



Architecture diagrams for power and utilities

Meter Data Analytics for Utilities



Meter Data Analytics for Utilities: Architecture diagrams for power and utilities

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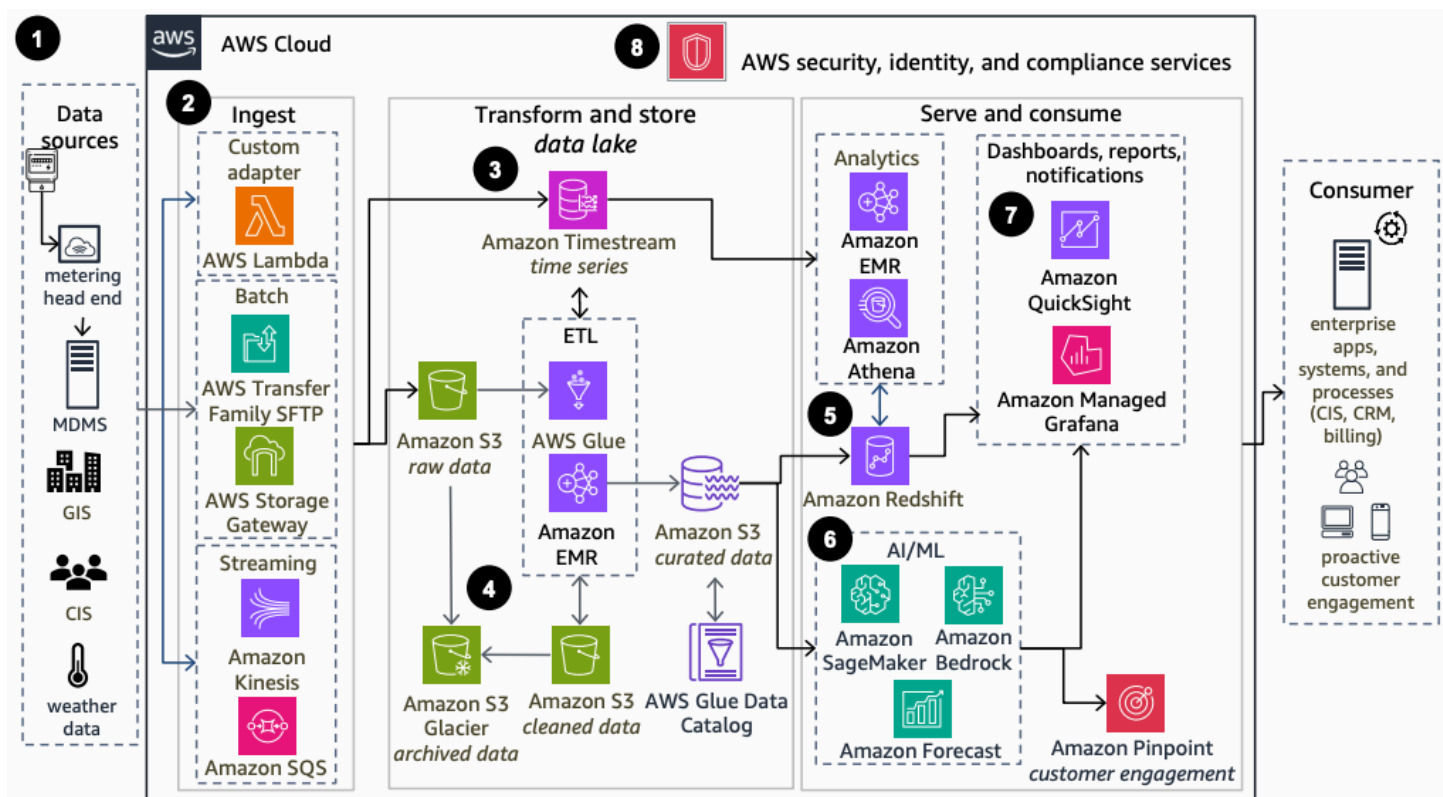
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Meter Data Analytics for Utilities

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With this architecture, you can build modern meter data analytics solutions. These solutions improve meter data availability for operational and customer insights. The solution unlocks data silos by using appropriate data stores, analytics, and AI/ML tools. Use cases include meter and circuit anomaly detection, circuit balancing, energy theft prevention, and demand prediction. Key services include [Amazon Kinesis](#) for streaming, [AWS Glue](#) for ETL, [Amazon SageMaker AI](#) for ML, and [Amazon Timestream](#) for time-series storage.

Meter data analytics diagram



The following steps describe the data pipeline and analytics components for this architecture:

1. Ingest data from various sources including meter data management systems (MDMS), head end systems (HES), customer information systems (CIS), and geographic information systems (GIS).
2. Ingest customer and meter data to AWS by using both batch and streaming approaches based on your use case. Choose from multiple tools such as [AWS Lambda](#) for custom adapters, [AWS](#)

[Transfer Family](#) for SFTP, [AWS Storage Gateway](#) for batch processing, and Amazon Kinesis and [Amazon Simple Queue Service](#) for streaming data.

3. Store and analyze meter data efficiently by using Amazon Timestream, a time-series database service. Power near-real-time dashboards and time-series analytics for mission-critical applications.
4. Automate extract, transform, and load (ETL) processes with AWS Glue, including file transforms, deduplication, and value-add processing such as running meter data validation, estimation, and editing (VEE) processes and creating billing determinants. Use Amazon S3 Glacier as low-cost storage for archival copies and retention compliance. Store final curated data sets in an [Amazon Simple Storage Service](#) bucket as the data lake single source of truth for downstream analytics and ML work. Use AWS Glue to automate data schema discovery and metadata tagging.
5. Query petabytes of structured and semi-structured data or time series across your data warehouse and data lake by using standard SQL with [Amazon Redshift](#). Perform complex analytics with [Amazon EMR](#) and run data discovery queries against your lake and warehouse with [Amazon Athena](#).
6. Use SageMaker AI to detect grid anomalies, forecast energy usage, and predict equipment failures. Use [Amazon Bedrock](#) integration to chat with your meter data.
7. Create and publish interactive dashboards that include AI/ML insights with [Amazon Quick Sight](#) or [Amazon Managed Service for Grafana](#). Access dashboards from any device and embed them into your applications and websites. Communicate proactively with customers by using [Amazon Pinpoint](#) to measure customer engagement across multiple channels including email, SMS, and mobile push notifications. Create personalized customer target segments and campaigns by using analytics and ML outputs with Amazon Pinpoint.
8. Use AWS security, identity, and compliance services to keep your data safe and secure.

Further reading

For additional information, see the following resources:

- [AWS Architecture Icons](#)
- [AWS Architecture Center](#)
- [AWS Well-Architected](#)

Diagram history

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