AWS Certified Developer Associate

Lesson 14: CloudFront and CloudWatch

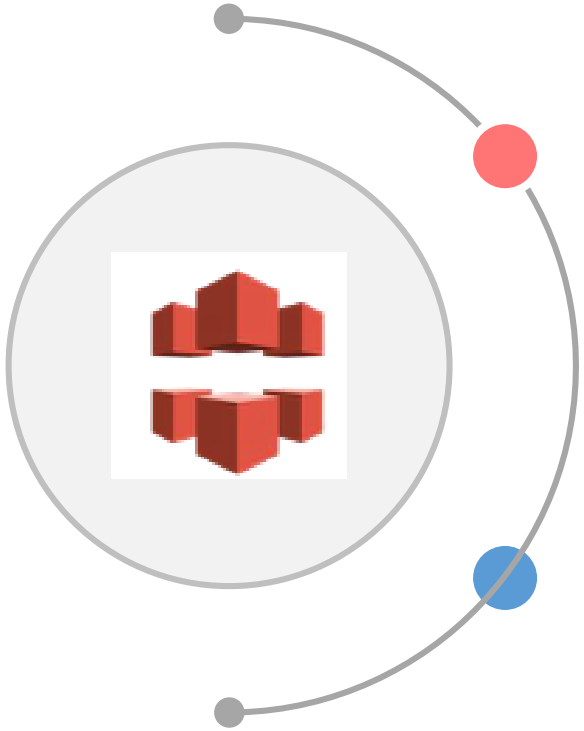
simplilearn

What You'll Learn

- Describe content delivery network in AWS
- Define CloudFront and edge locations
- List CloudFront pricing
- Identify monitoring with CloudWatch
- Describe CloudWatch metrics
- Define CloudWatch logs

CloudFront

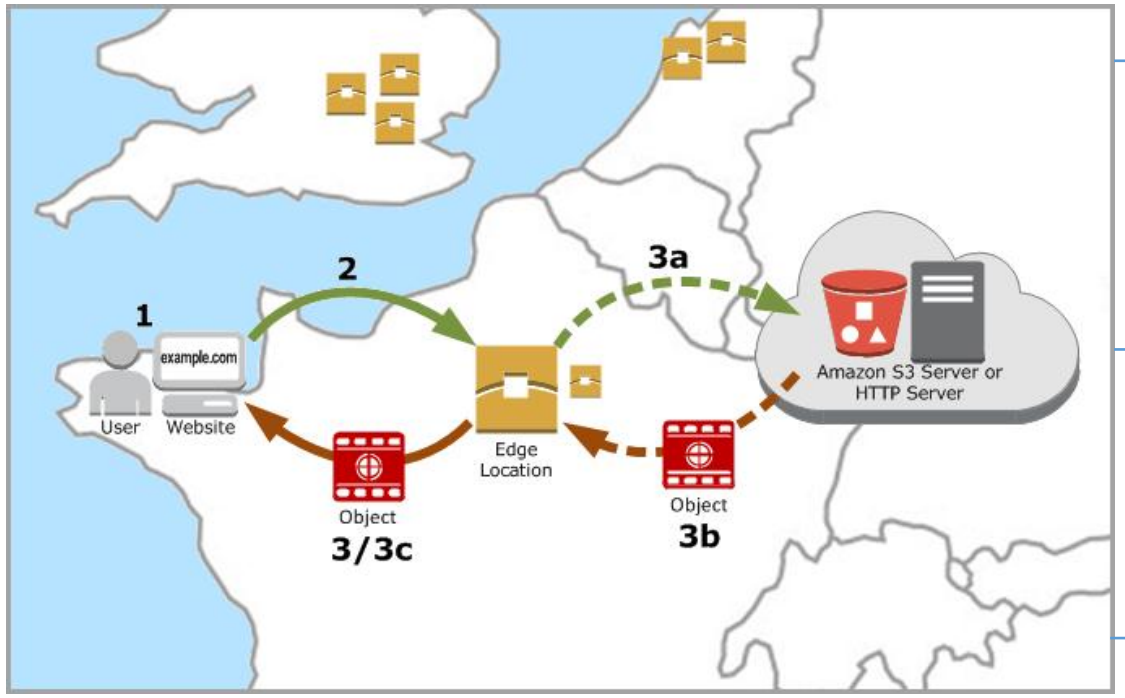
CloudFront



It is a content delivery network service that helps to distribute content to end users with reduced latency, high data transfer speed, and no minimum usage commitments.

Both static and dynamic web content can be delivered with optimized latency using CloudFront.

CloudFront and Edge Locations

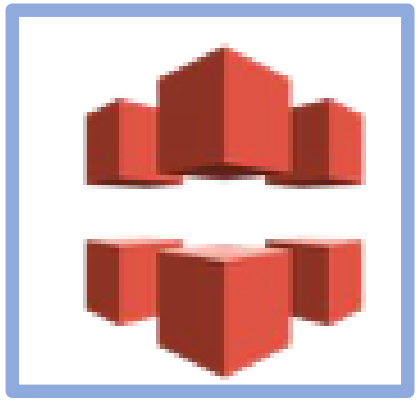


Source: http://docs.aws.amazon.com/AmazonCloudFront/latest/DeveloperGuide

- Edge locations, which are located across globe, act as edge servers that help CloudFront to distribute the content
- Request from the user is served from edge location that is near to the user
- If the content is unavailable on edge location, it can then be served from origin server

CloudFront Origin

CloudFront can distribute cache content for only two origins:



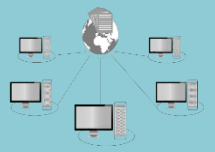
- S3 bucket
- Elastic Load Balancer

Without ELB, CloudFront cannot cache the content directly from EC2 web server.

Benefits of CloudFront

1. Highly secure CDN

2. Protection at network and application level



3. Automatic protections of AWS Shield Standard (Managed DDoS Protection) at no extra cost

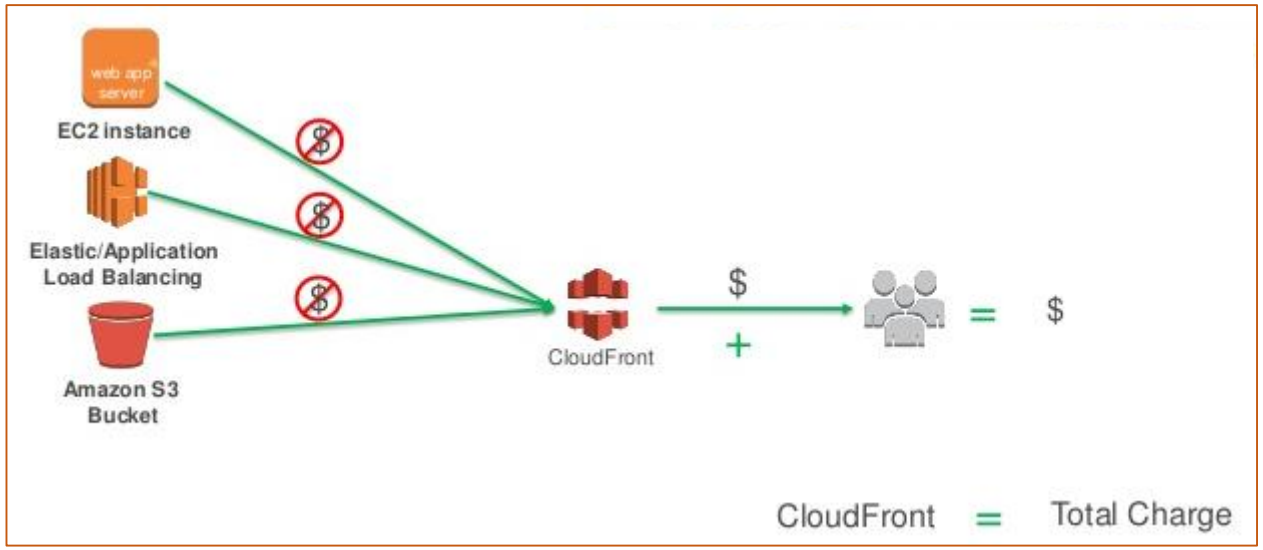
4. Well integrated with AWS WAF (Web Application Firewall) and AWS Shield Advanced protecting DDoS attacks

5. Compliance with PCI, DSS, HIPAA, and ISO ensures secure delivery of sensitive data

6. Delivery of secure APIs or applications via SSL/TLS

7. AWS Certificate Manager (ACM) is used to create custom SSL certificates at no extra cost

CloudFront Pricing



Free Usage

For free-tier account, 50 GB data transfer out and 2,000,000 HTTP and HTTPS requests each month for one year are free.

1

2

Regions

Charges vary depending on region for data transfer out to internet and origin.

3

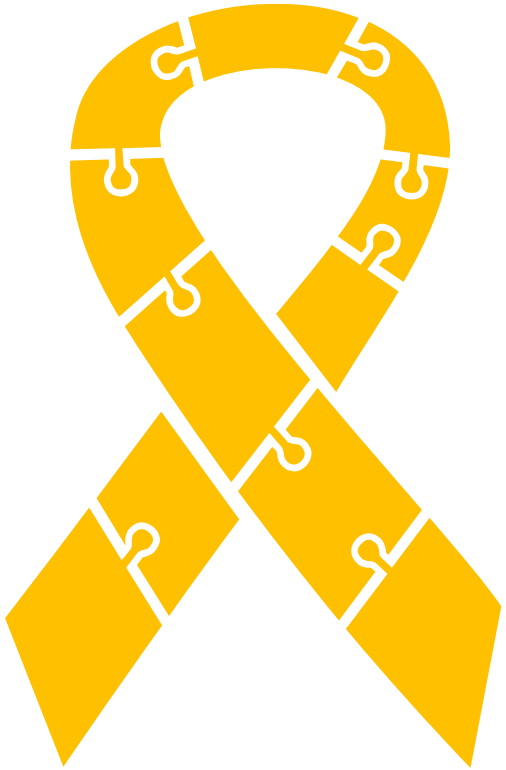
Reserved Capacity

It helps you commit to a minimum monthly usage level for 12 months or longer, and in turn receive a significant discount.

CloudFront Distributions

To start CloudFront, you need to create a “distribution” to deliver content to users. A distribution includes the following configuration settings:

- Origin Server
- Access on the files
- HTTP or HTTPS access
- Forward cookies and/or query strings to your origin
- Access logs creation



Distribution Types

Web distributions serve the following content over HTTP or HTTPS

- Static and dynamic download content, for example, .html, .css, .php, and image files, using HTTP or HTTPS
- Multimedia content on demand using progressive download and Apple HTTP Live Streaming (HLS)
- A live event, such as a meeting, conference, or concert, in real time

RTMP distributions stream media files using Adobe Media Server and the Adobe Real-Time Messaging Protocol (RTMP)

- An RTMP distribution must use an Amazon S3 bucket as the origin

Knowledge Check

KNOWLEDGE CHECK

You can store your files in more than one origin servers. Is the statement true or false?

a. True

b. False

KNOWLEDGE CHECK

You can store your files in more than one origin servers. Is the statement true or false?

a. True

b. False

The correct answer is **True**

Explanation: To store your files, multiple origin servers can be used; those can be different S3 buckets or a combination of EC2 and S3.

KNOWLEDGE CHECK

CloudFront allows you to create origin using which of the following options?

a. EC2

b. ELB

c. S3

d. RDS

KNOWLEDGE CHECK

CloudFront allows you to create origin using which of the following options?

a. EC2

b. ELB

c. S3

d. RDS

The correct answer is **B and C**

Explanation: CloudFront allows you to create origins only as ELB and S3.

KNOWLEDGE CHECK

Choose the correct statement(s).

a. If you have origin servers as AWS resources like EC2 and S3, there are no charges for AWS data transfer out to Amazon CloudFront.

b. You can set the expiration period of cache content in edge locations.

c. Expiration period determines the time after which the object should be checked from origin and refreshed.

d. By default, CloudFront is not PCI compliant.

KNOWLEDGE CHECK

Choose the correct statement(s).

a. If you have origin servers as AWS resources like EC2 and S3, there are no charges for AWS data transfer out to Amazon CloudFront.

b. You can set the expiration period of cache content in edge locations.

c. Expiration period determines the time after which the object should be checked from origin and refreshed.

d. By default, CloudFront is not PCI compliant.

The correct answer is **A, B, and C**

Explanation: By default, CloudFront is PCI compliant.

Practice Assignment: CloudFront

To create a website on EC2 and serve content using CDN

Create a Website on EC2 and Serve Content Using CDN

You are given two scenarios in this assignment.

- You will launch and access a website hosted on EC2 machine (web server).
- Later, you will serve this web content on an edge location using CloudFront instead of the web server to optimize latency parameters of our website.

Prerequisites:

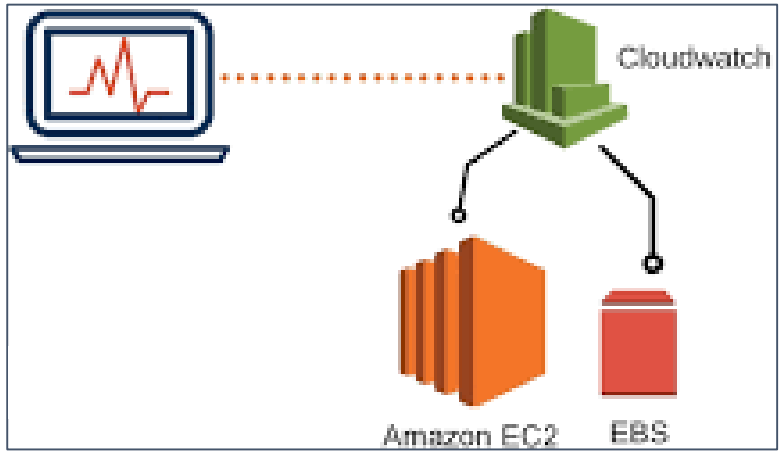
AWS Account

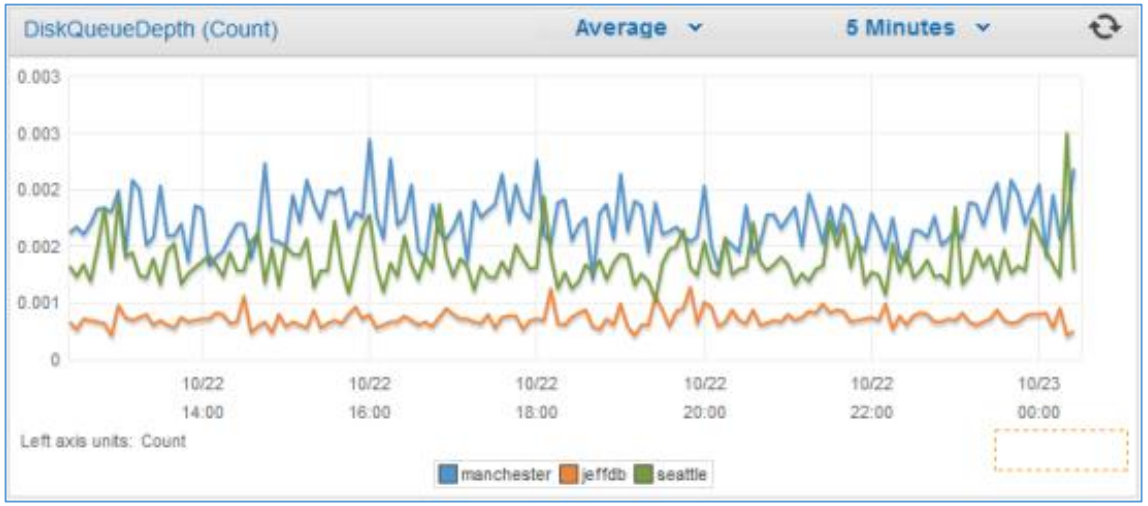
Task:

To implement CloudFront in AWS

CloudWatch

CloudWatch





CloudWatch is a service that keeps an eye on your AWS resources to provide you better resource utilization, application performance, and operational health.

CloudWatch Usage

01 Trigger alarms and send notifications using SNS service

02 Monitor the instances and further scale them if required

03 Take an action like terminating, stopping, or recovering an instance

CloudWatch Terminologies

Metrics

These are a collection of data points that are collected periodically. A metric is like a variable that needs to be measured with a set of values. This variable can come from various supported AWS resources.

Dimensions

A dimension is a name/value pair that uniquely identifies a metric. You can assign up to 10 dimensions to a metric.

Namespaces

CloudWatch namespaces are containers for metrics. Metrics in different namespaces are isolated from each other, so that metrics from different applications are not mistakenly aggregated into the same statistics.

Time Stamps

Every data point is marked with a timestamp as it differentiates it with next record. There is a range of total 4 weeks of time stamp.

CloudWatch Terminologies (Contd.)

Statistics

Statistics are metric data aggregations over specified periods of time. CloudWatch provides statistics based on the metric data points provided by your custom data or provided by other AWS services to CloudWatch.

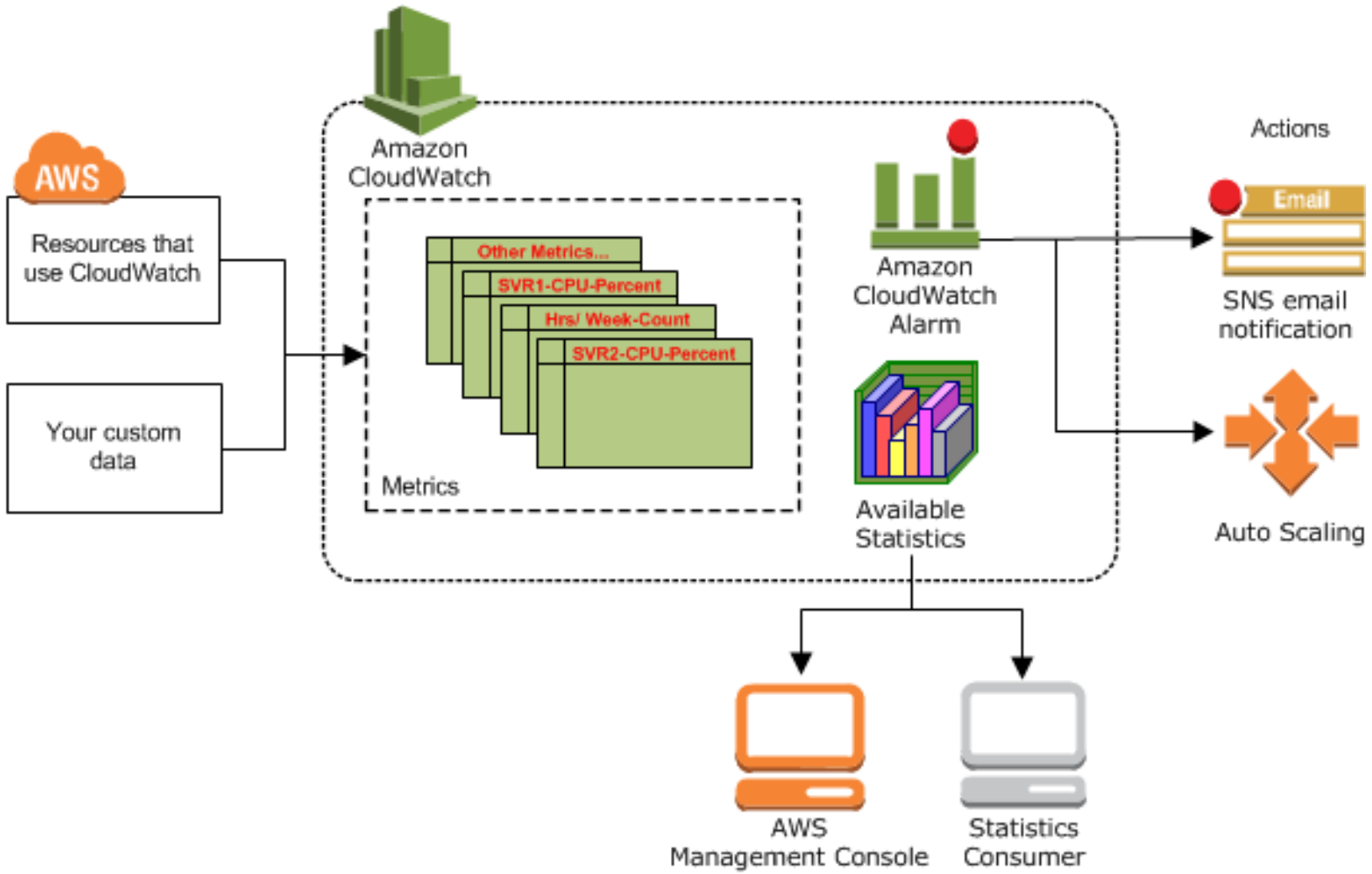
Units

Each statistic has a unit of measure. Example units include Bytes, Seconds, Count, and Percent.

Period

It refers to the time period for which stats are valid.

CloudWatch Architecture



Source: http://docs.aws.amazon.com/AmazonCloudWatch/latest/monitoring/cloudwatch_architecture.html

CloudWatch Monitoring Types

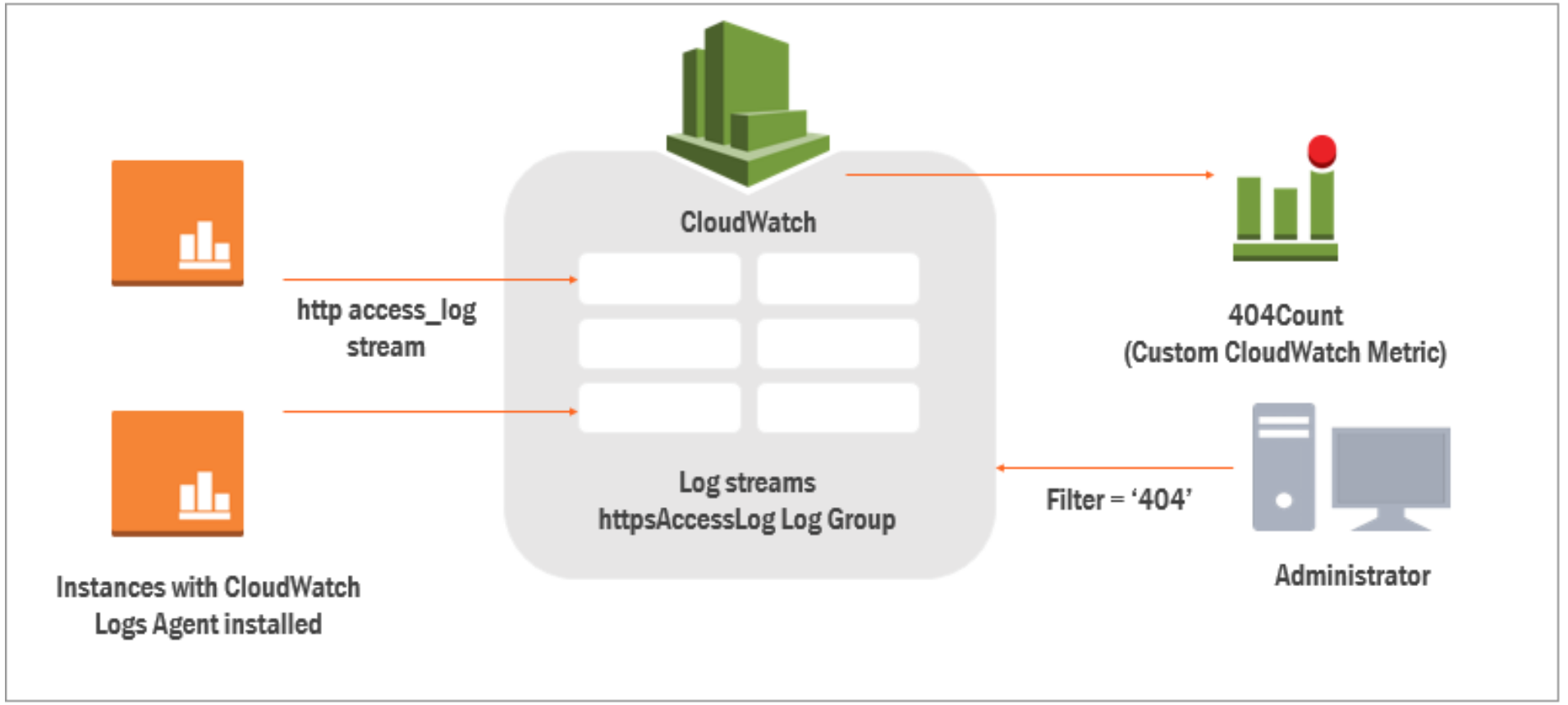
Basic

Basic monitoring is free of cost which comes along with the resources. Data is collected after every 5 mins.

Detailed

Detailed monitoring is paid, and data is captured every minute.

CloudWatch Logs



Steps to Configure Logs on CloudWatch

Create

Create an IAM role which grants the Amazon EC2 instance an access to S3 bucket, CloudWatch, and CloudWatch Logs

Launch

Launch an EC2 instance with IAM role

Install

Install Cloudwatch Agent on EC2 instance

Create

Create S3 bucket to place an agent configuration file

Define

Define CloudWatch Logs Metrics

Generate

Generate a Custom Metric from an instance

KNOWLEDGE CHECK

Which of the following is a standard metric provided by Amazon CloudWatch?

a. Web server visible metrics such as number of failed transaction requests

b. Operating system visible metrics such as memory utilization

c. Database visible metrics such as number of connections

d. Hypervisor visible metrics such as CPU utilization

KNOWLEDGE CHECK

Which of the following is a standard metric provided by Amazon CloudWatch?

a. Web server visible metrics such as number of failed transaction requests

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c. Database visible metrics such as number of connections

d. Hypervisor visible metrics such as CPU utilization

The correct answer is **D**

Explanation: CPU Utilization is one of the standard metrics. Transactions, memory utilization, and number of connections are not provided by default by Amazon CloudWatch.

Practice Assignment: CloudWatch

Set up the billing Alerts using CloudWatch, and send notifications to user email using SNS service

Create Your Own VPC

Your company wants to save some money by shutting down EC2 instances that are idle. You need to perform a test with AWS CloudWatch to see if it can be achieved.

Prerequisites:

AWS Account and existing EC2 instance

Task:

1. Launch a new EC2 instance for the test
2. Configure a CloudWatch alarm to do the following:
    - Perform an alarm action when CPU utilization is below 50% for a period of 5 minutes
    - Stop idle EC2 instances when the alarm fires
3. Verify that your instance has been shutdown

Quiz

QUIZ 1	You are working on an educational site where you have to distribute cloud videos to all the co-workers. Using CloudFront, which method can be used to serve content that is stored in S3, but publicly can't be accessed directly from S3?

a. Create an Origin Access Identity (OAI) for CloudFront and grant access to the objects in your S3 bucket to that OAI

b. Add the CloudFront account security group "amazon-cf/amazon-cf-sg" to the appropriate S3 bucket policy

c. Create an Identity and Access Management (IAM) User for CloudFront and grant access to the objects in your S3 bucket to that IAM User

d. Create an S3 bucket policy that lists the CloudFront distribution ID as the Principal and the target bucket as the Amazon Resource Name (ARN).

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d. Create a S3 bucket policy that lists the CloudFront distribution ID as the Principal and the target bucket as the Amazon Resource Name (ARN).

The correct answer is **a**

Explanation: By creating an Origin Access Identity (OAI) for CloudFront and granting access to the objects in your S3 bucket to that OAI, you can distribute cloud videos to all the co-workers.

QUIZ 2	Whenever an instance is terminated, an email should be triggered to root account holder with details like instance ID and user details of who terminated it. Choose the correct option to achieve this.

a. You can use CloudWatch basic monitoring

b. This is not possible as CloudWatch may not be able to track on user details who terminated the instance

c. This can be achieved using CloudTrail service which can directly send notifications

d. You can use CloudWatch log metric filter to set metrics on logs sent by CloudTrail

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d. You can use CloudWatch log metric filter to set metrics on logs sent by CloudTrail

The correct answer is **D**

Explanation: You can use CloudWatch log metric filter to set metrics on logs sent by CloudTrail and further integrate it with SNS to send notification.

QUIZ 3	Which option(s) describes detailed monitoring with CloudWatch?

a. A free service for all basic metrics and paid for all custom metrics with frequency of 5 min

b. A paid service which allows detailed monitoring with the frequency of 1 min

c. A free service for all basic metrics and paid for all custom metrics with frequency of 1 min

d. A paid service which allows detailed monitoring with frequency of less than 1 min

QUIZ

3

Which option(s) describes detailed monitoring with CloudWatch?

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b. A paid service which allows detailed monitoring with the frequency of 1 minute

c. A free service for all basic metrics and paid for all custom metrics with frequency of 1 minute

d. A paid service which allows detailed monitoring with frequency of less than 1 minute

The correct answer is **b**

Explanation: Detailed monitoring with CloudWatch is a paid service which allows detailed monitoring with the frequency of 1 minute.

QUIZ 4	Which metric will help you monitor the application's load time?

a. CPU utilization on a web server

b. ELB logs on latency

c. Count requests on a web server

d. Network in and out of web server or ELB

QUIZ

4

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The correct answer is **b**

Explanation: To monitor the application's load time, you can use ELB logs on latency.

Key Takeaways

- Content delivery network helps you deliver the content with optimized latency to end users.
- AWS CloudFront works with the team of edge locations. These edge locations are in sync with your origin servers (both ELB or S3).
- CloudWatch is used to monitor resources and applications running on AWS.
- It can be used to monitor resources both "of" the cloud and "in" the cloud.

This concludes “CloudFront and CloudWatch”.

The next lesson is Troubleshooting”