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Connected Vehicle Ecosystem – Road Usage Charging

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Our transportation funding system is old. *Really* old.

Oregon Introduces 1st State Fuel Tax in U.S.

Oregon Levies 1st Weight-Mile Tax

Oregon Begins Nation's 1st RUC Program

1932

1993

2021

1919

1947

2015

U.S. Institutes 1st Federal Fuel Tax

Congress Approves Last Federal Fuel Tax Increase

13 States Introduce RUC Legislation

Oregon pioneers transportation funding

1919

First gasoline tax in the country

1947

First weight-mile tax for heavy vehicles (>26,000 lbs.)

2015

First operational road charge program

New technology presents new challenges and opportunities

Why we are developing RUC program?

Declining fuel taxes

Fuel taxes are becoming unsustainable due to fuel efficiency

Construction costs

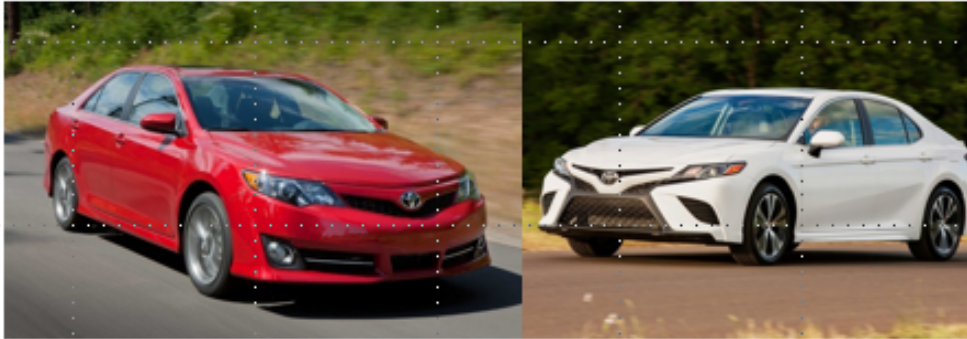Construction costs are increasing

Cars are similar

Passenger vehicles degrade pavement at the same rate

Fees are insufficient

Registration pays for access, road charge pays for use

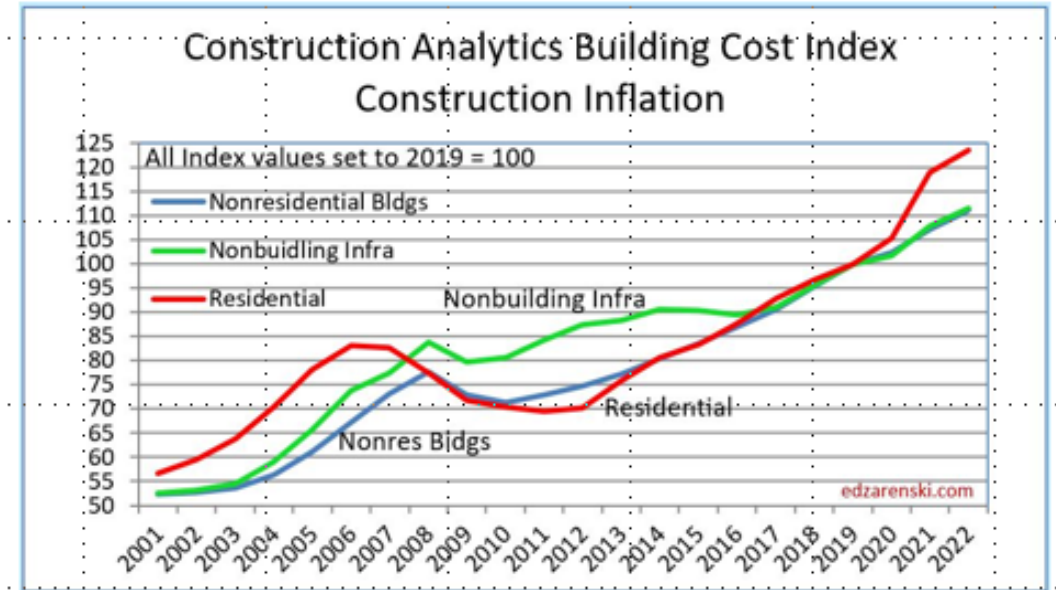**Decreasing fuel tax revenues**

2009 Toyota Camry
25 MPG
$182 Annual Fuel Tax

2019 Toyota Camry
52 MPG
$88 Annual Fuel Tax

Increasing inflation

Construction Analytics Building Cost Index
Construction Inflation

All Index values set to 2019 = 100

Nonresidential Bldgs
Nonbuidling Infra
Residential

Nonbuilding Infra
Residential
Nonres Bidgs

edzarenski.com

Why change the funding mix?

Differentiating RUC from other funding methods

- All users pay the base rate
  - *Similar to fuel taxes*
- Not variable by time of day
  - *Unlike congestion pricing*
- Applicable to entire system
  - *Unlike tolling*

Desired end state: Stable transportation funding

- The right mix of funding for the State Highway Fund
  - Fuel taxes
  - Weight mile tax
  - DMV fees, like registration
  - *Road usage charges**
  - *Tolling**
- Ability to deliver
  - Continue work within the agency
    - Maintenance
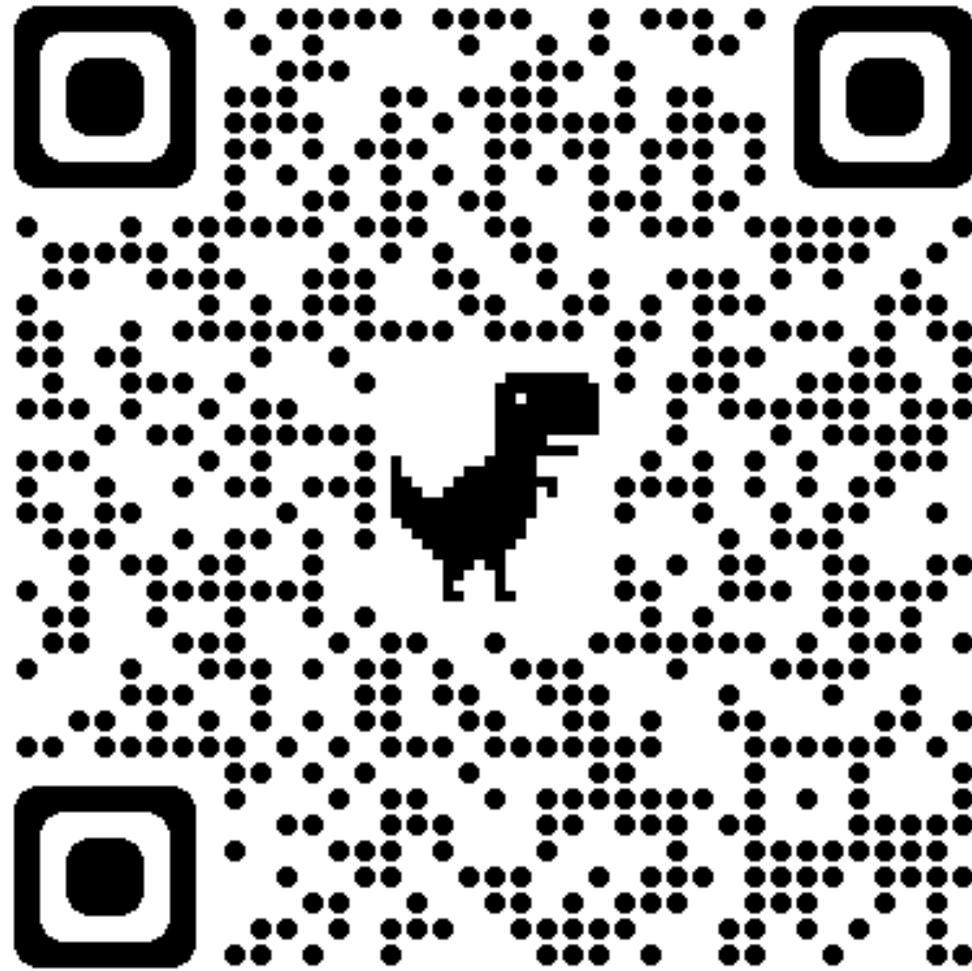   - Operations
  - Engage the public
  - Inform legislators

*New revenue sources for Oregon

Q: So why a CVE & RUC interface? A: Because vehicles are changing.

OREGON CVE PLATFORM

The Oregon CVE Platform will support different types of interfaces and protocols to facilitate the integration of current and future OEM data.

Data can be collected, validated, standardized, and labeled by the platform.

Sensitive information will be stored, anonymized and aggregated to meet privacy regulations.

Data will be integrated and consumed by systems and applications hosted by the platform and outside the platform.

nextmove
by cintra
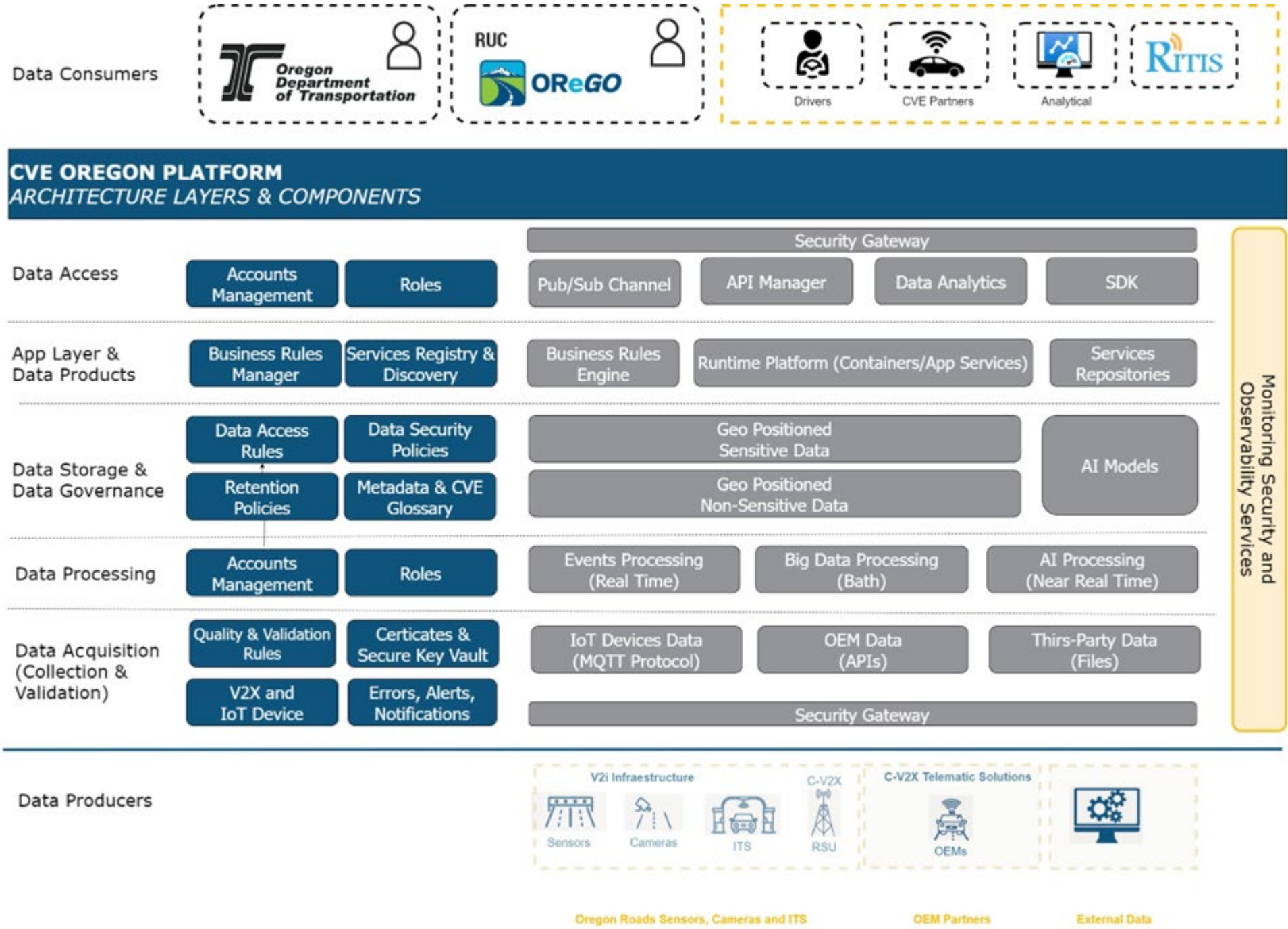
DATA PROCESSING & ACQUISITION LAYERS

The platform allows integration of data sources and data formats using industry **protocol, IoT standards (MQTT)** and **APIs.** It will ingest telemetry, OEM information and data from ODOT systems and third-party applications.
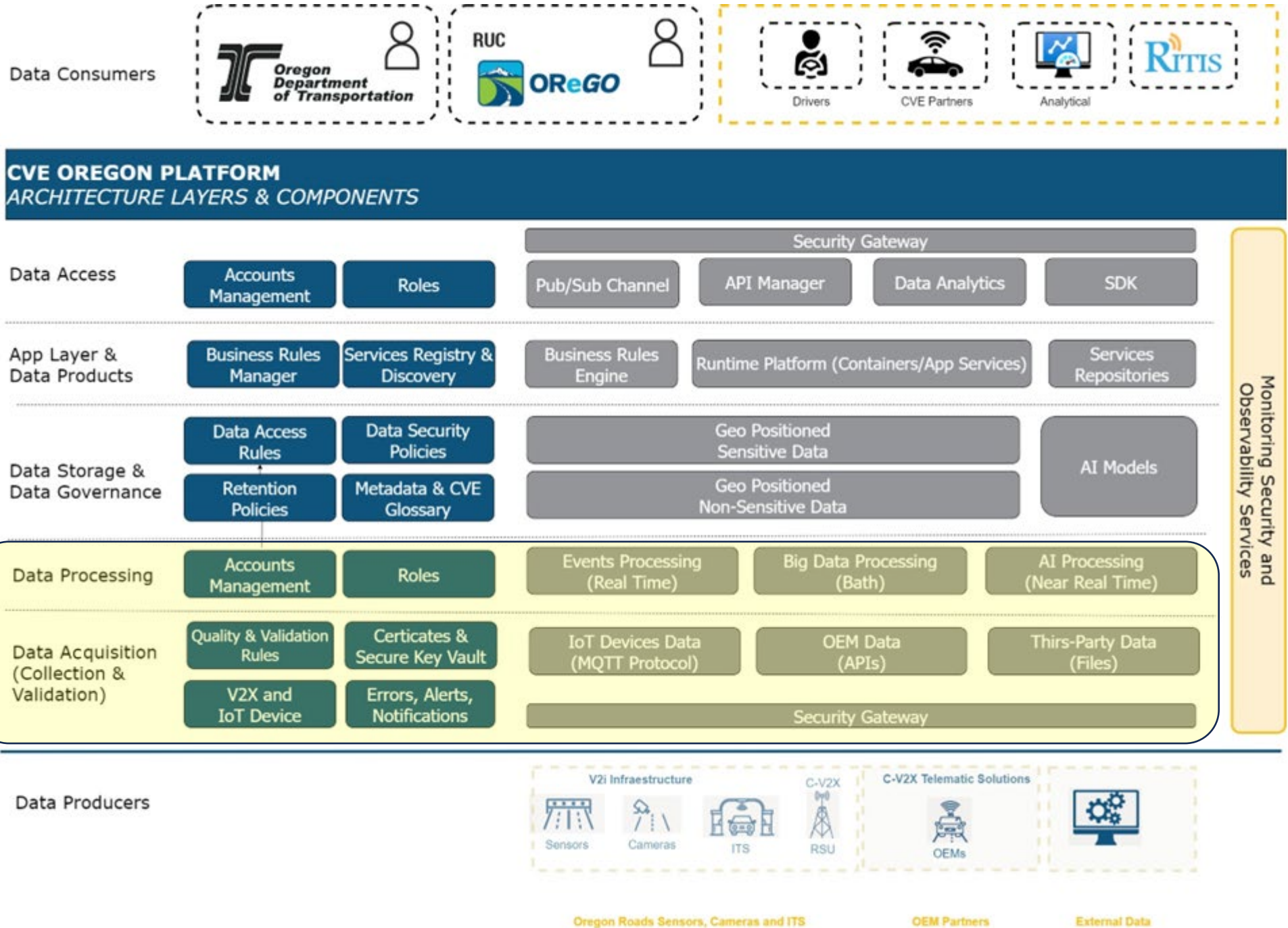
Once data is collected, real time and batch, it will be standardized to create **ontologies** or specific CVE data domains **tagged with self descriptive information** and stored in appropriate repositories.

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CVE OREGON PLATFORM
ARCHITECTURE LAYERS & COMPONENTS

Data Consumers

Data Access — Security Gateway; Accounts Management; Roles; Pub/Sub Channel; API Manager; Data Analytics; SDK

App Layer & Data Products — Business Rules Manager; Services Registry & Discovery; Business Rules Engine; Runtime Platform (Containers/App Services); Services Repositories

Data Storage & Data Governance — Data Access Rules; Data Security Policies; Geo Positioned Sensitive Data; AI Models; Retention Policies; Metadata & CVE Glossary; Geo Positioned Non-Sensitive Data

Data Processing — Accounts Management; Roles; Events Processing (Real Time); Big Data Processing (Bath); AI Processing (Near Real Time)

Data Acquisition (Collection & Validation) — Quality & Validation Rules; Certicates & Secure Key Vault; IoT Devices Data (MQTT Protocol); OEM Data (APIs); Thirs-Party Data (Files); V2X and IoT Device; Errors, Alerts, Notifications; Security Gateway

Monitoring Security and Observability Services

Data Producers — V2i Infraestructure; Sensors; Cameras; ITS; C-V2X RSU; C-V2X Telematic Solutions; OEMs

Oregon Roads Sensors, Cameras and ITS   OEM Partners   External Data

Challenges remain

- Not all vehicles are connected

- Administrative costs are still high for running a RUC program

- Public expectations are not necessarily realistic and are not being met
  - Infrastructure maintenance
  - Connectivity
  - Privacy