# Serverless Architecture for Product Defect Detection Using Computer Vision

Detect product defects, get real-time notifications, and visualize insights using AWS artificial intelligence and machine learning, and serverless services

Architecture for camera-based in-line or end-of-line quality inspection. Supports automated or one-time anomaly detection using image classification in the cloud; real-time monitoring and notifications; and analytics and insights from the classification results.
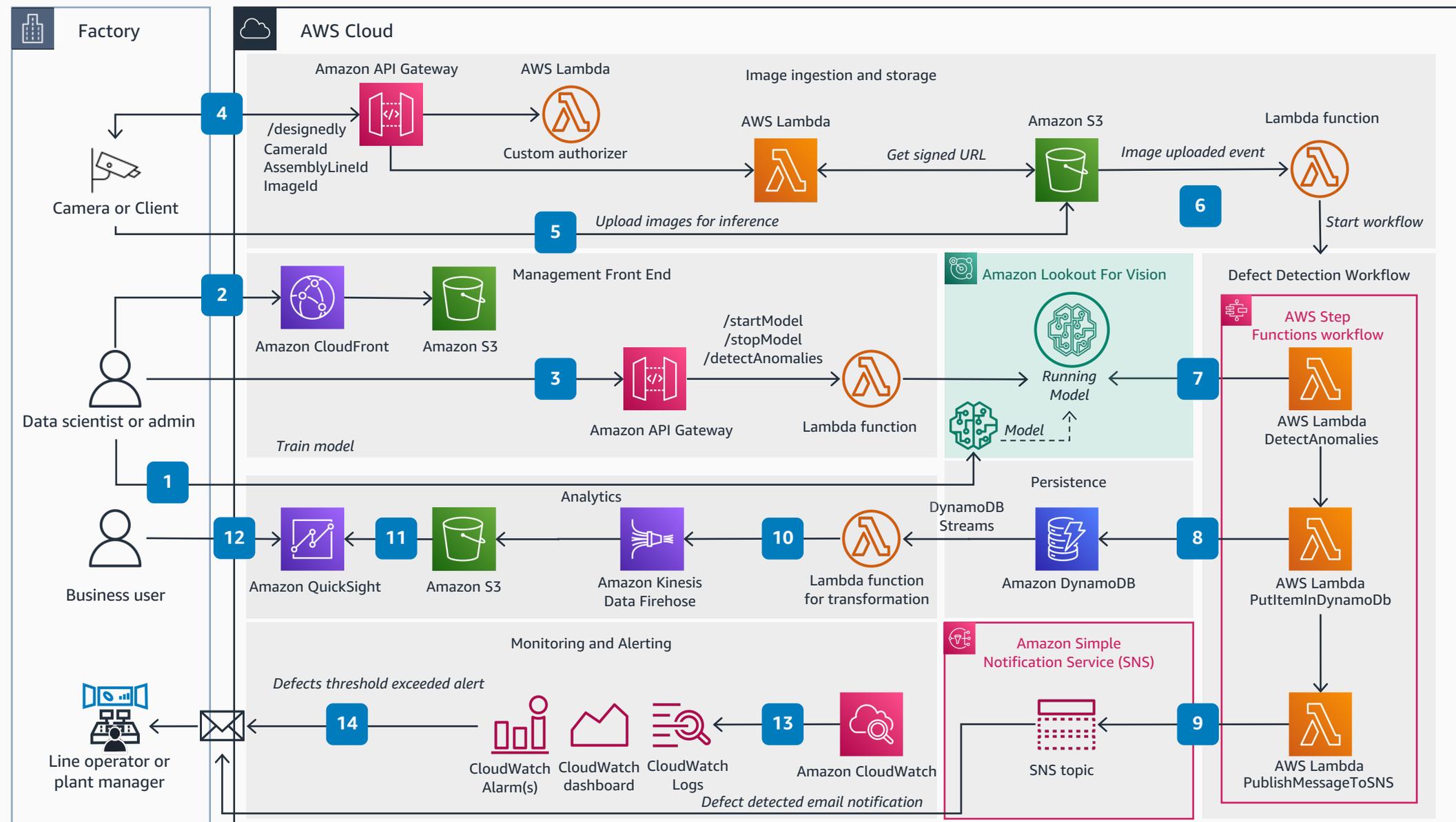
1 Upload training data to **Amazon Lookout For Vision** or import training data from **Amazon Simple Storage Service (Amazon S3)** and train a model.

2 Admin users signup and login to a management front end website.

3 Start or stop the model or do one-time defect detection by uploading an image.

4 Camera or a client application invokes an **Amazon API Gateway** endpoint to get a signed URL from **Amazon S3**. The request is authorized by an **AWS Lambda** function and a signed URL is returned.

5 Using the signed URL, an image, along with its associated metadata, is uploaded to **Amazon S3**.

6 Image upload to the **S3** bucket triggers an event notification to initiate an **AWS Step Functions** workflow**.**

7 Fetch image from the **S3** bucket and present to **Amazon Lookout For Vision** for anomaly detection using DetectAnomalies API.

8 Store inference result and image metadata in **Amazon DynamoDB**.

9 Publish a notification to an **Amazon Simple Notification Service (Amazon SNS) t**opic to send an email alert to subscribed operators and plant managers in case a defect or a low-confidence result is detected.

10 Inference results are fetched from **DynamoDB Streams**, transformed and enriched, sent to **Amazon Kinesis Data Firehose** for batching, and saved in another **S3** bucket.

11 Inference results datasets are imported into **Amazon Quicksight**. This process can be scheduled based on requirements.

12 Create dashboards and analyses for business users, and gain insights from the inference results.

13 **Amazon CloudWatch** provides a single pane of glass to operators and plant managers for workload and defect detection monitoring using logs, alarms, and dashboards.

14 Alarm notifications from **Amazon CloudWatch** are sent to operators and plant managers by **Amazon SNS** whenever defects exceed a pre-defined threshold.

AWS Reference Architecture