

# AWS Instance-Scheduler

- This solution uses Instance scheduler to automate the starting (and stopping) of EC2 instances based on specified timeframe.
- The architecture uses Amazon CloudWatch events, DynamoDB tables and a Lambda function.
  - o When the instance is stopped it adds a tag value to the instance
  - o When an Instance is also started by this solution, it adds a tag to the instance.

## Use Case

- Automatically stop instances only. Instances will not be automatically started
- Users can manually start instances after it has been stopped and the instance will be automatically stopped at end time based on the applicable period.

## Create an AWS CloudFormation stack with the AWS Instance Scheduler template

The stack deploys an AWS Lambda function, an Amazon DynamoDB table, an Amazon CloudWatch Events event, and Amazon CloudWatch custom metrics.

1. Go to cloud formation in the region you intend to create the stacks and click on [Launch solution](#) in the link provided. This will automatically launch the cloudFormation stack in your AWS account.
2. In the Create Stack page, ensure the s3 URL is selected as the template source

**Create stack**

**Prerequisite – Prepare template**  
You can also create a template by scanning your existing resources in the [IaC generator](#).

**Prepare template**  
Every stack is based on a template. A template is a JSON or YAML file that contains configuration information about the AWS resources you want to include in the stack.

☒ **Choose an existing template**  
Upload or choose an existing template.
 ☐ **Use a sample template**  
Choose from our sample template library.
 ☐ **Build from Application Composer**  
Create a template using a visual builder.

**Specify template** [Info](#)  
A template is a JSON or YAML file that describes your stack's resources and properties.

**Template source**  
Selecting a template generates an Amazon S3 URL where it will be stored.

☒ **Amazon S3 URL**  
Provide an Amazon S3 URL to your template.
 ☐ **Upload a template file**  
Upload your template directly to the console.
 ☐ **Sync from Git - new**  
Sync a template from your Git repository.

**Amazon S3 URL**

Amazon S3 template URL

S3 URL: `https://s3.amazonaws.com/solutions-reference/instance-scheduler-on-aws/latest/instance-scheduler-on-aws.template`

3. In "Specify stack details" page, for Stack name, enter **Ec2instanceScheduler**.
4. For Frequency, choose a frequency in minutes to run your scheduler (for example, 5 minutes).
5. (optional) Under "Services", disable all services but **EC2 scheduling**.
6. For Started tags, enter **Started-by=Instance\_Scheduler**.
7. For Stopped tags, enter **Stopped-by=Instance\_Scheduler**.
8. Select parameters or use the default values.
9. Click on **Next**.
10. On the "Configure stack Options" page, choose Next.
11. Review your settings, and then **check** the box "I acknowledge that AWS CloudFormation might create IAM resources".

**Capabilities**

**The following resource(s) require capabilities: [AWS::IAM::Role]**

This template contains Identity and Access Management (IAM) resources. Check that you want to create each of these resources and that they have the minimum required permissions. In addition, they have customised names. Check that the customised names are unique within your AWS account. [Learn more](#)

☒ I acknowledge that AWS CloudFormation might create IAM resources with customised names.

## 12. Choose **submit**.

This deployment will create 2 databases for storing state and configuration for period and schedules, a lambda function and cloud watch event rules and all other necessary resources.

### Create a period to stop instances based on a schedule

1. To create a period, Open the DynamoDB console
2. Select the "Explore items" tab and Choose Configuration table. This will list all the default schedules and periods of the solution

**DynamoDB** ×

DynamoDB > Explore items > Ec2InstanceScheduler-ConfigTable-ZSEKZJYQYALV

**Tables (3)** ×

Any tag key ▾

Any tag value ▾

Q Find tables

< 1 > ⚙

**Ec2InstanceScheduler-ConfigTable-ZSEKZJYQYALV**

Autopreview View table details

**Scan or query items**  
Expand to query or scan items.

✓ Completed. Read capacity units consumed: 2 ×

**Items returned (10)** ↻ Actions ▾ Create item

< 1 > ⚙

<input type="checkbox"/>	type (String) ▾	name (String) ▾	begintime ▾	description ▾
<input type="checkbox"/>	config	scheduler		
<input type="checkbox"/>	schedule	running		Instances run...
<input type="checkbox"/>	schedule	scale-up-down		Vertical scalin...
<input type="checkbox"/>	schedule	seattle-office-hours		Office hours l...
<input type="checkbox"/>	schedule	stopped		Instances sto...

3. In the Items view page, and select the "office-hours" period. Go to actions and click on duplicate.

**DynamoDB**

Dashboard  
Tables  
**Explore items**  
 PartiQL editor  
 Backups  
 Exports to S3  
 Imports from S3  
 Integrations [New](#)  
 Reserved capacity  
 Settings

DAX  
 Clusters  
 Subnet groups  
 Parameter groups  
 Events

Completed. Read capacity units consumed: 2

Items returned (1/10)

	type (String)	name (String)	
<input type="checkbox"/>	<a href="#">config</a>	scheduler	
<input type="checkbox"/>	<a href="#">schedule</a>	running	
<input type="checkbox"/>	<a href="#">schedule</a>	scale-up-down	Vertical scalin...
<input type="checkbox"/>	<a href="#">schedule</a>	seattle-office-hours	Office hours i...
<input type="checkbox"/>	<a href="#">schedule</a>	stopped	Instances sto...
<input type="checkbox"/>	<a href="#">schedule</a>	uk-office-hours	Office hours i...
<input type="checkbox"/>	<a href="#">period</a>	first-monday-in-quarter	Every first mo...
<input checked="" type="checkbox"/>	<a href="#">period</a>	office-hours	09:00 Office hours
<input type="checkbox"/>	<a href="#">period</a>	weekends	Days in weeke...
<input type="checkbox"/>	<a href="#">period</a>	working-days	Working days

Actions

- Edit item
- Duplicate item**
- Delete items
- Download selected items to CSV
- Download results to CSV

- Set the below parameters for the stop time. You will need to remove the begin time configuration and set the description and name to stop-time.

DynamoDB > Explore items: Ec2InstanceScheduler-ConfigTable-ZSEKZJYQYALV > Duplicate item

### Duplicate item

You can add, remove, or edit the attributes of an item. You can nest attributes inside other attributes up to 32 levels deep. [Learn more](#)

**Form** JSON view

**Attributes** Add new attribute

Attribute name	Value	Type	
type - Partition key	period	String	
name - Sort key	europe-office-hours	String	
begin time	09:00	String	Remove
description	Office hours in europe	String	Remove
end time	17:00	String	Remove
weekdays	Insert a field	String set	Remove
	0 mon-fri	String	Remove

Cancel Create item

- Click on "Create Item"

## Create a schedule for the period (created above)

1. To create a schedule, Open the DynamoDB console
2. On the *configuration table* items, select the "seattle-office-hours" schedule and Go to **action** and select Duplicate (as above)

The screenshot shows the AWS DynamoDB console interface. On the left is a navigation sidebar with options like Dashboard, Tables, Explore items, etc. The main area displays a list of items from the 'Ec2InstanceScheduler-ConfigTable-ZSEKZJYQYALV' table. The 'seattle-office-hours' item is selected, and the 'Actions' menu is open, showing options like Edit item, Duplicate item, Delete items, etc. A notification at the top right states 'Completed. Read capacity units consumed: 2'.

Set the below parameters for the schedule.

The screenshot shows the 'Duplicate item' form in the AWS DynamoDB console. The form has a 'Form' tab selected and a 'JSON view' tab. Below the tabs is a message: 'You can add, remove, or edit the attributes of an item. You can nest attributes inside other attributes up to 32 levels deep. [Learn more](#)'. The 'Attributes' section contains a table with the following data:

Attribute name	Value	Type	
type - Partition key	schedule	String	
name - Sort key	europa-office-hours	String	
description	for Office hours in europe	String	<button>Remove</button>
periods	<div>Insert a field</div>	String set	<button>Remove</button>
	0 europa-office-hours	String	<button>Remove</button>
timezone	Europe/Berlin	String	<button>Remove</button>

At the bottom right of the form are 'Cancel' and 'Create item' buttons.

You should see the new period and schedule Items on the list of items on the config table

3. Test the configured schedule on an instance
  - a. Spin up an EC2 instance(s) and use the tagkey = Schedule tagvalue = europe-office-hours (or YOUR Schedule name).  
Once these tags are applied to instances, the instance will stop with the next trigger based on the time zone.

Here is the list of [timezone](#) to use when creating a schedule.

e.g America/New\_York, Europe/Berlin

[America/New\\_York](#)