Architecture Design

Disease Recognition Using X-ray Plates

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1. Introduction

1.1 What is Architecture Design Document?

Any software needs the architectural design to represent the design of the software. IEEE defines architectural design as “the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system.” The software that is built for computer-based systems can exhibit one of these many architectures.
Each style will describe a system category that consists of:

- A set of components (eg: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic models help the designer to understand the overall properties of the system.

1.2 What is Scope?

Architecture Design Document (ADD) is an architectural design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the design principles may be defined during requirement analysis and then refined during architectural design work.

2. Architecture

2.1 AWS S3 Amazon Architecture

Amazon Simple Storage Service (Amazon S3) is an object storage service that offers industry-leading scalability, data availability, security, and performance. Customers of all sizes and industries can use Amazon S3 to store and protect any amount of data for a range of use cases, such as data lakes, websites, mobile applications, backup and restore, archive, enterprise applications, IoT devices, and big data analytics. Amazon S3 provides management features so that you can optimize, organize, and configure access to your data to meet your specific business, organizational, and compliance requirements.

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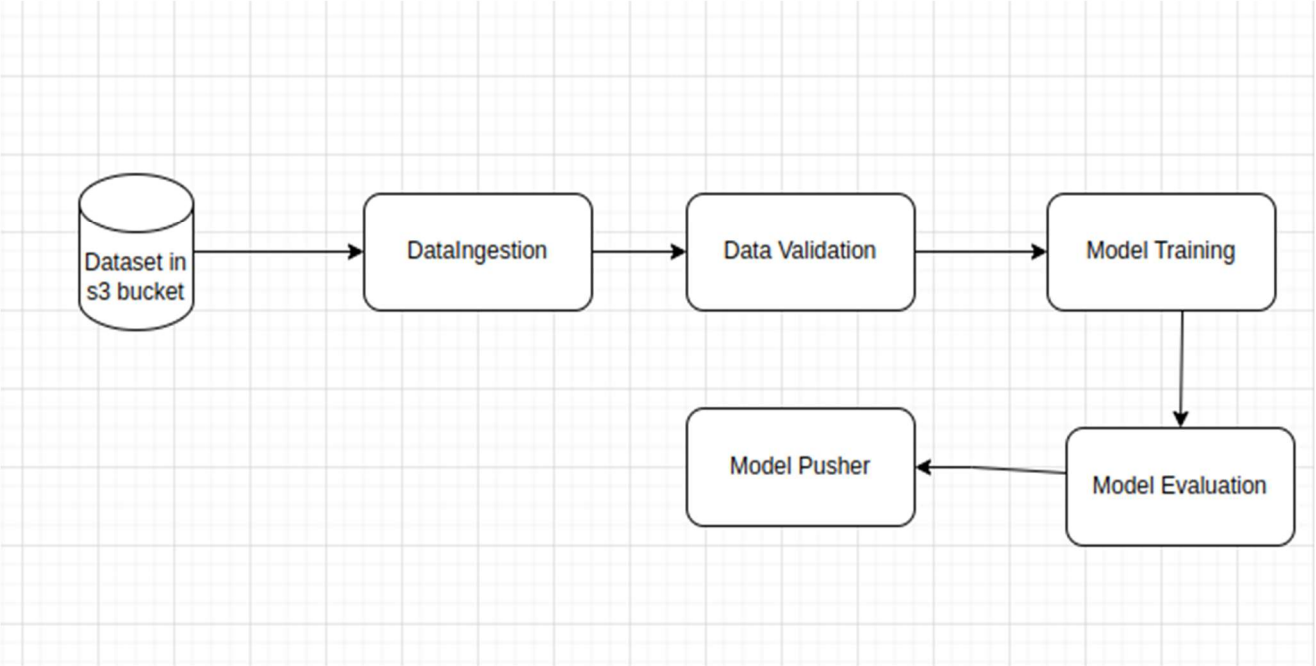


2.2 Components of AWS S3

1. **Storage Classes**

Amazon S3 Express One Zone is a high-performance, single-zone Amazon S3 storage class that is purpose-built to deliver consistent, single-digit millisecond data access for your most latency-sensitive applications. S3 Express One Zone is the lowest latency cloud object storage class available today, with data access speeds up to 10x faster and with request costs 50 percent lower than S3 Standard. S3 Express One Zone is the first S3 storage class where you can select a single Availability Zone with the option to co-locate your object storage with your compute resources, which provides the highest possible access speed. Additionally, to further increase access speed and support hundreds of thousands of requests per second, data is stored in a new bucket type: an Amazon S3 directory bucket.

2. **Storage Management**

Power BI Amazon S3 has storage management features that you can use to manage costs, meet regulatory requirements, reduce latency, and save multiple distinct copies of your data for compliance requirements.

- **S3 Lifecycle** – Configure a lifecycle configuration to manage your objects and store them cost effectively throughout their lifecycle. You can transition objects to other S3 storage classes or expire objects that reach the end of their lifetimes.
- **S3 Object Lock –** Prevent Amazon S3 objects from being deleted or overwritten for a fixed amount of time or indefinitely. You can use Object Lock to help meet regulatory requirements that require *write-once-read-many (WORM)* storage or to simply add another layer of protection against object changes and deletions.
- **S3 Replication** – Replicate objects and their respective metadata and object tags to one or more destination buckets in the same or different AWS Regions for reduced latency, compliance, security, and other use cases.
- **S3 Batch Operations** – Manage billions of objects at scale with a single S3 API request or a few clicks in the Amazon S3 console. You can use Batch Operations to perform operations such as **Copy**, **Invoke AWS Lambda function**, and **Restore** on millions or billions of objects.

3. **Data Processing**

To transform data and trigger workflows to automate a variety of other processing activities at scale, you can use the following features.

- **S3 Object Lambda** – Add your own code to S3 GET, HEAD, and LIST requests to modify and process data as it is returned to an application. Filter rows, dynamically resize images, redact confidential data, and much more.
- **Event notifications** – Trigger workflows that use Amazon Simple Notification Service (Amazon SNS), Amazon Simple Queue Service (Amazon SQS), and AWS Lambda when a change is made to your S3 resources.

4. **Storage logging and monitoring**

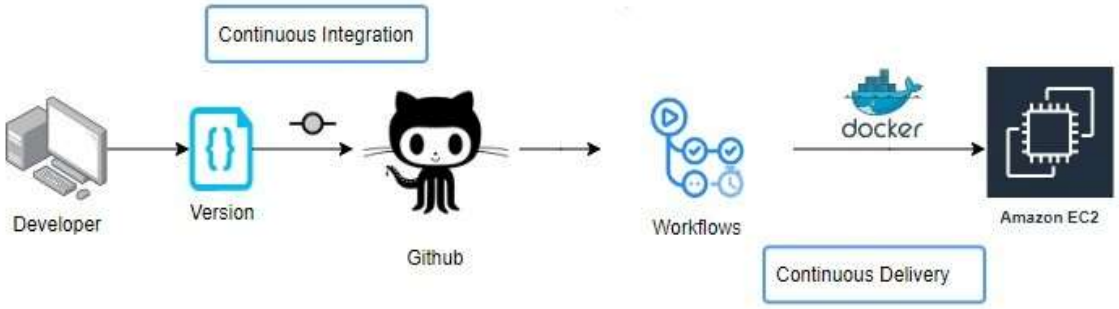
Amazon S3 provides logging and monitoring tools that you can use to monitor and control how your Amazon S3 resources are being used. For more information.

Automated monitoring tools

- **Amazon CloudWatch metrics for Amazon S3** – Track the operational health of your S3 resources and configure billing alerts when estimated charges reach a user-defined threshold.

- **AWS CloudTrail** – Record actions taken by a user, a role, or an AWS service in Amazon S3. CloudTrail logs provide you with detailed API tracking for S3 bucket-level and object-level operations.

Deployment

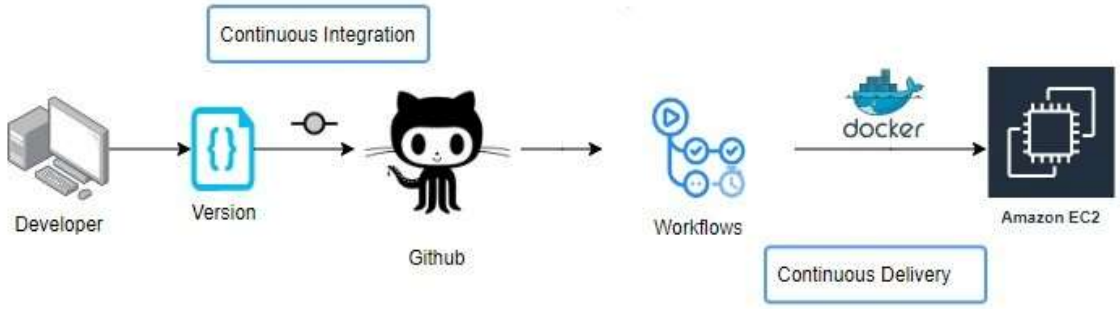


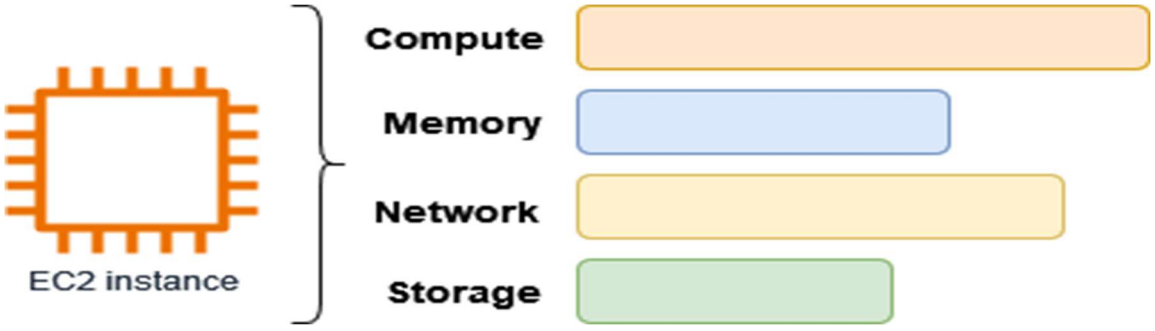
3.1 Amazon EC2 Deployment

Amazon Elastic Compute Cloud (Amazon EC2) provides on-demand, scalable computing capacity in the Amazon Web Services (AWS) Cloud. Using Amazon EC2 reduces hardware costs so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. You can add capacity (scale up) to handle compute-heavy tasks, such as monthly or yearly processes, or spikes in website traffic. When usage decreases, you can reduce capacity (scale down) again.

3.2 Publish datasets and reports from Amazon EC2

An EC2 instance is a virtual server in the AWS Cloud. When you launch an EC2 instance, the instance type that you specify determines the hardware available to your instance. Each instance type offers a different balance of compute, memory, network, and storage resources.





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