Documentation: Automated EBS Volume Extension with New Relic, PagerDuty, and Rundeck

Overview

This document outlines the automated process for extending EBS root volumes using AWS Systems Manager's `AWS-ExtendEbsVolume` automation, triggered by alerts from New Relic, managed via PagerDuty, and executed through Rundeck. This setup allows for proactive and hands-free scaling of EBS volumes, preventing potential capacity-related issues and ensuring application stability.

Architecture Diagram

```
[New Relic] --> [PagerDuty] --> [Rundeck] --> [AWS Systems Manager]
--> [EC2 Instance]
```

1. Monitoring with New Relic

- New Relic monitors the EC2 instance's root volume utilization.
- When the disk utilization reaches a predefined threshold (e.g., 80%), New Relic triggers an alert.

2. Alerting with PagerDuty

- The New Relic alert is sent to PagerDuty.
- PagerDuty acts as the central incident management platform, acknowledging the alert and triggering the necessary workflow.

3. Execution with Rundeck

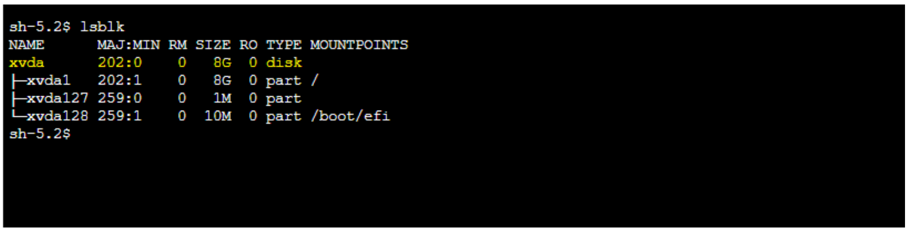
- PagerDuty is configured to trigger a Rundeck job upon receiving the New Relic alert.
- Rundeck acts as the automation execution platform, orchestrating the EBS volume extension process.

4. AWS Systems Manager Automation

- The Rundeck job initiates the `AWS-ExtendEbsVolume` automation within AWS Systems Manager.
- AWS Systems Manager Automation executes the automated process for EBS volume extension by interacting with EC2 instances.

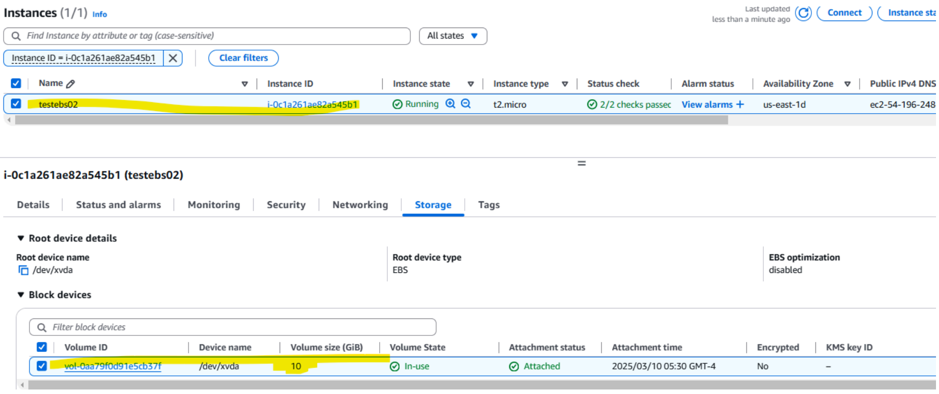
Step-by-Step Process with Images

1. Before Expansion:
    - The root volume is running at near full capacity.(Assumption here)
2. Before Expansion
   As shown in the image, before the expansion, the volume xvda is of 8GB size
   Details: The `lsblk` command run on the EC2 instance shows that the root volume (xvda) is at 8GB.



```
sh-5.2$ lsblk
NAME      MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS
xvda      202:0    0   8G  0 disk
├─xvda1   202:1    0   8G  0 part /
├─xvda127 259:0    0   1M  0 part
└─xvda128 259:1    0  10M  0 part /boot/efi
sh-5.2$
```

3. SSM Document Execution:
    - The `AWS-ExtendEbsVolume` document is executed via the Rundeck.
    - SSM will take care of extending the volume
4. Details:
   The automation workflow identifies the root volume, creates a snapshot (optional, for backup), extends the volume size on the AWS layer, and then extends the filesystem on the OS layer.
5. Volume Status After SSM Execution:
    - Console View



Instances (1/1) Info
Last updated less than a minute ago
Connect
Instance sta
Find Instance by attribute or tag (case-sensitive)
All states
Instance ID = i-0c1a261ae82a545b1
Clear filters

☑	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
☑	testebs02	i-0c1a261ae82a545b1	✓ Running	t2.micro	✓ 2/2 checks passec	View alarms +	us-east-1d	ec2-54-196-248

i-0c1a261ae82a545b1 (testebs02)

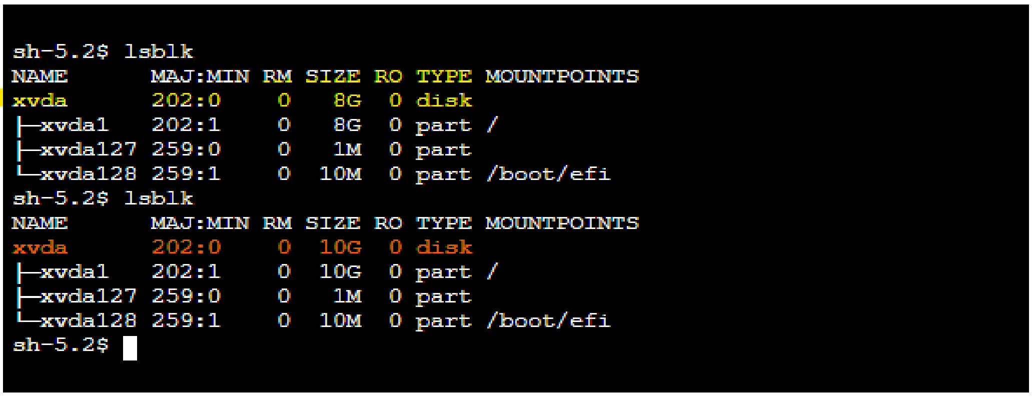
▼ Root device details

Root device name: /dev/xvda
Root device type: EBS
EBS optimization: disabled

▼ Block devices

☑	Volume ID	Device name	Volume size (GiB)	Volume State	Attachment status	Attachment time	Encrypted	KMS key ID
☑	vol-0aa79f0d91e5cb37f	/dev/xvda	10	✓ In-use	✓ Attached	2025/03/10 05:30 GMT-4	No	–

    - Details:
      After the console execution is completed, the volume status can be checked in the console
    - OS Layer (Post-Execution)
    - After expansion
      The volume has been extended from 8GB to 10GB
    - Details:
      A subsequent `lsblk` command shows that the volume has been successfully extended to 10GB.



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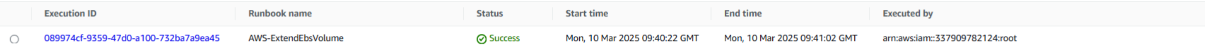
├─xvda127 259:0    0   1M  0 part
└─xvda128 259:1    0  10M  0 part /boot/efi
sh-5.2$
```

6. Job Output:



	Execution ID	Runbook name	Status	Start time	End time	Executed by
○	089974cf-9359-47d0-a100-732ba7a9ea45	AWS-ExtendEbsVolume	✓ Success	Mon, 10 Mar 2025 09:40:22 GMT	Mon, 10 Mar 2025 09:41:02 GMT	arn:aws:iam::337909782124:root

Benefits

- Automated Remediation: Automatically extends EBS volumes when utilization reaches a critical level, reducing manual intervention.
- Proactive Issue Resolution: Prevents potential application downtime due to disk space exhaustion.
- Improved Efficiency: Streamlines the EBS volume extension process, saving time and resources.
- Integration with Existing Tooling: Seamlessly integrates with New Relic, PagerDuty, and Rundeck, leveraging existing monitoring and automation infrastructure.

Conclusion

This automated solution offers a robust and efficient way to manage EBS volume capacity, ensuring the stability and performance of critical applications.