Cloud Native IoT
AWS Enterprise

aws partner network

Executive Summary

Levno provide Milk Vat Monitoring to Fonterra across 7,500 farms in New Zealand. Levno had a legacy Internet of Things (IoT) bespoke cloud backend which was not going to scale. Koan provided the strategy and delivery of a Cloud Native system build on AWS Managed Services. The approach enabled Levno to scale from 400 to 7,500 farms within 12 months.

Customer Challenges

Levno faced many challenges including: security, scalability, maintainability and end-to-end processing to enable farmers to be able to receive notifications based on various events and for stakeholders such as Milk Suppliers to be able to consume this data.

Their business challenge was to scale up processing systems from a legacy application to meet Fonterra's needs in 6 months, implement new business logic, develop new interactions for customers to login and view information and consolidate other products to serve an Integrated set of Applications to customers. Following this a formal security audit would take place.

If these challenges were not addressed, the current system which has around 400 farms running, would fail and the new business opportunity (to be New Zealands leading Milk Vat Monitoring company) would not be able to be undertaken.

Why AWS

Growing from hundreds to millions of daily IoT Messages

Levno choose AWS as the solution and platform after engaging an APN Partner Koan Limited, upon the recommendation of the partner. The "off the playbook" managed services approach using AWS IoT Core as the message broker, AWS Serverless Lambda, AWS Dynamo storage, MQTT protocol was recommended by Koan as the best both quickest to market, most secure and reliable.

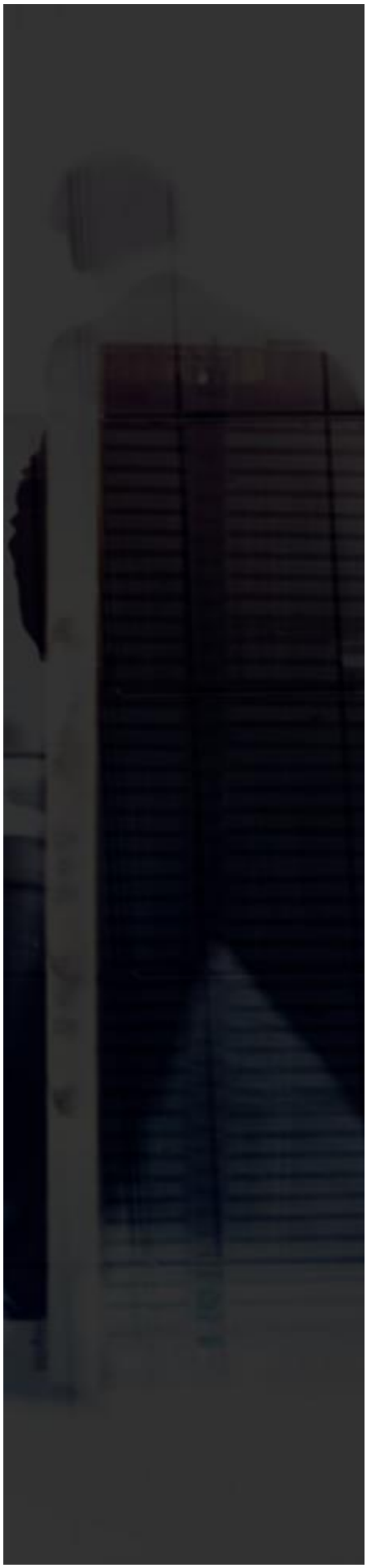
Why Koan

Levno choose Koan as the delivery partner based on our knowledge of AWS, and existing connections and recommendations in the local market and about suitable companies able to build and scale enterprise applications end-to-end on the cloud.

About Levno

levno™
lets you know

Levno provide Fuel, Milk, Water and Effluent monitoring to farmers and councils across New Zealand, and are the largest supplier of Milk Vat Telemetry to Fonterra. Implementing Fonterra's milk quality score allows Fonterra to know when to send tankers for pickup and if the milk is of a descent grade quality.



Partner Solution

The APN Partner solved the customer challenge by delivering and deploying a Greenfields system build on top of AWS Managed Services and Serverless AWS Lambda. The AWS environment was deployed and built using the AWS Infrastructure as Code (IaC) tool Cloud Development Kit (CDK) a repeatable deployment tool, automating the DevOps process.

Time to Market

Time to market business challenges were solved using AWS Managed Services, transceivers sending messages across MQTT, messages are ingested by AWS IoT Core. AWS IoT Core acts as the message broker and topic rules trigger lambda event processors, using Node.js, Lambda Layers, AWS SQS and AWS Dynamo to store, transform data, calculate milk quality and trigger event notifications for end users (e.g. Milk in Vat too warm).

Data Storage Challenges

Prior iterations found relational databases struggling with the size of IoT data. Hence business data was stored in AWS RDS Relational Data (RDS), separate from raw IoT Data (AWS Dynamo) for separation of concerns and scale.

Scale

Koan used API Gateway and an API Services Layer hosted on autoscaling EC2 instances, to process requests from Single Page Front End (Vue.js) Applications for Customers and Staff Internal User Interfaces.

Scalability was ensured using managed services AWS S3, AWS CloudFront, Auto Scaling EC2, AWS Dynamo, AWS RDS and AWS Lambda. Integration between API services and AWS APIs was developed to enable user triggered OTA updates. AWS CloudWatch used for log analysis.

Security

In order to secure the API Layer, AWS managed services, AWS WAF, Load Balancers were deployed according to AWS best practice. To achieve audit standards AWS deployment for secure architecture was used including multi-availability zones, Elastic Load Balancing, Security Groups, NAT Gateways and correct split between private and public subnets.

Authentication is via JWT tokens using JSON web signature to encode and server signed (using private key) tokens over HTTPS. Authorization is role based, where organisations have associated roles which give permissions to various types of data assets, ensuring organisations only have access to their own data.

Results and Benefits

Levno was able to secure the large contract with Fonterra and become the leading provider in New Zealand of Milk Vat telemetry services in the country.

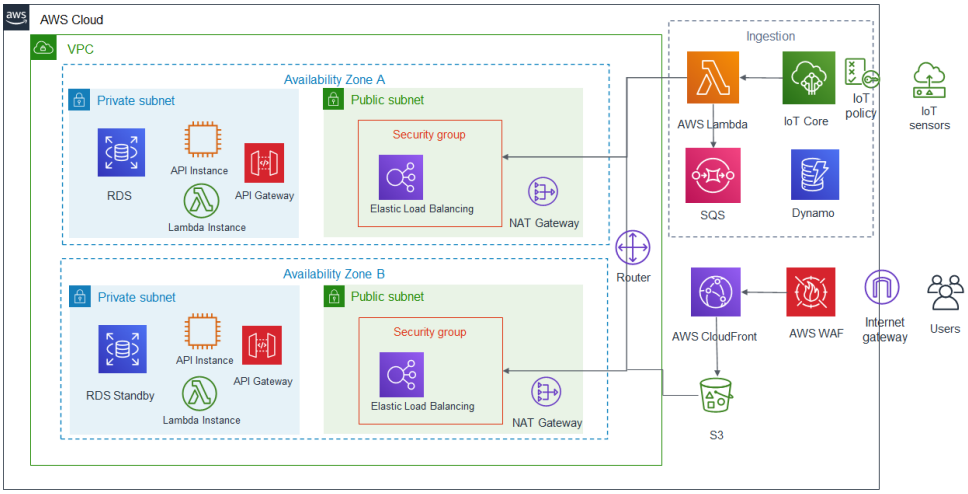
Fonterra were able to make significant cost savings with regard to tanker efficiency. As real time milk quality indicators enable Fonterra to know more accurately when to pick up milk and which milkings were low quality. This translated to Fonterra having less tankers on the road saving millions of dollars.

Results for Levno included having a developed and deployed compliant grade enterprise system in 6 months to replace a system that took several years to build based on quality of architecture, matched to technology stack, leveraged on managed services.

The deployed system was audited by 3rd party Cloud Security specialist Insomnia and received the best audit results ever seen by Fonterra.

The services interact directly with end customer in real time, Fonterra via API directly feeding all information into end customer systems for monitoring of tanks and milk quality.

Architecture



About Koan

Koan is an AWS and software development consultancy based in Wellington and Palmerston North. Koan has been building and deploying secure, compliant, enterprise applications for Global and New Zealand customers for 20 years. Koan is an AWS Advanced Tier Partner providing AWS Certified resources for DevSecOps AWS Migrations, Modernizations, Data Analytics.