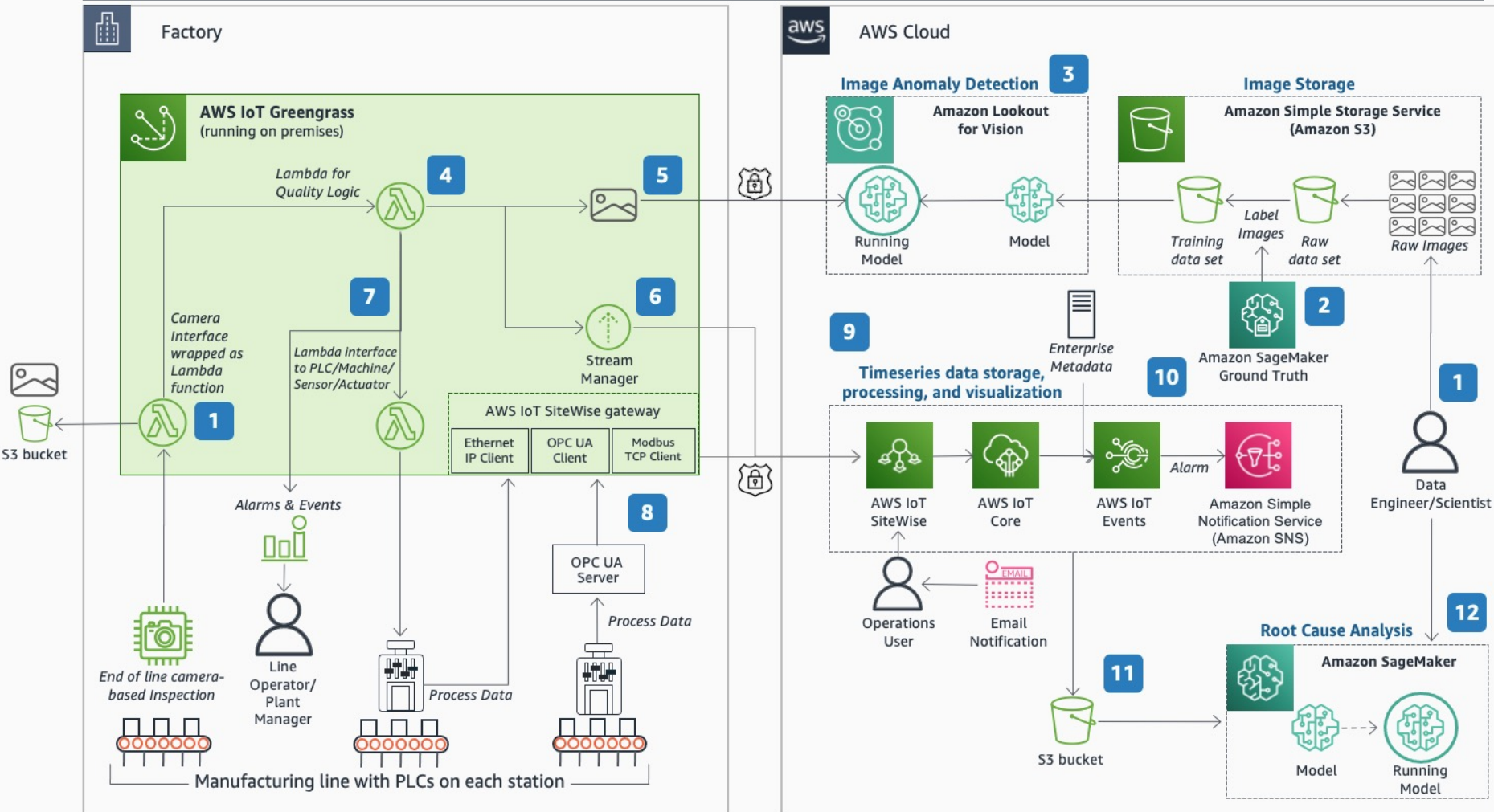


# Using Computer Vision for Product Quality Analysis in Plants

## Detect and act on product-defect-classification using AWS IoT and AI/ML services.

Use this architecture for camera-based, end-of-line quality inspection; defect-detection using image classification in the cloud; alert notifications; real-time actuation; and root cause analysis using process data and inferred vision results.



- 1 Auto-upload training images from the manufacturing line camera to **Amazon Simple Storage Service (Amazon S3)** using a **AWS Lambda** function running on **AWS IoT Greengrass**, or manually batch-upload training images to **Amazon S3**.
- 2 Use **Amazon SageMaker Ground Truth** to label training images.
- 3 Train a model using **Amazon Lookout For Vision (Lookout for Vision)** and deploy the trained model for running production inferences.
- 4 Feed live production images to **AWS Lambda** function on **AWS IoT Greengrass** to perform anomaly detection.
- 5 Present camera image to **Lookout For Vision** for anomaly detection using inference API.
- 6 Feed inference metadata to **AWS IoT SiteWise** in the cloud for further processing via **AWS IoT Greengrass** stream manager.
- 7 Perform automated action on machine of concern and/or notify plant personnel from **AWS Lambda** function (using **AWS IoT Greengrass** connector for the **Amazon Simple Notification Service (Amazon SNS)**).
- 8 Ingest process data into **AWS IoT SiteWise** gateway running on **AWS IoT Greengrass** from machine/equipment using Open Platform Communications Unified Architecture (OPC UA) as the standard protocol. Modbus Transmission Control Protocol (TCP) and Ethernet IP are also natively supported, with the **AWS IoT SiteWise** gateway sending PLC data to cloud.
- 9 Compute Key Performance Indicator (KPI) metrics from process data in **AWS IoT SiteWise**. Create monitoring and KPI dashboards in **SiteWise Monitor** for operations user.
- 10 Create events from plant data and enterprise metadata by routing data to **AWS IoT Events** via **AWS IoT Core**, and send out email or text notifications to operations user using **Amazon SNS**.
- 11 Send process and vision inference data streams to **Amazon S3** for training root cause analysis models.
- 12 Train and run model inference to pinpoint root cause using **Amazon SageMaker**.

