AWS IoT SiteWise, AWS IoT TwinMaker, Amazon S3, and Amazon RDS.

The Element Unify Quick Start uses a range of AWS services and features, including:

- Security groups
- AWS CloudFormation
- Amazon S3
- AWS Lambda
- AWS Secrets Manager
- AWS IoT SiteWise
- AWS IoT TwinMaker
- Amazon RDS

After deployment, you can configure and extend Element Unify to your specific business applications and processes.

For more information about Element Unify, see [Element Unify Overview](#).

Costs

You are responsible for the cost of the AWS services, Unify costs and any third-party licenses used while running this Quick Start. There is no additional cost for using the Quick Start.

The AWS CloudFormation templates for Quick Starts include configuration parameters that you can customize. For cost estimates, see the pricing pages for each AWS service you use. Prices are subject to change.

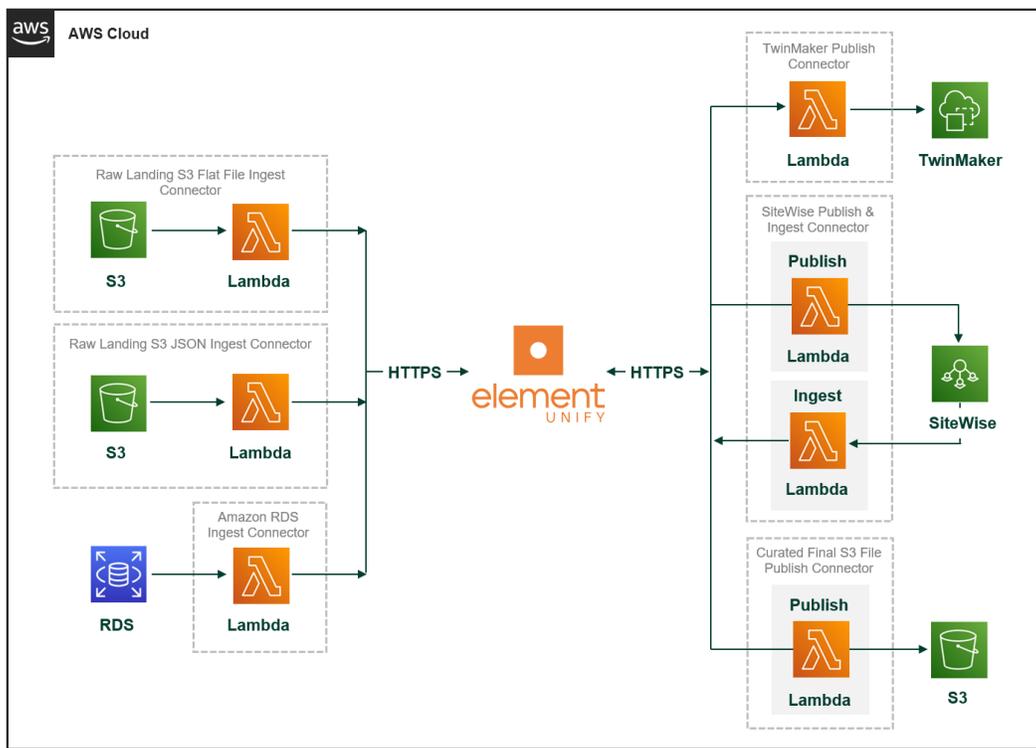
Software licenses

This Quick Start requires licenses for Unify. If you already own licenses for Unify, you can use the Bring Your Own License (BYOL) model.

Otherwise, purchase licenses from an [Element representative](#) or request a [30 day free trial](#).

Architecture

Deploying this Quick Start for a new virtual private cloud (VPC) with default parameters builds the following Element Unify connector environment in the AWS cloud.



The Quick Start sets up the following:

- Amazon S3 buckets to store and upload tag definitions and data models in flat file and JSON formats.
- AWS Lambda functions to automatically orchestrate connection and synchronization between Unify and AWS cloud services.
- Unify connectors for:
 - Amazon S3 flat file ingest/publish
 - Amazon S3 JSON ingest
 - AWS IoT SiteWise ingest/publish
 - AWS IoT TwinMaker publish
 - Amazon RDS ingest

Planning the deployment

Specialized knowledge

This deployment requires a moderate level of familiarity with AWS services. If you're new to AWS, see [Getting Started Resource Center](#) and [AWS Training and Certification](#). These sites provide materials for learning how to design, deploy, and operate your infrastructure and applications on the AWS Cloud.

This Quick Start assumes basic familiarity with Element Unify. Ideally the user has been onboarded to Unify.

AWS account

If you don't already have an AWS account, create one at <https://aws.amazon.com> by following the on-screen instructions. Part of the sign-up process involves receiving a phone call and entering a PIN using the phone keypad.

Your AWS account is automatically signed up for all AWS services. You are charged only for the services you use.

Technical requirements

Before you launch the Quick Start, review the following information and ensure that your account is properly configured. Otherwise, deployment might fail.

Resource quotas

If necessary, request [service quota increases](#) for the following resources. You might request quota increases to avoid exceeding the default limits for any resources that are shared across multiple deployments. The [Service Quotas console](#) displays your usage and quotas for some aspects of some services. For more information, see [What is Service Quotas?](#) and [AWS service quotas](#).

Resource	This deployment uses
AWS Lambda	7
AWS Secrets Manager	7
Amazon S3 bucket	4

Supported regions

The following Regions are currently supported by this Quick Start.

- US East (N. Virginia) us-east-1
- US West (Oregon) us-west-2
- Europe (Ireland) eu-west-1
- Asia Pacific (Singapore) ap-southwest-1

IAM permissions

Before launching the Quick Start, you must sign in to the AWS Management Console with IAM permissions for the resources that the templates deploy. The *AdministratorAccess* managed policy within IAM provides sufficient permissions, although your organization may choose to use a custom policy with more restrictions. For more information, see [AWS managed policies for job functions](#).

Prepare for the deployment

Register Service Account

Register a service account in Element Unify.

1. Log in to your instance of Unify
2. Navigate to the **Connector Portal**
3. Select Custom Connector card
4. Toggle **Auto Fill** and **Show Password** to configure a service account with the default credentials

REGISTER ⓘ

✎ You must have an administrator role in the organization that the service account will be associated with.

* Connector Id

c584d9da-9ab0-48a0-be53-c6c1c1184c04

* Service Account Name

connector-9823

* Service Account Id

7edffa57-0a28-4fe1-a638-4308f7291204

* Service Account Password

.....

Show Password Auto Fill

5. Take note of the Service Account Id and Service Account Password credentials for later use when launching the Quick Start
6. Select **Register**

Deployment Options

This Quick Start provides a single deployment option. It provisions the connectors in your existing AWS infrastructure. A single template is provided for this purpose.

Deployment steps

Launch the Quick Start

1. Sign in to your AWS account, and click the deploy link below to launch the AWS CloudFormation template.

Deploy Element Unify connectors	View template
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The deployment takes about 5 minutes to complete.

2. Check the AWS Region that's displayed in the upper-right corner of the navigation bar, and change it if necessary. This is where the network infrastructure for Element Unify connectors is built. The template is launched in the us-east-1 Region by default.
3. On the **Create stack** page:
 - a. Specify a **Stack name**.



The screenshot shows a form titled "Stack name" with a text input field containing the text "Unify Quick Start Deployment". Below the input field, there is a small note: "Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-)." The form is enclosed in a light gray border.

- b. Ensure that the **Unify Hostname** matches the login URL of your Element Unify account.
- c. Enter the **Unify Organization ID** that corresponds to the Organization of your Element Unify account.
- d. Enter the **Service Account Identifier** created during connector registration.
- e. Enter the **Service Account Password** created during the connector registration.
- f. Keep the default settings for the **Unify S3 Bucket Name** and the **Unify S3 Key Prefix**.

Parameters
Parameters are defined in your template and allow you to input custom values when you create or update a stack.

Element Unify Connection

UnifyHostname
Element Unify hostname.

UnifyOrgId
Element Unify organization id. The organization id is found in the url after you log in to Element Unify. https://UnifyHostName/#/org/<org id>

ServiceAccountIdentifier
Service Account Identifier. This is obtained during connector registration.

ServiceAccountPassword
Service Account Password. This is obtained during connector registration.

Connector Source

UnifyS3BucketName
Unify S3 bucket containing connector package

UnifyS3KeyPrefix
Unify S3 bucket key prefix containing connector package

- g. Choose **Next**.
4. On the **Configure stack options** page, you can [specify tags](#) (key-value pairs) for resources in your stack and [set advanced options](#). When you're finished, choose **Next**. On the **Review** page, review and confirm the template settings. Under **Capabilities**, select the two check boxes to acknowledge that the template creates IAM resources and might require the ability to automatically expand macros.
 5. Choose **Create stack** to deploy the stack. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the Element Unify connector deployment is ready. Use the values displayed in the **Resources** tab for the stack, as shown in Figure 2, to view the created resources.

UnifyQuickStart

Delete Update Stack actions Create stack

Stack info Events Resources Outputs Parameters Template Change sets

Resources (16)

Search resources

Logical ID	Physical ID	Type	Status
TwinMakerPublishConnector	arn:aws:cloudformation:us-east-1:822889150900:stack/UnifyQuickStart-TwinMakerPublishConnector-O70B4JX9NX7Q/c48bb980-a618-11ec-8088-0aaf0017d45d	AWS::CloudFormation::Stack	CREATE_COMPLETE
SiteWisePublishConnector	arn:aws:cloudformation:us-east-1:822889150900:stack/UnifyQuickStart-SiteWisePublishConnector-57HAE6KXBPGY/c48d4020-a618-11ec-9e5d-1263aba9d2c1	AWS::CloudFormation::Stack	CREATE_COMPLETE
SiteWiseIngestConnector	arn:aws:cloudformation:us-east-1:822889150900:stack/UnifyQuickStart-SiteWiseIngestConnector-1LED1UBHKOZMA/c3851ef0-a618-11ec-84e0-0e88a68b6167	AWS::CloudFormation::Stack	CREATE_COMPLETE

Test the deployment (Optional Step)

Publish dataset to an Amazon S3 bucket

Configure dataset in Element Unify

1. Navigate to Dataset Catalog
2. Select the dataset to publish to Amazon S3
3. Add a new **S3 Publish** label to the dataset
4. Select **Save Changes**

Configure and test AWS Lambda function

1. Navigate to AWS Lambda
2. Search for and open the **UnifyS3Publish** Lambda function
3. Select the **Configuration** tab
4. Open **Environment Variables**
5. Edit the **Label** variable to include the **S3 Publish** label

The screenshot shows the AWS Lambda console with the 'Configuration' tab selected. On the left, a sidebar lists various configuration options: General configuration, Triggers, Permissions, Destinations, Environment variables (highlighted), Tags, and VPC. The main content area is titled 'Environment variables (7)' and includes a note: 'The environment variables below are encrypted at rest with the default Lambda service key.' Below this is a table with two columns: 'Key' and 'Value'. The table contains three rows: 'BucketName' with value 'TargetS3Bucket', 'KeyPrefix' with value 'Unify', and 'Labels' with value '["S3 Publish Label"]'. The 'Method' is listed as 'UPDATE'. An 'Edit' button is located in the top right corner of the environment variables section.

Key	Value
BucketName	TargetS3Bucket
KeyPrefix	Unify
Labels	["S3 Publish Label"]

6. Select the **Test** tab
7. Select **Test**
8. Verify that the Lambda function has executed successfully..

The screenshot shows the AWS Lambda console with the 'Test' tab selected. A green notification box at the top of the main content area displays the message: 'Execution result: succeeded (logs)'. Below the message is a 'Details' link with a right-pointing arrow. A close button (X) is located in the top right corner of the notification box.

Post-deployment steps

Configure the Amazon RDS Connector (Optional)

1. Navigate to AWS Lambda
2. Search for and open the **UnifyODBCIngest** Lambda function
3. Select the **Configuration** tab
4. Select **Environment Variables**
5. Enter the configuration parameters for the desired Amazon RDS instance

Code | Test | Monitor | **Configuration** | Aliases | Versions

General configuration | Triggers | Permissions | Destinations | **Environment variables** | Tags | VPC | Monitoring and operations tools | Concurrency | Asynchronous invocation

Environment variables (10) Edit

The environment variables below are encrypted at rest with the default Lambda service key.

Key	Value
LD_LIBRARY_PATH	/tmp:\$ORACLE_HOME:/var/[REDACTED]/r
Method	UPDATE
ORACLE_HOME	/tmp
RegionName	us-east-1
SQLDatabase	postgres
SQLDriver	PostgreSQL
SQLServer	data [REDACTED].amazonaws.com
SQLTableName	maintenance_work_orders
SecretName	arn:aws:secret [REDACTED] Secret-pLk2
query	SELECT * FROM maintenance_work_orders

Adjust default EventBridge schedule

By default, an EventBridge schedule is configured to execute the Lambda function of each deployed connector once every hour. To adjust the schedule.

1. Navigate to AWS Lambda
2. Search for and open the desired Lambda function
3. Select the **EventBridge** card in the Function Overview
4. Select the link to open the EventBridge configuration
5. Update the **schedule expression** to reflect the desired timing of the trigger event

Frequently Asked Questions

How do I sign up for a Unify free trial?	A 30 day free trial can be requested directly from the AWS Marketplace .
The CloudFormation template failed to deploy due to a lack of permissions. What permissions do I need?	A list of permissions is found in the Quick Start Permissions section. You can create a new role with the appropriate policies listed in this section.
Where is the S3 bucket for the Unify S3 Publish connector?	The Unify S3 Publish Connector will publish datasets into an existing S3 bucket. You can update the destination bucket the S3 Publish Connector from the Configuration > Environment Variables section for the Lambda associated with the connector. The BucketName environment variable stores the name of the destination bucket.
Where can I learn more about the Unify Connectors?	The connector documentation is found at the Element Community site .
How do I deploy individual connectors?	You can deploy individual connectors directly from the Connector Portal within Unify.

Quick Start Permissions

The Quick Start will deploy a set of services. These permissions are outlined below. You can create a new role with the following permissions below if your user does not have permissions:

```
arn:aws:iam::aws:policy/SecretsManagerReadWrite
arn:aws:iam::aws:policy/AWSLambda_FullAccess
arn:aws:iam::aws:policy/AmazonS3FullAccess
arn:aws:iam::aws:policy/AWSIoTSiteWiseFullAccess
arn:aws:iam::aws:policy/AWSIoTSiteWiseConsoleFullAccess
arn:aws:iam::aws:policy/service-role/AWSIoTSiteWiseMonitorPortalAccess
arn:aws:iam::aws:policy/AWSCloudFormationFullAccess
arn:aws:iam::aws:policy/CloudWatchFullAccess
arn:aws:iam::aws:policy/AWSIoTFullAccess
iam:CreateRole
iam:AttachRolePolicy
iam:DetachRolePolicy
iam:GetRole
iam>DeleteRole
iam:PassRole
```

About Element Analytics

Element, a leading software provider in IT/OT data management, enables industrial organizations to unite their IT and operations data to produce analytical insights that drive cleaner, safer, healthier, and more profitable operations. Element Unify transforms siloed IT/OT data into contextualized, graph-based models to support diverse analytical workloads and data governance. Element's customers represent over \$250 billion in revenue, \$230 billion in fixed assets and 450,000 employees. To learn more about Element, please visit elementanalytics.com and follow the company on Twitter and LinkedIn.

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