

ElastiCache Stresser – Phase 2: CloudWatch Alarms Hands-On Guide

This guide provides a practical walkthrough to configure and validate AWS CloudWatch alarms for ElastiCache (Redis) while running load tests using CacheStressTester. It complements the README_Phase2_CloudWatchAlarms.md documentation.

1. Prerequisites

- An AWS account with CloudWatch and ElastiCache access.
- IAM permissions: cloudwatch:GetMetricData, cloudwatch:PutMetricAlarm, elasticache:DescribeCacheClusters.
- AWS CLI configured with access keys (`aws configure`).
- A running Redis cluster in ElastiCache.

2. Viewing Metrics in CloudWatch

1. Open **CloudWatch → Metrics → All metrics → ElastiCache**. 2. Choose **By CacheClusterId** or **By ReplicationGroupId**. 3. Observe key metrics: CPUUtilization, FreeableMemory, CurrConnections, CmdsProcessed, Evictions, CacheHits, CacheMisses.

3. Running the Stresser

Run CacheStressTester to simulate high load: `CacheStressTester.exe --Threads 500 --RequestsPerThread 20000 --Environment AWS` Within minutes, CloudWatch metrics will show increased CPU and connection usage.

4. Creating an Alarm (AWS Console)

1. Go to **CloudWatch → Alarms → Create alarm**. 2. Select metric: `AWS/ElastiCache`, choose your cluster. 3. Set condition: `CPUUtilization ≥ 75%` for `1 × 5` minutes. 4. Add an **SNS topic** for notifications (e.g., `ElastiCacheAlerts`) and subscribe your email. 5. Save and confirm the email subscription.

5. Creating the Same Alarm via AWS CLI

Example command: `aws cloudwatch put-metric-alarm --alarm-name "HighCPU-RedisCluster" --metric-name CPUUtilization --namespace AWS/ElastiCache --statistic Average --period 300 --threshold 75 --comparison-operator GreaterThanThreshold --dimensions Name=CacheClusterId,Value=my-redis-cluster --evaluation-periods 1 --alarm-actions arn:aws:sns:us-east-1:123456789012:ElastiCacheAlerts`

6. Validating the Alarm

- Re-run the Stresser.
- Watch the alarm transition: **OK → ALARM → OK** as CPU load increases and drops.
- Check your email for the SNS notification.

7. Fine-Tuning Thresholds

| Metric | Initial Threshold | Adjust To |
|----------------|-------------------|-----------|
| CPUUtilization | 75% | 80–85% |

| | | |
|-----------------|------------|------------------------|
| FreeableMemory | 100 MB | 50 MB |
| CurrConnections | 80% of max | Adjust per client load |

8. Monitoring Dashboards

Create a CloudWatch Dashboard to visualize: • CPUUtilization, FreeableMemory, CurrConnections, Evictions. • Alarm states in real time. • Helps correlate load tests with alarm triggers.

9. What You Don't Need Yet

You do ****not**** need CloudWatch Logs, custom exporters, or Lambda automation at this stage. All ElastiCache metrics are natively available in CloudWatch.

References

• AWS ElastiCache Metrics: <https://docs.aws.amazon.com/AmazonElastiCache/latest/red-ug/CacheMetrics.WhichShouldIMonitor.html> • CloudWatch Alarms Overview: <https://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/AlarmThatSendsEmail.html> • AWS CLI Alarm Command: <https://docs.aws.amazon.com/cli/latest/reference/cloudwatch/put-metric-alarm.html>