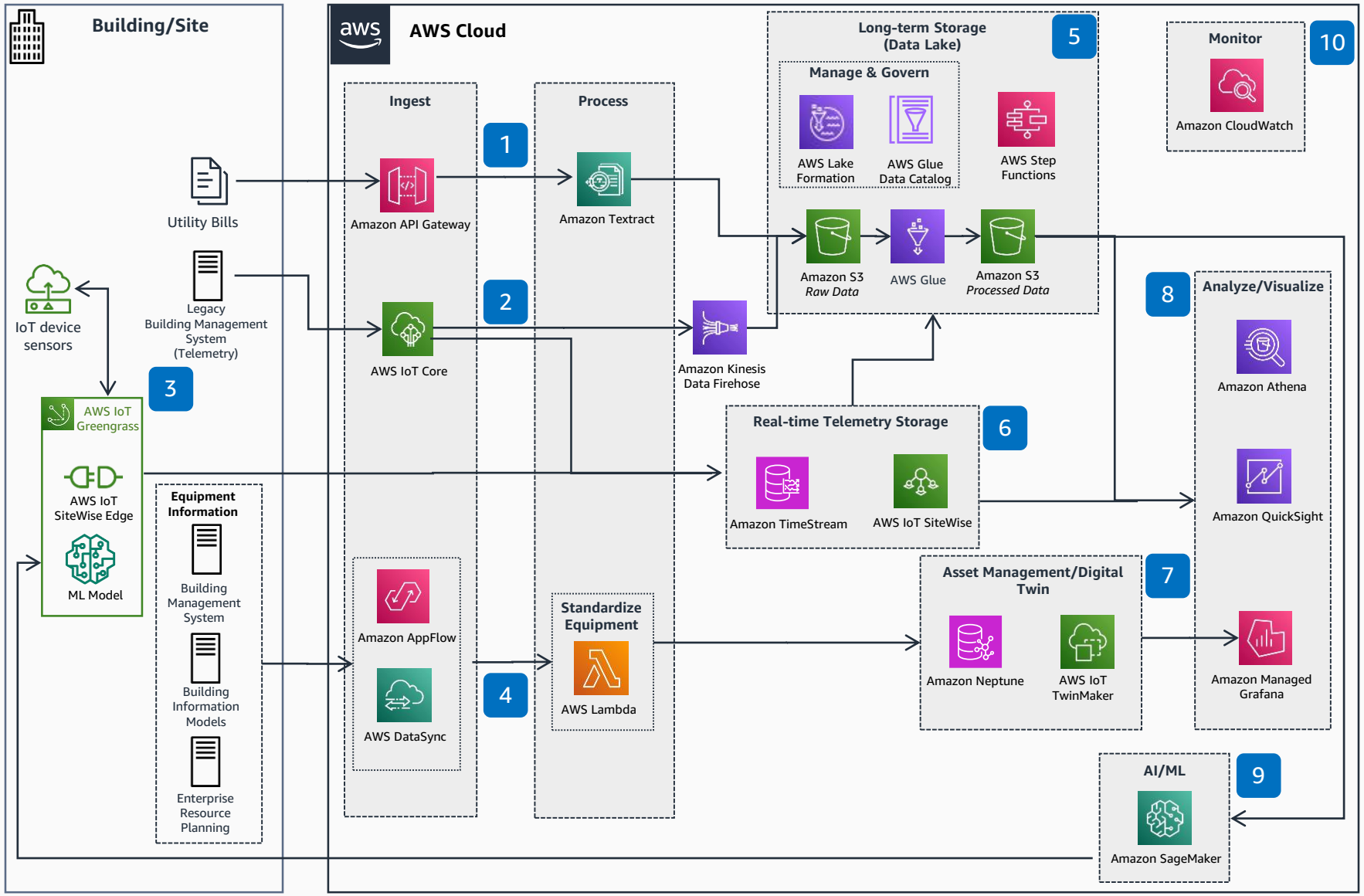
Guidance for Smart and Sustainable Buildings

Integrate building systems, assets, and sensors to enable real-time insights for sustainable management across your infrastructure and operations.



1. Ingest utility bills with **Amazon API Gateway** and convert into machine data using **Amazon Textract** to normalize electric, gas, water, and waste usage (see the Guidance for Utility Bill Processing on AWS for more details). This data can be sent to the data lake for further analysis.

2. Send device telemetry from legacy Building Management System (BMS) platforms to **AWS IoT Core** for ingestion into the Cloud. Deliver real-time telemetry data to **AWS IoT SiteWise** and to the data lake using **Amazon Kinesis Data Firehose**.

3. Harvest and process device sensor data with **AWS IoT SiteWise Edge** deployed on **AWS IoT Greengrass** and send directly to **AWS IoT SiteWise**.

4. Use **Amazon AppFlow** or **AWS DataSync** to connect to your BMS and Enterprise Resource Planning (ERP) systems. This allows you to ingest equipment attributes and your Building Information Modeling (BIM) platform for spatial building models and other attributes. Use **AWS Lambda** to modify equipment data to adhere to a chosen building metadata standard.

5. Build a data lake using **Amazon Simple Storage Service** (Amazon S3) to store your data, save technical metadata in your **AWS Glue Data Catalog**, use **AWS Step Functions** to orchestrate **AWS Glue** jobs for extract, transform, and load (ETL), and administer fine-grained access control with **AWS Lake Formation**.

6. Collect device measurement data in **Amazon Timestream** or **AWS IoT SiteWise** to calculate metrics and generate alarms.

7. Manage your asset attributes and relationships in **Amazon Neptune** or create a digital twin of your sites and assets using **AWS IoT TwinMaker**. Compose an interactive 3D view of your environment and overlay real-time measurements directly from **AWS IoT SiteWise**.

8. Provide structured query language (SQL) access to your data through **Amazon Athena**, or build embeddable, machine learning (ML) dashboards in **Amazon QuickSight** or **Amazon Managed Grafana**.

9. Connect **Amazon SageMaker** to your data lake to train ML models for deployment back on-site in **AWS IoT Greengrass** for real-time inferencing. Model outputs can be used to control on-site equipment or to derive new metrics for ingestion through the standard architecture.

10. Monitor overall system health and performance using **Amazon CloudWatch**.

Reviewed for technical accuracy July 13, 2023

AWS Reference Architecture