Errors or corrections? Email us at aws-course-feedback@amazon.com.
Other questions? Email us at aws-training-info@amazon.com.

Architecting on AWS

Services for Web Applications

Services for Web Applications | What we'll cover

1. AWS products for network content and delivery
2. AWS products for deployment and management

AWS Services for Web Applications

Amazon Route 53

Amazon Elastic Load Balancer

Amazon CloudFront

Amazon CloudWatch

Amazon Elastic Beanstalk

AWS CloudFormation

Services for Web Applications | Network and Content Delivery

1

AWS products for network content and delivery

Services for Web Applications | Network and Content Delivery

Amazon Route 53

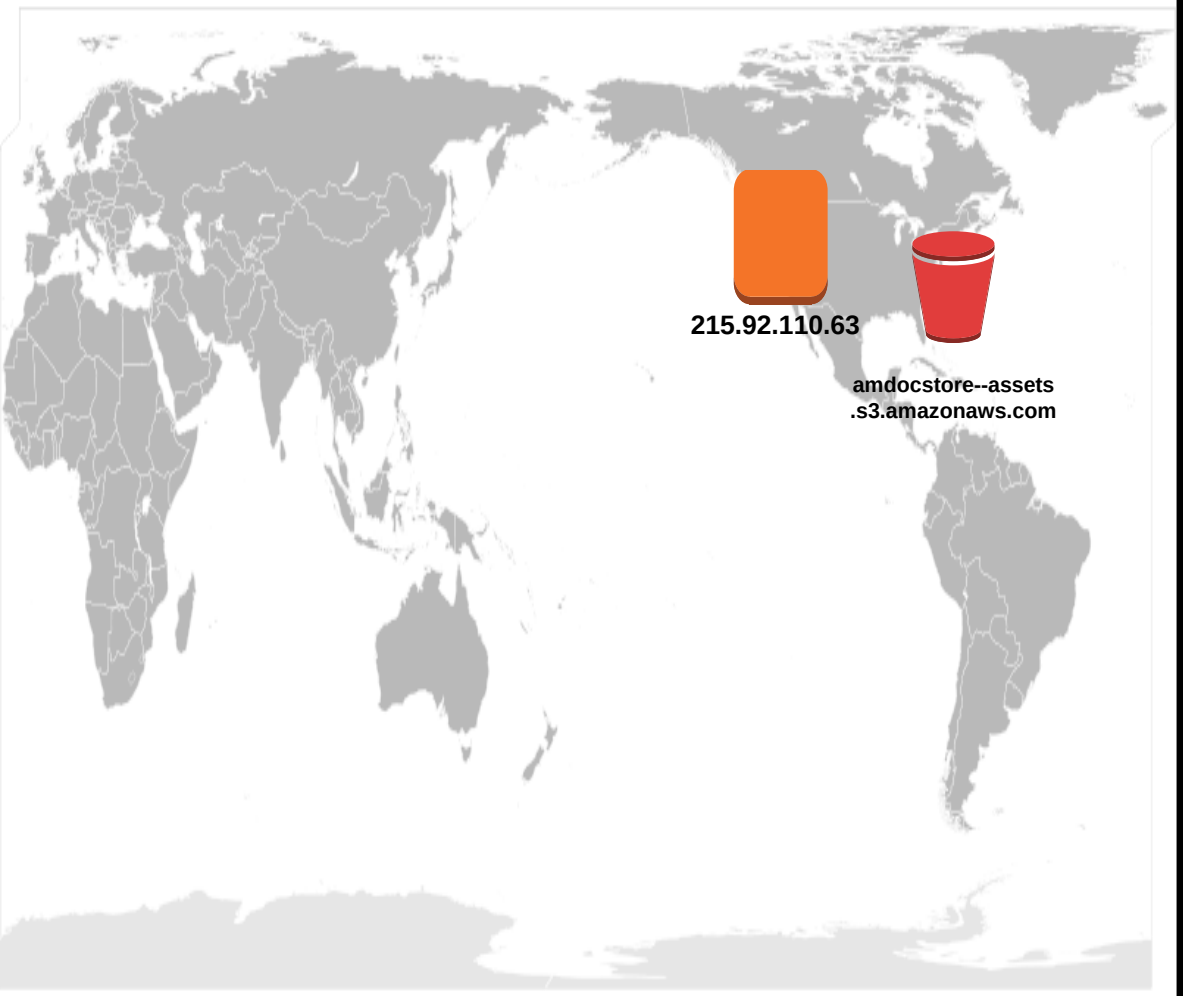
Amazon Elastic Load Balancer

Amazon CloudFront

Amazon Route 53

Amazon Route 53

- Global network of DNS servers that answer DNS queries with low latency

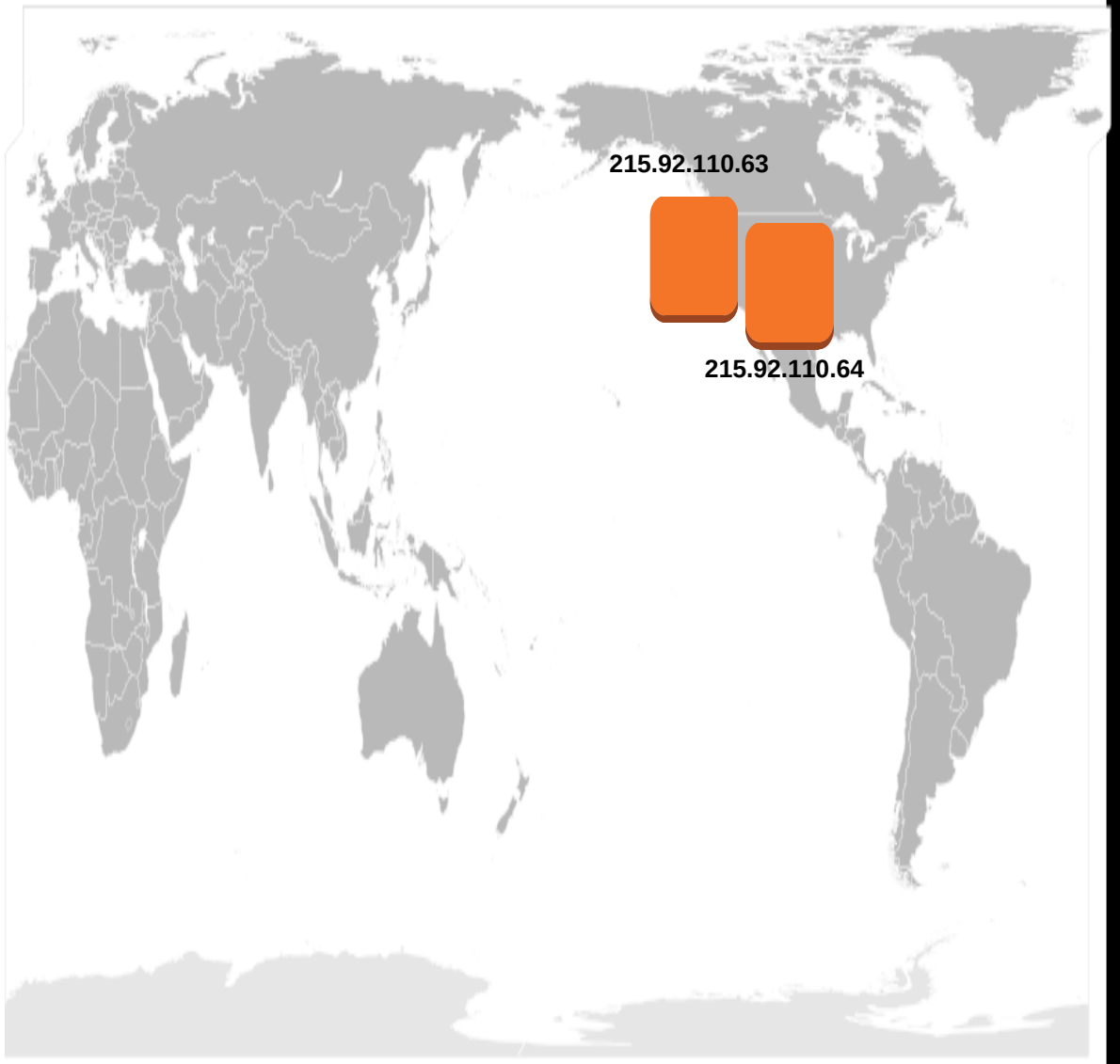


amdocstore.com

Name	Type	Value
amdocstore.com	A	215.92.110.63
www.amdocstore.com	CNAME	amdocstore.com
assets.amdocstore.com	CNAME	amdocstore-assets.s3.amazonaws.com

Amazon Route 53

- Round Robin: Resolve to different values for the same record with equal probability

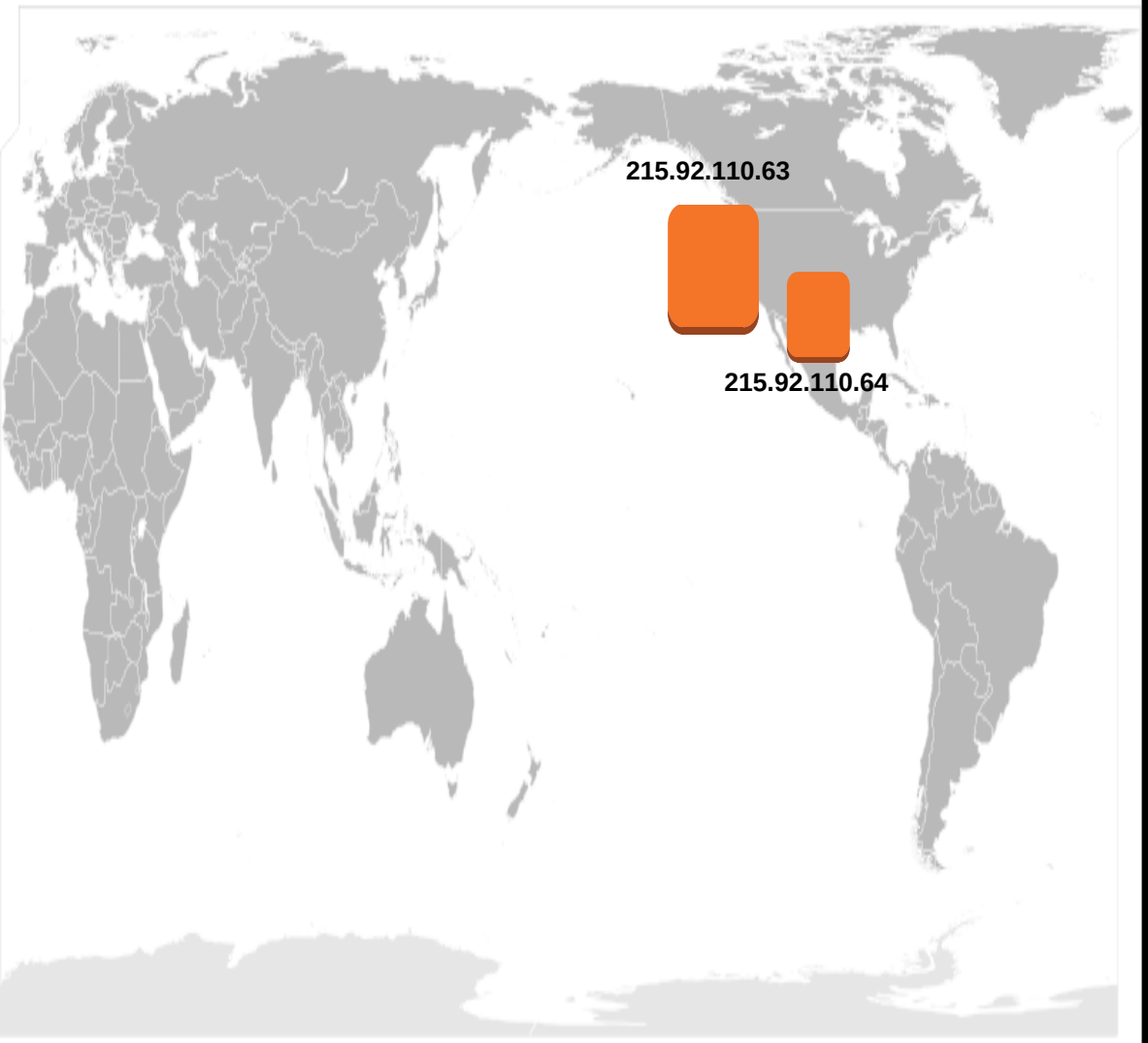


amdocstore.com

Name	Type	Value
amdocstore.com	A	215.92.110.63
amdocstore.com	A	215.92.110.64

Amazon Route 53

- Weighted Round Robin: Resolve to different values for the same record with different, user-controlled probabilities

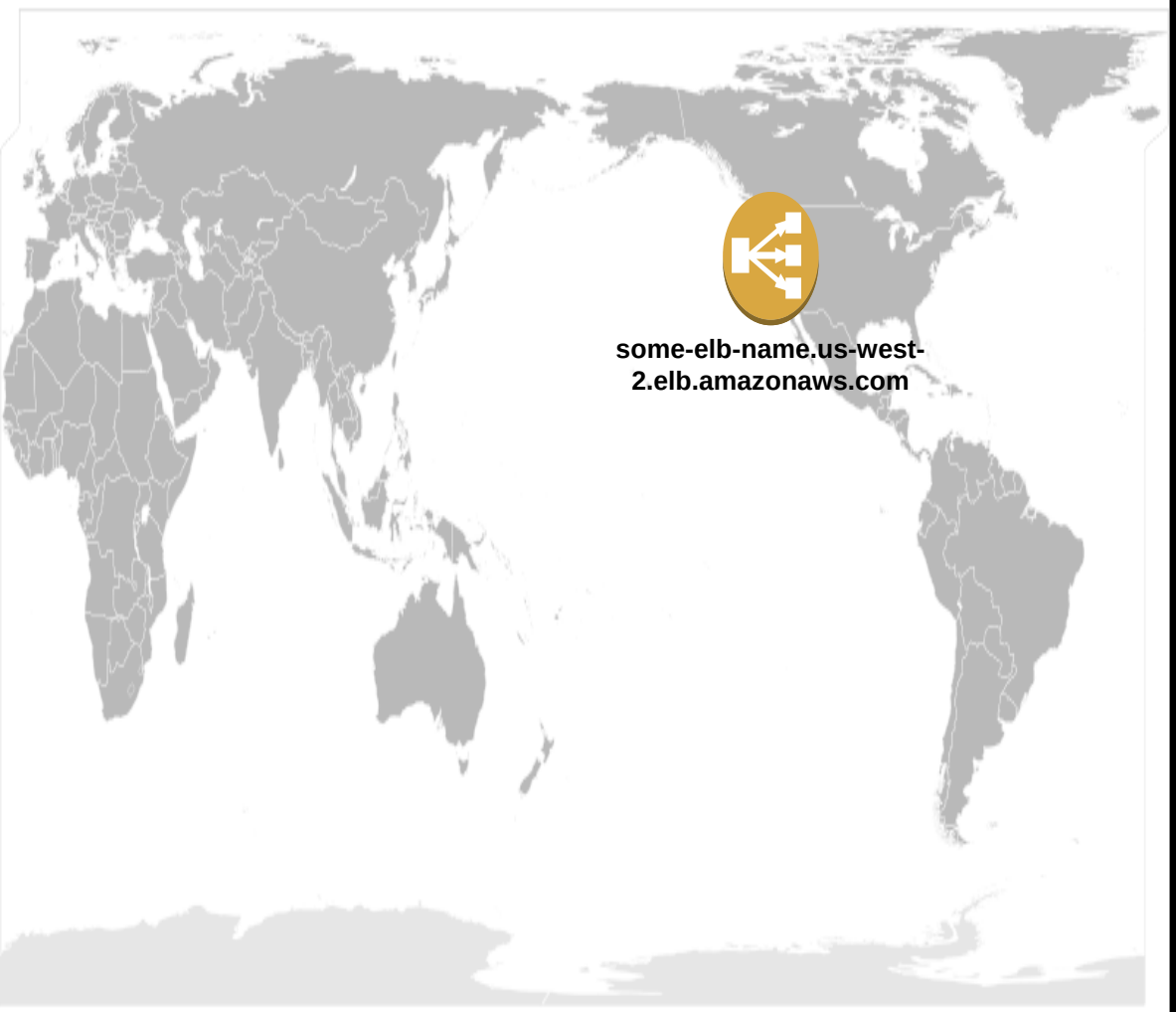


amdocstore.com

Name	Type	Value	Weight
amdocstore.com	A	215.92.110.63	4
Amdocstore.com	A	215.92.110.64	1

Amazon Route 53

- ALIAS Record: Resolve zone apex (such as amdocstore.com) to an Elastic Load Balancer

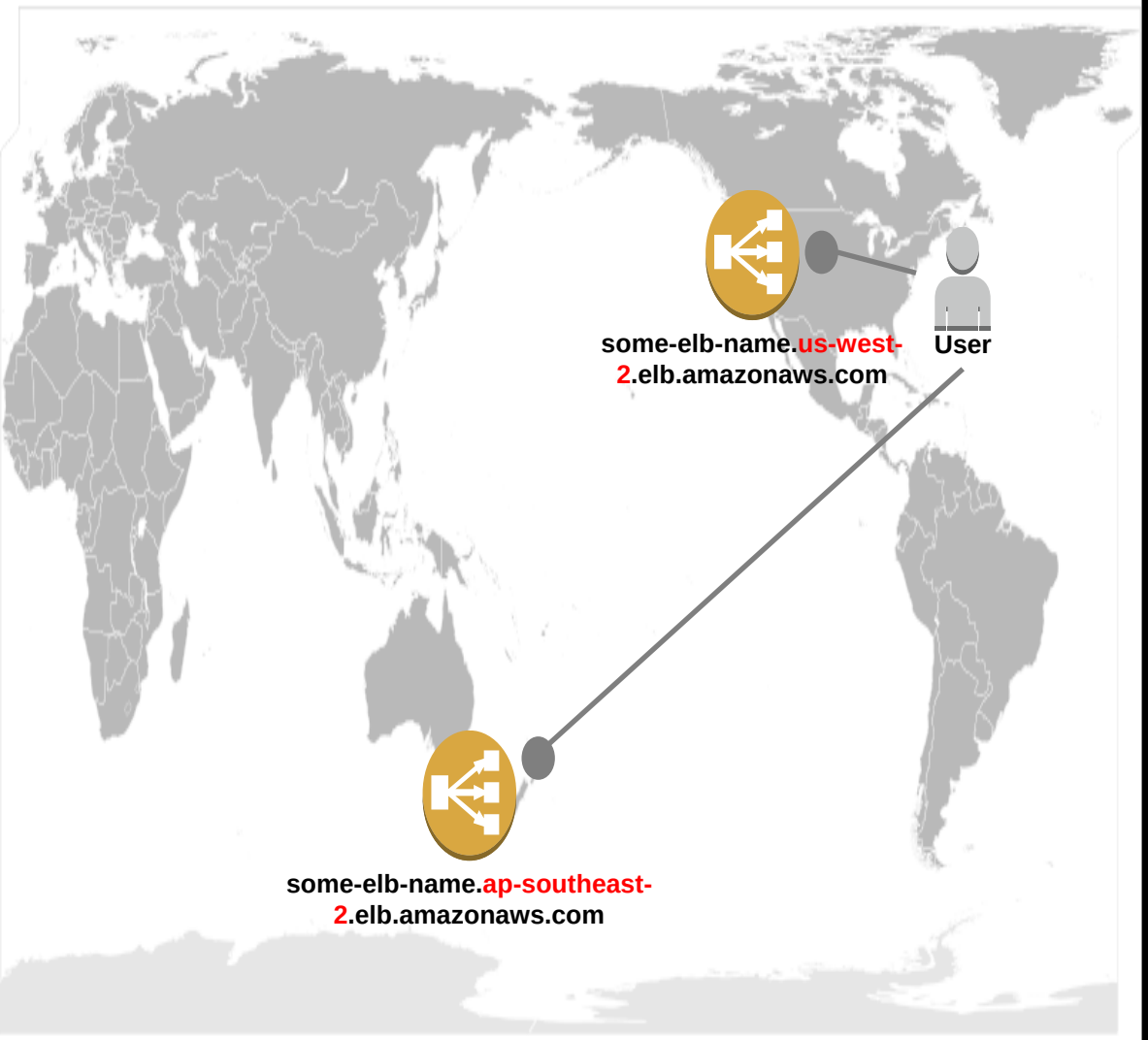


amdocstore.com

Name	Type	Value
amdocstore.com	ALIAS	some-elb-name.us-west-2.elb.amazonaws.com
www.amdocstore.com	CNAME	amdocstore.com

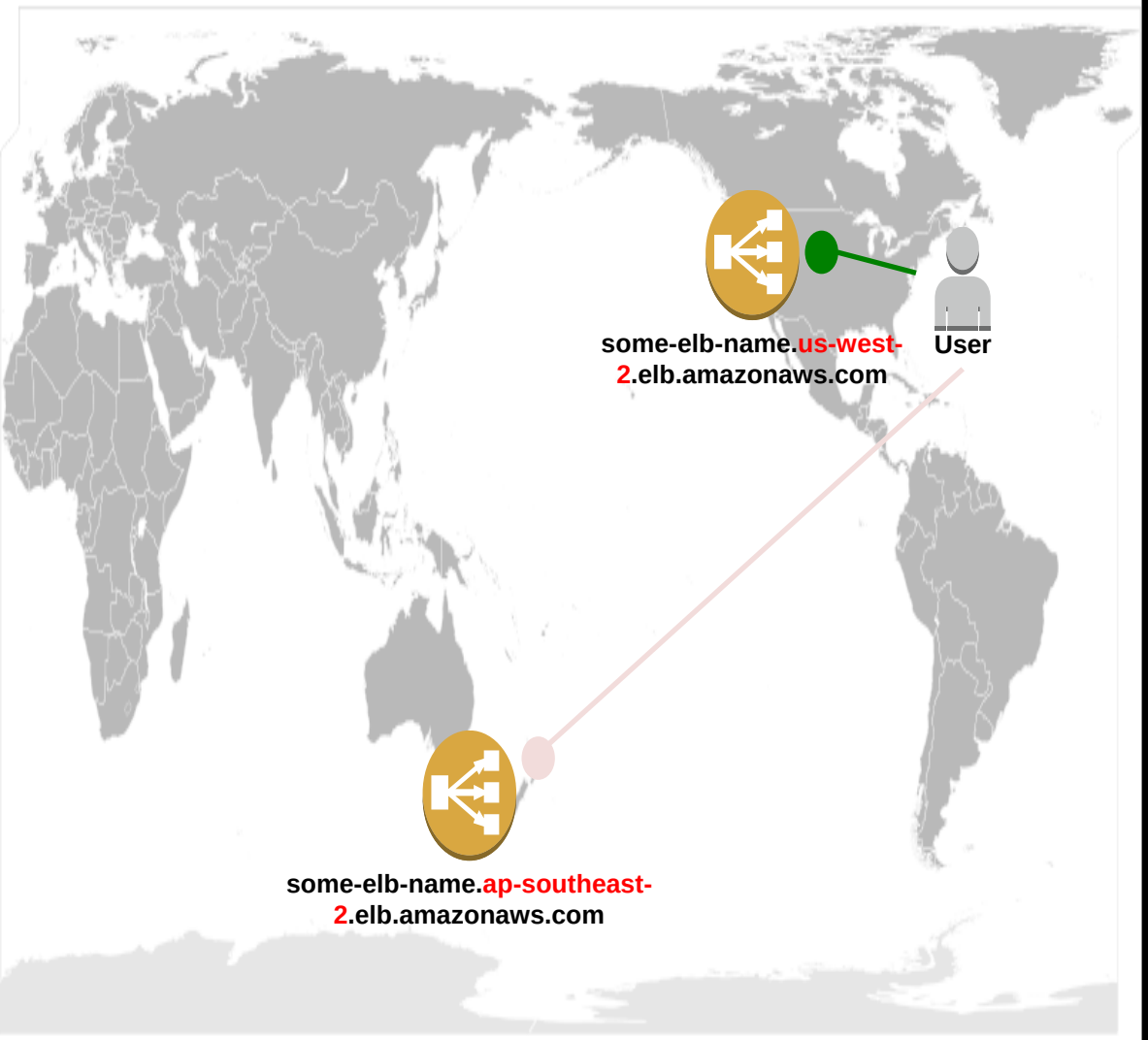
Amazon Route 53

- Latency Based Routing: Return address nearest the user/requester



amdocstore.com

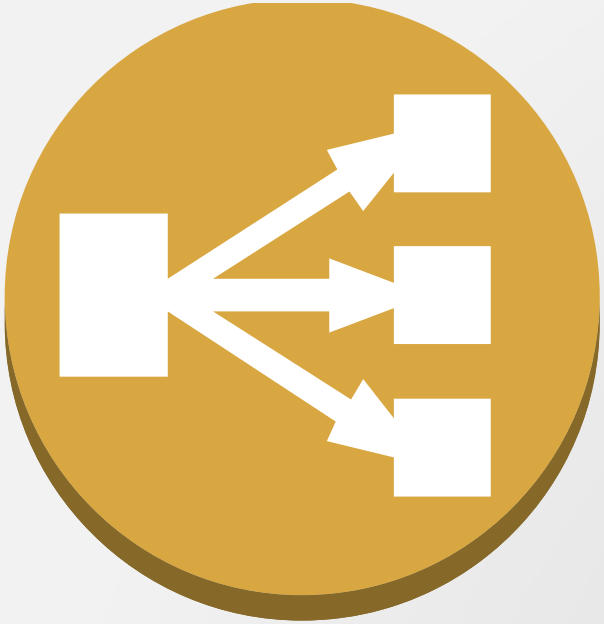
Name	Type	Value
amdocstore.com	ALIAS	some-elb-name.us-west-2.elb.amazonaws.com
amdocstore.com	ALIAS	some-elb-name.ap-southeast-2.elb.amazonaws.com



amdocstore.com

Name	Type	Value
amdocstore.com	ALIAS	some-elb-name.us-west-2.elb.amazonaws.com
amdocstore.com	ALIAS	some-elb-name.ap-southeast-2.elb.amazonaws.com

Amazon Elastic Load Balancer

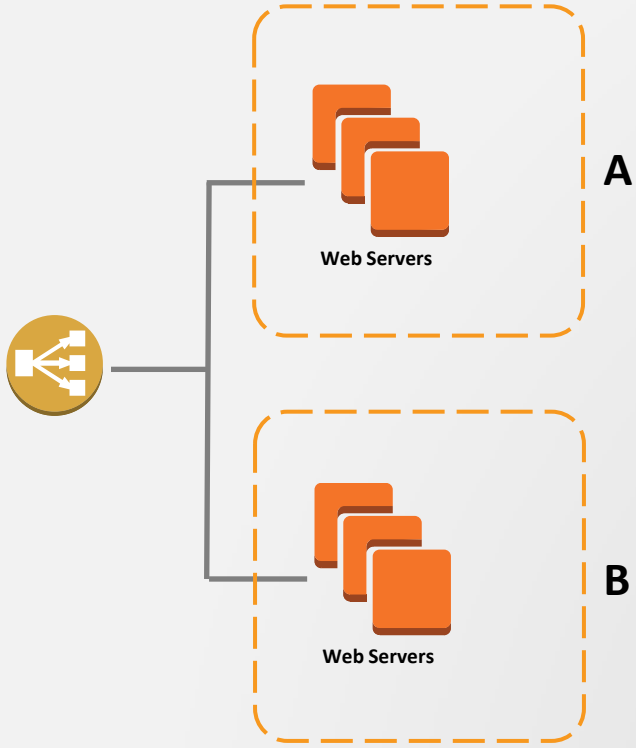


Amazon Elastic Load Balancer

- Supports the routing and load balancing of HTTP, HTTPS and TCP traffic to EC2 instances
- Supports health checks to detect and remove failing instances
- Dynamically grows and shrinks based on traffic
- Seamlessly integrates with Auto-scaling to add and remove instances based on scaling activities
- Single CNAME provides stable entry point for DNS configuration

Amazon Elastic Load Balancer

- Distribute load across Availability Zones

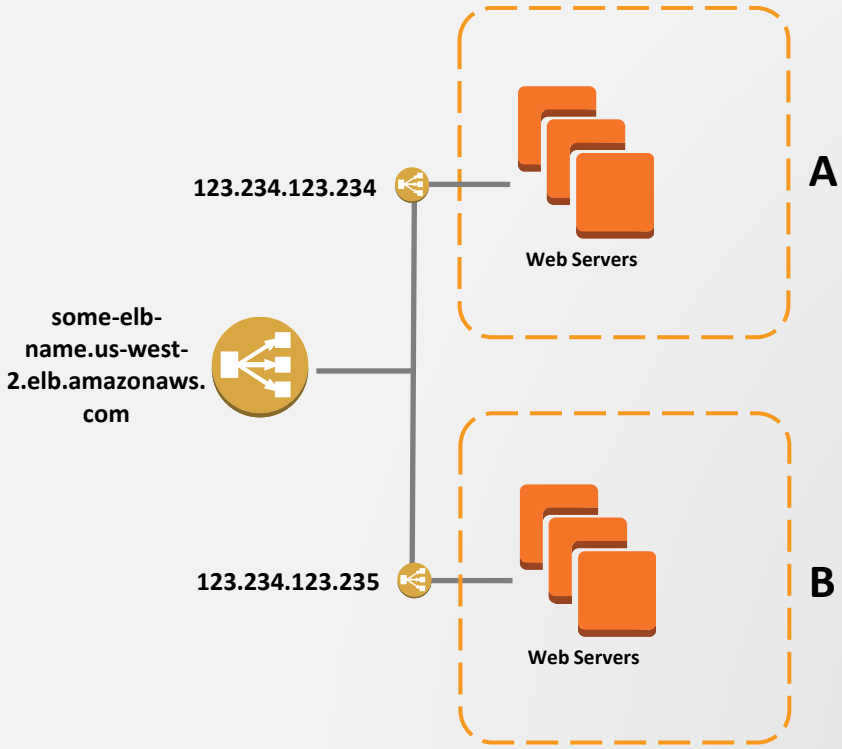


Amazon Elastic Load Balancer

- Health Check example:
- HTTP GET /health.php
- Every x seconds
- Instance marked unhealthy after y consecutive failures

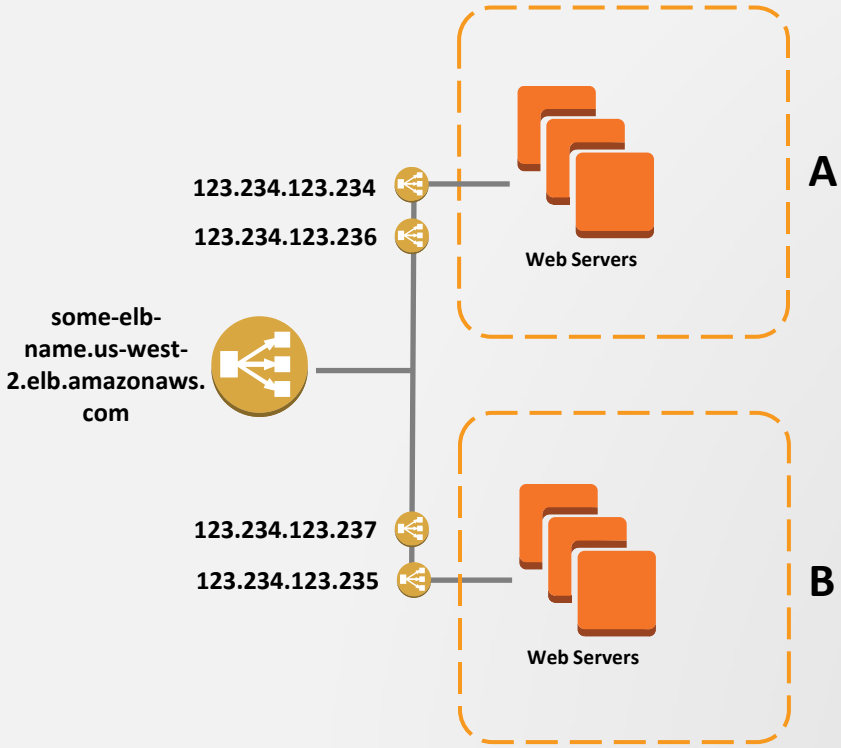
Amazon Elastic Load Balancer

- Scalability: Stable DNS host name resolves via round robin to ELB IP addresses in each Availability Zone.



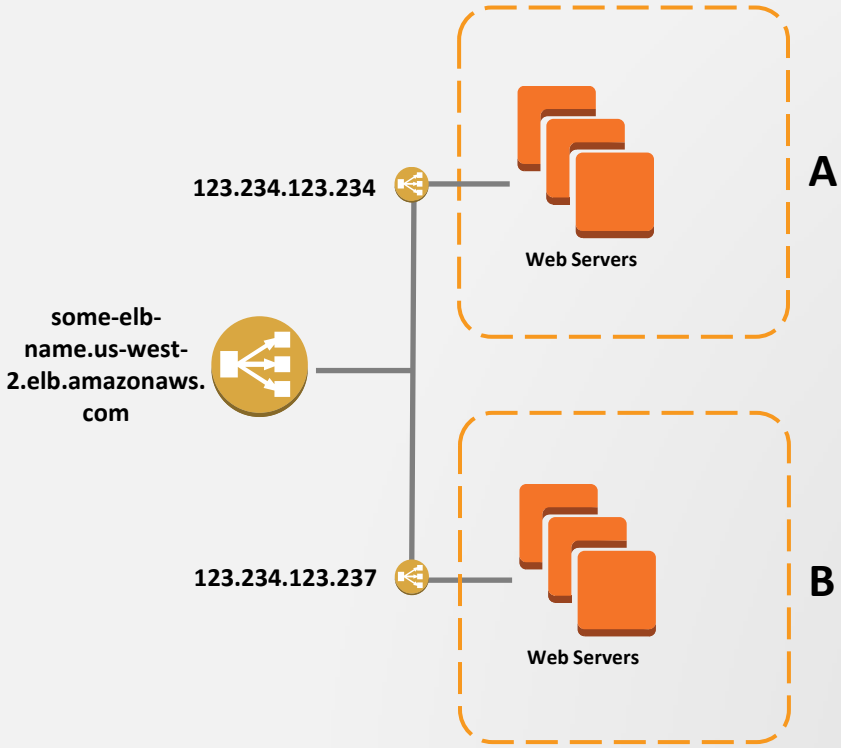
Amazon Elastic Load Balancer

- Scalability: As traffic increases, AWS adds IP addresses to ELB's DNS entry



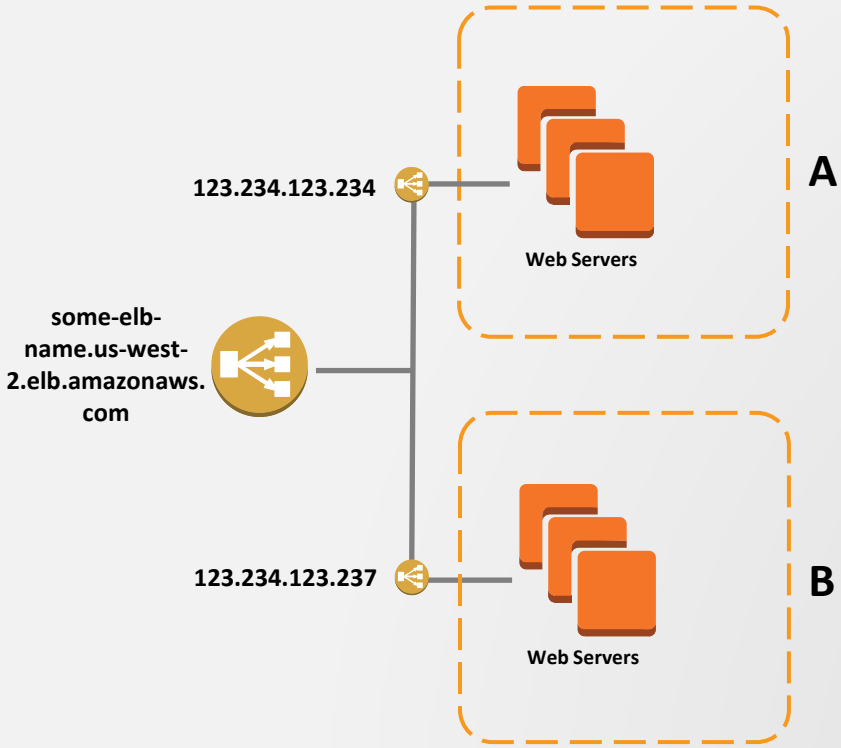
Amazon Elastic Load Balancer

- Scalability: As traffic decreases, AWS automatically removes IP address from the ELB's DNS entry

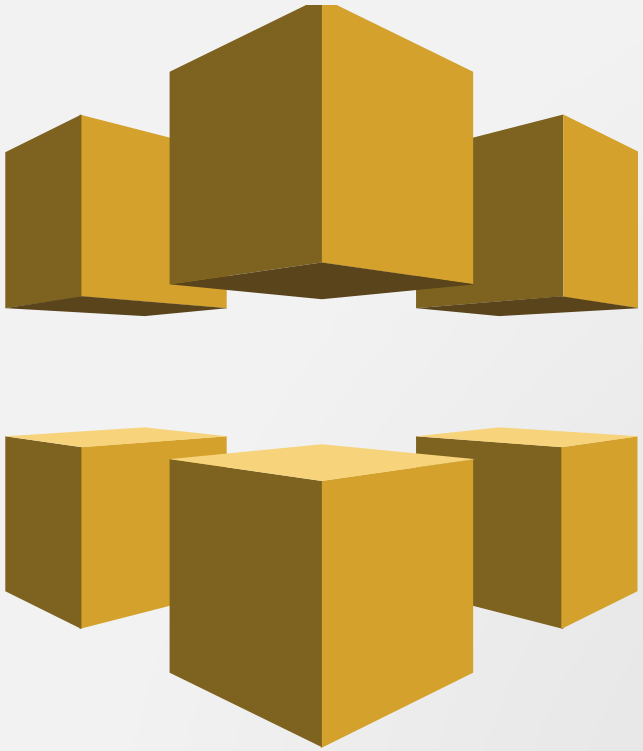


Amazon Elastic Load Balancer

- Scalability: Never refer to an ELB by its IP address. Always use its A Record.



Amazon CloudFront

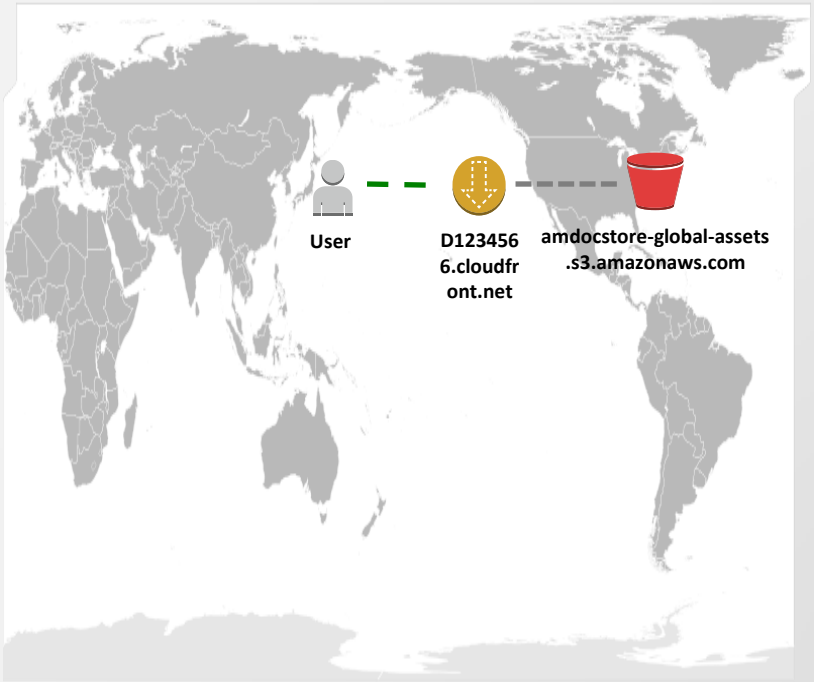


Amazon CloudFront

- Web service for content delivery
- Distribute content to end users with low latency, high data transfer speeds, and no commitments
- Delivers your content using a global network of edge locations
- Supports download, dynamic, streaming and live streaming

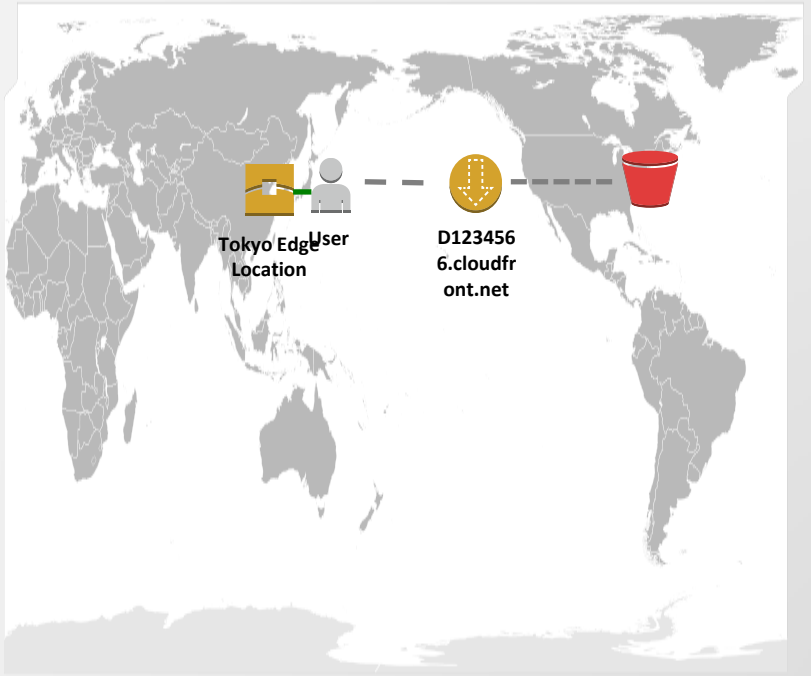
Amazon CloudFront

- Static content and S3 origin:
- User in Japan requests content from S3 via CloudFront distribution



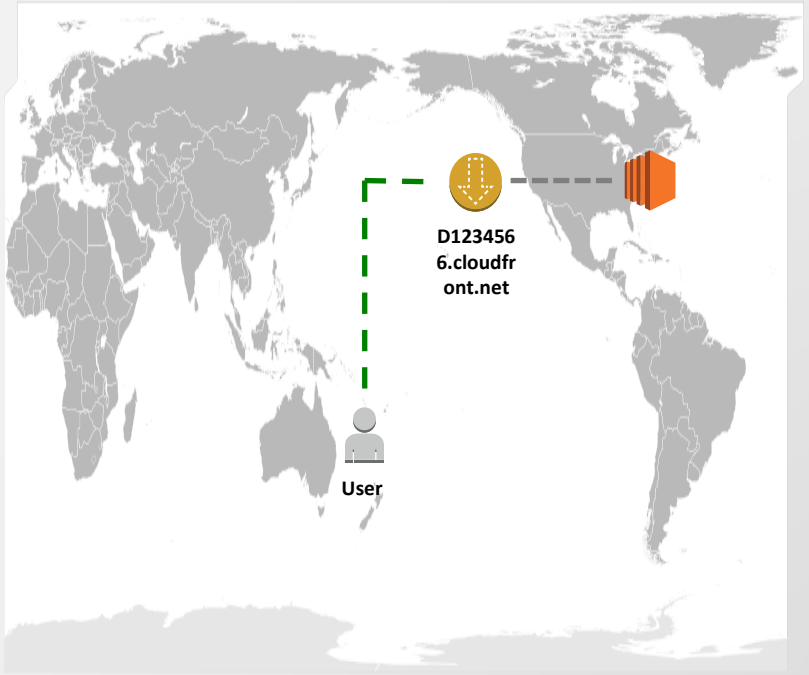
Amazon CloudFront

- Static content and S3 origin:
- User receives content from CloudFront edge location in Tokyo



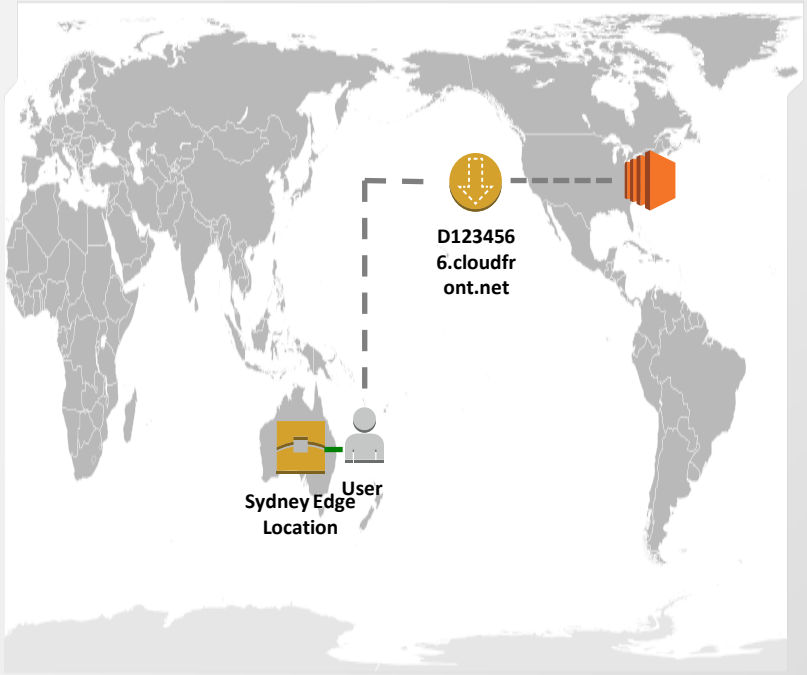
Amazon CloudFront

- Dynamic content and EC2 origin
- User in Australia requests dynamic content from EC2 via CloudFront distribution.



Amazon CloudFront

- Dynamic content and EC2 origin
- User receives dynamic content from CloudFront edge location in Sydney.



Amazon CloudFront

- Streaming media
- Live media streaming via Adobe Flash Media Server (FMS) to both Flash Player and Apple iOS devices
- Live Smooth Streaming using Windows Media Services
- Stream pre-recorded media stored in S3 via FMS or via progressive-download

Services for Web Applications | Monitoring and Deployment/Management

2

AWS products for deployment and management

Monitoring & Deployment/Management

Amazon CloudWatch

Amazon Elastic Beanstalk

AWS CloudFormation

Amazon CloudWatch

Amazon CloudWatch

- Monitor AWS resources automatically without installing additional software
- Alarm when a value is breached, triggering an action (e.g., send an e-mail, add/remove EC2 instances to an Auto Scaling Group, etc.)
- Visibility into resource utilization, operational performance, and overall demand patterns
- Metrics, including CPU utilization, disk I/O, and network traffic
- Custom application-specific metrics of your own
- Accessible via AWS Management Console, APIs, SDK, or CLI

Amazon CloudWatch

Many AWS resources provide metrics automatically, and at no charge:

Amazon CloudWatch

Many AWS resources provide metrics automatically, and at no charge:

- EC2
- EBS
- ELB
- RDS
- SQS
- SNS
- ElastiCache
- DynamoDB
- Billing

Amazon CloudWatch

EC2: 5-minute frequency for no charge, 1-minute frequency for a small hourly fee, for example:

- CPU Utilization (%)
- NetworkOut
- NetworkIn
- DiskReadBytes
- DiskWriteBytes
- Etc…

Amazon CloudWatch

ELB: 1-minute frequency for no charge:

- RequestCount
- HealthyHostCount
- UnHealthyHostCount
- Latency
- HTTPCode_Backend_2XX
- HTTPCode_Backend_3XX
- HTTPCode_Backend_4XX
- HTTPCode_Backend_5XX
- Etc…

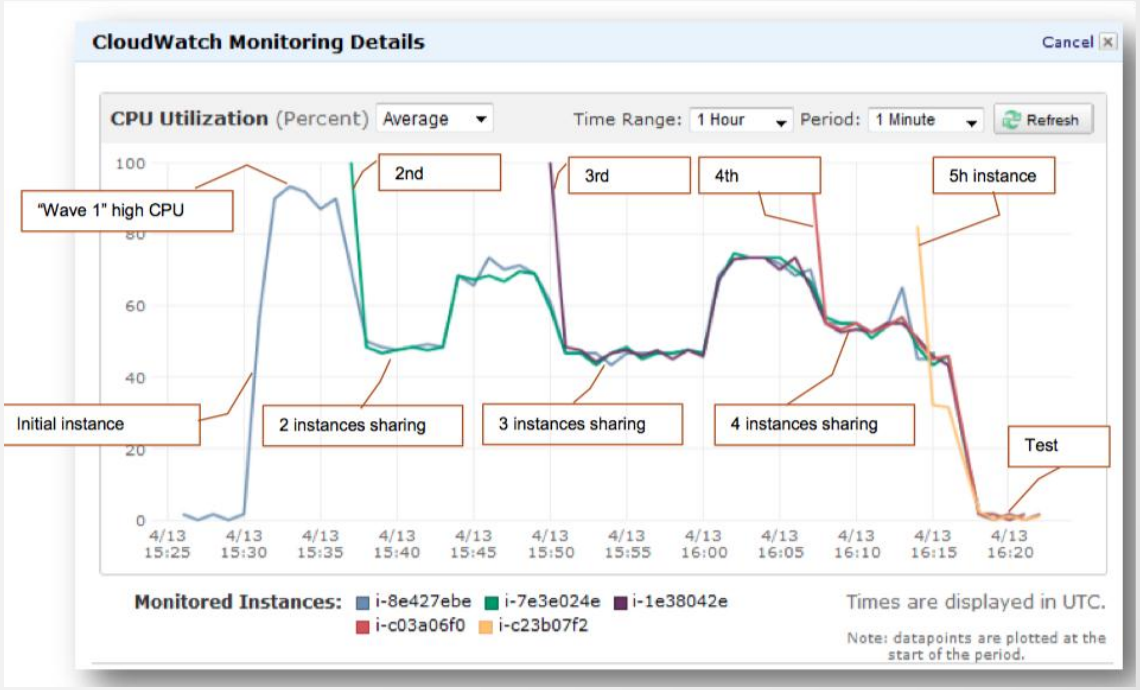
Amazon CloudWatch

Alarms

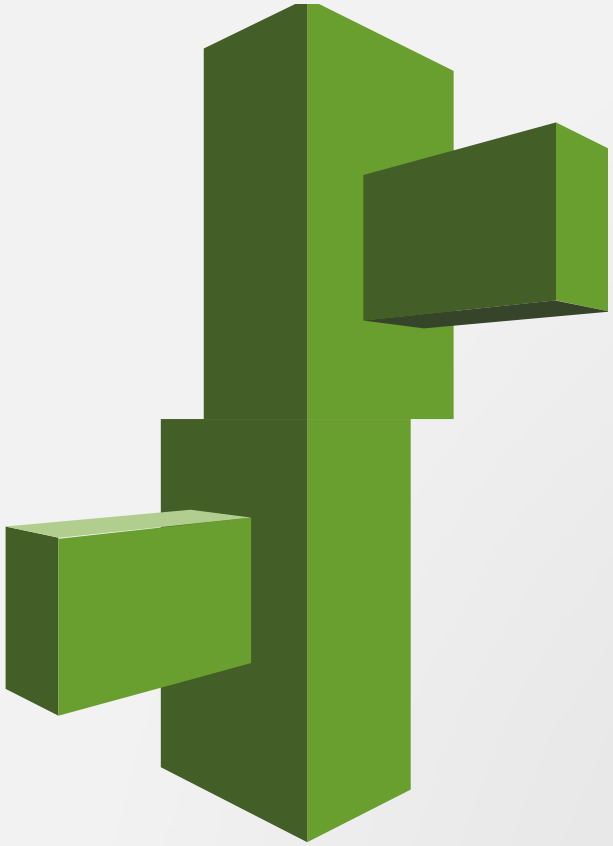
- When a metric is breached (for example, instance CPU utilization > 80% for 5 minutes), take some action, such as:
- Send an e-mail
- Add or remove an EC2 instance

Amazon CloudWatch

- Visualize metrics in the AWS Management Console, or download via the API



Amazon Elastic Beanstalk



Amazon Elastic Beanstalk

- Simply upload your application – or push with git
  - and Beanstalk deploys to an environment
- Environment includes an Elastic Load Balancer, Auto Scaling/EC2, and Notifications
- Manage multiple application versions across different environments (e.g., dev, test, prod)
- Supported containers include Java, .NET, PHP, Python, node.js, and Ruby
- Application and server logs pushed to S3 automatically

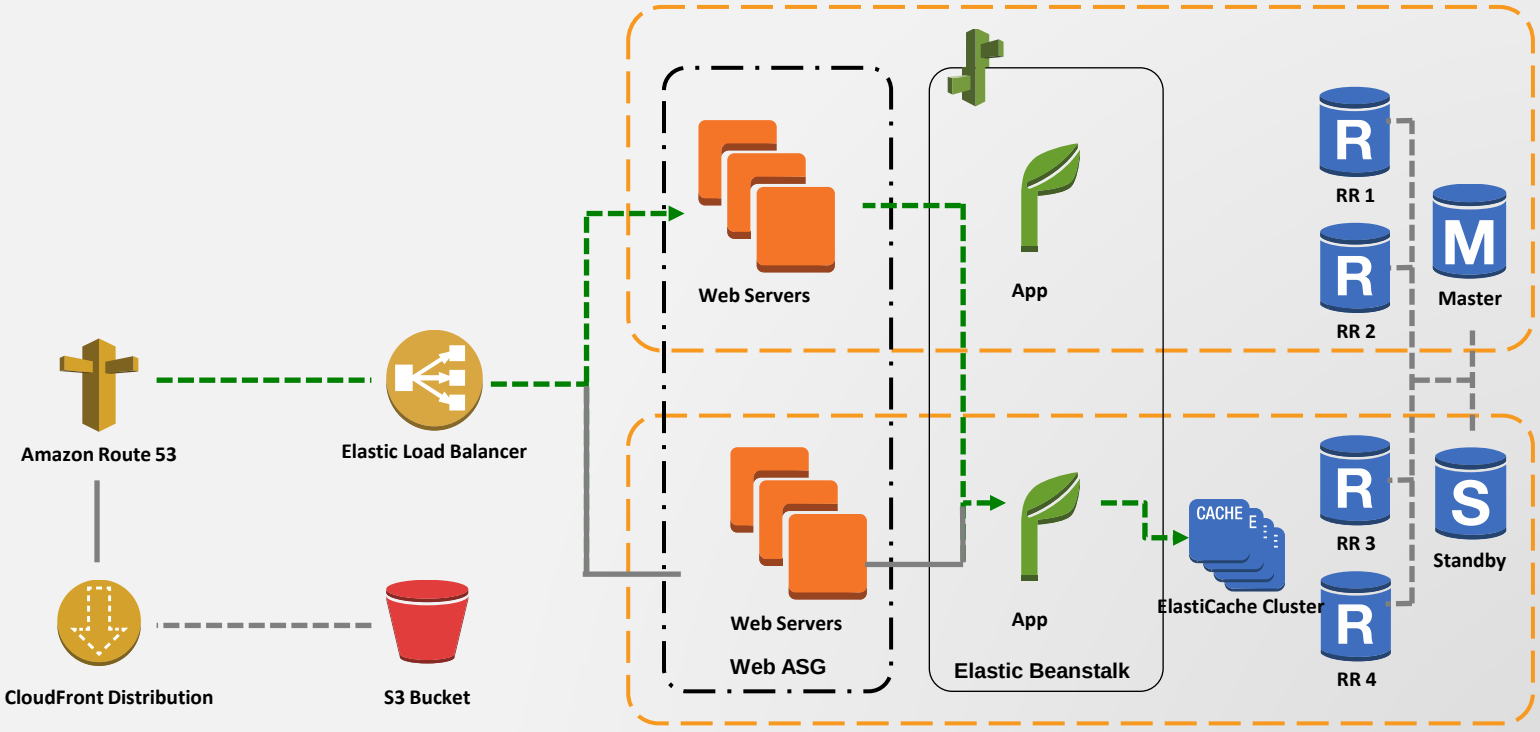
AWS CloudFormation

AWS CloudFormation

- Infrastructure as code, suitable for change management in version control (e.g., git, svn, etc.)
- Define an entire application stack (i.e., all resources required for your application) in a JSON template file
- Define runtime parameters for a template (e.g., EC2 Instance Size, EC2 Key Pair, etc)

AWS CloudFormation

- This is an example of an application stack.



AWS CloudFormation

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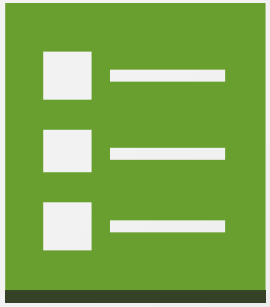
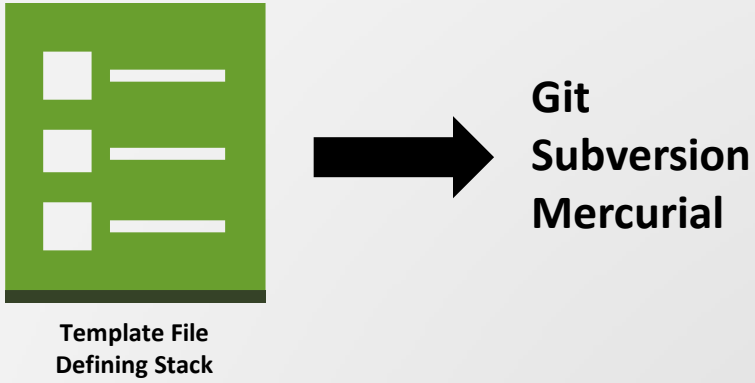


Template File Defining Stack

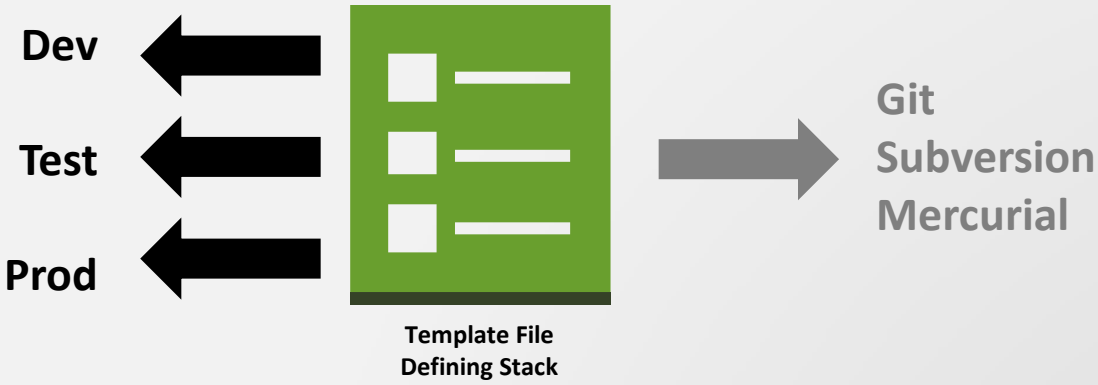
AWS CloudFormation

- This is an example of an application stack.



AWS CloudFormation

- This is an example of an application stack.



AWS CloudFormation

```
{
        "Description" : "Create an EC2 instance running the Amazon Linux 32 bit AMI.”,
        "Parameters" : {
                "KeyPair" : {
                        "Description" : "The EC2 Key Pair to allow SSH access to the
instance",
                        "Type" : "String"
                }
        },
        "Resources" : {
                "Ec2Instance" : {
                        "Type" : "AWS::EC2::Instance",
                        "Properties" : {
                                "KeyName" : { "Ref" : "KeyPair" },
                                "ImageId" : "ami-75g0061f”,
                                “InstanceType” : “m1.medium”
                        }
                }
        },
        "Outputs" : {
                "InstanceId" : {
                        "Description" : "The InstanceId of the newly created EC2 instance",
                        "Value" : { "Ref" : "Ec2Instance” }
                }
        }
}
```

AWS CloudFormation

```
{
        "Description" : "Create an EC2 instance running the Amazon Linux 32 bit AMI.",
        "Parameters" : {
                "KeyPair" : {
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                                "ImageId" : "ami-75g0061f",
                                "InstanceType" : "m1.medium"
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                }
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AWS CloudFormation

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                }
        }
}
```

For review

- List the three main AWS products for network and content delivery
- List the three main AWS products for deployment and management