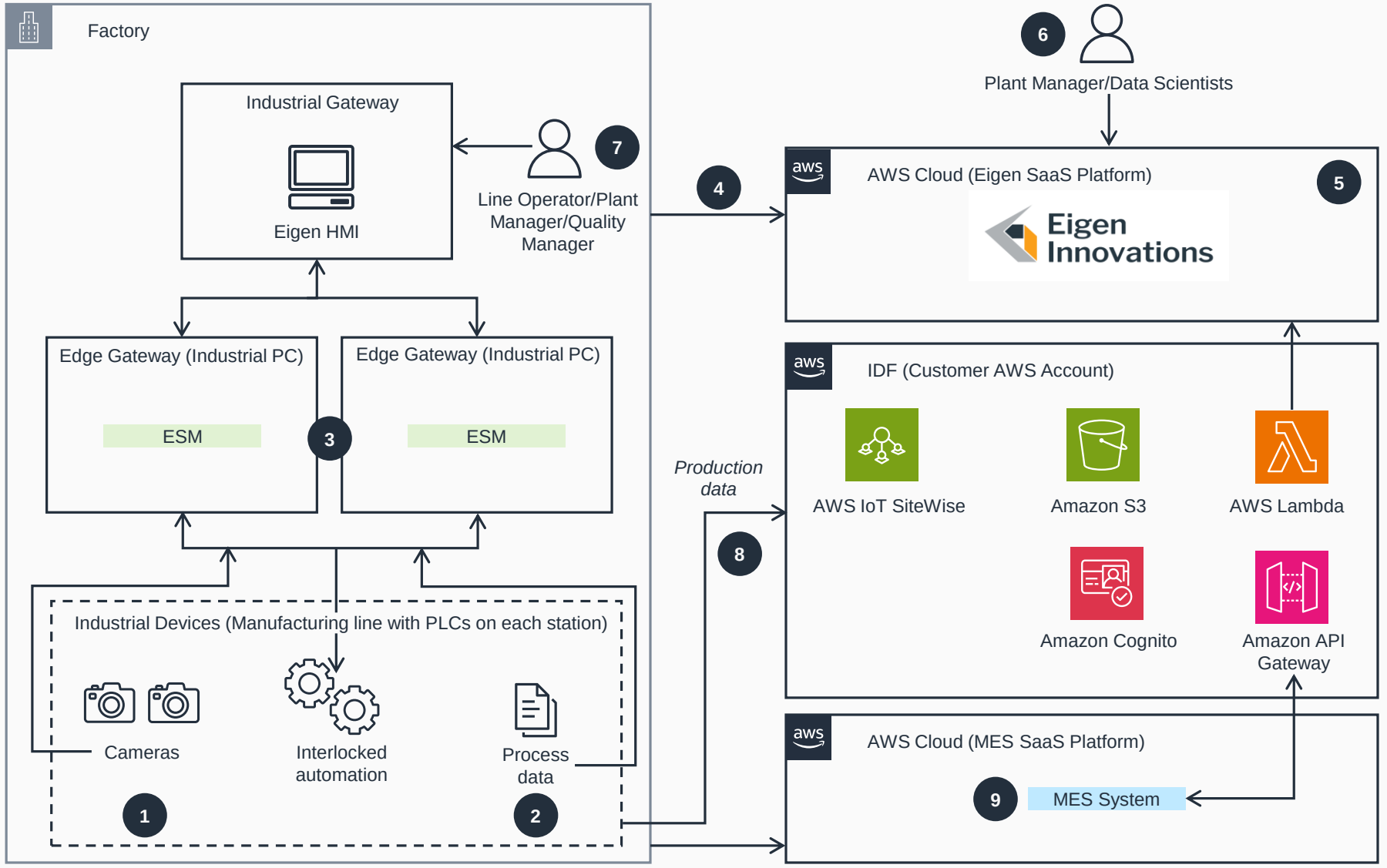
Guidance for Predictive Quality with Eigen on AWS

This architecture diagram shows how to build an edge cloud hybrid architecture for camera-based quality, including defect detection, quality metrics, process insights, part classification, defect severity, and location.



1. Industrial devices at the plant level collect product quality data, such as parametric and visual data from in-line or end-of line inspection, and send data to edge gateways for processing.
2. Manufacturing process data is also collected in sync with the product and production flow and sent to the edge gateways.
3. Eigen Smart Modules (ESMs) connect to cameras, the control network, and the AWS Cloud. In disconnected scenarios, the following services allow for buffering data at the edge: Eigen Web Application (EWA) allows local configuration. Eigen Video Application (EVA) processes streaming camera feeds, video processing, and inference. Eigen Virtual Render (EVR) provides 3D service. Eigen Alignment Service (EAS) supports part alignment and image stitching.
4. ESMs communicate with the Eigen software-as-a-service (SaaS) platform on the AWS Cloud through HTTPS. All traffic is outbound only and routed through the Eigen.io domain to AWS.
5. The Eigen SaaS platform receives events and camera data from edge locations and creates ML and predictive models. The trained models are pushed to the ESMs for edge inference.
6. Users access the Eigen front-end app for advanced insights, quality causation analysis, search, labeling, historical data, and predictive parameters. All process data is correlated with machine vision data capture.
7. Line operators, plant managers, and quality managers use the Eigen human machine interface (HMI) for near real-time results and predictive quality on the manufacturing line. Process experts analyze part quality and image data presented part over part.
8. Production data from control network can be sent to AWS using the Industrial Data Fabric (IDF) (**AWS IoT SiteWise** and **Amazon Simple Storage Service [Amazon S3]**) and then can be pushed to Eigen through an **AWS Lambda** function invoking Eigen API.
9. Manufacturing Execution System (MES) systems collect data from the control network and send it to the IDF using **Amazon API Gateway**.

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AWS Reference Architecture