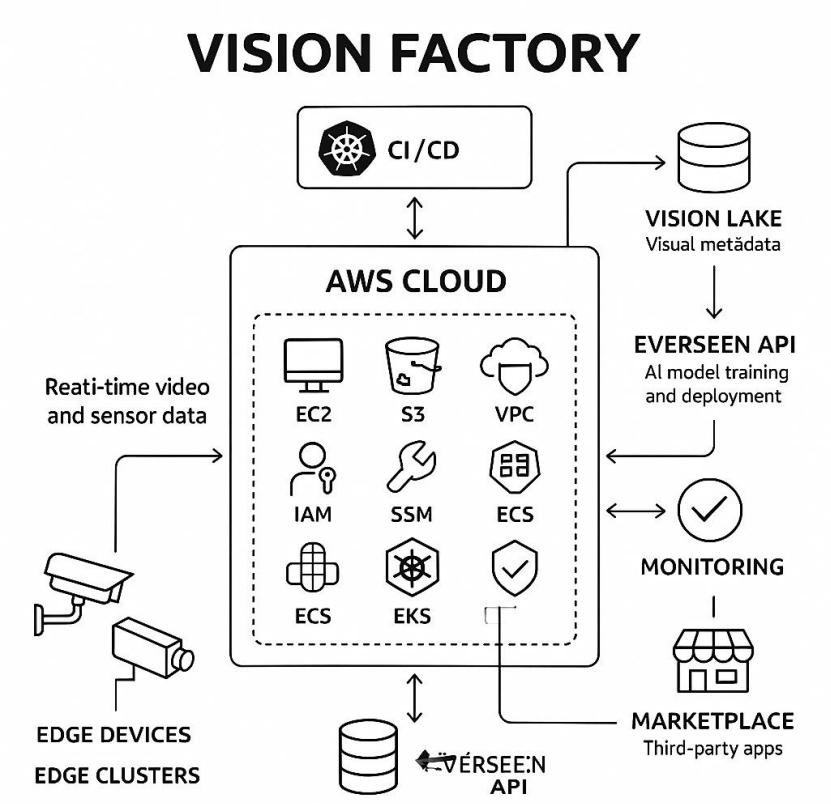

. Edge Devices / Edge Clusters

- **Function**: These are cameras or sensors deployed at the edge (e.g., in factories or retail stores) that capture **real-time video and sensor data**.
- **Role**: They serve as the data source for the entire system.

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2. AWS Cloud Infrastructure

This is the backbone of the system, hosting various services:

- **EC2 (Elastic Compute Cloud)**: Provides scalable virtual servers to run applications and services.
- **S3 (Simple Storage Service)**: Stores large volumes of data, including images, videos, and metadata.
- **VPC (Virtual Private Cloud)**: Creates a secure and isolated network environment for AWS resources.
- **IAM (Identity and Access Management)**: Controls access to AWS services and resources securely.
- **SSM (Systems Manager)**: Manages and automates operational tasks across AWS resources.
- **ECS (Elastic Container Service)**: Runs containerized applications using Docker.

- **EKS (Elastic Kubernetes Service)**: Manages Kubernetes clusters for orchestrating containerized applications.

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3. CI/CD Pipeline

- **Function**: Automates the process of **building, testing, and deploying** applications.
- **Role**: Ensures continuous updates and improvements to the system with minimal manual intervention.

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4. Vision Lake

- **Function**: A data lake specifically for storing **visual metadata** (e.g., object detection results, timestamps).
- **Role**: Acts as a central repository for all processed visual data.

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5. EVERSEEN API

- **Function**: A platform for **AI model training and deployment**.
- **Role**: Enables machine learning capabilities such as object recognition, anomaly detection, etc.

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6. Monitoring

- **Function**: Tracks system health, performance metrics, and logs.
- **Role**: Ensures reliability and quick detection of issues.

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7. Marketplace

- **Function**: A platform for integrating **third-party applications**.
- **Role**: Extends the system's capabilities by allowing external tools and services to plug in.

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8. Data Flow

- **Arrows** in the diagram show how data moves:
    - From **edge devices** to the **cloud**.
    - Through **processing and storage** layers.
    - Into **AI models** and **monitoring systems**.

- Out to **external APIs** or **marketplace apps**.

Application Detail:

1. AI/ML Applications

- Purpose: To analyze video and sensor data using machine learning models.
- Where: Deployed via the EVERSEEN API.
- Examples:
    - Object detection
    - Anomaly detection
    - Behavior analysis
    - Predictive maintenance

2. Containerized Applications

- Purpose: Modular services that handle specific tasks like data ingestion, preprocessing, or analytics.
- Where: Run on ECS (Elastic Container Service) and EKS (Elastic Kubernetes Service).
- Examples:
    - Video stream processors
    - Metadata extractors
    - Microservices for API handling

3. CI/CD Automation Tools

- Purpose: Automate the build, test, and deployment of applications.
- Where: Integrated into the CI/CD pipeline.
- Examples:
    - Jenkins, GitLab CI, AWS CodePipeline
    - Automated testing frameworks

4. Monitoring & Logging Applications

- Purpose: Ensure system health, performance tracking, and alerting.

- Where: Part of the Monitoring layer.
- Examples:
    - CloudWatch, Prometheus, Grafana
    - Log aggregators and anomaly detectors

5. Third-Party Integrations

- Purpose: Extend functionality via external applications.
- Where: Accessed through the Marketplace.
- Examples:
    - Retail analytics tools
    - Security and compliance apps
    - Visualization dashboards

6. Data Storage & Management Services

- Purpose: Store and manage large volumes of visual and sensor data.
- Where: S3 and Vision Lake.
- Examples:
    - Data lakes for analytics
    - Backup and archival systems

Application APIs:

1. **Data Ingestion API** – Handles real-time video and sensor data from edge devices.
2. **Preprocessing API** – Cleans and formats data before analysis.
3. **Inference API** – Runs AI/ML models to generate predictions.
4. **Storage Management API** – Interfaces with S3 for storing data.
5. **Metadata Extraction API** – Extracts and structures visual metadata for Vision Lake.
6. **Monitoring API** – Collects logs and metrics for system health.
7. **Notification API** – Sends alerts based on AI-detected anomalies or system events.