🚨 AWS CPU Utilization Alert Setup Guide

Complete Step-by-Step Tutorial with CloudWatch Alarms

📌 **What You'll Learn:** How to set up automated CPU monitoring alerts in AWS using CloudWatch to get notified when your EC2 instances are under stress.

🎯 Overview: How AWS CPU Alerts Work

Alert Flow Architecture

☁️ EC2 Instance (Running Your Application)

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📊 CloudWatch Metrics (Collects CPU Data)

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⚠️ CloudWatch Alarm (Monitors Threshold)

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✉️ SNS Topic (Notification Service)

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👤 You Get Email/SMS Alert!

📋 Prerequisites

- ✅ Active AWS account
- 💻 At least one EC2 instance running
- 🔐 IAM permissions for CloudWatch and SNS
- ✉️ Valid email address for notifications

🛠️ Step-by-Step Setup Process

1

Access AWS CloudWatch

Navigation:

- Log into AWS Management Console

- Search for "CloudWatch" in the services search bar
- Click on CloudWatch to open the dashboard

2

Create SNS Topic (Notification Channel)

Why? SNS (Simple Notification Service) sends you alerts when the alarm triggers.

- In CloudWatch, go to left sidebar → **Topics** (under Application Integration)
- Or search for "SNS" and open Simple Notification Service
- Click **"Create topic"**
- Select **Type:** Standard
- **Name:** CPU-Alert-Topic (or your preferred name)
- Click **"Create topic"**

3

Create Subscription (Where to Send Alerts)

After creating the topic:

- Click **"Create subscription"**
- **Protocol:** Select "Email" or "SMS"
- **Endpoint:** Enter your email address or phone number
- Click **"Create subscription"**
- ⚠️ **Important:** Check your email and click the confirmation link!

⚠️ **Don't Skip This!** You must confirm your email subscription, or you won't receive any alerts. Check your spam folder if you don't see the confirmation email.

4

Navigate to CloudWatch Alarms

- Go back to CloudWatch dashboard
- Click **"Alarms"** in the left sidebar
- Click **"Create alarm"** button

5

Select Metric

Choose what to monitor:

- Click **"Select metric"**
- Choose **"EC2"** → **"Per-Instance Metrics"**
- Find your EC2 instance in the list
- Select the **"CPUUtilization"** metric checkbox
- Click **"Select metric"**

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Configure Metric Conditions

Set your alert threshold:

- **Statistic:** Average
- **Period:** 5 minutes (how often to check)
- **Threshold type:** Static
- **Condition:** Greater than
- **Threshold value:** 40 for Alert 1, 50 for Alert 2

📧 **Setting Up Multiple Email Alerts:**

Alert 1 - Early Warning (40% CPU):

- Create first alarm with threshold: 40
- **Alarm name:** CPU-Alert-1-Early-Warning-40percent
- **Action:** Send email to your SNS topic

Alert 2 - Warning Level (50% CPU):

- Repeat the alarm creation process (Steps 4-9)
- Use threshold: 50
- **Alarm name:** CPU-Alert-2-Warning-50percent
- **Action:** Send email to the same or different SNS topic

This gives you two levels of notification so you can monitor CPU trends proactively!

💡 **Pro Tip:** With 40% and 50% alerts, you get early warning before CPU becomes critical. This is perfect for capacity planning and preventing performance issues before they impact users.

7

Configure Actions

Tell AWS what to do when threshold is breached:

- **Alarm state trigger:** In alarm
- **Send notification to:** Select your SNS topic (CPU-Alert-Topic)
- Optionally add actions for "OK" state (when CPU returns to normal)
- Click **"Next"**

8

Name and Describe Your Alarm

For Alert 1 (40%):

- **Alarm name:** CPU-Alert-1-Early-Warning-40percent-[InstanceName]
- **Description:** "Early warning: CPU exceeds 40% for 5 minutes"

For Alert 2 (50%):

- **Alarm name:** CPU-Alert-2-Warning-50percent-[InstanceName]
- **Description:** "Warning: CPU exceeds 50% for 5 minutes"

 Click **"Next"**

9

Review and Create

- Review all your settings
- Check the preview graph
- Click **"Create alarm"**
- ✅ Done! Your alarm is now active

🧪 **Testing Your Alarm**

🔬 **Want to test if it works?**

You can manually set the alarm state:

- Go to your alarm in CloudWatch
- Select it and click **"Actions"** → **"Set alarm state"**
- Choose "In alarm"
- You should receive a test notification!

📊 **Understanding Alarm States**

✅ OK - CPU is normal (below threshold)

⚠️ INSUFFICIENT DATA - Not enough data yet

🚨 ALARM - CPU exceeded threshold!

🎛️ **Advanced Configuration Options**

Multiple Threshold Alerts - Recommended Setup

Create separate alarms for different severity levels:

- 📧 **Alert 1 (Early Warning):** 40% CPU → Email notification to monitor increasing load
- ⚠️ **Alert 2 (Warning):** 50% CPU → Email notification for elevated usage
- 🚨 **Alert 3 (Critical - Optional):** 80%+ CPU → Email + SMS + Consider auto-scaling

💡 **Why Multiple Thresholds?**

- **40% Alert:** Gives you early visibility into resource trends
- **50% Alert:** Time to investigate and plan capacity
- **80%+ Alert:** Immediate action needed

Additional Metrics to Monitor

- 💾 **Memory Utilization** (requires CloudWatch agent)
- 💿 **Disk I/O**
- 🌐 **Network Traffic**
- ⚡ **Status Check Failed**

🔧 Troubleshooting Common Issues

❌ Not receiving alerts?

- Verify email subscription is confirmed (check spam folder)
- Check SNS topic is correctly associated with alarm
- Ensure IAM permissions allow CloudWatch to publish to SNS
- Verify the EC2 instance is actually running

❌ False alarms?

- Adjust the period (try 10 or 15 minutes instead of 5)
- Increase threshold percentage
- Use "Datapoints to alarm" to require multiple breaches

💰 Cost Considerations

💵 Pricing (as of 2025):

- First 10 CloudWatch alarms: **FREE**
- Additional alarms: ~$0.10 per alarm per month
- SNS notifications: First 1,000 emails free, then $2 per 100,000
- Standard EC2 metrics: FREE (collected automatically every 5 minutes)

💡 **Bottom line:** Very affordable for most use cases!

📚 Further References and Learning Resources

Official AWS Documentation

📖 Creating CloudWatch Alarms - AWS Official Guide 📊 Understanding CloudWatch Metrics 📨 Amazon SNS Documentation

Video Tutorials

📺 YouTube: AWS CloudWatch CPU Alert Tutorials

Best Practices & Advanced Topics

💡 AWS CloudWatch Blog - Latest Updates & Tips ⭐ Recommended Alarms for AWS Services

Community Resources

💬 Stack Overflow - CloudWatch Questions 🤝 AWS re:Post - Community Forum

🎓 **Next Steps:**

- Set up alarms for all critical EC2 instances
- Create a runbook for responding to high CPU alerts
- Explore CloudWatch Dashboards for visualization
- Learn about AWS Auto Scaling to automatically handle high load
- Install CloudWatch agent for detailed memory and disk metrics

✅ **Quick Checklist**

- ☑️ SNS Topic created
- ☑️ Email subscription confirmed
- ☑️ CloudWatch Alert 1 configured (40% threshold)
- ☑️ CloudWatch Alert 2 configured (50% threshold)
- ☑️ Both alarms tested and working
- ☑️ Team notified about alert process