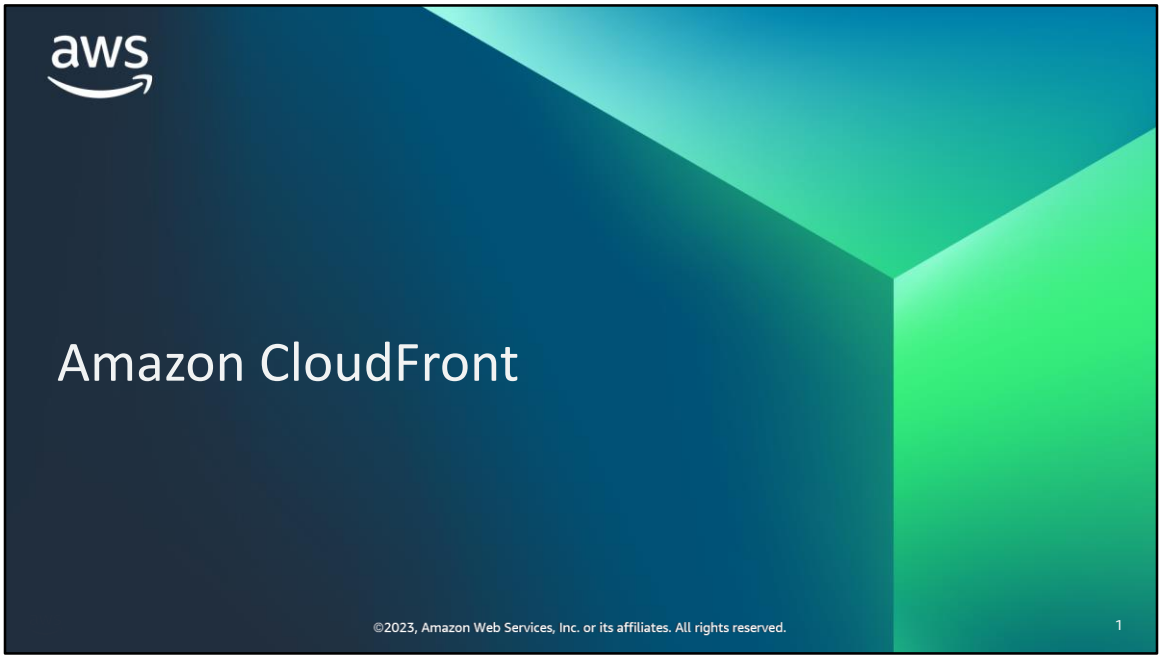


At the core of the lesson

You will learn how to describe the Amazon CloudFront content delivery network (CDN) service.

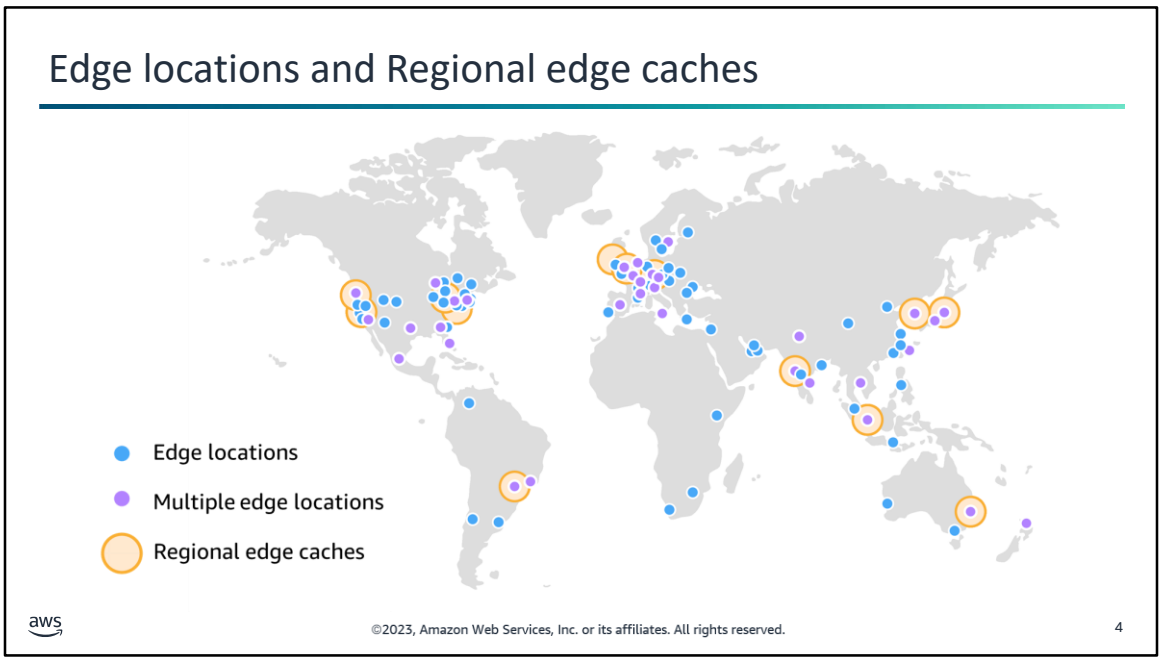
What is CloudFront?

Amazon CloudFront

- CloudFront is a web service that speeds up the distribution of static and dynamic web content (such as .html, .css, .js, and image files) to users.
- CloudFront delivers content through a worldwide network of data centers that are called edge locations.

aws

When a user requests content that you're serving with CloudFront, the request is routed to the edge location that provides the lowest latency (time delay) so that content is delivered with the best possible performance. If the content is already in the edge location with the lowest latency, CloudFront delivers it immediately. If the content is not in that edge location, CloudFront retrieves it from an origin that you've defined, such as an Amazon Simple Storage Service (Amazon S3) bucket, a MediaPackage channel, or an HTTP server (for example, a web server) that you have identified as the source for the definitive version of your content.

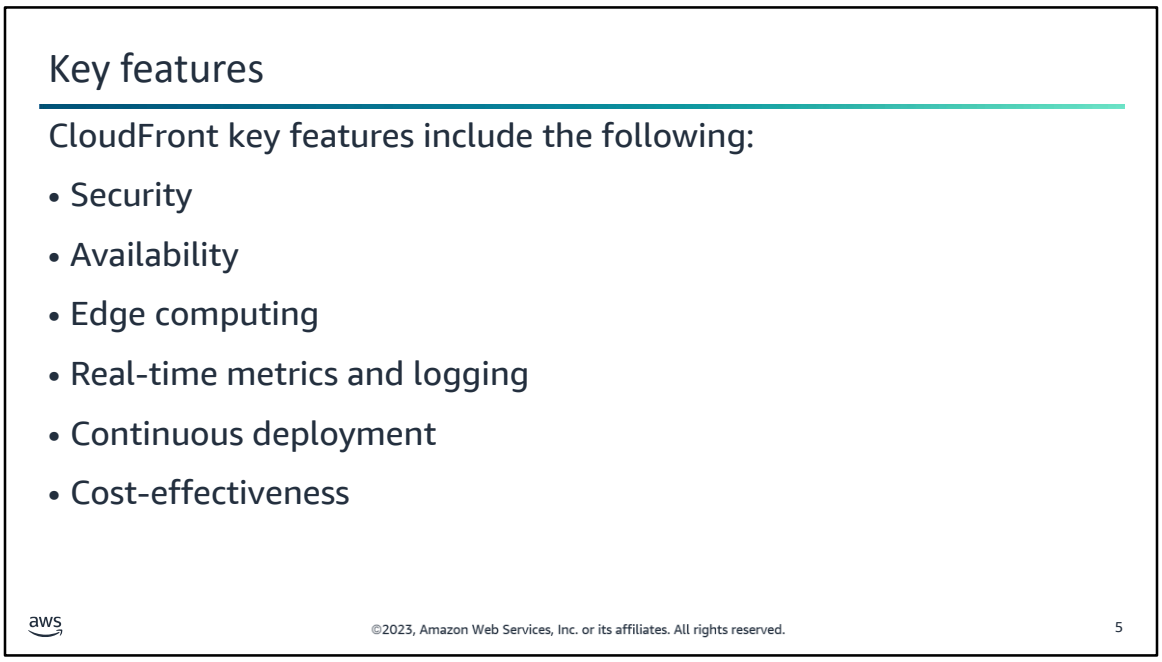


To deliver content to end users with lower latency, Amazon CloudFront uses a global network of more than 450 edge locations and 13 Regional edge caches in more than 90 cities across 48 countries. The map is current as of February 2023.

CloudFront edge locations (also known as points of presence, or POPs) make sure that popular content can be served quickly to viewers. CloudFront also has Regional edge caches that bring more content closer to viewers, even when the content is not popular enough to stay at an edge location, to help improve performance for that content.

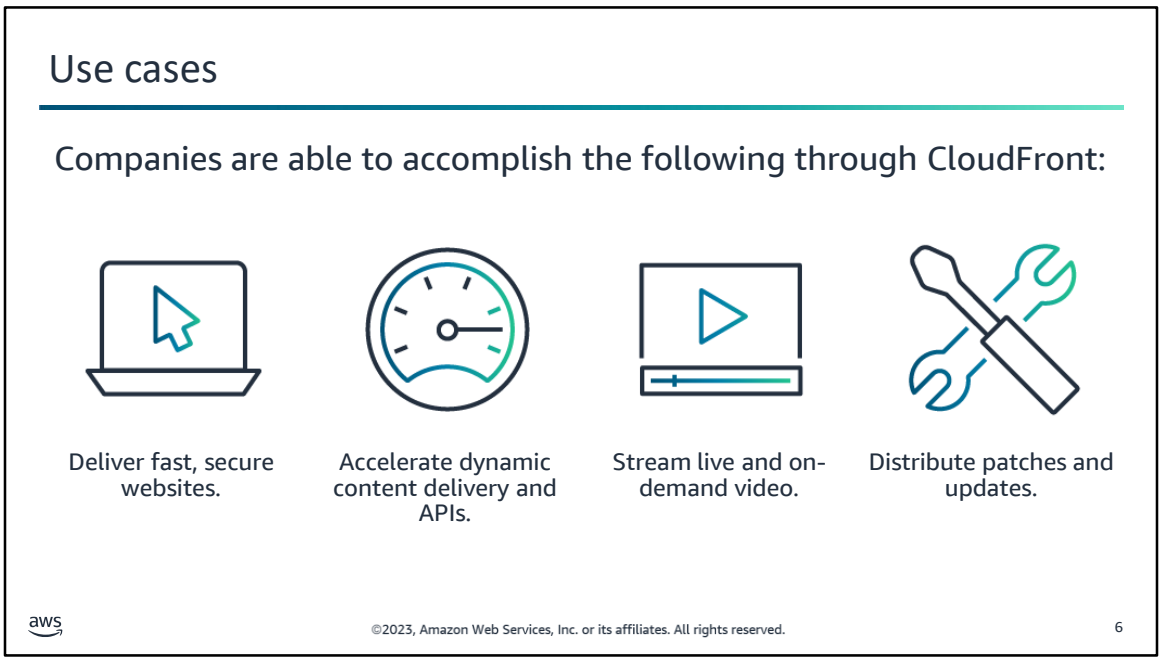
Regional edge caches help with all types of content, particularly content that tends to become less popular over time. Examples include user-generated content, such as video, photos, or artwork; ecommerce assets, such as product photos and videos; and news and event-related content that might suddenly find new popularity.

CloudFront edge locations are connected to AWS Regions through the AWS network backbone—fully redundant, multiple 100 gigabit Ethernet (GbE) parallel fibers that circle the globe and link with tens of thousands of networks for improved origin fetches and dynamic content acceleration.



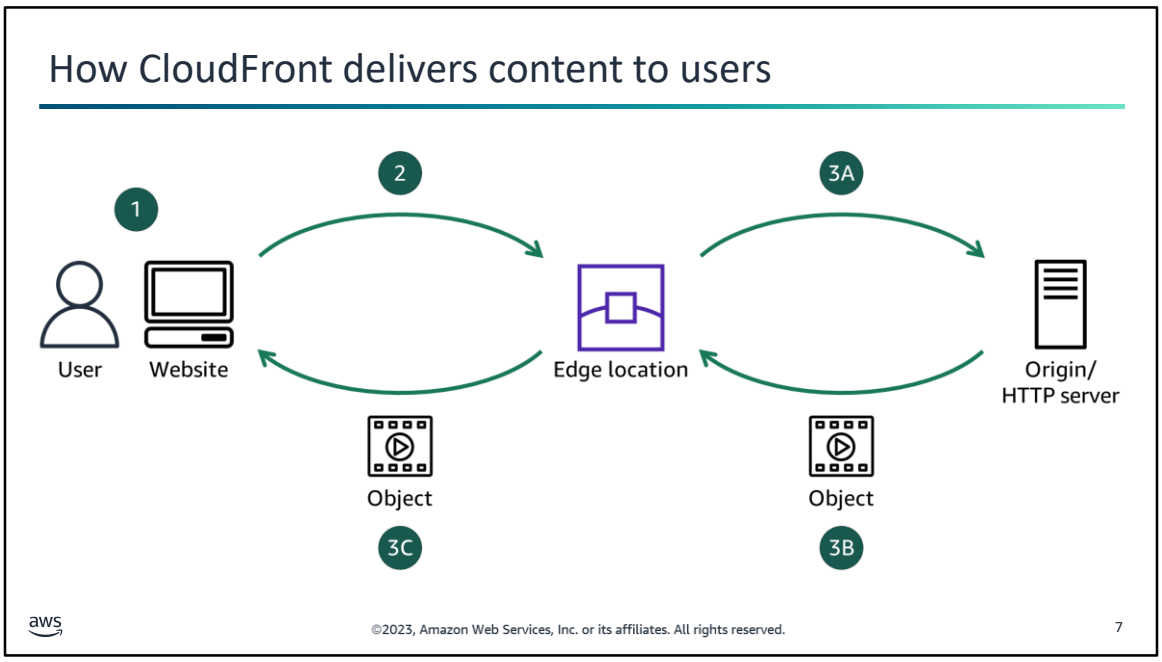
CloudFront users benefit from the following features:

- Security
  - Protects against network and application layer attacks
  - Delivers content, APIs, or applications over HTTPS using the latest TLS version (TLSv1.3) to encrypt and secure communication between viewer clients and CloudFront
  - Supports multiple methods of access control
  - Is compliant with major industry standards, including PCI-DSS, HIPAA, and ISO/IEC, to help ensure secure delivery for sensitive data
- Availability
  - Automatically serves content from a backup origin when the primary origin is unavailable by using its native origin failover capability.
- Edge computing
  - Offers programmable and secure edge CDN computing capabilities through CloudFront Functions and Lambda@Edge
- Real-time metrics and logging
  - Is integrated with Amazon CloudWatch and automatically publishes six operational metrics per distribution, which are displayed in a set of graphs in the CloudFront console
- Continuous deployment
  - Gives you the ability to deploy two separate but identical environments—called a blue/green deployment—and support integration with the ability to roll out releases gradually without any Domain Name System (DNS) changes
- Cost-effectiveness
  - Offers personalized pricing options, including pay-as-you-go, the CloudFront security savings bundle, and custom pricing. With CloudFront, there are no upfront payments or fixed platform fees, no long-term commitments, no premiums for dynamic content, and no requirements for professional services to get started.
  - Offers free data transfer between AWS Cloud services and CloudFront.



CloudFront is a CDN service built for high performance, security, and developer convenience. CloudFront is ideal for use cases that require the following capabilities:

- Deliver fast, secure websites: Companies can reach viewers across the globe in milliseconds with built-in data compression, edge compute capabilities, and field-level encryption.
- Accelerate dynamic content delivery and APIs: Companies are able to optimize dynamic web content delivery with the purpose-built and feature-rich AWS global network infrastructure.
- Stream live and on-demand video: Companies like video streaming services can start streams quickly, play them with consistency, and deliver high-quality video to any device with AWS Media Services and AWS Elemental resources.
- Distribute patches and updates: Companies can also scale automatically to deliver software, game patches, and Internet of Things (IoT) over-the-air (OTA) updates at scale with high transfer rates.



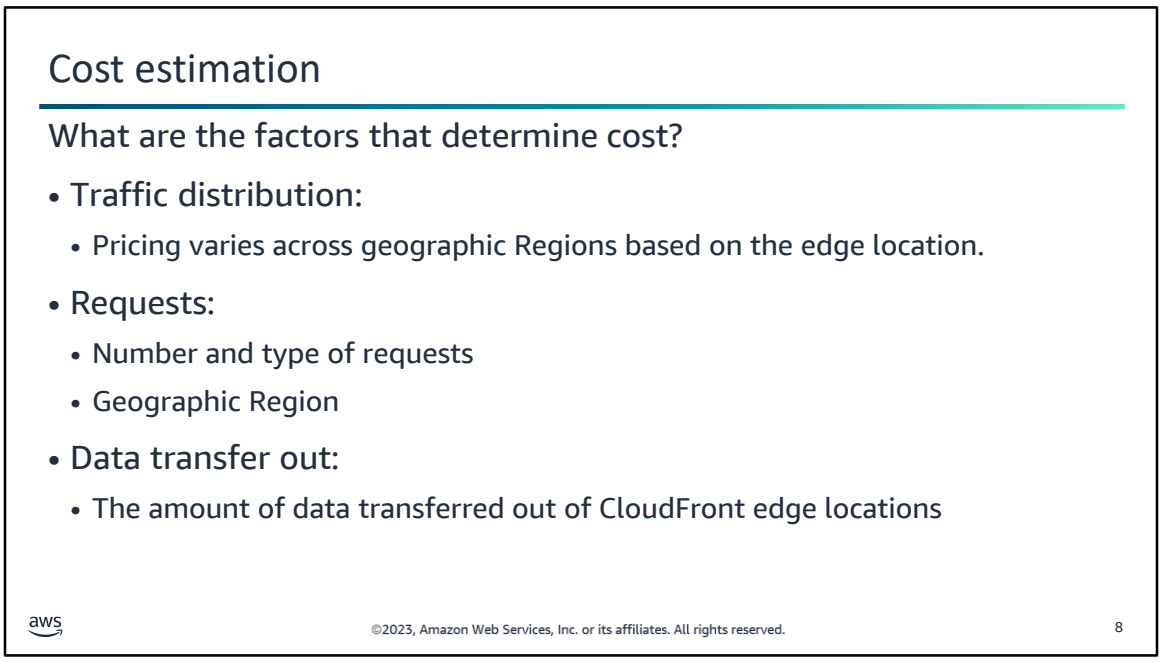
As an example, suppose that you're serving an image from a traditional web server, not from CloudFront. For example, you might serve an image, sunsetphoto.png, using the URL https://example.com/sunsetphoto.png.

Your users can navigate to this URL and see the image. However, they probably don't know that their request is routed from one network to another—through the complex collection of interconnected networks that comprise the internet—until the image is found.

CloudFront speeds up the distribution of your content by routing each user request through the AWS backbone network to the edge location that can best serve your content. Typically, this is a CloudFront edge server that provides the fastest delivery to the viewer. Using the AWS network dramatically reduces the number of networks that your users' requests must pass through, which improves performance. Users get lower latency—the time it takes to load the first byte of the file—and higher data transfer rates.

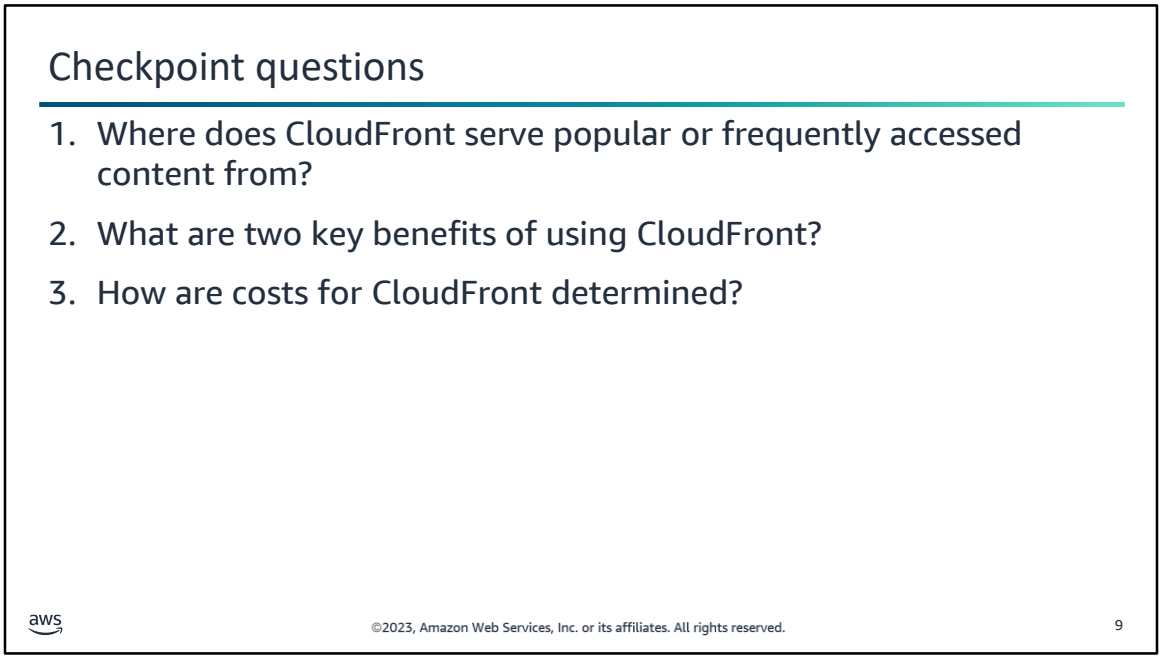
The diagram on the slide demonstrates what happens when users request objects after CloudFront has been configured to deliver your content. Here is a description of each step:

1. A user accesses your website or application and sends a request for an object, such as an image file or an .html file.
2. DNS routes the request to the CloudFront POP (edge location) that can best serve the request—typically the nearest CloudFront POP in terms of latency—and routes the request to that edge location.
3. CloudFront checks its cache for the requested object. If the object is in the cache, CloudFront returns it to the user. If the object is not in the cache, CloudFront does the following:
    A. CloudFront compares the request with the specifications in your distribution and forwards the request to your origin server for the corresponding object (for example, to your S3 bucket or your HTTP server).
    B. The origin server sends the object back to the edge location.
    C. As soon as the first byte arrives from the origin, CloudFront begins to forward the object to the user. CloudFront also adds the object to the cache for the next time someone requests it.



CloudFront is designed so that you don’t have to pay any upfront fees or commit to how much content you'll have. As with the other AWS services, you pay as you go and pay for only what you use. When you begin to estimate the cost of CloudFront, you must consider traffic distribution, requests, and data transfer out:

- Traffic distribution: Data transfer and request pricing vary across geographic regions based on the edge location where your content is served from.
- Requests: You incur CloudFront charges when CloudFront responds to requests for your objects, which include the number and type of requests (HTTP or HTTPS) that were made and the geographic Region where the requests are made.
- Data transfer out: You incur CloudFront charges when users transfer data out to the internet and out to an origin or edge function, which includes DELETE, OPTIONS, PATCH, POST, and PUT requests. If you use AWS origins such as Amazon S3 or Elastic Load Balancing (ELB), you pay only for storage costs and transfers out to the internet, not for any data transferred between these services and CloudFront.



The answers to the questions are as follows:

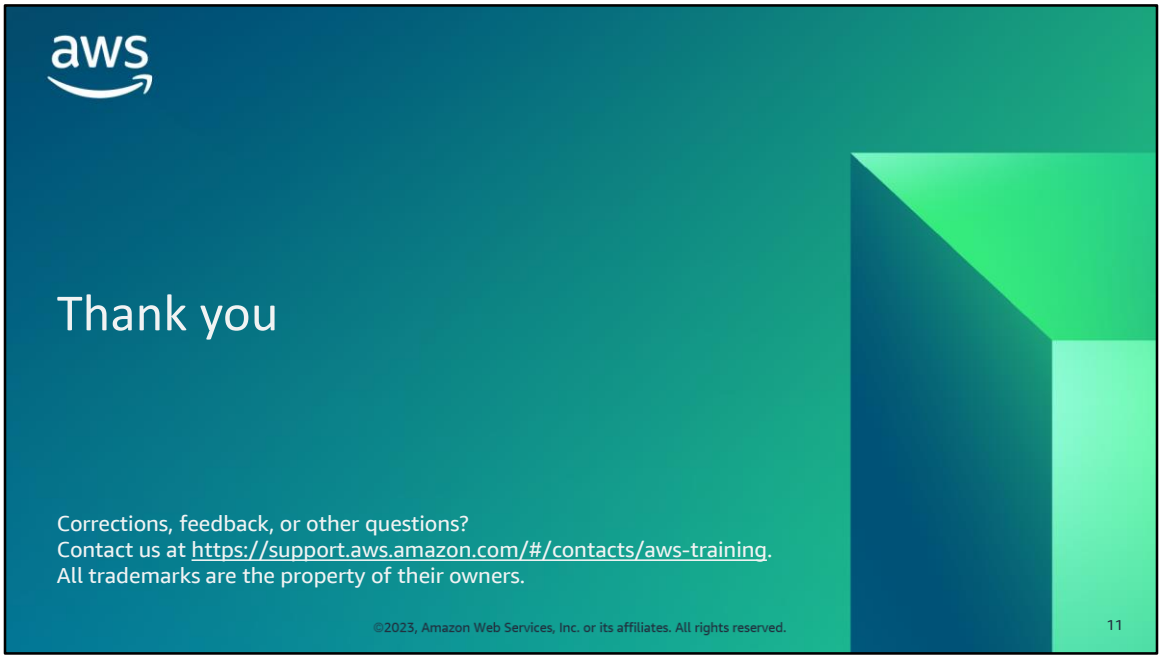
1. Where does CloudFront serve popular or frequently accessed content from?
   An edge location

2. What are two key benefits of using CloudFront?
   - Security
   - Availability
   - Edge computing
   - Real-time metrics and logging
   - Continuous deployment
   - Cost-effectiveness

3. How are costs for CloudFront determined?
   CloudFront costs are calculated based on geographic Region, number and type of requests, and the amount of data that is transferred out.

Key ideas

- CloudFront is a CDN service that uses edge locations to deliver content securely in a highly available, scalable, and performant manner.
- CloudFront works with other AWS services to help you distribute content to users with low latency, high data transfer speeds, and no required minimum commitments.
- CloudFront costs are calculated based on geographic Region, number and type of requests, and the amount of data that is transferred out.



Thank you

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