Retrieving Execution Logs

In this lesson, you will be able to retrieve the logs for your application using AWS Web Console and AWS command-line.

WE'LL COVER THE FOLLOWING

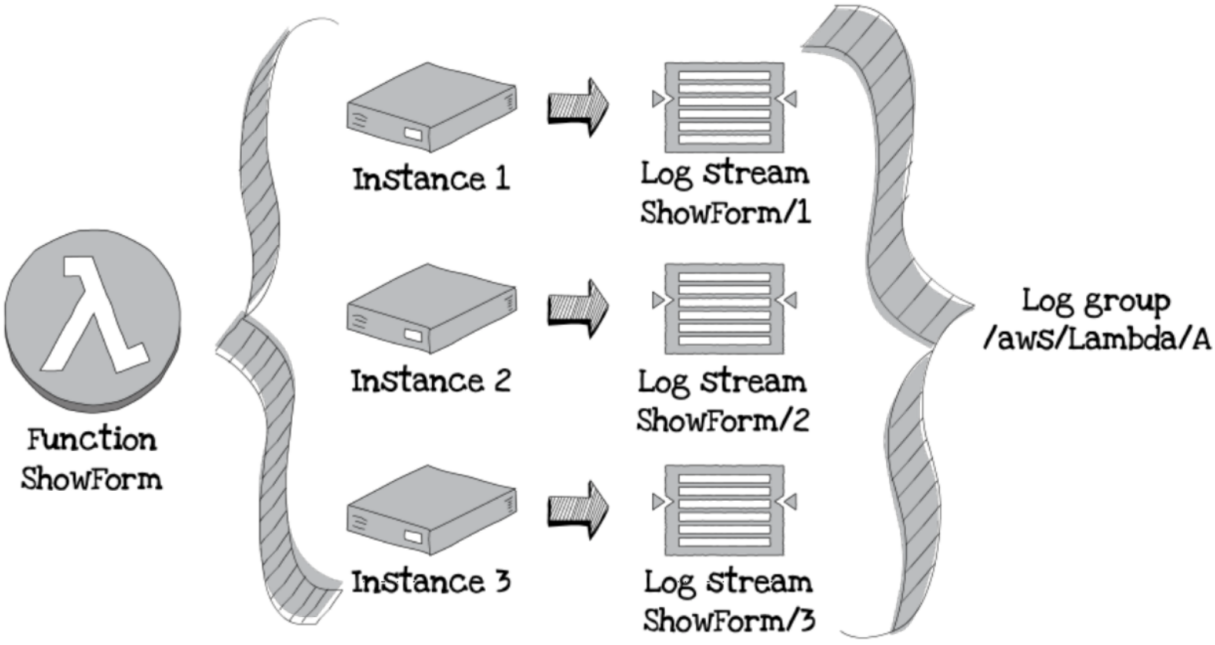
Log groups and log streams

The *Monitoring* tab also has a quick link to inspect CloudWatch logs. Click the *View logs in Cloudwatch* button, and you'll see the CloudWatch log group for your function.

CloudWatch groups logs in two levels of hierarchy:

- log groups
- log streams

Log groups correspond to a logical service. AWS Lambda creates a log group for each function. A single log group can have multiple *log streams*, which typically correspond to a single running process. Lambda creates a log stream for each container instance (each *cold start*). If Lambda reuses the container for subsequent requests, the logs will appear in the same stream. If it creates a new container, the logs will appear in a new stream (refer to the figure below).



All logs from a single Lambda function go to the same log group. Entries from a single running Lambda process go to the same log stream.

Click the most recent log stream link and you'll see the details of the function execution, including the total time it took to run, how much memory it used, and the ID of the request (refer to the figure below). This information is incredibly useful if you start getting errors from an API. You can see if requests are timing out (if so, you need to increase the allowed time) or if they are hitting the memory limit (in which case you might want to increase the container size).

Lambda logs are not instantaneous

It might take a few seconds between a function logging a message and that information appearing in CloudWatch, so don't panic if your logs do not immediately appear. That's the price to pay for working with a highly distributed deployment.

CloudWatch logs show details of a single Lambda function call.

Retrieving logs from the command line

Navigating through web pages just to see the logs isn't really good for a quick development flow. The SAM command-line tools have a convenient shortcut that lets you get the logs quickly. Poke the function web page again so it generates a recent log entry, and then run the following command:

```
sam logs -n HelloWorldFunction --stack-name sam-test-1
```

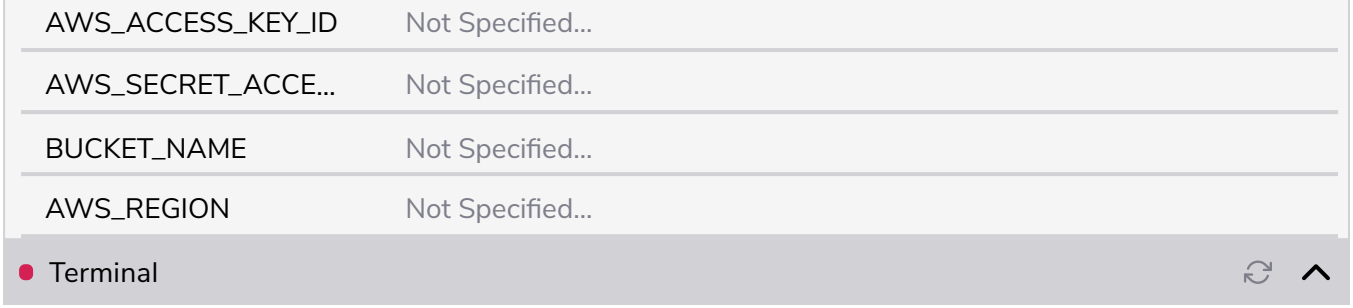
Here is what the arguments mean:

- `-n` (or `--name`) is the name of the function whose logs you want to retrieve
- `--stack-name` is the name of the stack that owns the function

You can either provide the full physical name of the function, (in which case the stack name is not important) or provide the logical name of the function and the stack name. The first way of invoking `sam logs` is useful for retrieving logs from functions created outside CloudFormation, but the second way of invoking is often more convenient for functions created using SAM.

Environment Variables

Key:	Value:
LANG	C.UTF-8
LC_ALL	C.UTF-8



You may see the log output directly in your command window:

```
$ sam logs -n HelloWorldFunction --stack-name sam-test-1
2019/02/10/[$LATEST]85c744cede7f405997aff8198ce0604e 2019-02-10T13:01:44.7
18000 END RequestId: 6b2b4dc3-dc2d-4148-9c47-acb8e7589c33
2019/02/10/[$LATEST]85c744cede7f405997aff8198ce0604e 2019-02-10T13:01:44.7
18000 REPORT RequestId: 6b2b4dc3-dc2d-4148-9c47-acb8e7589c33  Duration: 1
9.64 mBilled Duration: 100 ms    Memory Size: 128 MB Max Memory Used: 46 M
B
```

For more information on these and other `sam logs` options, see the SAM Logs Command Reference page.

> ### SAM usually shows only recent logs
>
> Unless you ask for a specific time segment, `sam logs` shows only messages logged in the previous 10 minutes. To show older messages, specify a starting point with `-s`. You can also restrict the end of the message period with the `-e` option. Provide a relative value such as '`5mins ago`' or a specific time in the format '`YYYY-MM-DD HH:MM:SS`'.

Searching logs

Remote execution logs, especially for busy services, tend to contain a lot of data. If you are looking for a specific entry, you can save time by telling SAM to automatically search logs and display only messages matching a keyword. To do that, use the `--filter` option. For example, the following command will show only the log lines containing the word `ERROR` from the last month:

```
sam logs -n HelloWorldFunction --stack-name sam-test-1 --filter ERROR -s
"1 month ago"
```

Search filters do not have to be simple keywords; they can include logical operators and even deep inspection of JSON structures. For more information

operators and even deep inspection of JSON structures. For more information

on the syntax for filters, check out the Filter and Pattern Syntax page in the CloudWatch user guide.

SAM will retrieve messages from all the log streams associated with the specified function and show the stream identifier in the first column of the results (in the previous example, all the logs are in the same stream: `2019/02/10/[$LATEST]85c744cede7f405997aff8198ce0604e`). To look at only a single stream, either filter the messages based on the stream identifier or use the `aws logs` command instead of `sam logs`.

The `aws logs` command does not make any assumptions about working with CloudFormation stacks or functions but instead lets you access CloudWatch structures directly, so it might be helpful for more complex queries. This command has several tools, including `filter-log-events`, which retrieves remote logs and allows searching for CloudWatch log events by a full stream name or a prefix. When using `aws logs` instead of `sam logs`, you will need to provide a full log group name instead of just a function name. Lambda creates log groups for functions by adding the `/aws/lambda/` prefix to the physical name, so a function called `sam-test-1-HelloWorldFunction-1WILG175MZ3XV` would log events to the group `/aws/lambda/sam-test-1-HelloWorldFunction-1WILG175MZ3XV`.

To see all the options, run the following command:

```
aws logs filter-log-events help
```

In the next lesson, you will learn how to view your logs live. Stay tuned!