



## TELEOPTI INC

# Teleopti WFM - Amazon Connect Integration Requirements

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Version 1.0

Who	Version	Change
Krista Crout, Teleopti Inc	1.0	First Version
David Jonsson, Teleopti Inc	1.1	Added Teleopti Word Template
David Jonsson, Teleopti Inc	1.2	Describe Standard Report vs. Interaction Data
Krista Crout, Teleopti Inc	1.3	Add AWS Configuration
David Jonsson, Teleopti Inc	1.4	Use Interaction Data only Add RTA details
David Jonsson, Teleopti Inc	1.5	Switch agent identifier, add RTA logic

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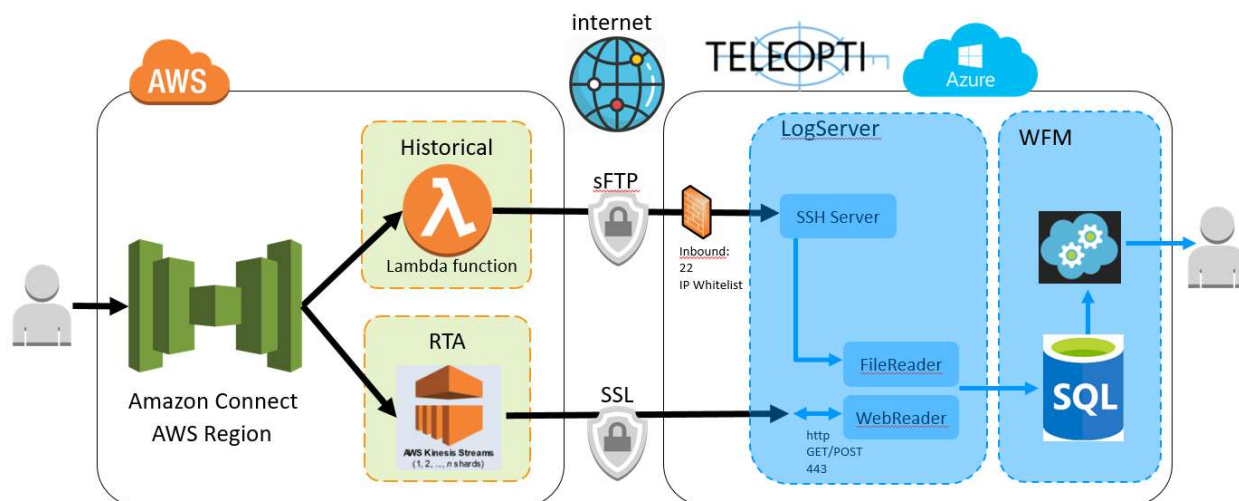
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## 1 Table of Contents

<b>2</b>	<b>Architecture Overview</b>	<b>3</b>
<b>3</b>	<b>Data integrations</b>	<b>3</b>
3.1	Historical feed	3
3.2	RTA feed	4
<b>4</b>	<b>Historical feed – details</b>	<b>5</b>
4.1	Setting up and Scheduling Reports	5
4.1.1	Login	5
4.1.2	Agent Performance Statistics	5
4.2	Required Lambda Functions	6
4.3	AWS Additional Requirements	6
4.4	Data Mapping	7
4.4.1	Queue Statistics	7
4.4.2	Agent Queue Statistics	8
4.4.3	Agent Performance Statistics	8
<b>5</b>	<b>RTA feed - details</b>	<b>9</b>
5.1	Shards	9
5.2	Performance consideration	9
5.3	Logic	9
<b>6</b>	<b>Appendix – Setting up Amazon Services</b>	<b>10</b>
6.1	Services required	10
6.2	CloudFormation Deployment	10
6.3	Amazon S3 Configuration	15
<b>7</b>	<b>Appendix – Setting up a ReadOnly account for RTA stream</b>	<b>18</b>
7.1	Create User	18
7.2	Handle permission	18
7.3	Share the credentials with Teleopti	21
7.4	Share the Stream with Teleopti	22

## 2 Architecture Overview



The picture above demonstrates the basic architecture of the integration. Reports are saved from Amazon Connect every 15/30 minutes into an Amazon S3 storage bucket, where they are transformed into .csv files by a Lambda function and then transmitted via sFTP to Teleopti. The Teleopti sFTP server receives the reports and uses them to generate reports and forecasting models.

Agents and resource planners continue to use Connect, and now also have access to Teleopti via the web for scheduling, forecasting, intraday monitoring, and viewing reports.

This integration requires that the customer has an existing Amazon Connect instance, a RealTime stream setup and will require configuration of a few other Amazon Services as outlined in the Appendix.

## 3 Data integrations

### 3.1 Historical feed

The Teleopti AWS Cloud Formation Template will implement a "Amazon firehose" that will export all interactions into a S3 bucket. A Lambda-script transforms the data into .csv-files which are pushed to Teleopti sFTP. The data is at this point still on a call (interaction) level and Teleopti will do the aggregation of the data into *intervals* using SQL Azure code given the customer's choice of interval length, usually by 15 minute.

Agents are identified using the Agent **UserName** from AWS Queue are identified using the Queue **ARN** from AWS

Teleopti will provide a QuickStart template, Teleopti will provide the customer with the following as input to the QuickStart:

- sFTP hostname
- sFTP username
- sFTP password
- SSH Access Key??

## 3.2 RTA feed

Teleopti will use the Kinesis Data Streams in AWS. The AWS stream output is shared between all (other) integrations the customer might have. “Scale out” of the stream is done using “shards”, see: <https://docs.aws.amazon.com/streams/latest/dev/service-sizes-and-limits.html>

Every 5 sec Teleopti will pull the latest available state for all agents. The delta (agents that changed state since last pull) are passed on to the Teleopti WFM RTA web service to be displayed on the RTA web tools.

Teleopti will need to know

- Access Key ID
- Secret Access Key
- Stream ARN  
the ARN of the stream dictates what **region** and **name** Teleopti will use to connect to the stream

Agents are identified using the Agent **UserName** from AWS

## 4 Historical feed – details

The data pushed through the firehose into the S3 bucket every x minute should match the interval length configured in the TeleoptiAnalytics datamart for a close(r) to real-time experience. Note the interval needs to end before Teleopti can aggregate it. Add a few more minutes for processing and timing of events; the aggregated numbers should be available 10min after the interval ended.

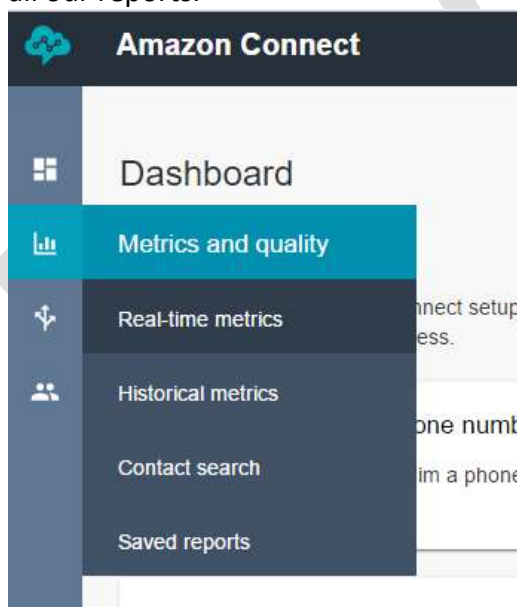
Note:

- Data transformations are done according to section **Data Mapping**
- Agent data – interval length matters!  
Agent data is not available in the firehose but is pulled from AWS Standard Reports. That data is currently only available at a **30min level** from AWS. Teleopti have to pick this data up as is and usually split the data down to a 15min level.

### 4.1 Setting up and Scheduling Reports

#### 4.1.1 Login

- a. Login to Connect and choose *Historical Metrics*. We will use Queue & Agent Metrics for all our reports.



- b. Configure your reports to include only to the Metrics Teleopti needs:  
*Agent Performance Statistics*

#### 4.1.2 Agent Performance Statistics

- i. From the Historical Metrics page, click Queues, then click the gear in the upper right corner of the default report to open the Table Settings.

- ii. On the Interval and Time Range tab, set the Interval to 30 minutes, leaving the Time Zone UTC and the Time Range Last 24 Hours.
  - iii. On the Groupings tab, ensure that “Interval” and “Agent” are selected.
  - iv. On the Metrics tab, ensure the following options are selected:
    1. Agent idle time
    2. Non-Productive Time
    3. Online time
  - v. Click Apply.
  - vi. Click the arrow next to Save in the upper right corner, and select “Schedule.”
  - vii. Give the report a unique name and click “Continue.”
  - viii. Publish the report by clicking “Publish.”
  - ix. Schedule the report to be delivered to the S3 bucket. On the Recurrence tab, set the report to be generated every half hour for the previous 2 hours.
  - x. After clicking Create, Amazon will display a summary screen. The report has been successfully scheduled.
- c. Make sure the Reports are published to the S3 Bucket at the required times (Bucket names are configured under Data storage option in connect).

## 4.2 Required Lambda Functions

- a. The Lambda function resides on a central repository, where it will be referenced by the Cloud Formation Template.
- b. The Lambda code package consists of multiple .js modules, the dependencies bluebird, ssh2, and node-s3-encryption-client, while the dependency aws-sdk is provided natively by the Amazon environment.
- c. A trigger created by the Cloud Formation Template calls the Lambda any time a .csv file is created on the user S3 location.
  - a. The file is compared to known names, and is determined to be an interactions file if it starts with “connectCTR” and an Agent Performance file if it starts with “TeleoptiAgentPerformance.”
    - i. Interactions files are transformed from JSON to .csv and sent through SFTP to the Teleopti integration server.
    - ii. Agent Performance files are sent through SFTP to the Teleopti integration server as-is.
- d. TeleoptiLogServer then aggregates the collected data, after which the ETL service pushes it to the data mart, making it available to the customer.

## 4.3 AWS Additional Requirements

For Lambda to access the S3 buckets to read and write files, an IAM role with those permissions for all the relevant S3 buckets is created by the Cloud Formation Template.

The Lambda functions are provided the S3 bucket names for the incoming Connect reports and the client KMS key if encryption is requested by the Cloud Formation Template.

The SFTP server information for the Teleopti destination server is configured as input parameters by the Cloud Formation Template.

## 4.4 Data Mapping

### 4.4.1 Queue Statistics

Teleopti Field	Amazon Field	Notes
talking_call_dur	Agent_AgentInteractionDuration	
wrap_up_dur	Agent_AfterContactWorkDuration	
overflow_in_call_cnt	Count (TransferredToEndpoint)	
overflow_out_call_cnt	Count(TransferCompletedTimestamp)	
aband_call_cnt	Count(Agent_ConnectedToAgentTimestamp = null)	
answ_call_cnt	Count(Agent_ConnectedToAgentTimestamp)	
queued_and_answ_call_dur	Sum(Queue_Duration)	Filtered on answered as defined above
queued_and_aband_call_dur	Sum(Queue_Duration)	Filtered on abandoned as defined above
queued_answ_longest_que_dur	Max(Queue_Duration)	Filtered on answered as defined above
queued_aband_longest_que_dur	Max(Queue_Duration)	Filtered on abandoned as defined above
avg_avail_member_cnt		Not available

ans_servicelevel_cnt	Count(Queue_Duration < SLA)	SLA provided by customer, same for all Queues
wait_dur		Not available
aband_short_call_cnt	Count (Queue_Duration < 5)	Short call Threshold is 5 seconds by Teleopti default, a different value can be requested by customer
aband_within_sl_cnt	Count(Queue_Duration < SLA)	SLA provided by customer, same for all Queues

#### 4.4.2 Agent Queue Statistics

Note: this report is based off the AWS Standard Report

Teleopti Field	Amazon Field	Notes
talking_call_dur	Agent_AgentInteractionDuration	
wrap_up_dur	Agent_AfterContactWorkDuration	
answ_call_cnt	Count(Agent_ConnectedToAgentTime stamp)	
transfer_out_call_cnt	Count(TransferCompletedTimestamp)	

#### 4.4.3 Agent Performance Statistics

Teleopti Field	Amazon Field	Notes
tot_work_dur	Online time	
pause_dur	Non-Productive Time	
avail_dur	Online time - Non-Productive Time	
wait_dur	Agent idle time	
admin_dur		Not available



direct_out_call_cnt		Not available
direct_out_call_dur		Not available
direct_in_call_cnt		Not available
direct_in_call_dur		Not available

## 5 RTA feed - details

### 5.1 Shards

An AWS Kinesis data stream is divided into Shards for performance reasons. Each Shard has a limited amount of throughput. See: <https://aws.amazon.com/kinesis/data-streams/faqs/>, currently: 2MB/sec data output and 1000 PUT records per second per Shard

#### Q: What is a shard?

Shard is the base throughput unit of an Amazon Kinesis data stream. One shard provides a capacity of 1MB/sec data input and 2MB/sec data output. One shard can support up to 1000 PUT records per second. You will specify the number of shards needed when you create a data stream. For example, you can create a data stream with two shards. This data stream has a throughput of 2MB/sec data input and 4MB/sec data output, and allows up to 2000 PUT records per second. You can monitor shard-level metrics in Amazon Kinesis Data Streams and add or remove shards from your data stream dynamically as your data throughput changes by **resharding** the data stream.

### 5.2 Performance consideration

Many clients might share the stream but as the shard has a limitation on the throughput the customer need to consider planning number of shards. Given the data stream only servers the Teleopti RTA client, Teleopti suggest adding **one Shard per 500 agents as a starting point.**

### 5.3 Logic

At Startup the Teleopti Log Server (TLS) will pull all available data (for the last 24h) from each shard, this generates a big enough dataset to cover most agents, that either were active or logged off during the past 24h. Agents not available in that dataset will be given a default "logged out" state by Teleopti.

Once the first data 24h is collected by TLS it will start to fetch all states changes for the past 5 seconds. If multiple states is found for one agent TLS will post only the most recent RTA state change to the Teleopti WFM system. TLS sort the state changes by a AWS *SequenceNumber* which are global within each Shard. TLS will keep track of the last known SequenceNumber for

the next 5 second data pull in memory - but will also persist the SequenceNumber to the database every 10 minutes - in case the Teleopti Integration service needs a restart.

The TLS will run the integration code for all Shards in parallel for better performance. Each agent ("username" used as identifier) will only be connected to one shard at any given point in time.

## 6 Appendix – Setting up Amazon Services

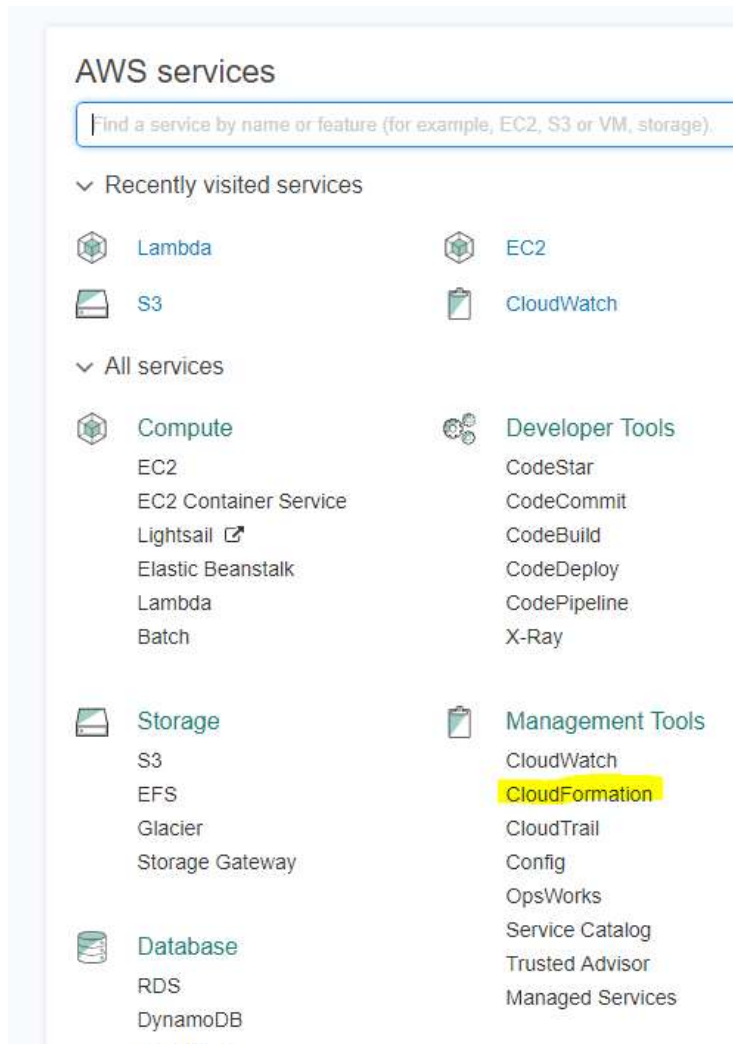
### 6.1 Services required

To complete the integration, the customer will be required to use the following Amazon Services:

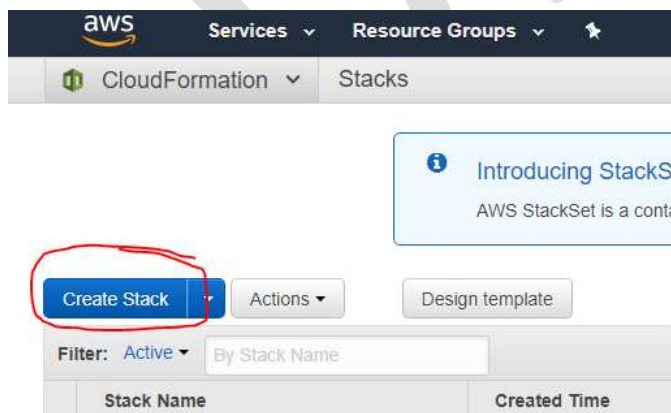
- Amazon Connect – configuration already covered
- Amazon S3
- Amazon Cloud Formation

### 6.2 CloudFormation Deployment

From the Amazon Web Services Console Homepage, Select CloudFormation.



On the CloudFormation Page, click Create Stack.



Select the file for the template provided by Teleopti. Then click Next.

The screenshot shows the AWS CloudFormation console's 'Create Stack' wizard. The top navigation bar includes the AWS logo, 'Services', 'Resource Groups', and user information (Krista Crout, N. Virginia, Support). The breadcrumb trail is 'CloudFormation > Stacks > Create Stack'. The main heading is 'Create stack'. On the left, a sidebar lists the steps: 'Select Template' (active), 'Specify Details', 'Options', and 'Review'. The 'Select Template' section has a sub-heading 'Select Template' and a description: 'Select the template that describes the stack that you want to create. A stack is a group of related resources that you manage as a single unit.' There are two main options: 'Design a template' (with a 'Design template' button) and 'Choose a template' (with a description: 'A template is a JSON/YAML-formatted text file that describes your stack's resources and their properties. Learn more.'). Under 'Choose a template', there are three radio buttons: 'Select a sample template' (with a dropdown menu), 'Upload a template to Amazon S3' (selected), and 'Specify an Amazon S3 template URL' (with a text input field). The 'Upload a template to Amazon S3' option has a 'Choose File' button and a file name 's3-teleopti-sftp.template' is displayed. At the bottom right, there are 'Cancel' and 'Next' buttons, with the 'Next' button circled in red.

On the details page, name the stack, enter the name of your existing S3 bucket, and enter the SFTP connection details provided by Teleopti.

## Create stack

[Select Template](#)**Specify Details**[Options](#)[Review](#)

## Specify Details

Specify a stack name and parameter values. You can use or change the default parameter values, which are defined in the AWS CloudFormation template. [Learn more](#).

**Stack name**

## Parameters

<b>BucketName</b>	<input type="text" value="YourConnectBucket"/>	The S3 bucket where you will sync to and from SFTP.
<b>ExistingBucket</b>	<input type="text" value="true"/>	
<b>SFTPHostname</b>	<input type="text" value="provided by Teleopti"/>	The Teleopti provided hostname of your SFTP server.
<b>SFTPPassword</b>	<input type="text" value="provided by Teleopti"/>	The Teleopti provided password for your SFTP account.
<b>SFTPUserName</b>	<input type="text" value="provided by Teleopti"/>	The Teleopti provided username for your SFTP account.

[Cancel](#)[Previous](#)[Next](#)

On the options page, leave everything default. Click Next.

aws

Services

Resource Groups

CloudFormation

Stacks

Create Stack

Krista CroutN. VirginiaSupport

## Create stack

Select Template

Specify Details

**Options**

Review

### Options

#### Tags

You can specify tags (key-value pairs) for resources in your stack. You can add up to 50 unique key-value pairs for each stack. [Learn more.](#)

	Key (127 characters maximum)	Value (255 characters maximum)	
1	<input type="text"/>	<input type="text"/>	<input data-bbox="1380 630 1412 661" type="button" value="+"/>

#### Permissions

You can choose an IAM role that CloudFormation uses to create, modify, or delete resources in the stack. If you don't choose a role, CloudFormation uses the permissions defined in your account. [Learn more.](#)

IAM Role

Choose a role (optional)

Enter role arn

Advanced

You can set additional options for your stack, like notification options and a stack policy. [Learn more.](#)

Cancel

Previous

Next

On the Review page, make sure to check the box giving the stack permissions to create a new role. Click Create.

### Capabilities

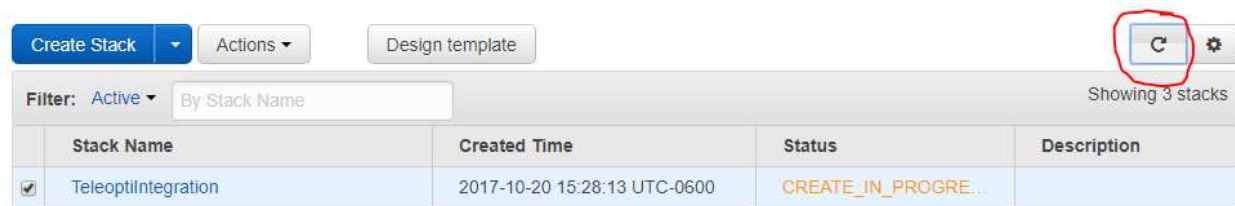
#### **i** The following resource(s) require capabilities: [AWS::IAM::Role]

This template contains Identity and Access Management (IAM) resources that might provide entities access to make changes to your AWS account. Check that you want to create each of these resources and that they have the minimum required permissions. [Learn more.](#)

☒ I acknowledge that AWS CloudFormation might create IAM resources.

[Cancel](#)[Previous](#)[Create](#)

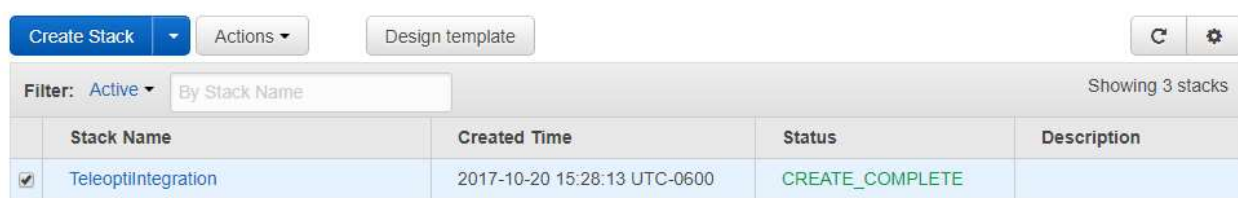
The creation of the stack will take a few minutes. You can hit the refresh button to check progress.



Create Stack	Actions	Design template		
Filter: Active	By Stack Name	Showing 3 stacks		
	Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/>	TeleoptiIntegration	2017-10-20 15:28:13 UTC-0600	CREATE_IN_PROGRE...	

Once creation is complete, the page will automatically refresh.

## 6.3 Amazon S3 Configuration

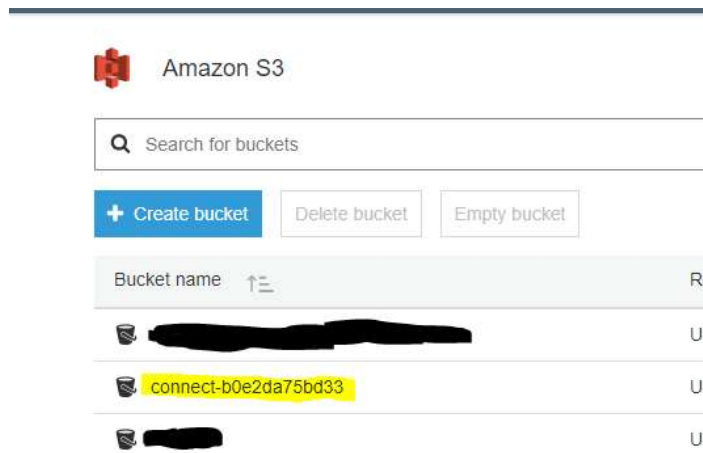


Create Stack	Actions	Design template		
Filter: Active	By Stack Name	Showing 3 stacks		
	Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/>	TeleoptiIntegration	2017-10-20 15:28:13 UTC-0600	CREATE_COMPLETE	

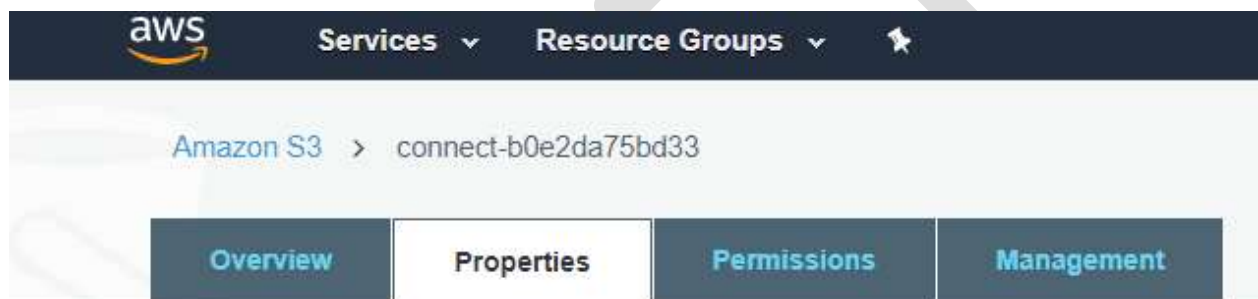
Return to the AWS homepage and select S3.



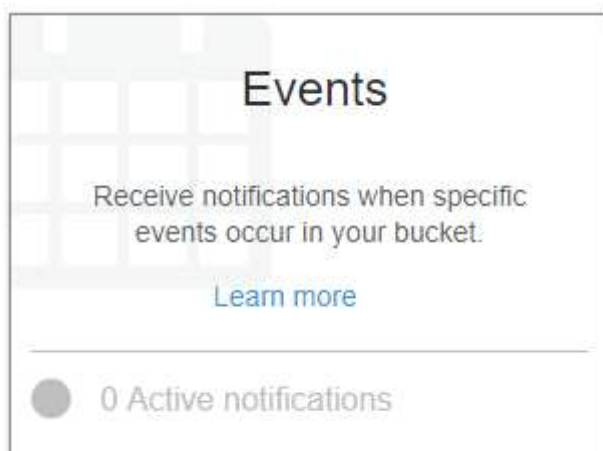
Open your Connect Bucket.



Select the Properties Tab.

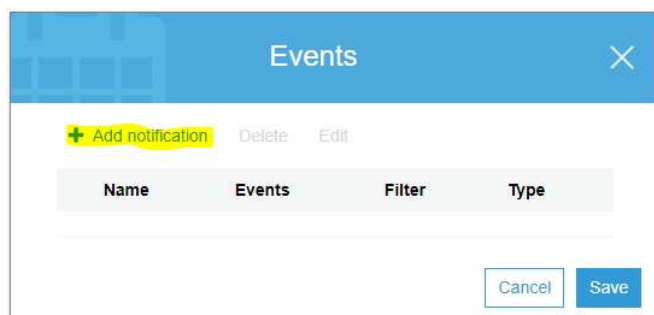


Select Events.



Click Add notification.



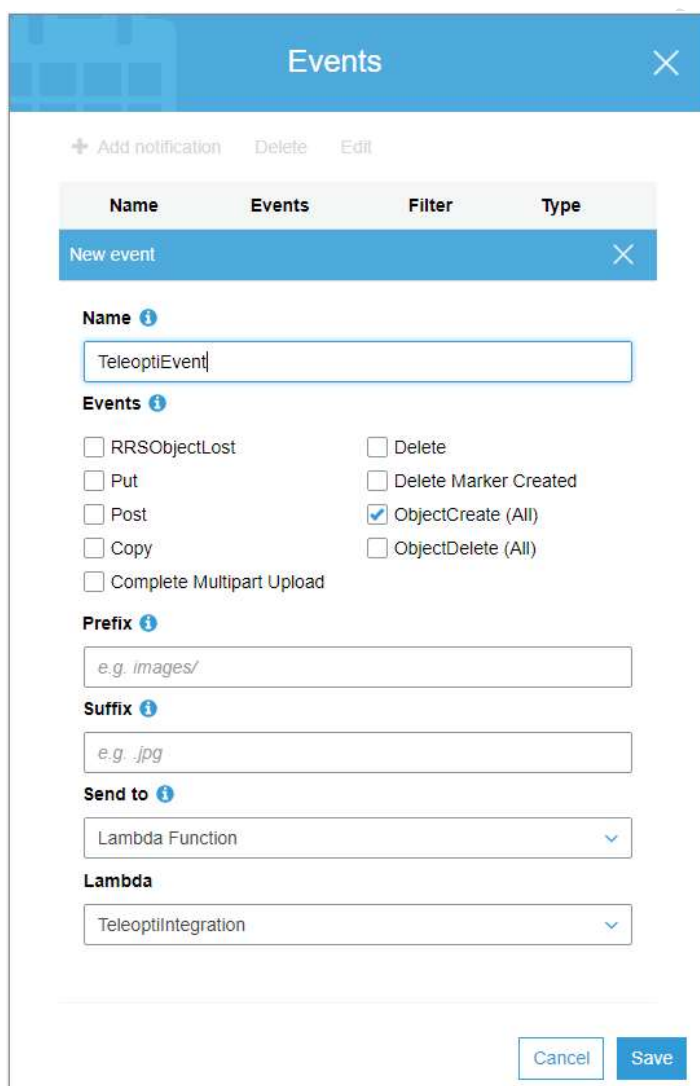


The 'Events' dialog box has a blue header with a close button. Below the header, there are buttons for '+ Add notification', 'Delete', and 'Edit'. A table with the following structure is present:

Name	Events	Filter	Type
------	--------	--------	------

At the bottom of the dialog are 'Cancel' and 'Save' buttons.

To Configure The event, give it a name, check the box for ObjectCreate (All), select Lambda Function from the Send to dropdown, and select the name of your new stack in the Lambda dropdown. Then click Save. This will complete the configuration.



The 'Events' dialog box shows the configuration form. It includes a table with the following structure:

Name	Events	Filter	Type
New event			

Below the table, there are several fields and checkboxes:

- Name**: A text input field containing 'TeleoptiEvent'.
- Events**: A list of checkboxes for event types:
  - ☐ RRRObjLost
  - ☐ Put
  - ☐ Post
  - ☐ Copy
  - ☐ Complete Multipart Upload
  - ☐ Delete
  - ☐ Delete Marker Created
  - ☒ ObjectCreate (All)
  - ☐ ObjectDelete (All)
- Prefix**: A text input field with a placeholder 'e.g. images/'.
- Suffix**: A text input field with a placeholder 'e.g. .jpg'.
- Send to**: A dropdown menu with 'Lambda Function' selected.
- Lambda**: A dropdown menu with 'TeleoptiIntegration' selected.

At the bottom of the dialog are 'Cancel' and 'Save' buttons.

## 7 Appendix – Setting up a ReadOnly account for RTA stream

### 7.1 Create User

<https://console.aws.amazon.com/iam/home#/users>

use “Add User” to create a new User

**User Name:** TeleoptiRTAReadOnly (or similar)

**Access type:** “Programmatic access”

Add user



#### Set user details

You can add multiple users at once with the same access type and permissions. [Learn more](#)

User name\* TeleoptiRTAReadOnly

[Add another user](#)

#### Select AWS access type

Select how these users will access AWS. Access keys and autogenerated passwords are provided in the last step. [Learn more](#)

- Access type\* ☒ **Programmatic access**  
Enables an **access key ID** and **secret access key** for the AWS API, CLI, SDK, and other development tools.
- ☐ **AWS Management Console access**  
Enables a **password** that allows users to sign-in to the AWS Management Console.

### 7.2 Handle permission

Attach the AmazonReadOnlyAccess policy to it the new group

[Cancel](#)

[Next: Permissions](#)

Create New Group

Create New Group

## Create New Group

Create group

Create a group and select the policies to be attached to the group. Using groups is a best-practice way to manage users' permissions by job functions, AWS service access, or your custom permissions. [Learn more](#)

Group name

RTAReadOnly

Create policy

Refresh

Filter: Policy type

Q

kinesisreadonly

Showing 1 result

	Policy name	Type	Attachments	Description
<input checked="" type="checkbox"/>	AmazonKinesisRea...	AWS managed	1	Provides read only access to all streams via the ...

Cancel

Create group

Group	Attached policies
<input checked="" type="checkbox"/> RTAReadOnly	AmazonKinesisReadOnlyAccess

Cancel

Previous

Next: Review



## Add user



## Set permissions for TeleoptiRTAReadOnly



Add user to an existing group or create a new one. Using groups is a best-practice way to manage user's permissions by job functions. [Learn more](#)

[Create group](#)[Refresh](#)

Q Search

Showing 2 results

Group	Attached policies
<input type="checkbox"/> Administrators	AdministratorAccess
<input checked="" type="checkbox"/> RTAGroup	AmazonKinesisReadOnlyAccess and 1 more

## Add user



## Review

Review your choices. After you create the user, you can view and download the autogenerated password and access key.

## User details

**User name** TeleoptiRTAReadOnly  
**AWS access type** Programmatic access - with an access key

## Permissions summary

The user shown above will be added to the following groups.

Type	Name
Group	RTAReadOnly

[Cancel](#)[Previous](#)[Create user](#)

Add user



✔ Success

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: <https://teleopti.signin.aws.amazon.com/console>

Download .csv

	User	Access key ID	Secret access key
▶	✔ TeleoptiRTARedOnly	AKIAIBEMTAOYKB6KVPOQ	***** Show

Close

### 7.3 Share the credentials with Teleopti

Share this info with your Teleopti Tech Consultant

Add user

1 Details2 Permissions3 Review4 Complete

✔ Success

You successfully created the users shown below. You can view and download user security credentials. You can also email users instructions for signing in to the AWS Management Console. This is the last time these credentials will be available to download. However, you can create new credentials at any time.

Users with AWS Management Console access can sign-in at: <https://teleopti.signin.aws.amazon.com/console>

Download .csv

	User	Access key ID	Secret access key
▶	✔ TeleoptiRTARedOnly	AKIAIBEMTAOYKB6KVPOQ	***** Show

C:\Users\davidj\Downloads\credentials.csv - Notepad++

File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?

credentials.csv

1 User name,Password,Access key ID,Secret access key,Console login link

2 TeleoptiRTARedOnly,,AKIAIBEMTAOYKB6KVPOQ,xx,https://teleopti.signin.aws.amazon.com/console

3

	User	Access key ID	Secret access key
▶	✔ TeleoptiRTARedOnly	AKIAIBEMTAOYKB6KVPOQ	B86ab+1sjMPXTF+rlcqb1IC Hide

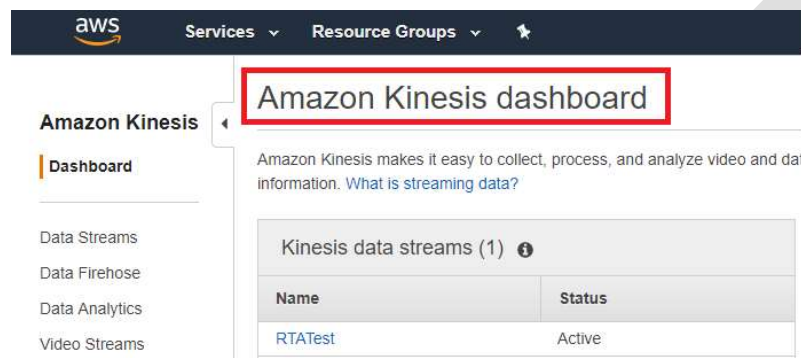


## 7.4 Share the Stream with Teleopti

The “Kinesis data streams” can be found here: <https://console.aws.amazon.com/kinesis/>

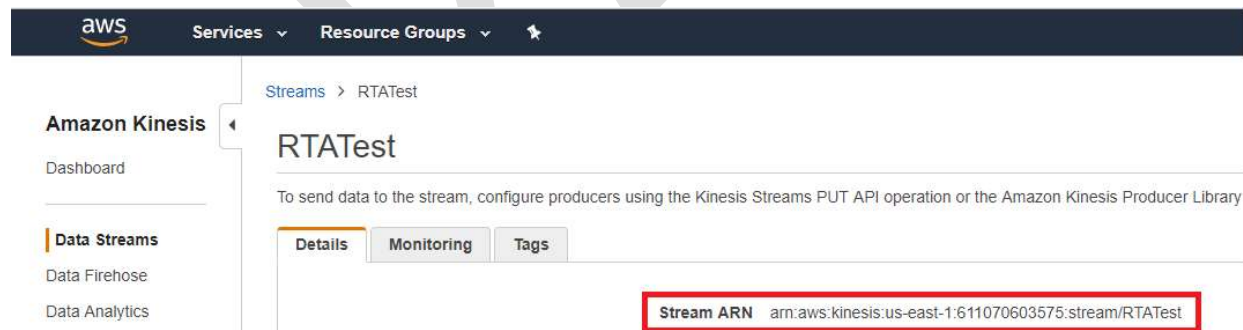
The stream should capture Agent Events.

Please Note: The Secret access key is only available on demand when logged into AWS - but can be exported to .csv to be shared with your Teleopti Consultant. See below.



Click your stream **Name**

Send the stream ARN to Teleopti



Please leave the Stream encryption “Disabled”, Teleopti will not be able to decrypt the data. However the traffic, known as “data in transit”, is still encrypted using https/SSL.

### Server-side encryption

Enable server-side encryption to encrypt sensitive data in the Kinesis stream with an AWS KMS master key.

Server-side encryption Disabled