RUC Payment and Reporting Options for Drivers: Lessons from Electronic Tolling

NCSL
National Conference of State Legislators

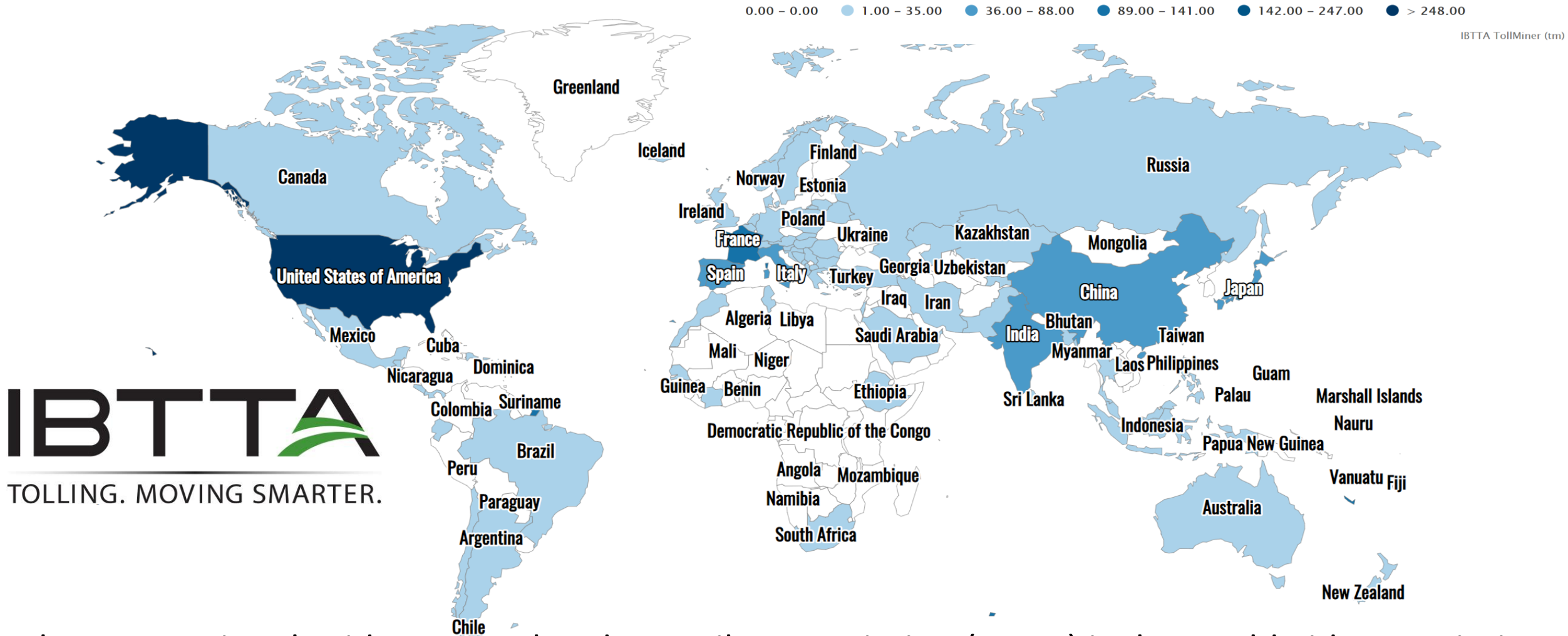State Road User Charging Meeting
June 27, 2022

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The Worldwide Tolling Industry

The International Bridge, Tunnel and Turnpike Association (IBTTA) is the worldwide association for the owners and operators of toll facilities and the businesses that serve tolling. Founded in 1932, IBTTA has members in more than 20 countries on six continents.

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Tolling in the United States

Toll Operators = 130
Toll Facilities = 354
Centerline Miles = 6,500
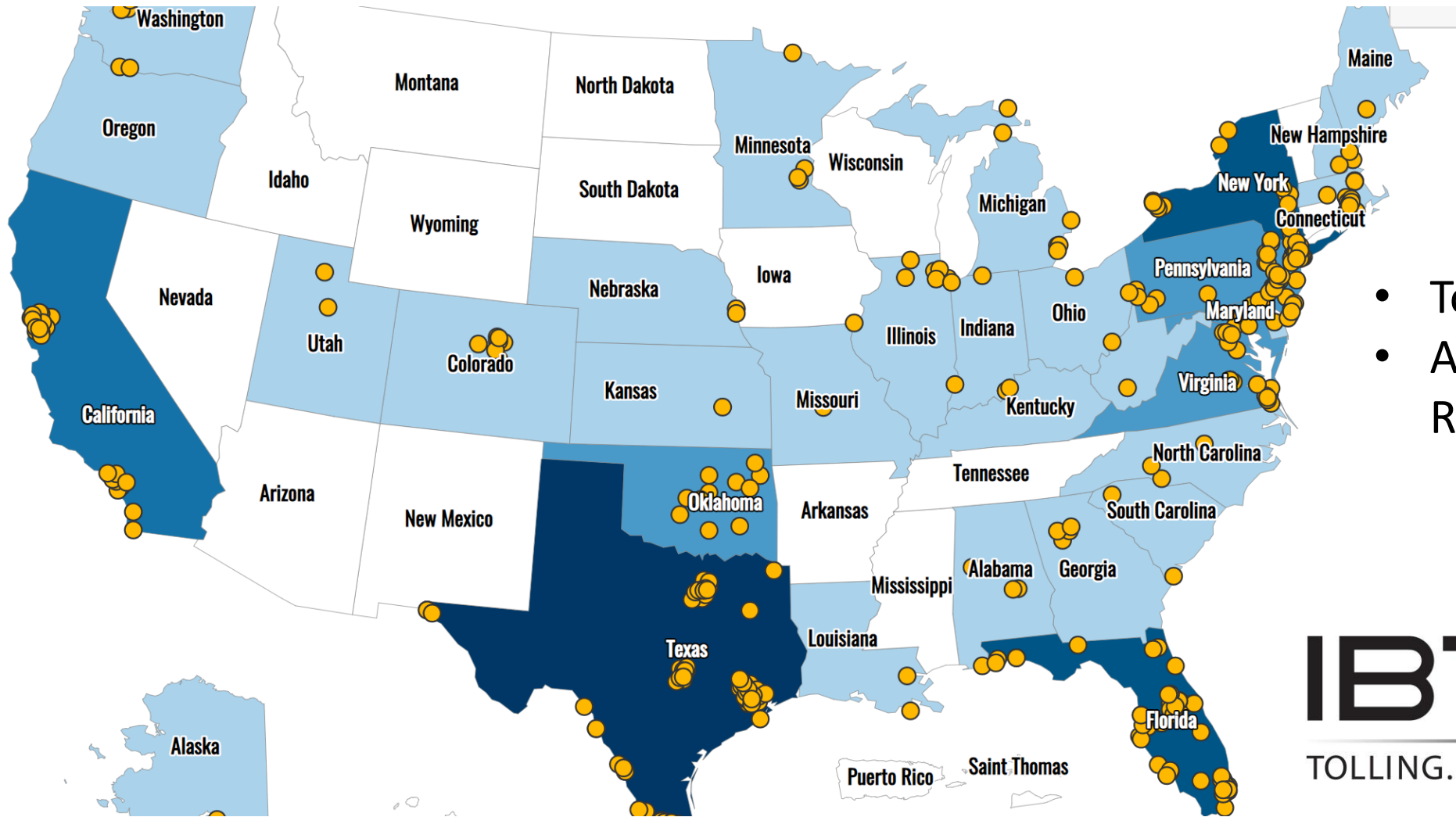
- Tolling in 34 States
- Annual US Toll Revenue > $22B

Map legend: 0.00 – 0.00 | 1.00 – 8.00 | 9.00 – 20.00 | 21.00 – 32.00 | 33.00 – 56.00 | > 57.00

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Overcoming RUC Challenges

> ➤ *Political Support*
> ➤ *Public Acceptance*

- **Privacy**
- **Administrative Costs**
- **Interoperability**
- **Rural Driver Impacts**
- **Equity for Low-Income Travelers**
- **Environmental Impacts**
- **Travel Diversion**
- **Double Taxation**
- **Trucking Industry**

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Road-Use Charging: Basic Functions and Roles

RUC Functions (What?)

1. **Identify vehicles and owners/lessees/operators** [connect vehicle registry, fleet operator, transportation network companies, etc.]

2. **Generate data of distances traveled for vehicles over a specific time period** [recording mileage data]

3. **Access distance traveled data** [transmission and reporting of mileage data]

4. **Apply distance traveled charge rates** [data processing to determine amount of charge; account management]

5. **Provide invoice or notice to owner/lessee/operator** [notice of the charge]

6. **Collect payment** [payment channels, collections, accounting]

7. **Acknowledgment payment** [issue a receipt/account statement]

8. **Enforce payment and ensure compliance** [mechanisms to ensure proper payment]

9. **Remit net revenues to designated institutions** [integrate revenue distribution, financial settlement, and financial accounting]

RUC Roles (Who?)

1. **Account Managers** [transaction processing, revenue collection, account management, customer service/information, dispute resolution, etc.]

2. **Data Collectors** [motorists, vehicle OEMs, toll operators, concessionaires, third-party service providers, etc.]

3. **Road/Facility Operators** [road/traffic conditions, multi-modal integration, capacity mgmt., maintenance, roadside equipment and data.]

4. **Vehicle Owners** [Establish/maintain account, register vehicle, select mileage reporting option, identify payment method.]

5. **Vehicle Operators** [Establish/maintain account, select mileage reporting option, identify payment method.]

6. **Government Agencies** [monitoring, reporting, issue resolution, oversee commercial account mgrs., tax collection/reconciliation, DMV, accounting, enforcement, public interface, program mgmt.]

7. **Independent Service Providers** [value-added services, integrated pmt. platforms].

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Leverage Experience: 30+ Years of Electronic Tolling

Electronic toll collection is road-user charging and has notable achievements:

- scale and efficiencies;
- value proposition throughout the spectrum of stakeholders;
- public acceptance and satisfaction;
- partnership with independent service providers and public partners;
- interoperable and reciprocal transactions across geography and jurisdictions;
- standards and business practices that are adaptive to technological change and innovation;
- attention to personal privacy protection and cybersecurity practices;
- pricing methods that represent sustainable revenue sources with flexibility to address state/local objectives as desired and approved locally.

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Successful Growth and Adoption of ETC in the U.S.

Strong Customer Adoption
Customer choice guided adoption.

- No mandates, but widespread application and public acceptance.
- Clear value proposition:
  - convenience
  - reduced delay
  - more reliable trips
  - toll discounts

Strong Institutional Adoption
Flexibility propelled adoption.

- Flexibility to meet local needs and satisfy a range of institutional and statutory requirements allowed interoperable toll programs to expand and flourish.
- The ability of toll operators to employ different business rules led to success of interoperable toll technologies and operations.
- Electronic toll interoperability did not require changes to toll rates, bond covenants, or local financial/operational/policy objectives to harmonize all aspects of a toll program.

A similar market-based strategy for adoption of RUC might offer the most promise for successful multi-state implementation but may also require the most patient approach for a full conversion.

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E-ZPass: Built for Interoperability and Reciprocity

- 1991 - E-ZPass Interagency Group created by 7 independent transportation agencies in NY, NJ and PA to develop an interoperable and seamless electronic toll payment system.

- Today - E-ZPass is the largest interoperable toll collection system in the world.

- E-ZPass is accepted in 19 states by 50 public and private toll operators.

- E-ZPass enjoys strong brand recognition and high customer satisfaction with over 49 million E-ZPass devices in circulation.
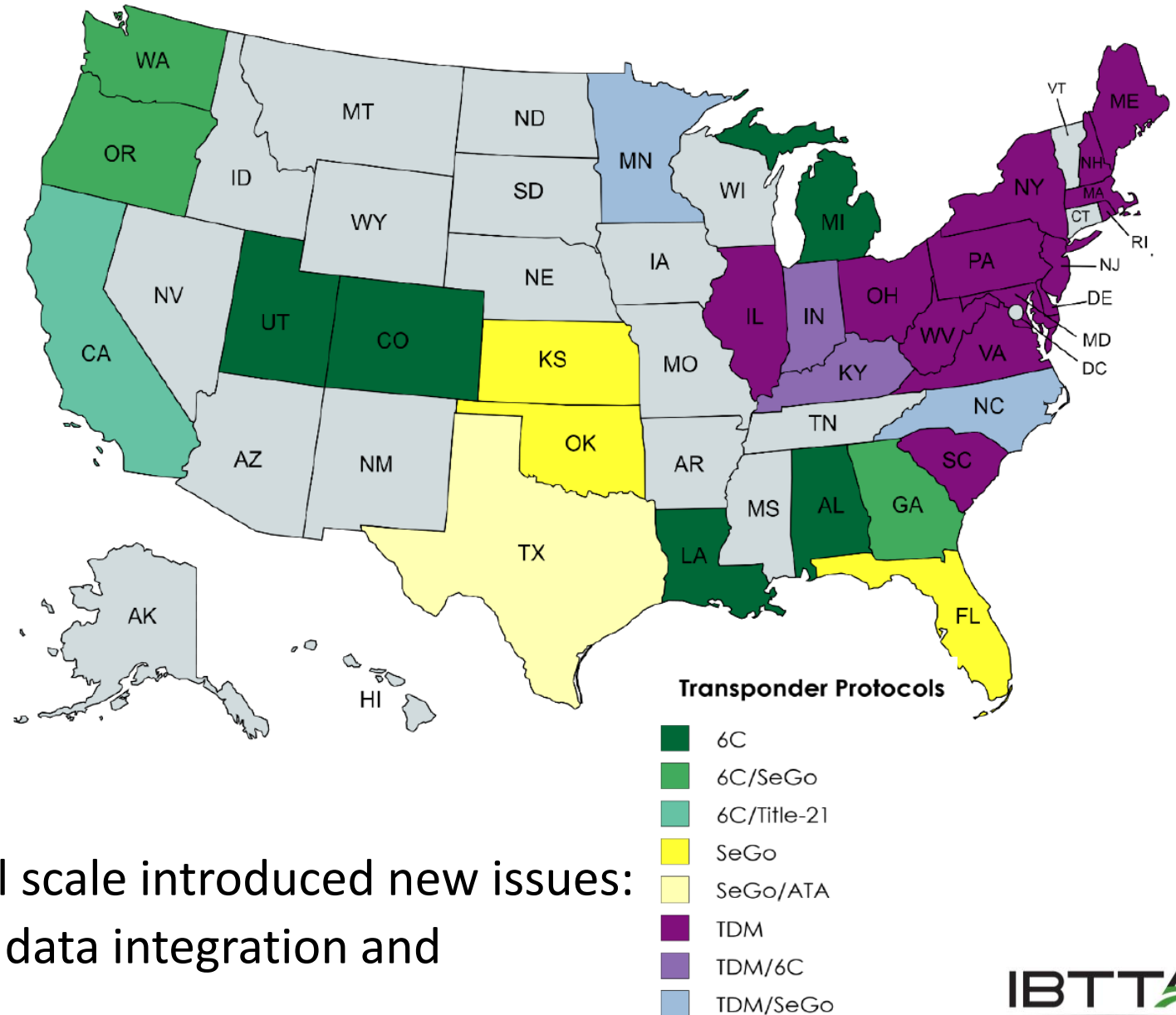
How was it done?

- *Built upon a single proprietary technology standard*
- *"Most-favored-nation" provisions in the vendor contract guaranteed best pricing, at the cost of innovation and competitive market.*

State with **E-ZPass®**

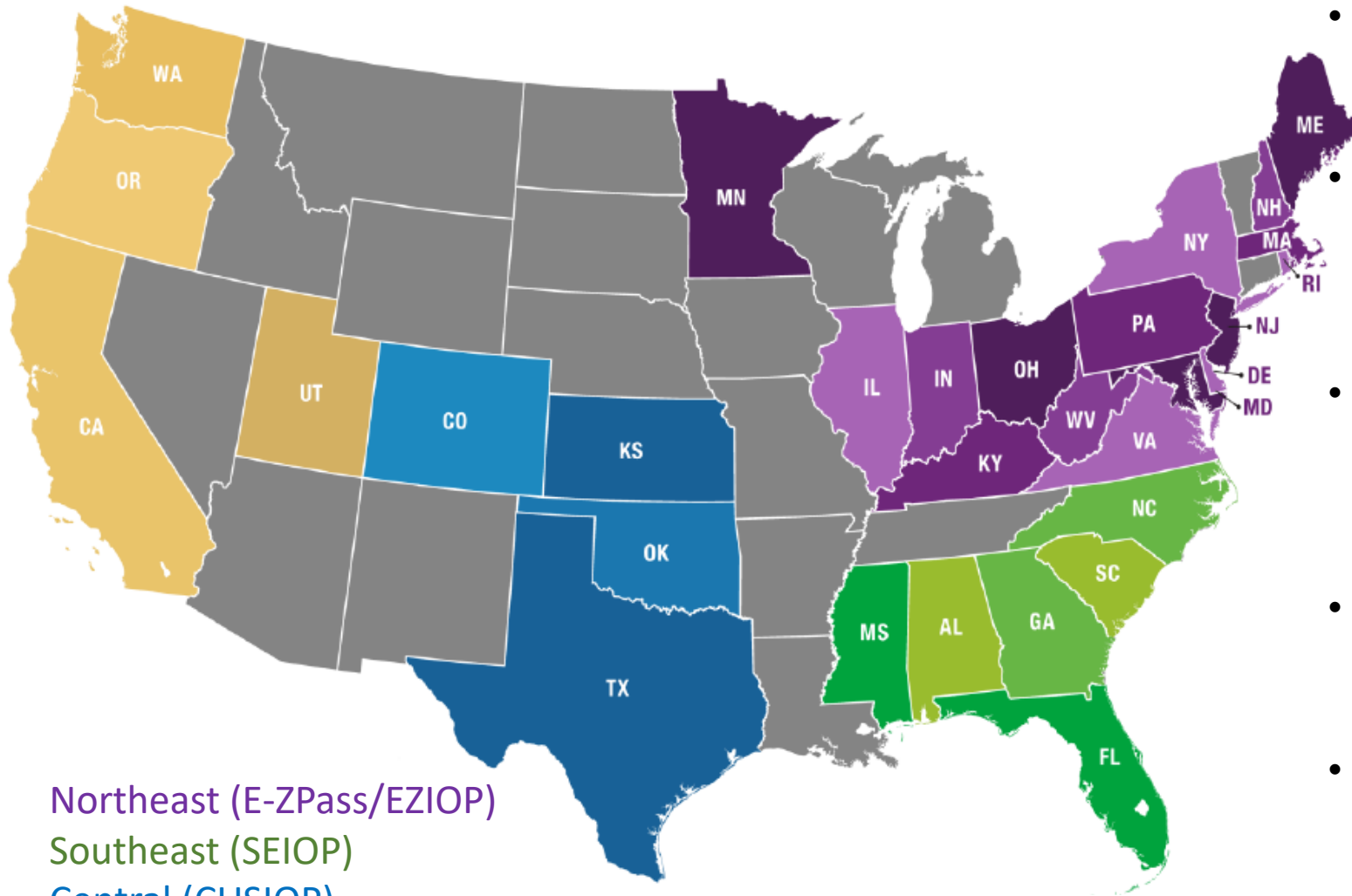**E-ZPass®** coming soon

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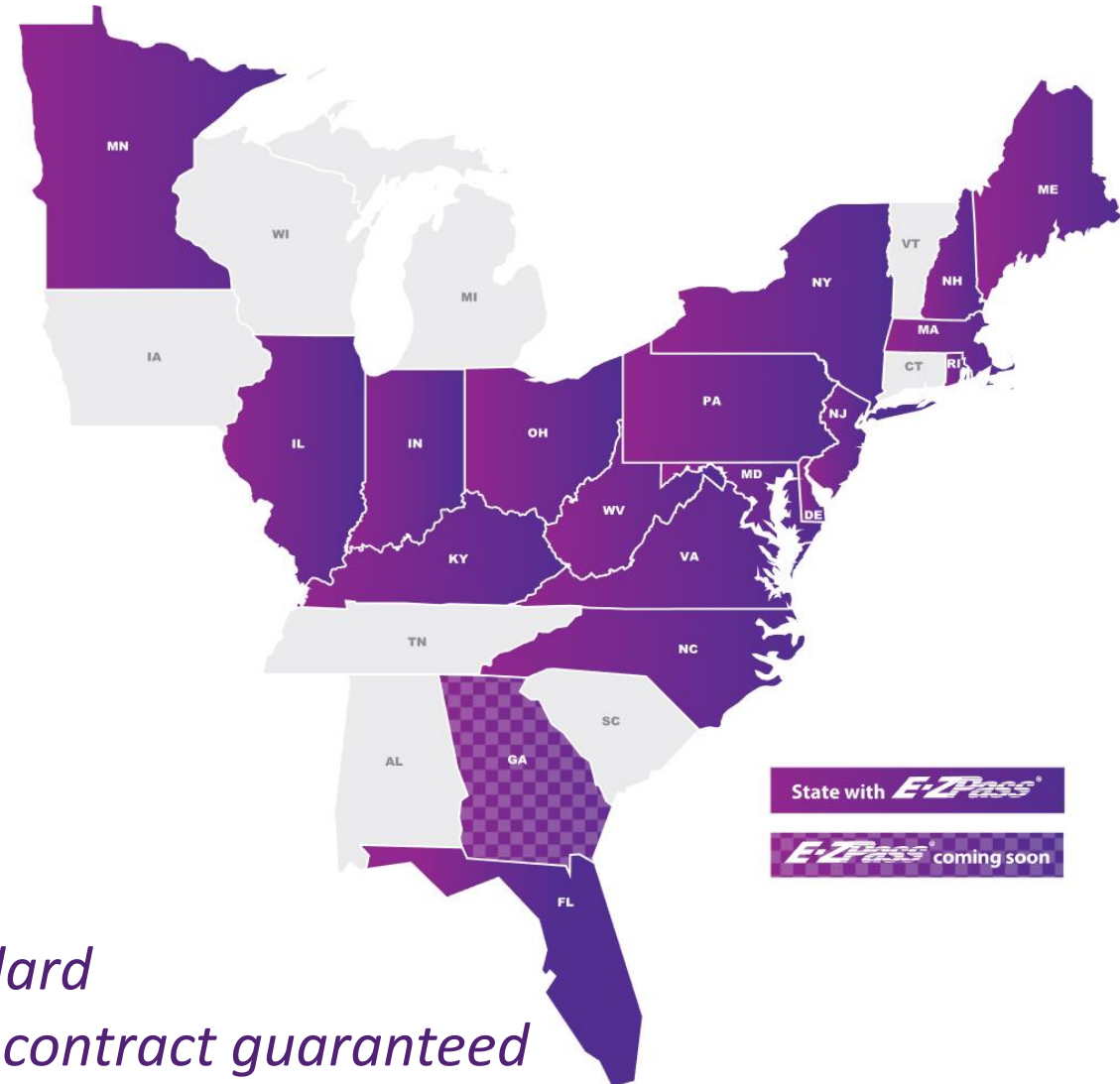
A Patchwork of Electronic Tolling Programs and Protocols

- Long-term contracts, proprietary technologies, and sizeable toll operator investments contributed to interoperability inertia.
- Intellectual property rights and local business/economic development interests created entrenched positions.
- The value proposition for nation-wide interoperability was limited to a small population of motorists.
- Video tolling solutions at a national scale introduced new issues: higher costs, revenue leakage, and data integration and acquisition.

Transponder Protocols

- 6C
- 6C/SeGo
- 6C/Title-21
- SeGo
- SeGo/ATA
- TDM
- TDM/6C
- TDM/SeGo

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The Electronic Tolling Interoperability Solution


Northeast (E-ZPass/EZIOP)
Southeast (SEIOP)
Central (CUSIOP)
Western (WRIOP)

- MAP-21: federal-aid highway toll facilities implement technologies or business practices that provide interoperability.
- Required Balance: project economics, responsible public investment, intellectual property rights, competitive business interests, and new private sector roles.
- Achievement: national business rules and interface controls, governing customer experience and open exchange of toll transactions.
- Four Regional Hubs: interoperable tolling transactions with a single account within regions that share common customers.
- National Scalability: private account providers and hub-to-hub transaction processing.
- First hub-to-hub interoperable toll transactions to begin in mid-2022.

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Open Markets and Architectures: Lessons from Abroad
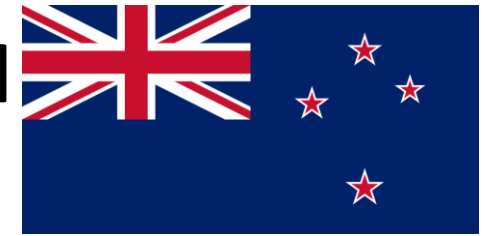
New Zealand's Approach:

- Open market delivery RUC services by commercial vendors

- Collaborative approach to develop authoritative standards and an industry Code of Practice

- Self-certification with independent 3rd party verification to ensure balance

Critical KPIs:
- ➤ Accuracy
- ➤ Security
- ➤ Privacy
- ➤ Scalability
- ➤ Redundancy

Public / Road Operator Roles	Private / Service Provider Roles
Set policy goals	Understand
Set performance requirements	Innovate
Decide on the system design	Develop, or fit products to, the system
Set rates	Ensure correct and integrous delivery, collection and remittance
Certification of providers	Provide evidence of compliance
Audit vendors	Maintain records
Set up compliance & enforcement framework	Support taxpayer to meet their requirements

Source: *ERoad*

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Open Systems Architectures
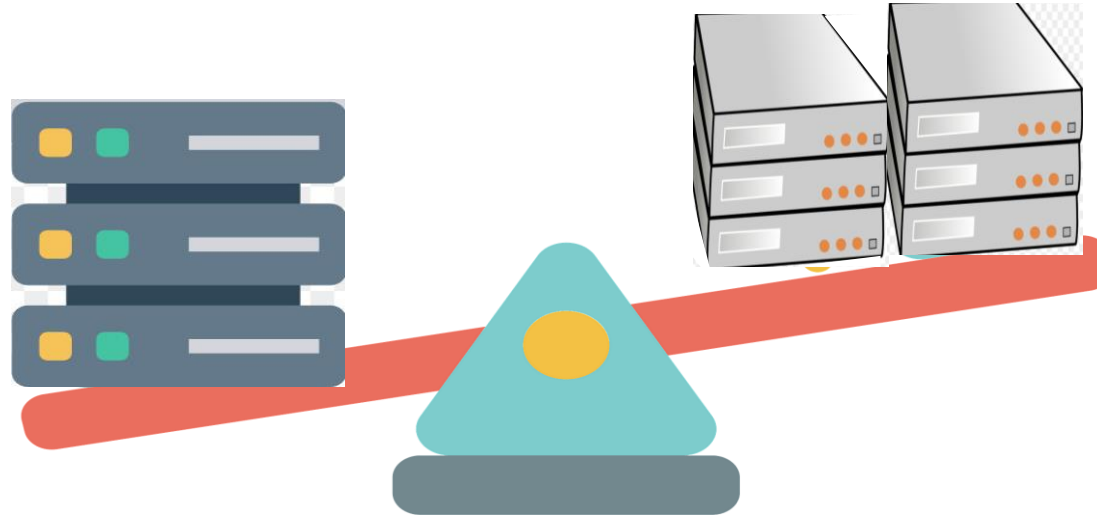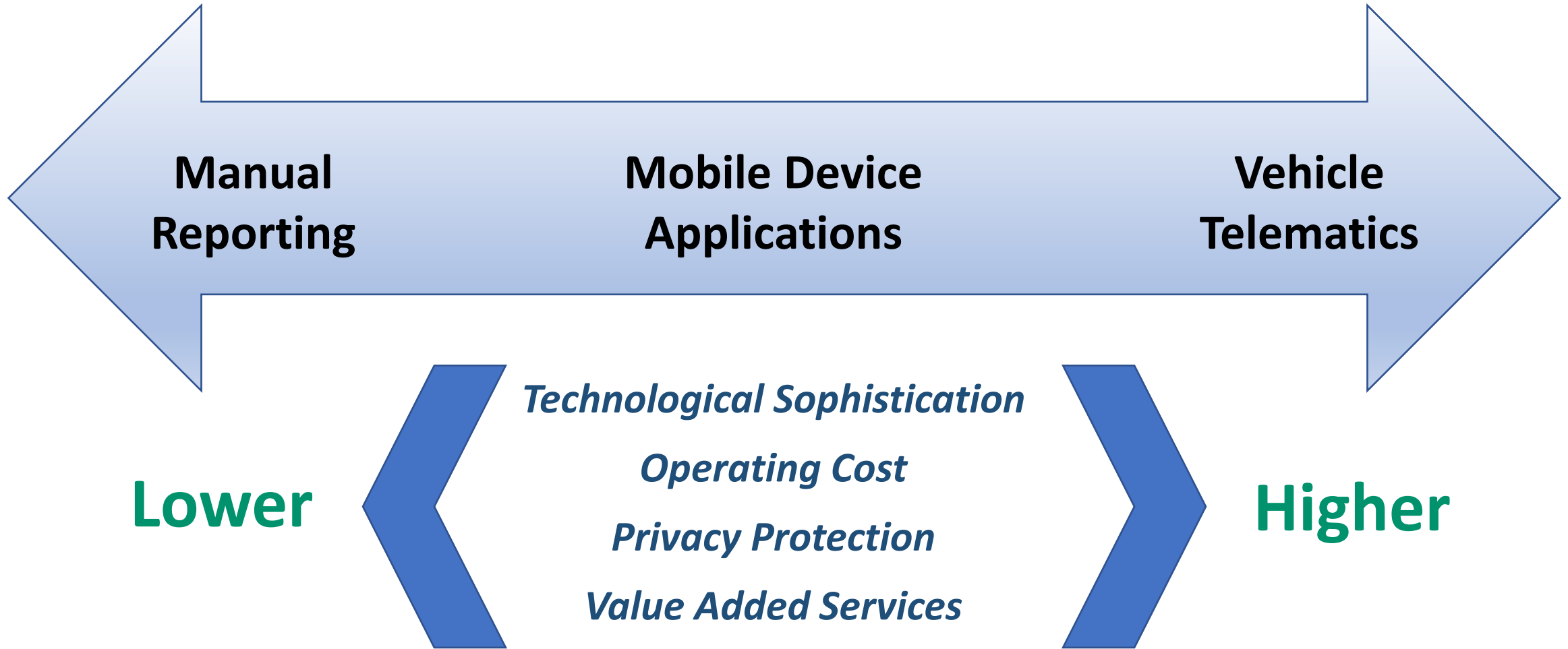

The Advantages

- Fosters competition
- Promotes user acceptance
- Offers additional value-added and revenue opportunities

The Disadvantages

- Procurement challenges
- Revenue collection efficiency difficulties
- Complications in managing the ecosystem

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RUC Mileage Reporting Options (MROs)

Manual Reporting · **Mobile Device Applications** · **Vehicle Telematics**

Lower ← *Technological Sophistication* · *Operating Cost* · *Privacy Protection* · *Value Added Services* → **Higher**

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The Question of Technology and Role of Requirements

The Question of Technology

Electronic Tolling Interoperability

- Multi-protocol solutions are the wave of the future.
- No matter what type of on-board unit a toll account employs, transactions will be processed seamlessly for the customer.
- Targets the 3 predominant protocols: TDM (E-ZPass), 6C, and SeGo.
- Use of multi-protocol equipment:
  - Roadside readers, or
  - On-board multi-protocol transponders

Today's transponders and protocols are only an interim bridge to a future that will migrate to new vehicle communications (V2X and 5G/6G) in the future.

RUC Technology Considerations

- Technological sophistication is not a prerequisite for successful RUC implementation.
- Pilots/demonstrations/implementations all show technology is not a barrier to effective RUC operations.
- Acceptance by offering an array of options for RUC adoption that allow choice.
- Match users' risk tolerance, technology adoption comfort, privacy desires, and interest in bundled services and products.

RUC implementation is likely to begin with an array of technology alternatives from simple approaches relying on odometer readings, to the most sophisticated approaches employing in-vehicle telematics and GPS.

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The Need for Clear Requirements

Electronic Tolling Lessons

Lessons from electronic toll collection suggest best RUC implementation paths would be:

- technology agnostic
- based on systems engineering practices
- rooted in a sound Concept of Operations
- anchored to clear requirements

We need "technical requirements", not "technology standards."

RUC Program Design Goals

RUC program development and implementations often aim to be:

- adaptable to new technologies
- scalable over time
- allow for innovation

We need to avoid a mindset of RUC trials being a competition among technologies by establishing <u>functional and technical requirements</u>, and business rules that govern data collection, data protection, and payment processing.

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Partnerships and Readiness for the Future

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Growing Customer Expectations

- Linked and interdependent digital world is shaping personal choices and behaviors
- Transportation is becoming a social experience, shifting from a "car" culture to a "mobility" culture
- Travelers expect more choices, real-time information, greater speed in service delivery and more convenience
- Information requirements are increasingly expected to be personalized and context sensitive
- Responsive solutions are requiring more sophisticated data integration
- User experience favors one account and a single platform to access multiple mobility services and providers
- More payment options for varied trip purposes
- Ad-hoc scheduling via seamless booking mechanisms

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Today's Patchwork of Transportation Payment Systems

- Agencies owns the customer data
- Customers have one account for tolling and often separate accounts for:
  - Parking (airports, private garages, city streets)
  - Mass transit (bus, train, subway, ferry)
  - Ridesharing (Uber/Lyft)
  - Micro-mobility (bike share, E-scooter, etc.)
  - Other mobile e-commerce
- Each mobility service/facility has its own independent app and payment channels
- A credit/debit card is attached to each app
- Payments are made separately, often for each journey

The Evolution from Tolling to Mobility Services

Source: GO Consulting

An Illustrative Future of Toll Service Providers

Toll Agencies

Agency Payment Apps

Toll Service and Payment Providers

Payment Channels and Service Bundles
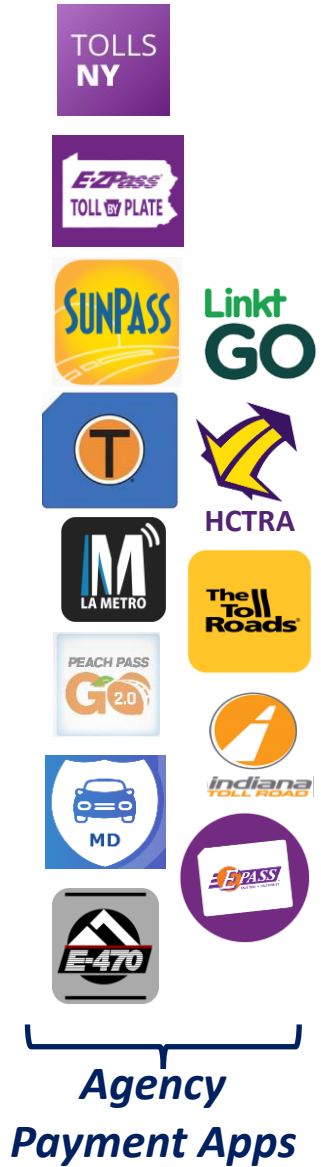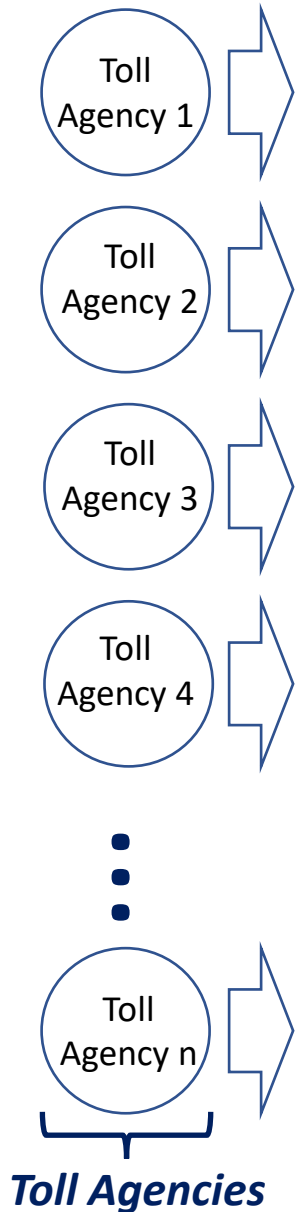
Partnerships Will Be Critical to RUC Success

An Array of Partnerships: transportation operators, infrastructure providers, state and other public agencies, technology companies, vehicle manufacturers, financial institutions, and many third-party service providers.

Wide-ranging Participation: business approaches and service delivery offering a variety of value propositions and service options for users.

Use Technology Already in Development: Vehicle and technology companies are already progressing the basic foundation for vehicle-based commerce and transactions.

Maintain Options and Flexibility: Committed open system designs and technology protocols will allow competition of solutions and services and ability to adapt to technological change and innovation.

RUC and Emerging Technologies

- **Electric Vehicles (EV)** – the impetus for initial RUC implementations and the beginning of the transformation as a gas tax replacement.

- **Connected Vehicles (CV)** – the capability for vehicle communications and in-vehicle telematics change commercial transactions on roadways.

- **Edge Computing** – lighter and less intrusive roadside equipment with potential for more real-time transaction processing.

- **Blockchain** – a solution auditability and data security in an open architecture environment.

- **Vehicle Occupancy Detection Systems** – more effective Managed/Express Lane and HOV charging and enforcement applications.

- **Autonomous Vehicles (AV)** – a transformation from vehicle _owner_ charging to vehicle _occupant_ charging.

- **AI/Computer Vision** – a path toward effective enforcement

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Road-Use Charge: Walking Before We Run

What We Know & Today's Wisdom…

- The Highway Trust Fund has reached insolvency.
- General Fund transfers are a political and unreliable source of revenue.
- Greatest RUC implementation hurdles are political support and public acceptance.
- Systems must offer user choice and service options.
- Use technology to create options and value propositions that speak to the many roadway users.
- Keep it simple. Ease of understanding helps avoid opposition and delays and preserves the power of pricing signals.

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Implications for the future…

- Offer a balanced set of options matching users' risk tolerance, technology adoption comfort, privacy desires, and interest in bundled services.
- Establish functional & technical requirements and business rules governing data collection, data protection, and payments.
- Fix the revenue problem before addressing too many policy issues. Complex pricing adds costs, confuses customers, and dilutes pricing signals.
- Partnerships will be essential in RUC system implementation.
- Merging RUC clearinghouses & tolling IOP hubs may offer economies of scale & efficiencies.

Thank You... Please Stay in Touch

Together We Can Make a Difference!

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