Product Tracing System (PTS)

Advancing Food Traceability through Innovation

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Why Food Traceability?

- Tracking and mitigating foodborne outbreaks has been a challenge for the FDA - FDA is advancing traceability to help protect consumers from contaminated products with the goal to perform rapid trace-forward and traceback analyses, identify specific product sources, and help to remove products from the marketplace as quickly as possible.

Protecting public health through innovation and automation

FSMA Final Rule on Requirements for Additional Traceability Records for Certain Foods | FDA

New Era for Smarter Food Safety

Core Element 1 – Tech-enabled Traceability

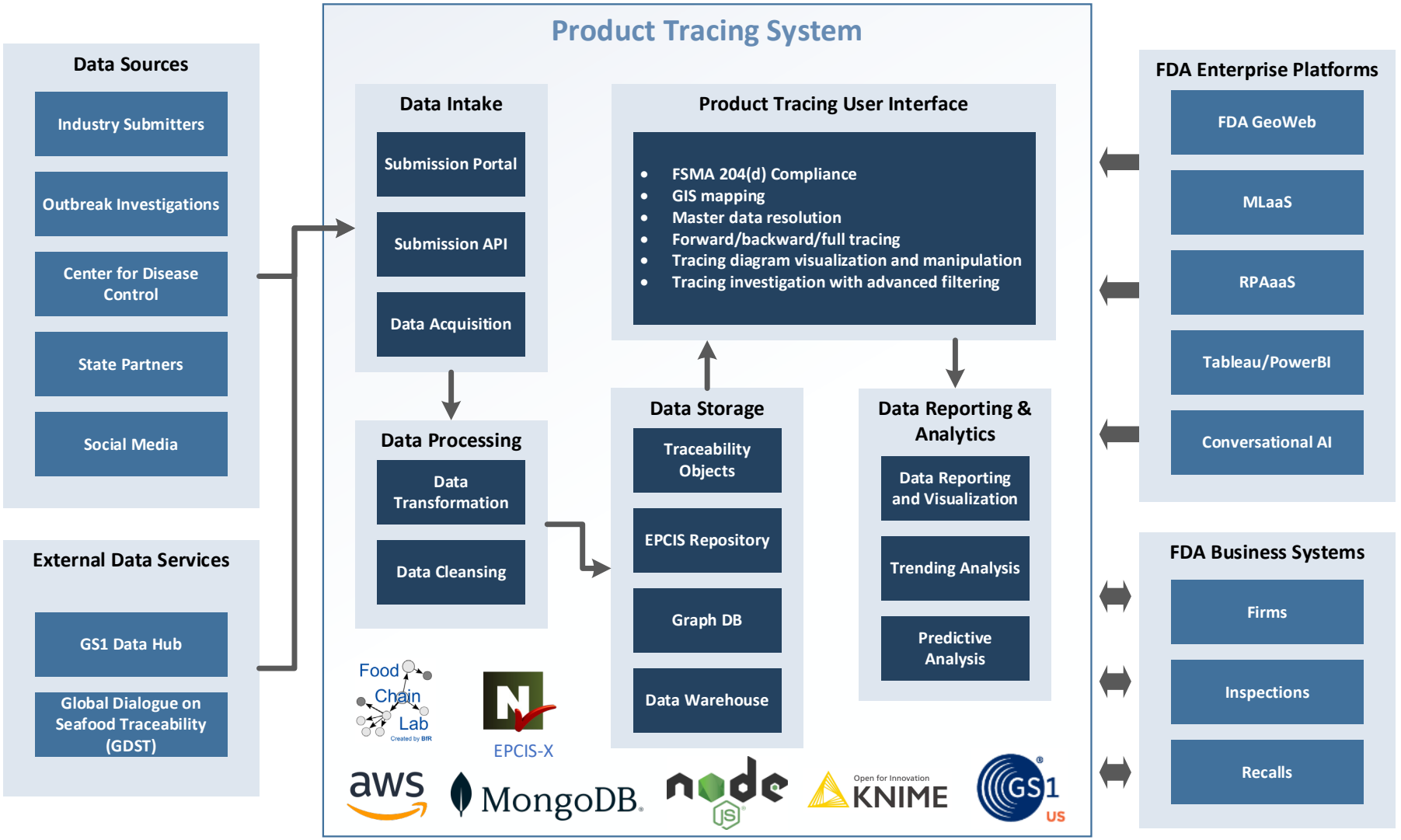
Food Product Tracing as a Platform

Central repository for food safety data	• Master data management (firm, location, product) • FSMA rule requirements • Web form for traceability data submissions • Integration with CDC, State Partners for end-to-end data
Product Tracing	• Product tracing in alignment with data standard (EPCIS) • End-to-end network tracing and link event relationships • Map/GIS tracing views • Outbreak investigation - traceback / trace-forward
Workflow, Automation	• Advanced search and filter capability • Automation to improve efficiency and data accuracy • Output to existing FDA systems to support other food safety goals
Data Analytics, Reporting	• Advanced reporting • Trending and predictive analytics through use of AI/ML • Network similarity • Risk assessment data
Intelligent Processing	• Perform subcluster linking and analysis • Using CDC data and ML, early detection/prevention • ChatBot features to support rule review • Data generation for testing/ML model refinement

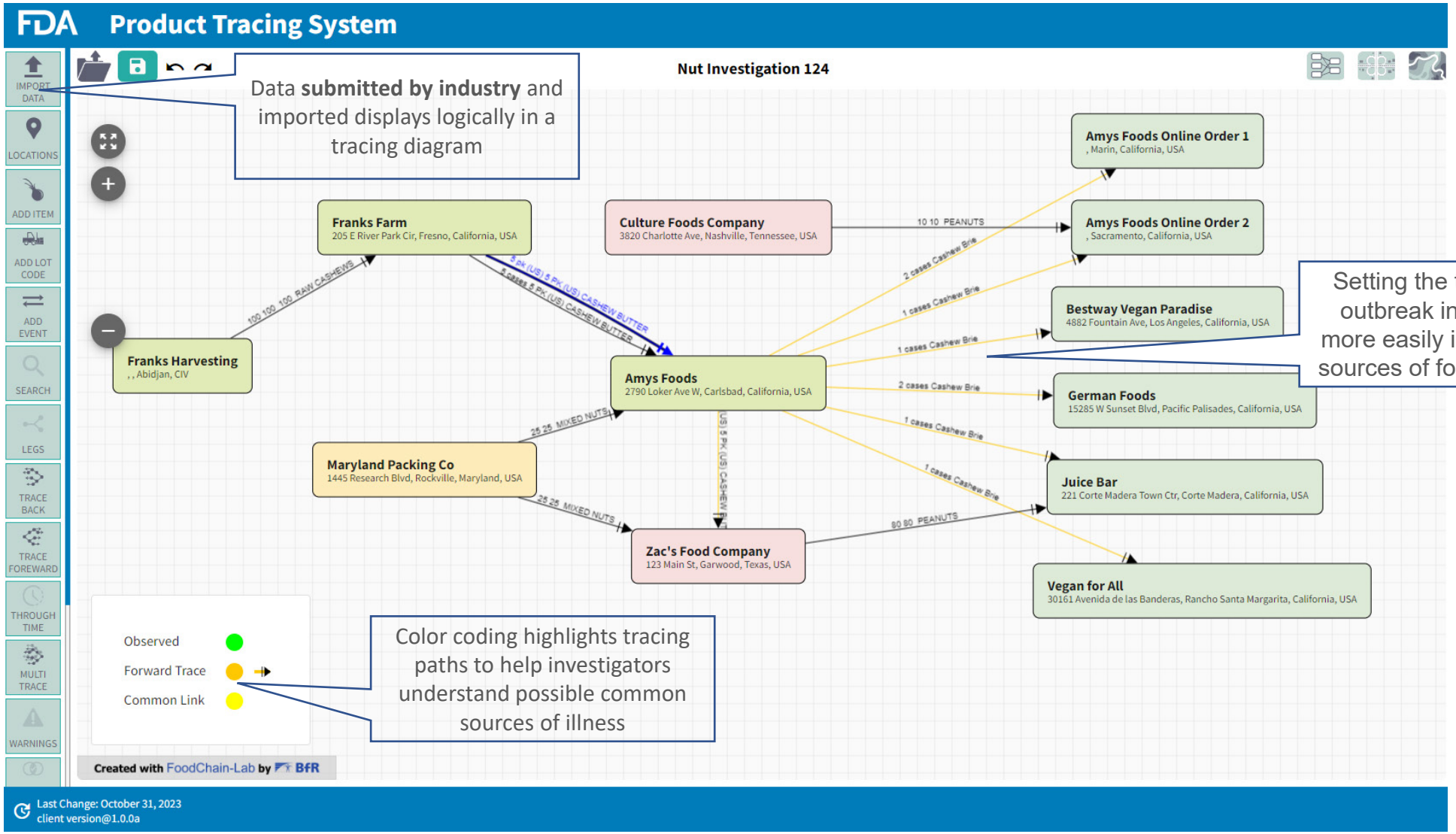
FY24–27 ODT Strategic Plan Goals:

1. Enhancing Collaboration
2. Strengthening Infrastructure
3. **Modernizing Services**
4. **Sharing Data**
5. **Adopting AI and Innovations**
6. Cultivating Talent and Leadership

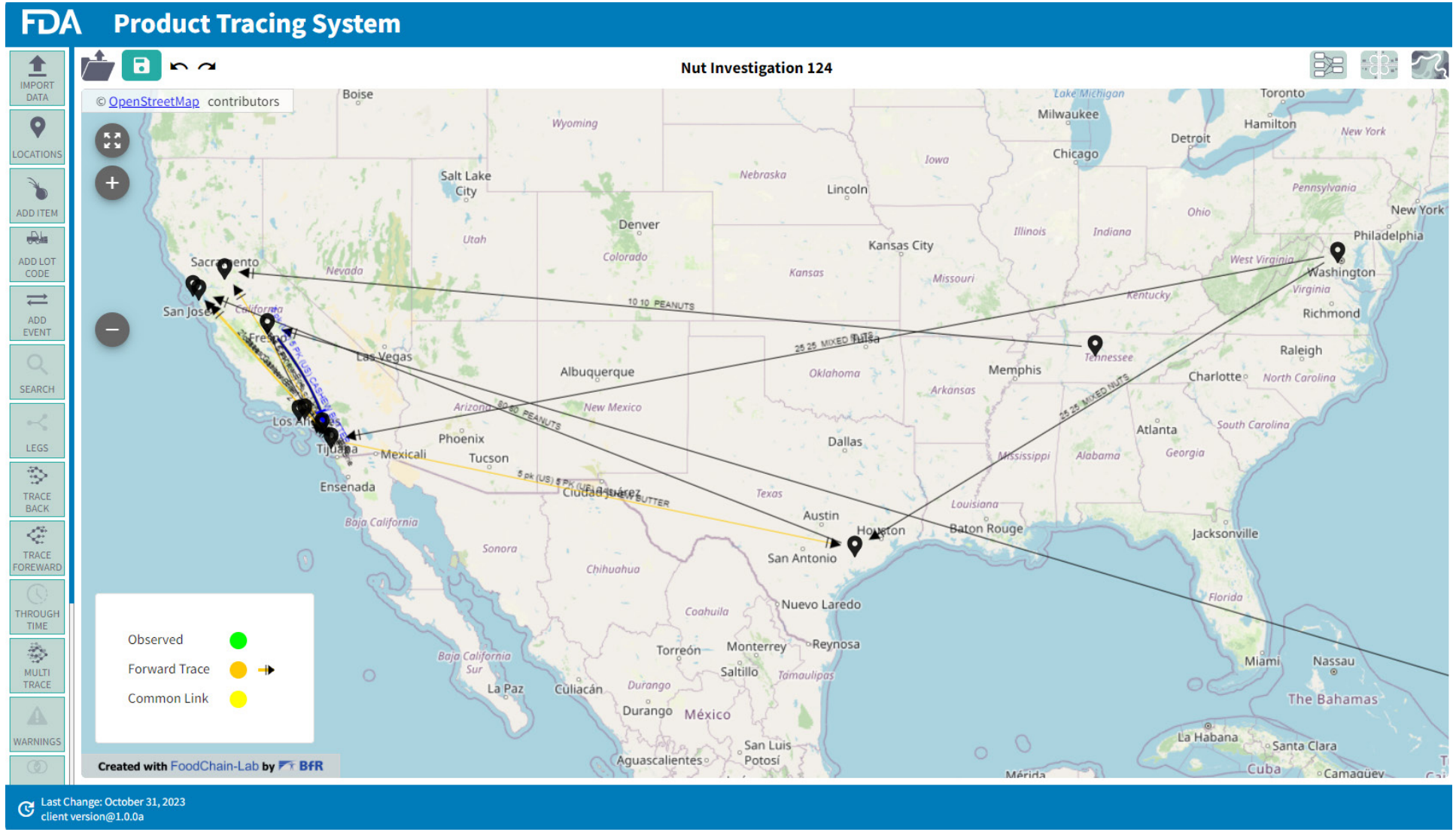
Product Tracing System



Product Tracing in Action



Product Tracing in Map View



Technology Summary

Technology Summary – WILEE

Application Hosting Amazon Web Services (AWS)	• CFSAN AWS East Applications Environment • Key Services: AWS RDS.S3, OpenSearch, EKS
Front End Development Django	• Free and open-source • Python-based web framework • Embedded BI interfaces
Data Analytics & AI/ML Domino Data Labs & Amazon Sagemaker	• Machine learning and predictive analytics • Sentiment Analysis • Anomaly Detection
Data Visualization Qlik	• Development Collaboration • Data Integration and Preparation • Data Discovery & Robust Scalability

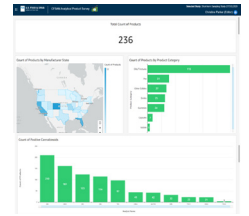
Technology Summary – CAPS

Application Hosting
Modern cloud native serverless stack in Amazon Web Services (AWS)

- Minimal operational costs, fraction of penny per web request
- AWS RDS, S3, API Gateway, Lambda, DynamoDB

Front End Development
Vue.js JavaScript Framework

- Will run on any modern web browser (cross platform / device)
- Enables reusable components throughout the application
- Leverages Google material design specifications

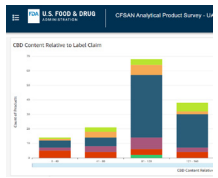


Retrieve data from RDS and DynamoDB
AWS Lambda

- AWS Lambda functions for Data Handler, Metadata Handler, Dashboard Handler, and Survey Handler

Data Visualization
Amazon Quicksight

- Serverless architecture that automatically scales
- Directly connect to and import data
- SPICE (super-fast, parallel, in-memory calculation engine)



Food Label Text Extraction
Amazon Textract

- Reducing the manual burden of processing product label images
- Accessible from CAPS user interface
- Integration with standardized data processing engines