AWS-4

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AWS Monitoring
CloudWatch

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Why Monitoring is Important

- We know how to deploy applications
  - Safely
  - Automatically
  - Using Infrastructure as Code
  - Leveraging the best AWS components!
- Our applications are deployed, and our users don't care how we did it…
- Our users only care that the application is working!
  - Application latency: will it increase over time?
  - Application outages: customer experience should not be degraded
  - Users contacting the IT department or complaining is not a good outcome
  - Troubleshooting and remediation
- Internal monitoring:
  - Can we prevent issues before they happen?
  - Performance and Cost
  - Trends (scaling patterns)
  - Learning and Improvement

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Monitoring in AWS

- AWS CloudWatch:
  - Metrics: Collect and track key metrics
  - Logs: Collect, monitor, analyze and store log files
  - Events: Send notifications when certain events happen in your AWS
  - Alarms: React in real-time to metrics / events

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AWS CloudWatch Metrics

- CloudWatch provides metrics for *every* services in AWS
- Metric is a variable to monitor (CPUUtilization, NetworkIn…)
- Dimension is an attribute of a metric (instance id, environment, etc…).
- Up to 10 dimensions per metric
- Metrics have timestamps
- Can create CloudWatch dashboards of metrics

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AWS CloudWatch EC2 Detailed monitoring

- EC2 instance metrics have metrics "every 5 minutes"
- With detailed monitoring (for a cost), you get data "every 1 minute"
- Use detailed monitoring if you want to more prompt scale your ASG!

- The AWS Free Tier allows us to have 10 detailed monitoring metrics

- Note: EC2 Memory usage is by default not pushed (must be pushed from inside the instance as a custom metric)

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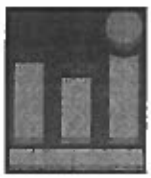
AWS CloudWatch Alarms



- Alarms are used to trigger notifications for any metric
- Alarms can go to Auto Scaling, EC2 Actions, SNS notifications
- Various options (sampling, %, max, min, etc…)
- Alarm States:
  - OK
  - INSUFFICIENT_DATA
  - ALARM
- Period:
  - Length of time in seconds to evaluate the metric
  - High resolution custom metrics: can only choose 10 sec or 30 sec

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AWS CloudWatch Events

- Schedule: Cron jobs
- Event Pattern: Event rules to react to a service doing something
  - Ex: CodePipeline state changes!
- Triggers to Lambda functions, SQS/SNS/Kinesis Messages
- CloudWatch Event creates a small JSON document to give information about the change

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AWS CloudWatch Logs

- Applications can send logs to CloudWatch using the SDK
- CloudWatch can collect log from:
  - Elastic Beanstalk: collection of logs from application
  - ECS: collection from containers
  - AWS Lambda: collection from function logs
  - VPC Flow Logs: VPC specific logs
  - API Gateway
  - CloudTrail based on filter
  - CloudWatch log agents: for example on EC2 machines
  - Route53: Log DNS queries
- CloudWatch Logs can go to:
  - Batch exporter to S3 for archival
  - Stream to ElasticSearch cluster for further analytics

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AWS CloudWatch Logs

- CloudWatch Logs can use filter expressions
- Logs storage architecture:
  - Log groups: arbitrary name, usually representing an application
  - Log stream: instances within application / log files / containers
- Can define log expiration policies (never expire, 30 days, etc..)
- Using the AWS CLI we can tail CloudWatch logs
- To send logs to CloudWatch, make sure IAM permissions are correct!
- Security: encryption of logs using KMS at the Group Level

Aws-5

Cloud Trail

1

AWS CloudTrail

- Provides governance, compliance and audit for your AWS Account
- 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
- If a resource is deleted in AWS, look into CloudTrail first!

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CloudTrail continued…

- CloudTrail shows the past 90 days of activity
- The default UI only shows "Create","Modify" or "Delete" events
- CloudTrail Trail:
  - Get a detailed list of all the events you choose
  - Ability to store these events in S3 for further analysis
  - Can be region specific or global
- CloudTrail Logs have SSE-S3 encryption when placed into S3
- Control access to S3 using IAM, Bucket Policy, etc…