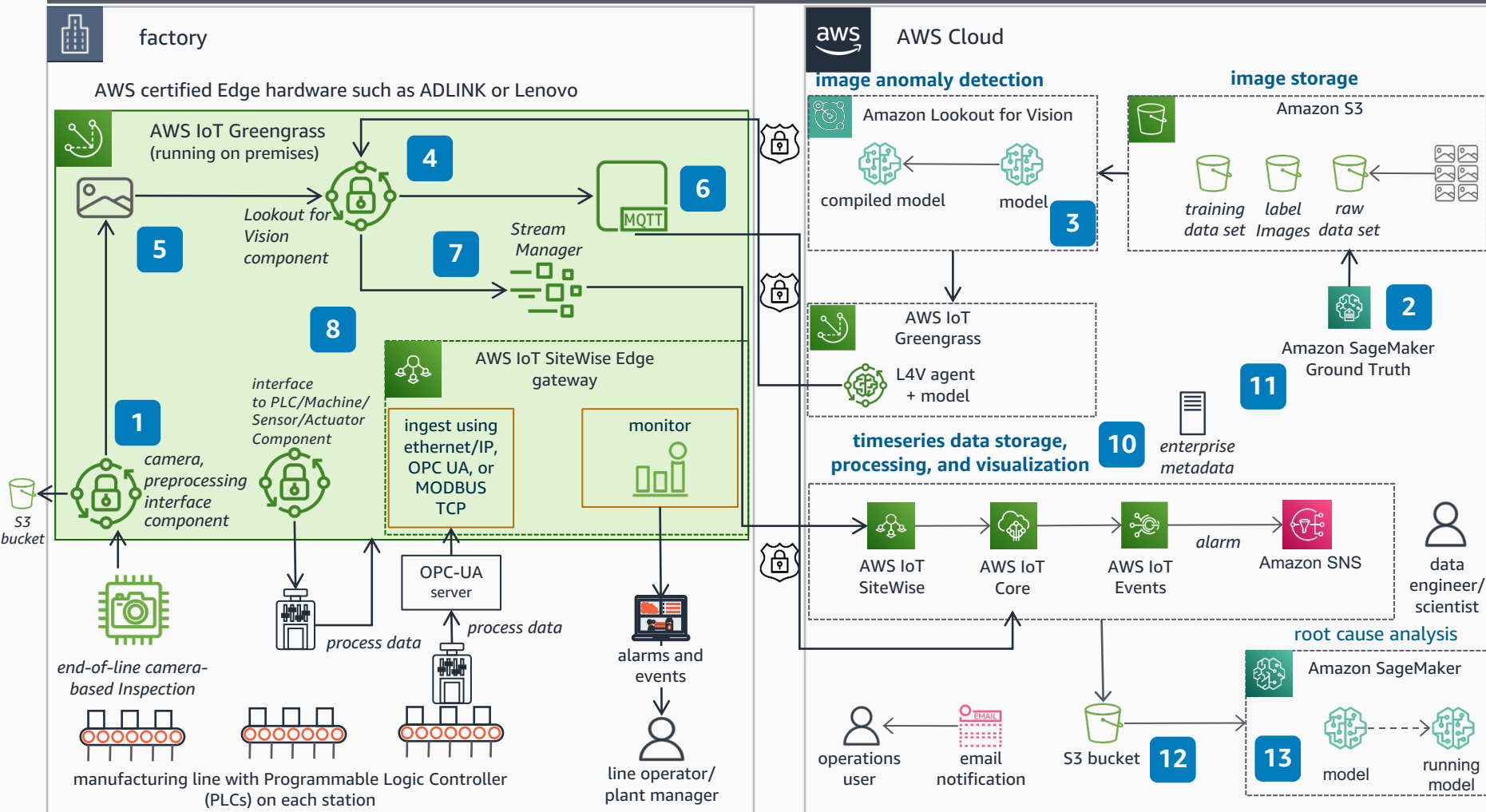


Computer Vision Based Product Quality for Manufacturing

Detect and act on product defect classification using AWS IoT and artificial intelligence/machine learning (AI/ML) services.

Use this architecture for camera-based, end-of-line quality inspection; defect-detection using image classification and semantic segmentation at edge with x86 central processing unit (CPU) or NVIDIA graphics processing unit (GPU); alert notifications; near 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)**.
- 2 Use **Amazon SageMaker Ground Truth** to label training images and label defects.
- 3 Begin model training using **Amazon Lookout For Vision** from **Amazon S3**.
- 4 Export (deploy) trained model in **Amazon Lookout For Vision to Edge** for running production inferences using **AWS IoT Greengrass**.
- 5 Present camera image to **Lookout For Vision** edge agent for anomaly detection.
- 6 Publish inference to **AWS IoT MQTT** topic.
- 7 Feed inference metadata to **AWS IoT Greengrass Stream Manager** for further processing and sending to **AWS IoT SiteWise** in the cloud.
- 8 Perform automated action on machine of concern and/or notify plant personnel of anomalies from the **AWS IoT Greengrass** component.
- 9 Ingest process data into the **AWS IoT SiteWise** gateway running on **AWS IoT Greengrass** from machine/equipment using **OPC UA** as the standard protocol. **Modbus TCP** and **ethernet IP** are also natively supported.
- 10 Configure **AWS IoT SiteWise** gateway to forward PLC tag data to **AWS**.
- 11 Compute KPI metrics (overall equipment effectiveness (OEE), and so on) from process data in **AWS IoT SiteWise**. Create monitoring and KPI dashboards in **SiteWise Monitor** for operations user.
- 12 Create events from plant data and enterprise metadata by routing data to **AWS IoT Events** through **AWS IoT Core** and send out email or text notifications to the operations user using **Amazon Simple Notification Service (Amazon SNS)**.
- 13 Feed process data and vision inference data streams to **S3** for training root cause analysis models. Run model inference to pinpoint root cause.