Monitoring Memory and Disk Metrics for Amazon EC2 Linux Instances

You can download the [Amazon CloudWatch Monitoring Scripts for Linux](#) from the AWS sample code library.

Amazon Linux AMI

If you are running Amazon Linux AMI, version 2014.03 or later, you'll need to add some additional Perl modules in order for the monitoring scripts to work. Use the following procedures to configure your server.

To install the scripts for the first time

Log on to your Amazon Linux AMI instance.

At a command prompt, install the following package:

```
$ sudo yum install perl-DateTime perl-Sys-Syslog perl-LWP-Protocol-https
```

To download, install, and configure the script

Open a command prompt, move to a folder where you want to store the scripts, and then type the following:

```
curl http://aws-
cloudwatch.s3.amazonaws.com/downloads/CloudWatchMonitoringScripts-1.2.1.zip -
O
unzip CloudWatchMonitoringScripts-1.2.1.zip
rm CloudWatchMonitoringScripts-1.2.1.zip
cd aws-scripts-mon
```

The CloudWatchMonitoringScripts-1.2.1.zip package contains these files:

1. **CloudWatchClient.pm**—Shared Perl module that simplifies calling Amazon CloudWatch from other scripts.

2. **mon-put-instance-data.pl**—Collects system metrics on an Amazon EC2 instance (memory, swap, disk space utilization) and sends them to Amazon CloudWatch.

3. **mon-get-instance-stats.pl**—Queries Amazon CloudWatch and displays the most recent utilization statistics for the EC2 instance on which this script is executed.

4. **awscreds.template**—File template for AWS credentials that stores your access key ID and secret access key.

5. **LICENSE.txt**—Text file containing the Apache 2.0 license.

6. **NOTICE.txt**—copyright notice.

7. If you already have an AWS Identity and Access Management (IAM) role associated with your instance, make sure that it has permissions to perform the following operations:

   - cloudwatch:PutMetricData
   - cloudwatch:GetMetricStatistics
   - cloudwatch:ListMetrics
   - ec2:DescribeTags

   Otherwise, you can create a new IAM role with permissions to perform CloudWatch operations and associate that role when you launch a new instance. For more information, see [Controlling User Access to Your AWS Account](#).

8. Optional: If you aren't using an IAM role, update the `awscreds.template` file that you downloaded earlier. The content of this file should use the following format:

```
AWSAccessKeyId=YourAccessKeyID

AWSSecretKey=YourSecretAccessKey
```

   > **Note**
   >
   > This step is optional if you have already created a file for credentials. You can use an existing file by specifying its location on the command line when you call the scripts. Alternatively, you can set the environment variable `AWS_CREDENTIAL_FILE` to point to the file with your AWS credentials.
   >
   > For instructions on how to access your credentials, see [Creating, Modifying, and Viewing User Security Credentials](#) in *IAM User Guide*.

Using the Scripts

mon-put-instance-data.pl

This script collects memory, swap, and disk space utilization data on the current system. It then makes a remote call to Amazon CloudWatch to report the collected data as custom metrics.

Options

Name	Description
--mem-util	Collects and sends the MemoryUtilization metrics in percentages. This option reports only memory allocated by applications and the operating system, and excludes memory in cache and buffers.
--mem-used	Collects and sends the MemoryUsed metrics, reported in megabytes. This option reports only memory allocated by applications and the operating system, and excludes memory in cache and buffers.
--mem-avail	Collects and sends the MemoryAvailable metrics, reported in megabytes. This option reports memory available for use by applications and the operating system.
--swap-util	Collects and sends SwapUtilization metrics, reported in percentages.
--swap-used	Collects and sends SwapUsed metrics, reported in megabytes.
--disk-path=PATH	Selects the disk on which to report. PATH can specify a mount point or any file located on a mount point for the filesystem that needs to be reported. For selecting multiple disks, specify a --disk-path=PATH for each one of them. To select a disk for the filesystems mounted on / and /home, use the following parameters:

Name	Description
	`--disk-path=/ --disk-path=/home`
--disk-space-util	Collects and sends the DiskSpaceUtilization metric for the selected disks. The metric is reported in percentages.
--disk-space-used	Collects and sends the DiskSpaceUsed metric for the selected disks. The metric is reported by default in gigabytes. Due to reserved disk space in Linux operating systems, disk space used and disk space available might not accurately add up to the amount of total disk space.
--disk-space-avail	Collects and sends the DiskSpaceAvailable metric for the selected disks. The metric is reported in gigabytes. Due to reserved disk space in the Linux operating systems, disk space used and disk space available might not accurately add up to the amount of total disk space.
--memory-units=UNITS	Specifies units in which to report memory usage. If not specified, memory is reported in megabytes. UNITS may be one of the following: bytes, kilobytes, megabytes, gigabytes.
--disk-space-units=UNITS	Specifies units in which to report disk space usage. If not specified, disk space is reported in gigabytes. UNITS may be one of the following: bytes, kilobytes, megabytes, gigabytes.
--aws-credential-file=PATH	Provides the location of the file containing AWS credentials. This parameter cannot be used with the `--aws-access-key-id` and `--aws-secret-key` parameters.
--aws-access-key-id=VALUE	Specifies the AWS access key ID to use to identify the caller. Must be used together with the `--aws-secret-key` option. Do not use this option with the `--aws-credential-file` parameter.
--aws-secret-key=VALUE	Specifies the AWS secret access key to use to sign the request to CloudWatch. Must be used together with the `--aws-access-`

Name	Description
	`key-id` option. Do not use this option with `--aws-credential-file` parameter.
`--aws-iam-role=VALUE`	Specifies the IAM role used to provide AWS credentials. The value `=VALUE` is required. If no credentials are specified, the default IAM role associated with the EC2 instance is applied. Only one IAM role can be used. If no IAM roles are found, or if more than one IAM role is found, the script will return an error. Do not use this option with the `--aws-credential-file`, `--aws-access-key-id`, or `--aws-secret-key` parameters.
`--aggregated[=only]`	Adds aggregated metrics for instance type, AMI ID, and overall for the region. The value `=only` is optional; if specified, the script reports only aggregated metrics.
`--auto-scaling[=only]`	Adds aggregated metrics for the Auto Scaling group. The value `=only` is optional; if specified, the script reports only Auto Scaling metrics. The [IAM policy](#) associated with the IAM account or role using the scripts need to have permissions to call the EC2 action[DescribeTags](#).
`--verify`	Performs a test run of the script that collects the metrics, prepares a complete HTTP request, but does not actually call CloudWatch to report the data. This option also checks that credentials are provided. When run in verbose mode, this option outputs the metrics that will be sent to CloudWatch.
`--from-cron`	Use this option when calling the script from cron. When this option is used, all diagnostic output is suppressed, but error messages are sent to the local system log of the user account.
`--verbose`	Displays detailed information about what the script is doing.
`--help`	Displays usage information.
`--version`	Displays the version number of the script.

The following examples assume that you have already updated the `awscreds.conf` file with valid AWS credentials. If you are not using the `awscreds.conf` file, provide credentials using the `--aws-access-key-id`and `--aws-secret-key` arguments.

To perform a simple test run without posting data to CloudWatch

Run the following command:

```
./mon-put-instance-data.pl --mem-util --verify --verbose
```

To collect all available memory metrics and send them to CloudWatch

Run the following command:

```
./mon-put-instance-data.pl --mem-util --mem-used --mem-avail
```

To set a cron schedule for metrics reported to CloudWatch

Start editing the crontab using the following command:

```
crontab -e
```

Add the following command to report memory and disk space utilization to CloudWatch every five minutes:

```
*/5 * * * * ~/aws-scripts-mon/mon-put-instance-data.pl --mem-util --disk-space-util --disk-path=/ --from-cron
```

If the script encounters an error, the script will write the error message in the system log.

To collect aggregated metrics for an Auto Scaling group and send them to Amazon CloudWatch without reporting individual instance metrics

Run the following command:

```
./mon-put-instance-data.pl --mem-util --mem-used --mem-avail --auto-
scaling=only
```

To collect aggregated metrics for instance type, AMI ID and region, and send them to Amazon CloudWatch without reporting individual instance metrics

Run the following command:

```
./mon-put-instance-data.pl --mem-util --mem-used --mem-avail --
aggregated=only
```

mon-get-instance-stats.pl

This script queries CloudWatch for statistics on memory, swap, and disk space metrics within the time interval provided using the number of most recent hours. This data is provided for the Amazon EC2 instance on which this script is executed.

Options

Name	Description
`--recent-hours=N`	Specifies the number of recent hours to report on, as represented by `N` where N is an integer.
`--aws-credential-file=PATH`	Provides the location of the file containing AWS credentials.
`--aws-access-key-id=VALUE`	Specifies the AWS access key ID to use to identify the caller. Must be used together with the `--aws-secret-key` option. Do not use this option with the `--aws-credential-file` option.
`--aws-secret-key=VALUE`	Specifies the AWS secret access key to use to sign the request to CloudWatch. Must be used together with the `--aws-access-key-id` option. Do not use this option with `--aws-credential-file` option.
`--aws-iam-role=VALUE`	Specifies the IAM role used to provide AWS credentials. The value `=VALUE` is required. If no credentials are specified, the default IAM role associated with the EC2 instance is applied. Only one IAM role can be used. If no IAM roles are found, or if more than one IAM

Name	Description
	role is found, the script will return an error. Do not use this option with the `--aws-credential-file`, `--aws-access-key-id`, or `--aws-secret-key` parameters.
`--verify`	Performs a test run of the script that collects the metrics, prepares a complete HTTP request, but does not actually call CloudWatch to report the data. This option also checks that credentials are provided. When run in verbose mode, this option outputs the metrics that will be sent to CloudWatch.
`--verbose`	Displays detailed information about what the script is doing.
`--help`	Displays usage information.
`--version`	Displays the version number of the script.

Examples

To get utilization statistics for the last 12 hours

Run the following command:

```
./mon-get-instance-stats.pl --recent-hours=12
```

The returned response will be similar to the following example output:

```
Instance metric statistics for the last 12 hours.

CPU Utilization
Average: 1.06%, Minimum: 0.00%, Maximum: 15.22%

Memory Utilization
Average: 6.84%, Minimum: 6.82%, Maximum: 6.89%

Swap Utilization
Average: N/A, Minimum: N/A, Maximum: N/A

Disk Space Utilization on /dev/xvda1 mounted as /
Average: 9.69%, Minimum: 9.69%, Maximum: 9.69%
```

Viewing Your Custom Metrics in the AWS Management Console

If you successfully call the `mon-put-instance-data.pl` script, you can use the AWS Management Console to view your posted custom metrics in the Amazon CloudWatch console.

To view custom metrics

Execute `mon-put-instance-data.pl`, as described earlier.

Sign in to the AWS Management Console and open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.

Click **View Metrics**.In the **Viewing** list, your custom metrics posted by the script are displayed with the prefix System/Linux.