

# Cloud Monitoring Section

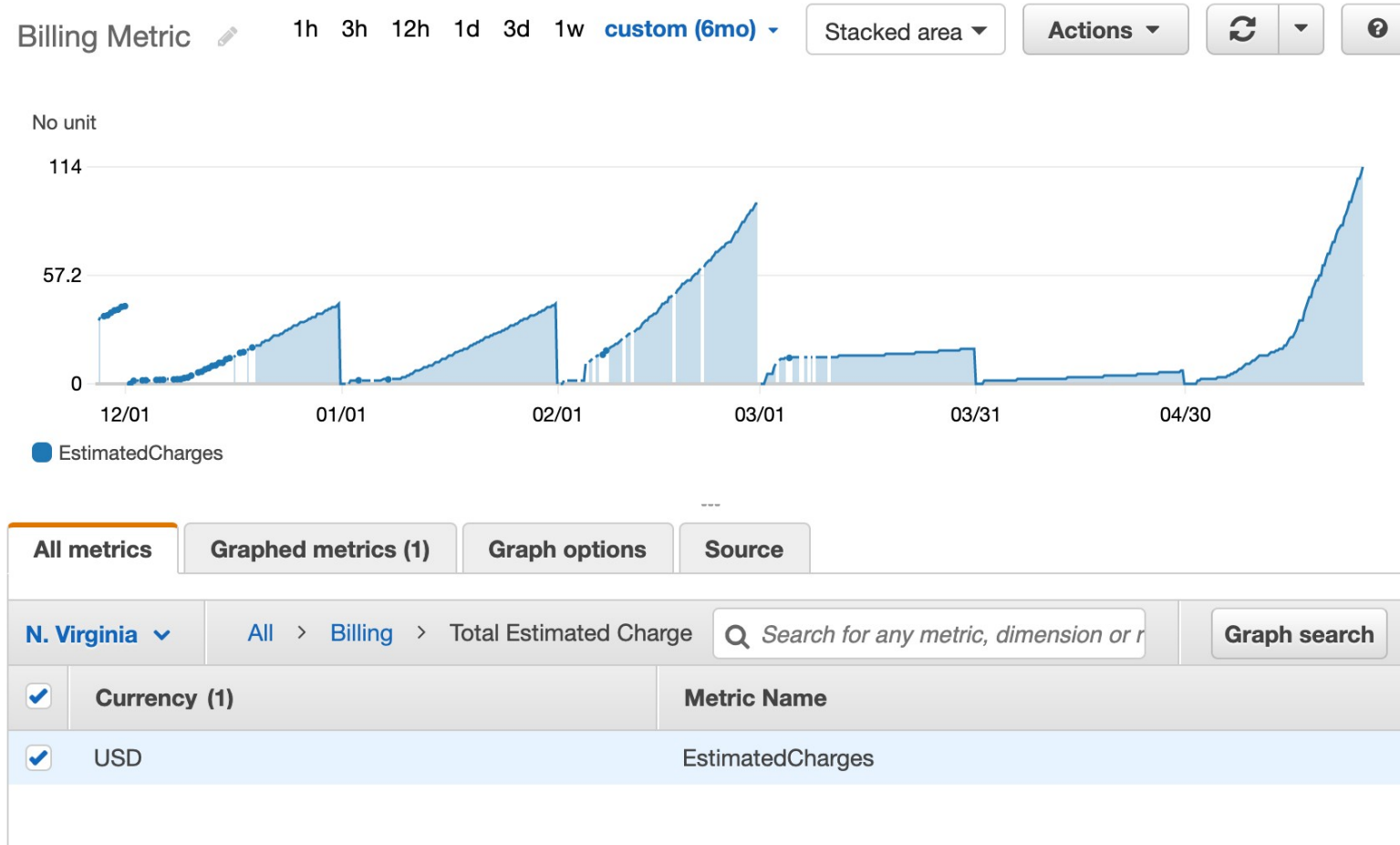
# Amazon CloudWatch Metrics



Amazon CloudWatch monitors your Amazon Web Services (AWS) resources and the applications you run on AWS in real time

- CloudWatch provides metrics for every services in AWS
- Metric is a variable to monitor (CPU Utilization, NetworkIn...)
- Metrics have timestamps
- Can create CloudWatch dashboards of metrics

# Example: CloudWatch Billing metric (us-east-1)



# Metrics

Metrics are data about the performance of your systems

- EC2 instances: CPU Utilization, Status Checks, Network (not RAM)
  - Default metrics every 5 minutes
  - Option for Detailed Monitoring (\$\$\$): metrics every 1 minute
- EBS volumes: Disk Read/Writes
- S3 buckets: BucketSizeBytes, NumberOfObjects, AllRequests
- Billing: Total Estimated Charge (only in us-east-1)
- Service Limits: how much you've been using a service API
- Custom metrics: push your own metrics

# Amazon CloudWatch Alarms



- Alarms are used to trigger notifications for any metric
- Alarms actions...
  - Auto Scaling: increase or decrease EC2 instances “desired” count
  - EC2 Actions: stop, terminate, reboot or recover an EC2 instance
  - SNS notifications: send a notification into an SNS topic
- Various options (sampling, %, max, min, etc...)
- Can choose the period on which to evaluate an alarm
- Example: create a billing alarm on the CloudWatch Billing metric
- Alarm States: OK, INSUFFICIENT\_DATA, ALARM

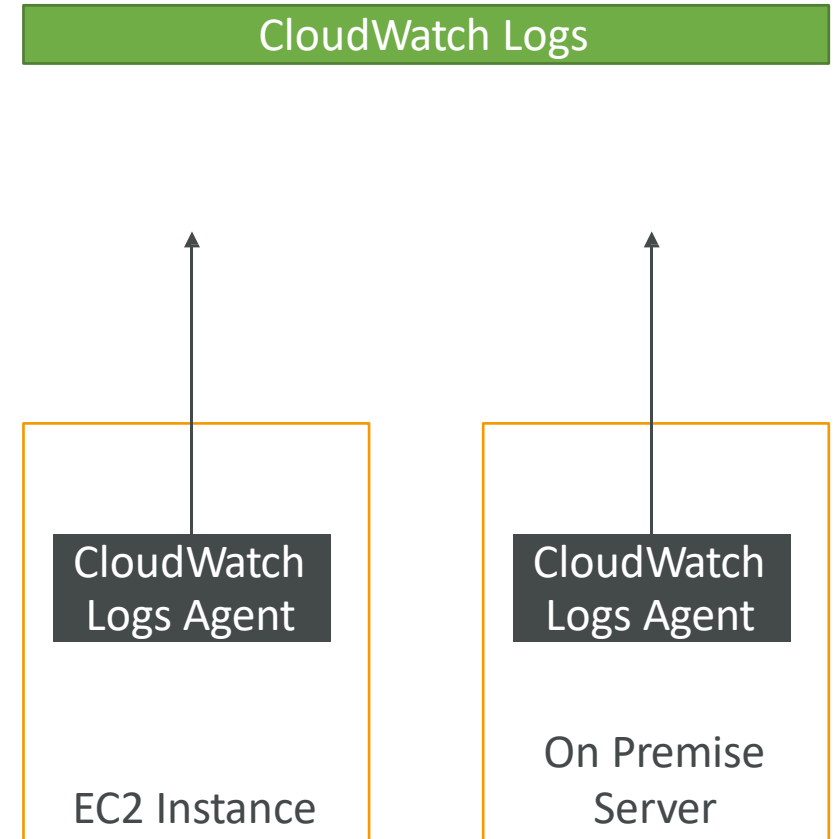
# Amazon CloudWatch Logs



- CloudWatch Logs can collect log from:
  - Elastic Beanstalk: collection of logs from application
  - ECS: collection from containers
  - AWS Lambda: collection from function logs
  - CloudTrail based on filter
  - CloudWatch log agents: on EC2 machines or on-premises servers
  - Route53: Log DNS queries
- Enables real-time monitoring of logs
- Adjustable CloudWatch Logs retention

# CloudWatch Logs for EC2

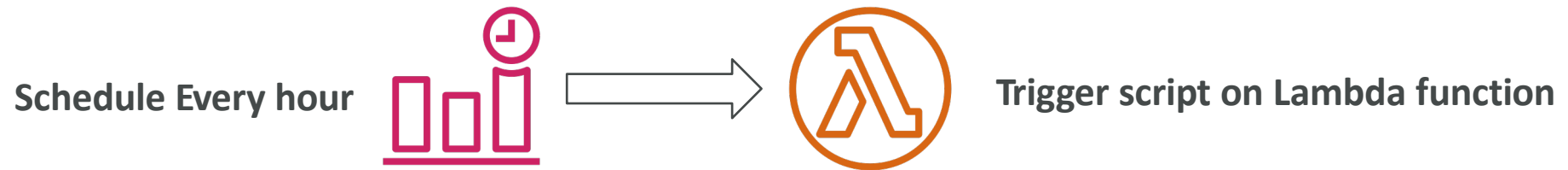
- By default, no logs from your EC2 instance will go to CloudWatch
- You need to run a CloudWatch agent on EC2 to push the log files you want
- Make sure IAM permissions are correct
- The CloudWatch log agent can be setup on-premises too



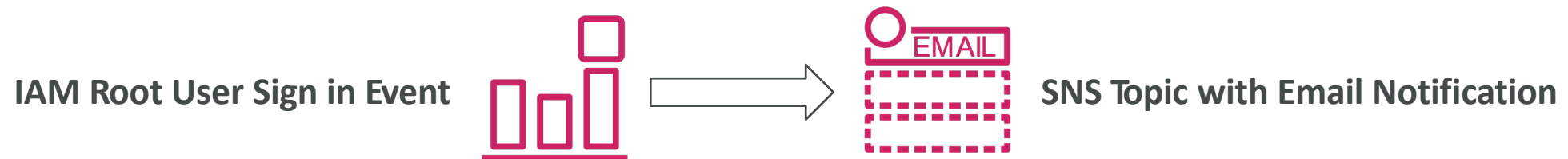
# Amazon EventBridge (formerly CloudWatch Events)



- Schedule: Cron jobs (scheduled scripts)



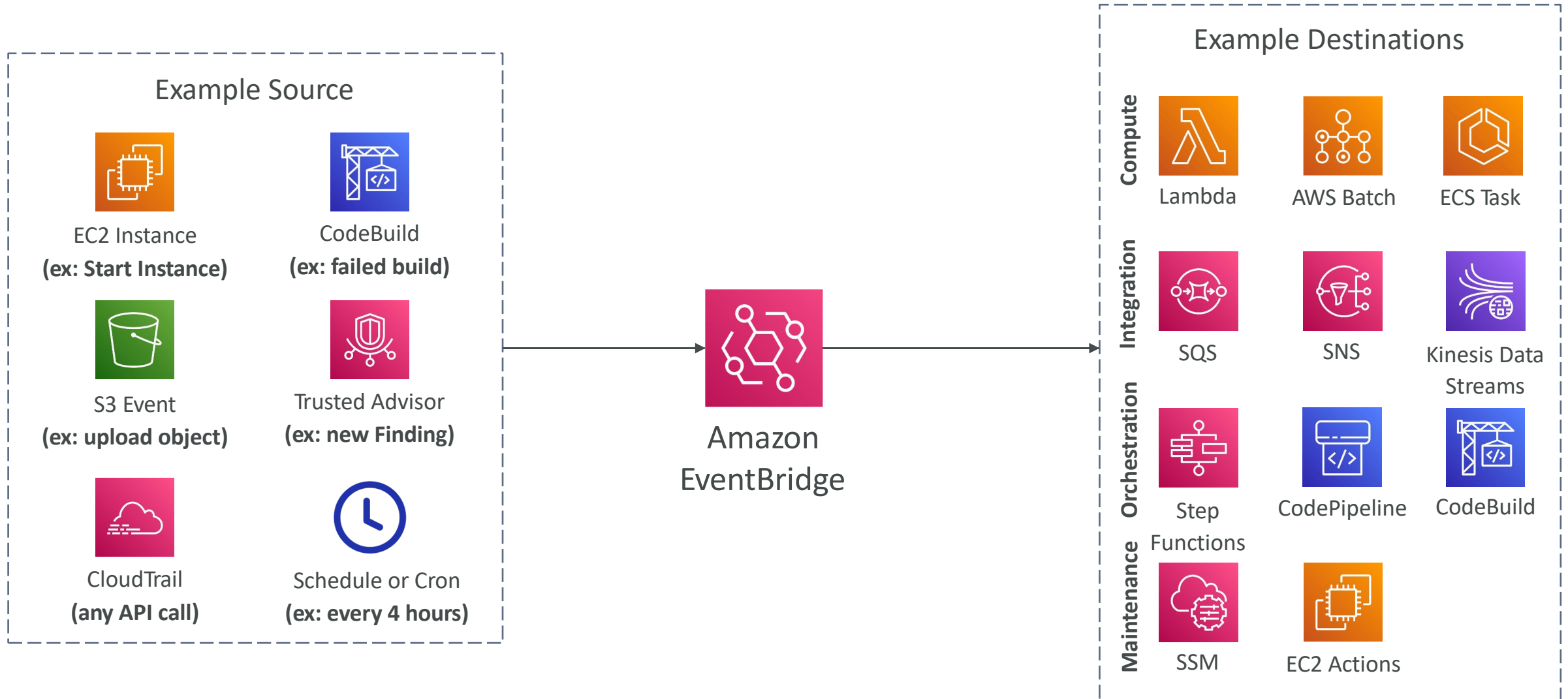
- Event Pattern: Event rules to react to a service doing something



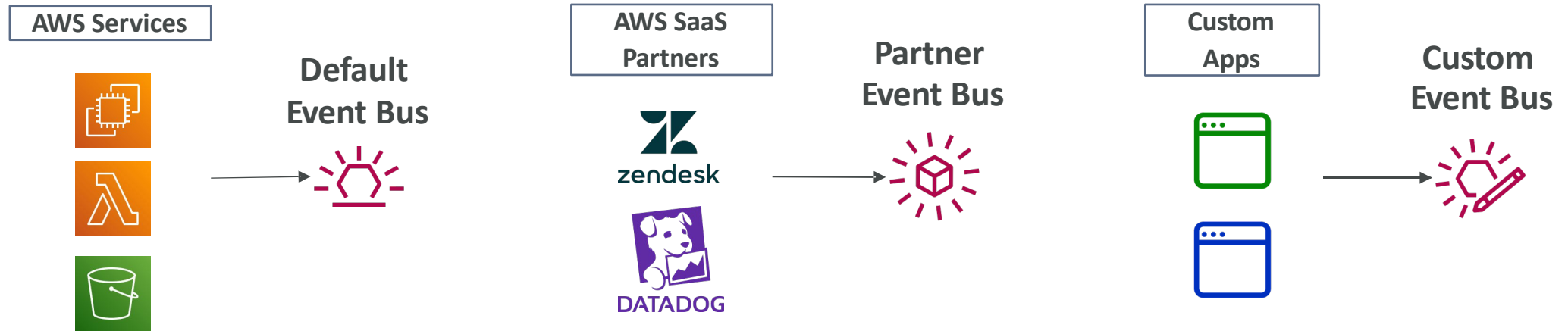
- Trigger Lambda functions, send SQS/SNS messages...



# Amazon EventBridge Rules



# Amazon EventBridge

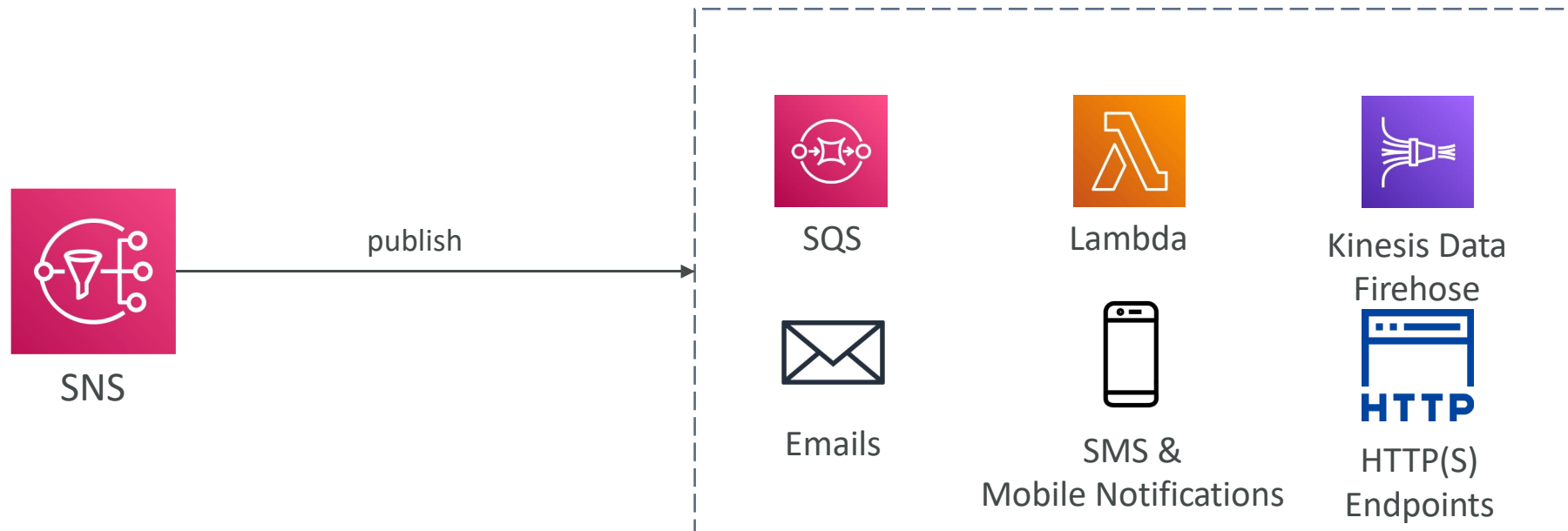


- Schema Registry: model event schema
- You can archive events (all/filter) sent to an event bus (indefinitely or set period)
- Ability to replay archived events

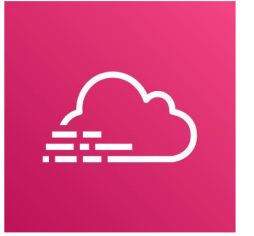
# Amazon SNS



- Amazon Simple Notification Service is a notification service provided as part of Amazon Web Service.
- It provides a low-cost infrastructure for the mass delivery of messages
- Each subscriber to the topic will get all the messages
- Up to 12,500,000 subscriptions per topic, 100,000 topics limit



# AWS CloudTrail

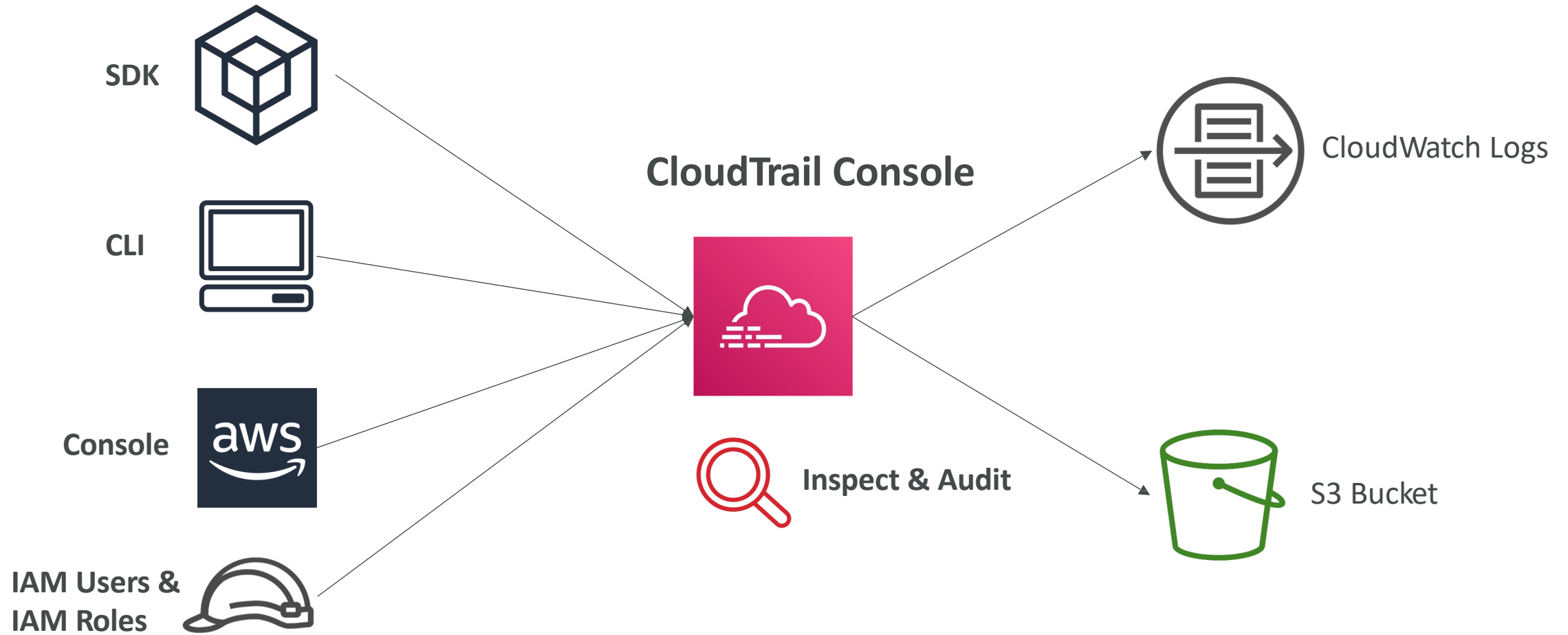


- Provides governance, compliance and audit for your AWS Account
- Actions taken by a user, role, or an AWS service are recorded as events in CloudTrail.
- CloudTrail is enabled by default!
- Get an history of events / API calls made within your AWS Account by:
  - Console
  - SDK
  - CLI
  - AWS Services
- Can put logs from CloudTrail into CloudWatch Logs or S3
- A trail can be applied to All Regions (default) or a single Region.
- If a resource is deleted in AWS, investigate CloudTrail first!

# CloudTrail Events

- **Management events:** provide information about management operations that are performed on resources in your AWS account.
- **Data events:** provide information about the resource operations performed on or in a resource.
- **CloudTrail Insights:** events capture unusual API call rate or error rate activity in your AWS account.

# CloudTrail Diagram



# Monitoring Summary

- CloudWatch:
  - Metrics: monitor the performance of AWS services and billing metrics
  - Alarms: automate notification, perform EC2 action, notify to SNS based on metric
  - Logs: collect log files from EC2 instances, servers, Lambda functions...
  - Events (or EventBridge): react to events in AWS, or trigger a rule on a schedule
- CloudTrail: audit API calls made within your AWS account
- CloudTrail Insights: automated analysis of your CloudTrail Events