



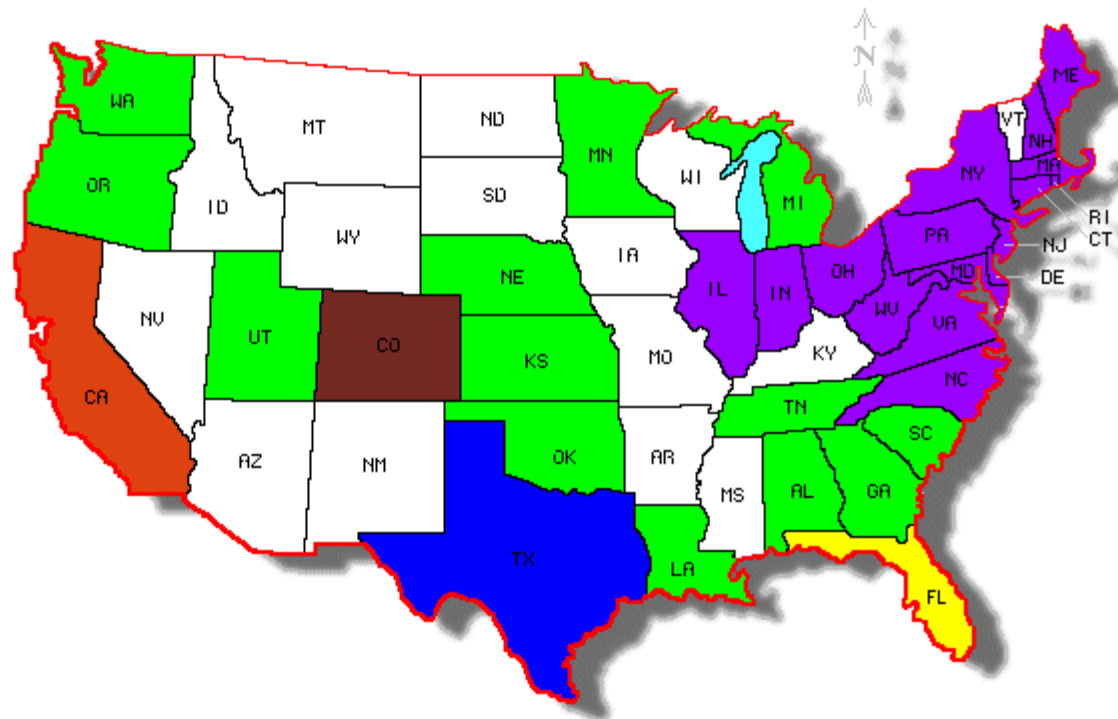
# ELECTRONIC TOLL COLLECTION

# AGENDA

- ◉ Presentation Objective
- ◉ Electronic Toll Collection (ETC) and Interoperability in United States
- ◉ Tolling in Texas
- ◉ ETC Systems
- ◉ System Testing
- ◉ Violation Enforcement
- ◉ Discussion

# ***Electronic Toll Collection and Interoperability***

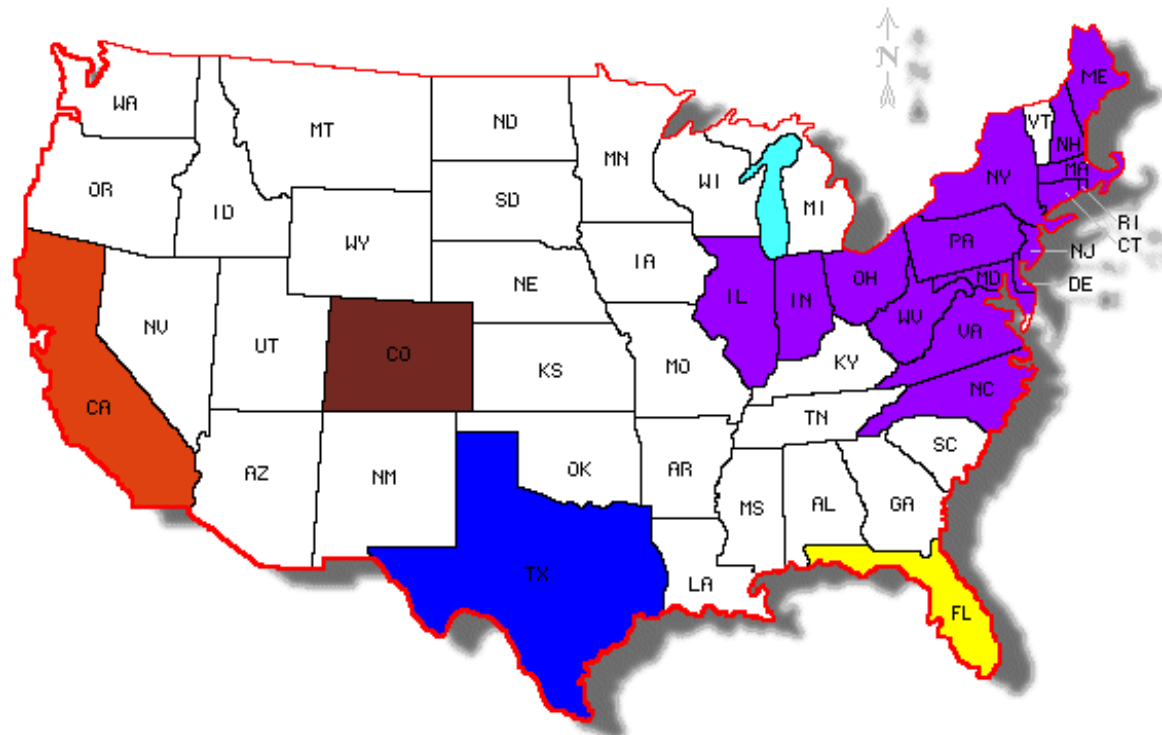
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1990	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099



# U.S. TOLL INTEROPERABILITY

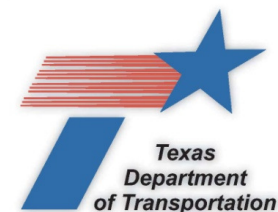
## Interoperability in U.S.

- - IAG
- - Texas
- - Florida
- - Colorado
- - California

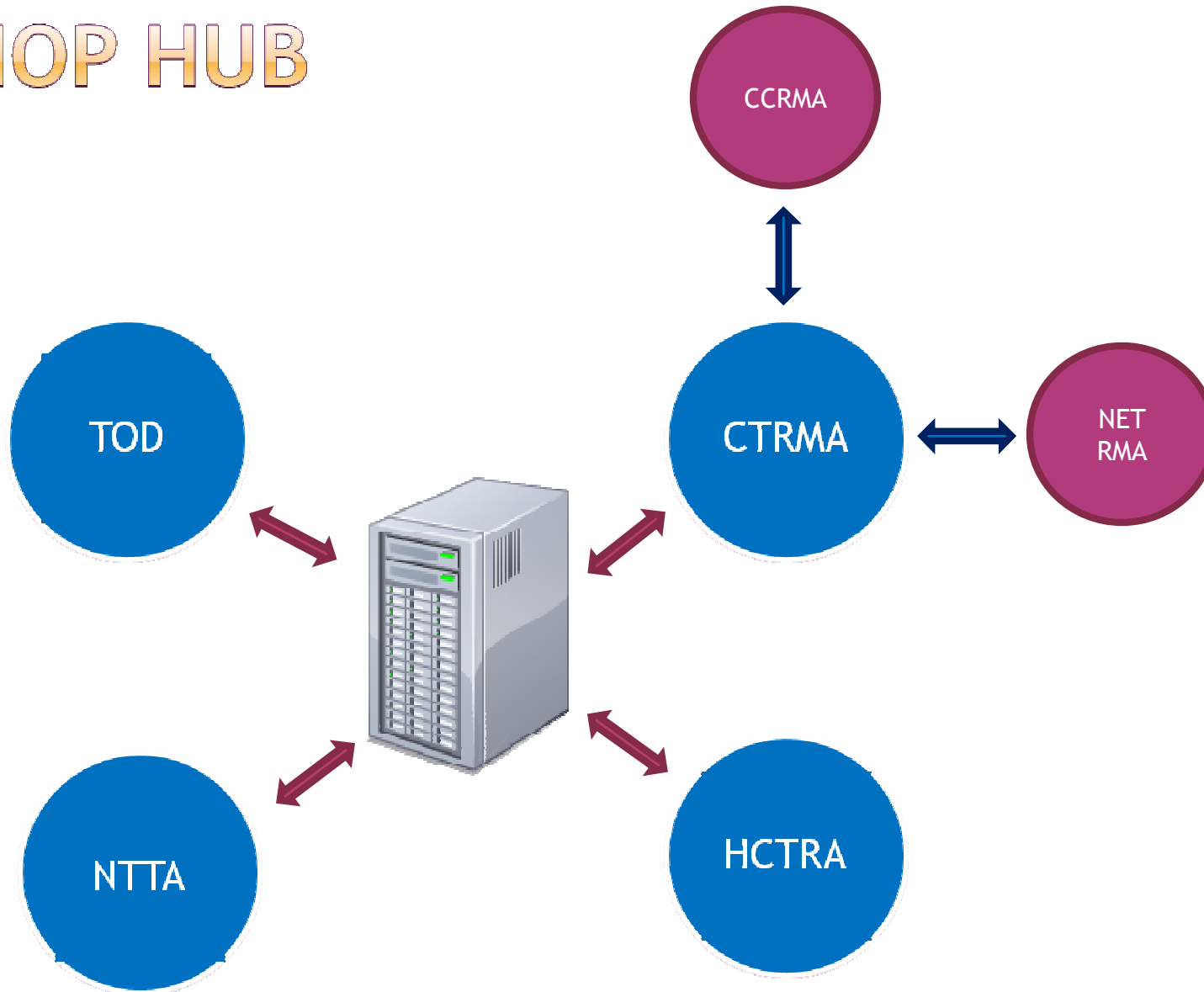


# TEXAS INTEROPERABLE AGENCIES

- ◉ Cameron County Regional Mobility Authority
- ◉ Camino Real Regional Mobility Authority
- ◉ Central Texas Regional Mobility Authority
- ◉ Harris County Toll Road Authority
- ◉ North East Texas Regional Mobility Authority
- ◉ North Texas Tollway Authority
- ◉ Toll Operations Division of TxDOT



# IOP HUB



Visited agency charged 6%-8%

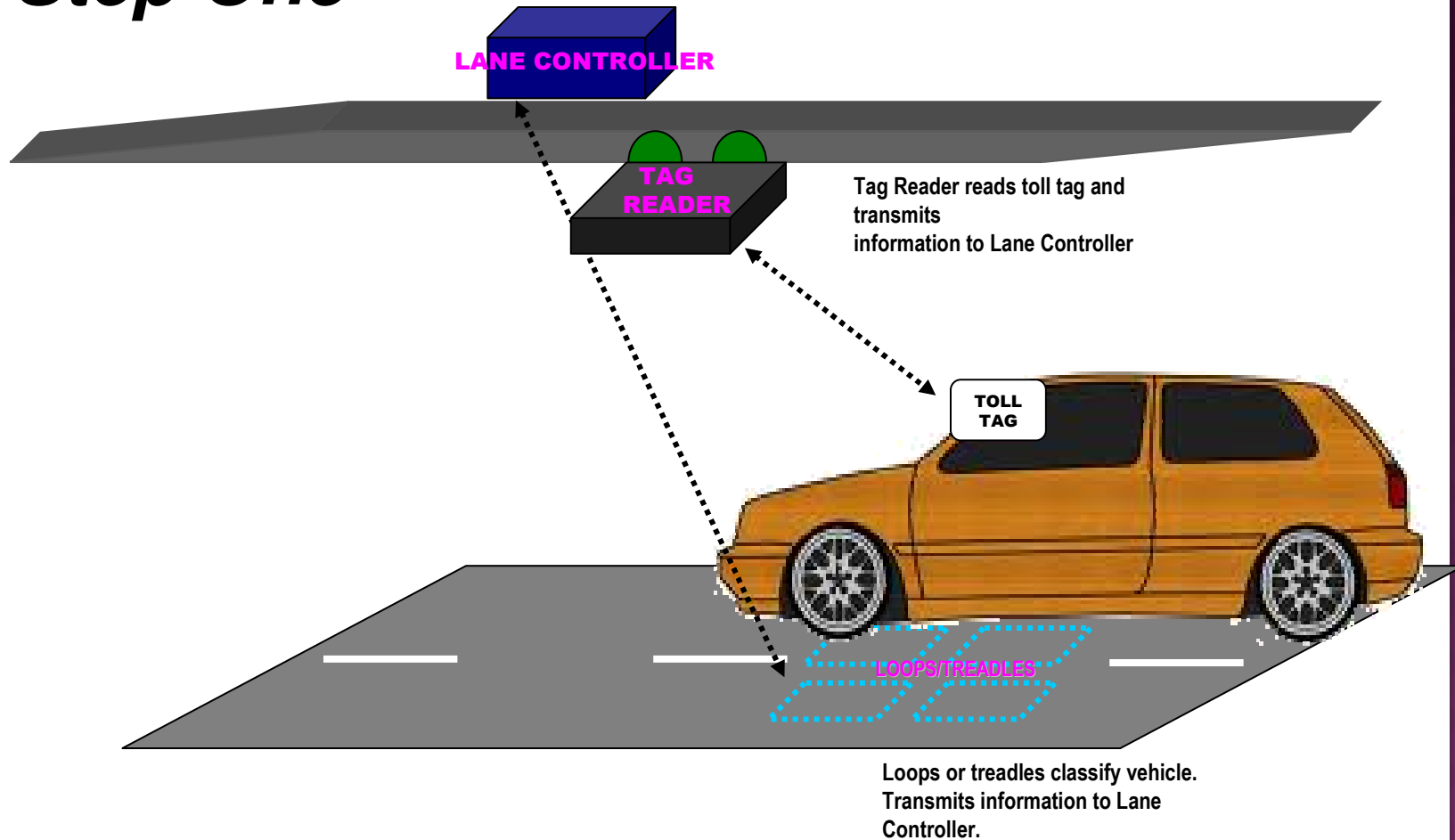
# ***Typical ETC System***



# ***Electronic Toll Collection Process***

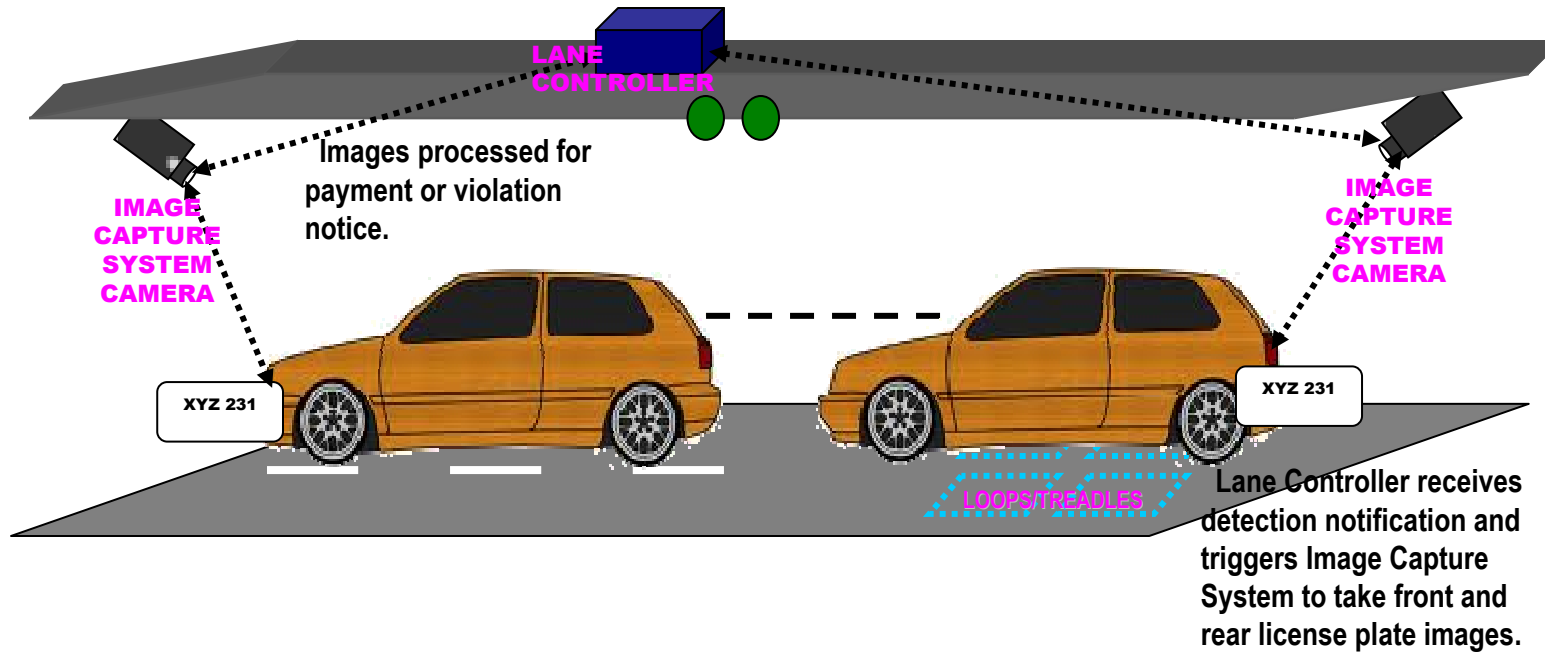
- ✓ Vehicle detection
- ✓ Tag Read
- ✓ Vehicle Classification
- ✓ License Plate Images Captured
- ✓ Lane Controller Reconciles Information
- ✓ Information Sent to Host or Central Transaction Repository (CTR)
- ✓ CTR Sends Information to IOP HUB for Interoperable Transaction Processing

# Step One



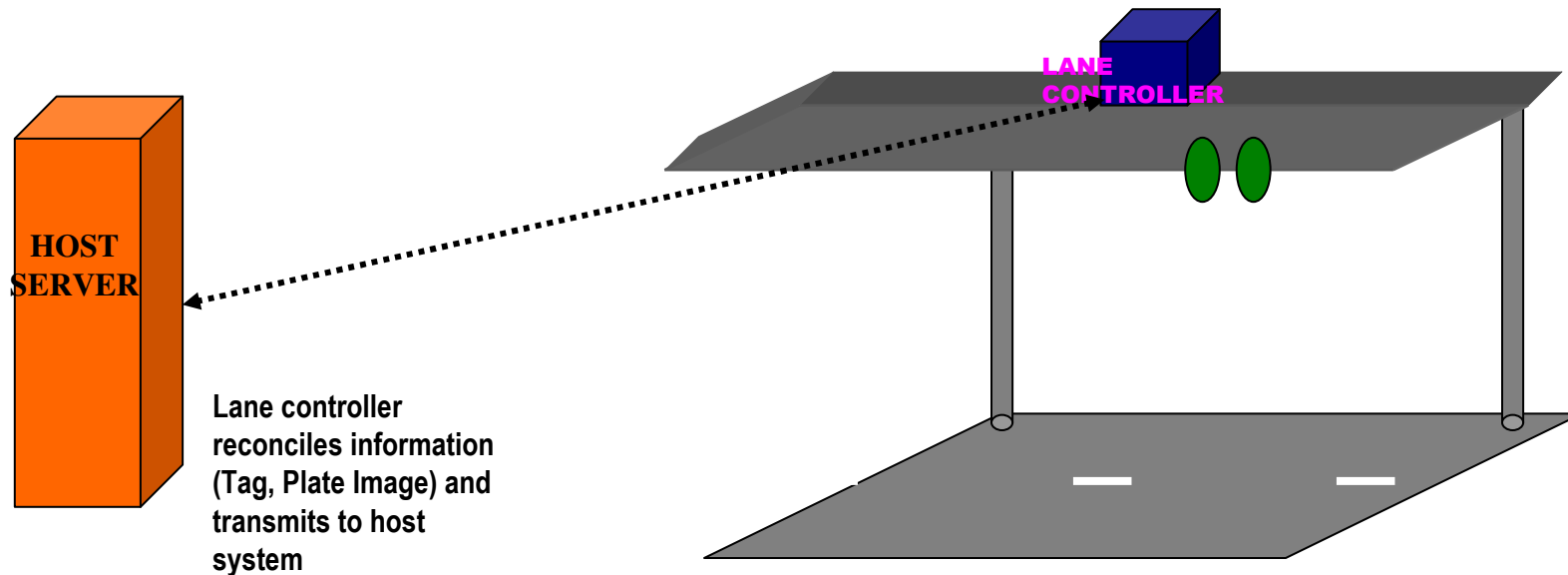
1. As the car enters the lane, the loops or treadles detect and classify the vehicle while the tag reader detects and reads the toll tag. Information from the classification system and tag reader are transmitted to the lane controller for processing.

# Step Two



2. The loops prompt the lane controller to trigger the image capture system cameras to take rear and front license plate images. The images are then sent to the lane controller for processing to determine if a valid tag read has occurred.

# Step Three

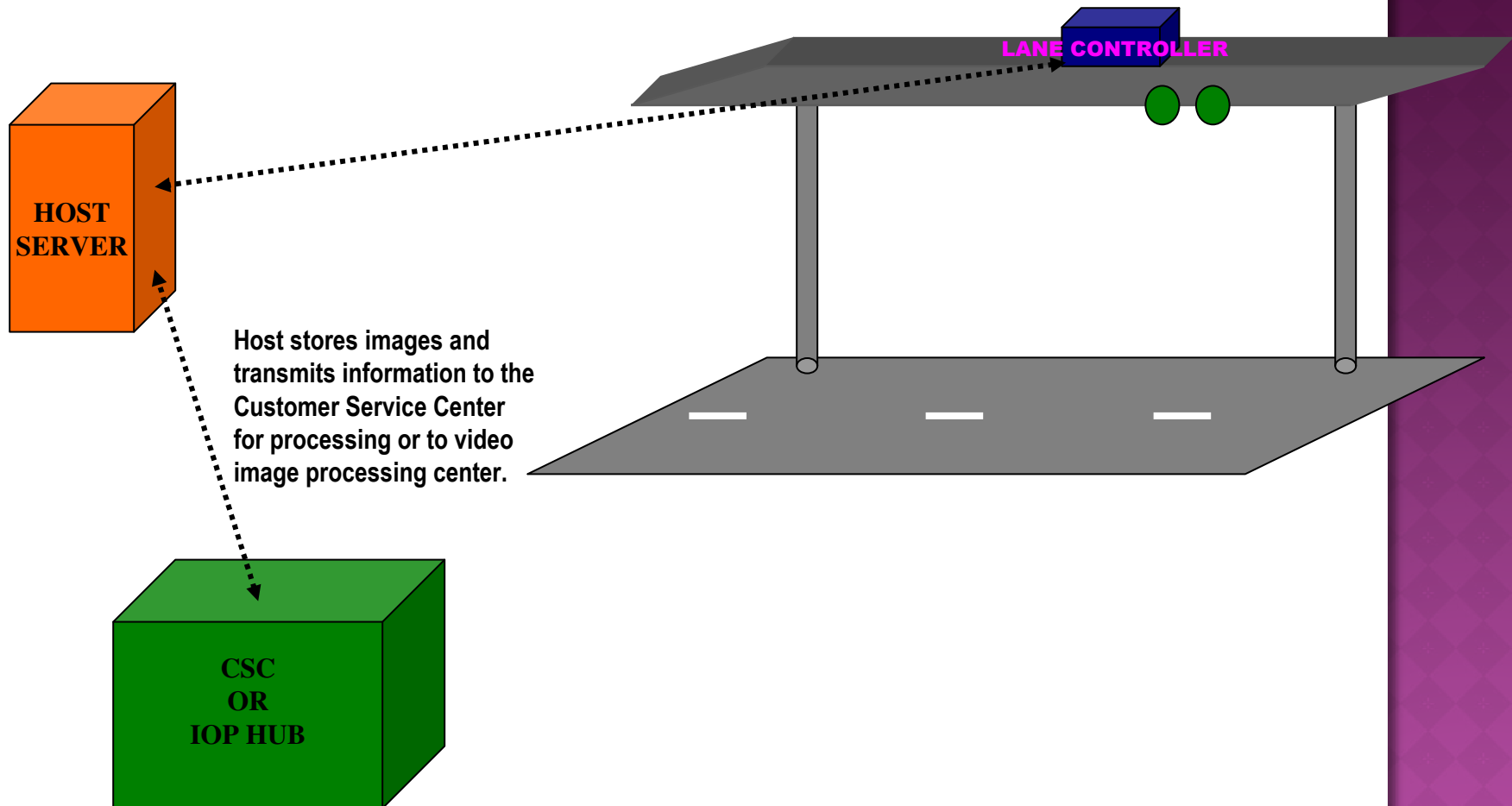


3. Once the vehicle is classified and toll tag is read, the lane controller reconciles the transaction with the information it has received from the IOP HUB for the following:

- ✓ Toll tag matches vehicle classification (i.e. toll tag is registered to a 2 axle vehicle and a 2 axle vehicle was present in the lane).
- ✓ Toll tag account balance has sufficient funds to process toll transaction.

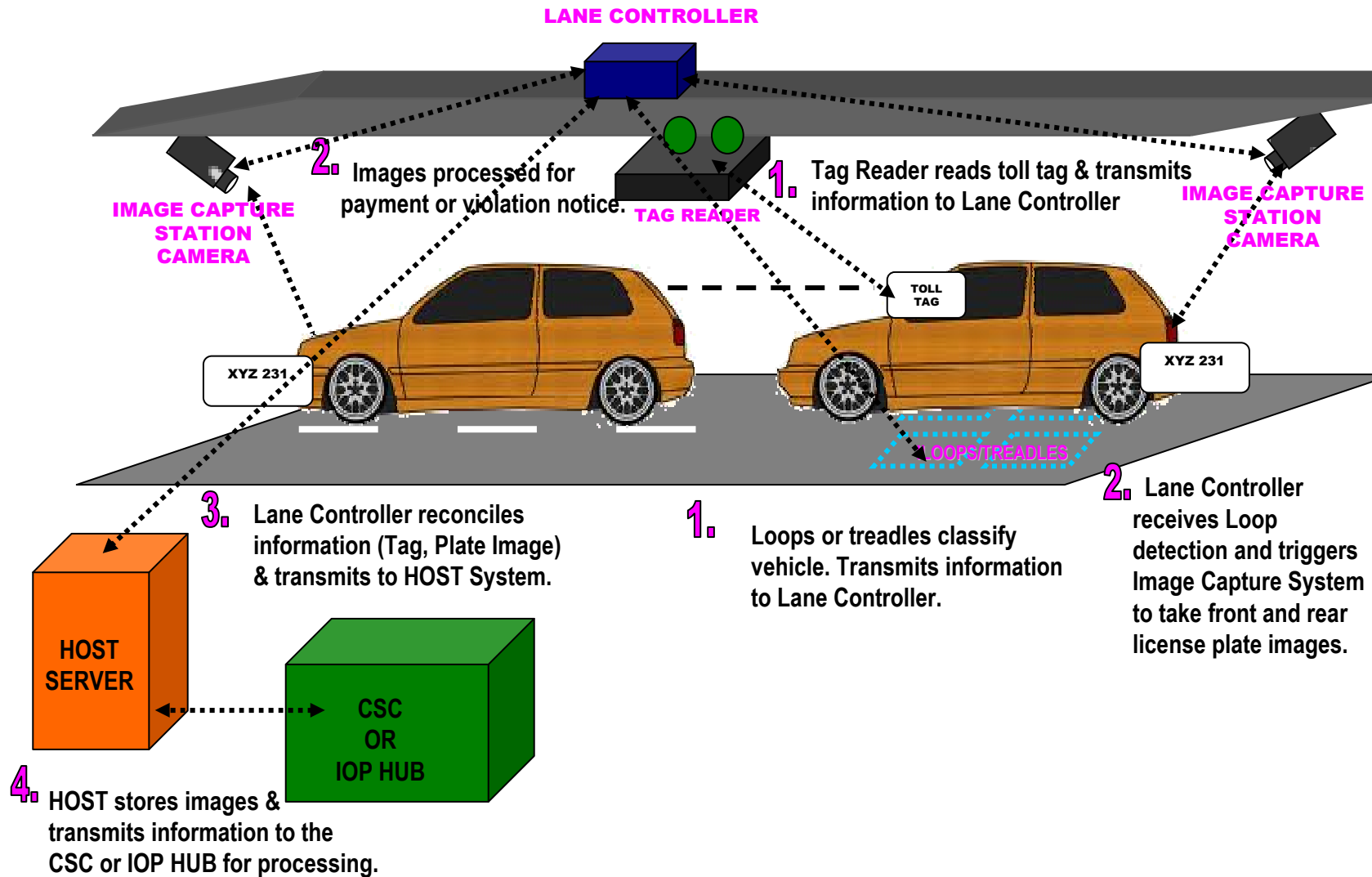
The information is then transmitted to the authority host system.

## Step Four

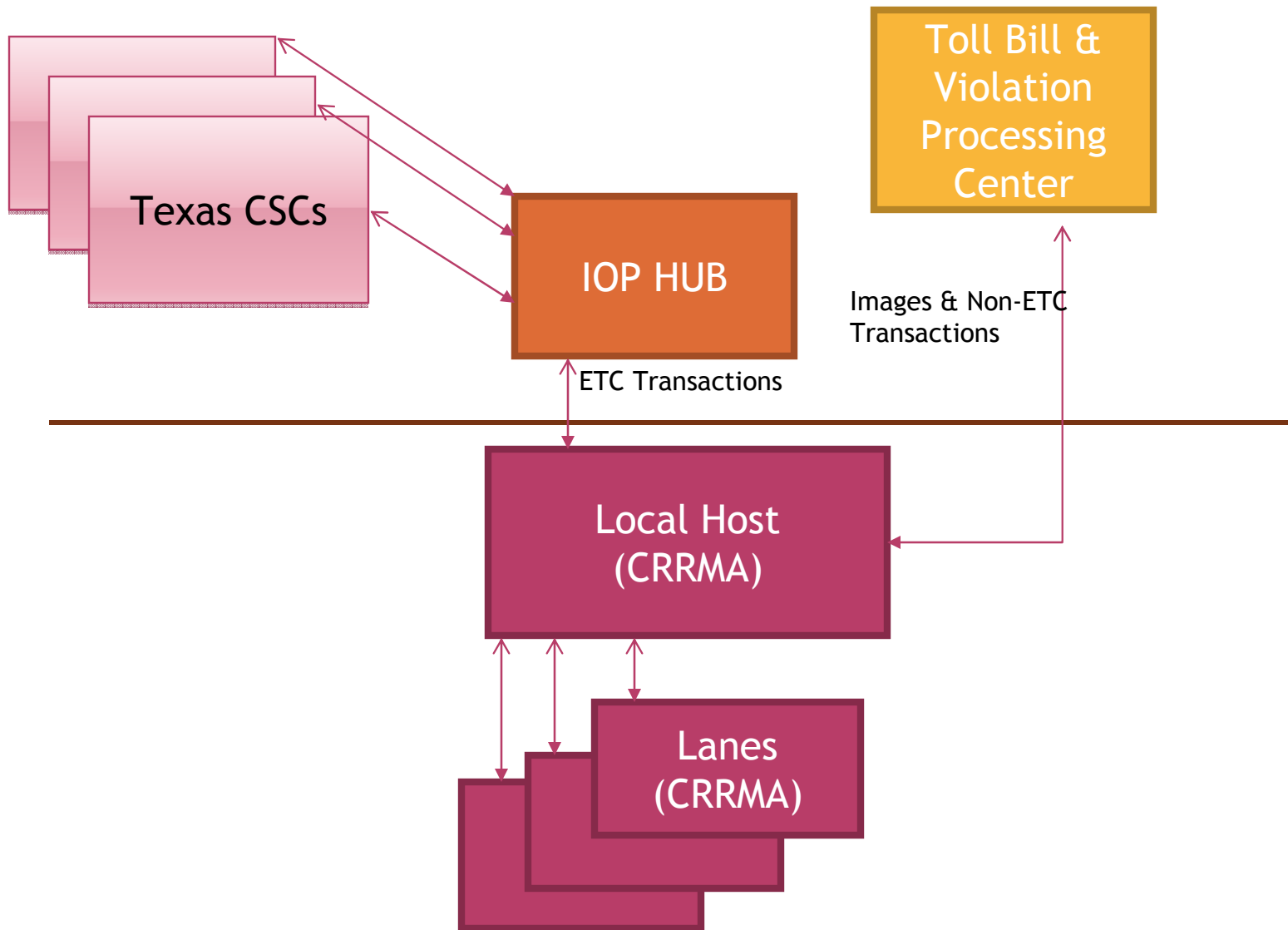


4. The host collects and stores all transaction information from all toll lanes. Toll tag transactions are transmitted from the host to the Customer Service Center (CSC) or IOP HUB for transaction processing.

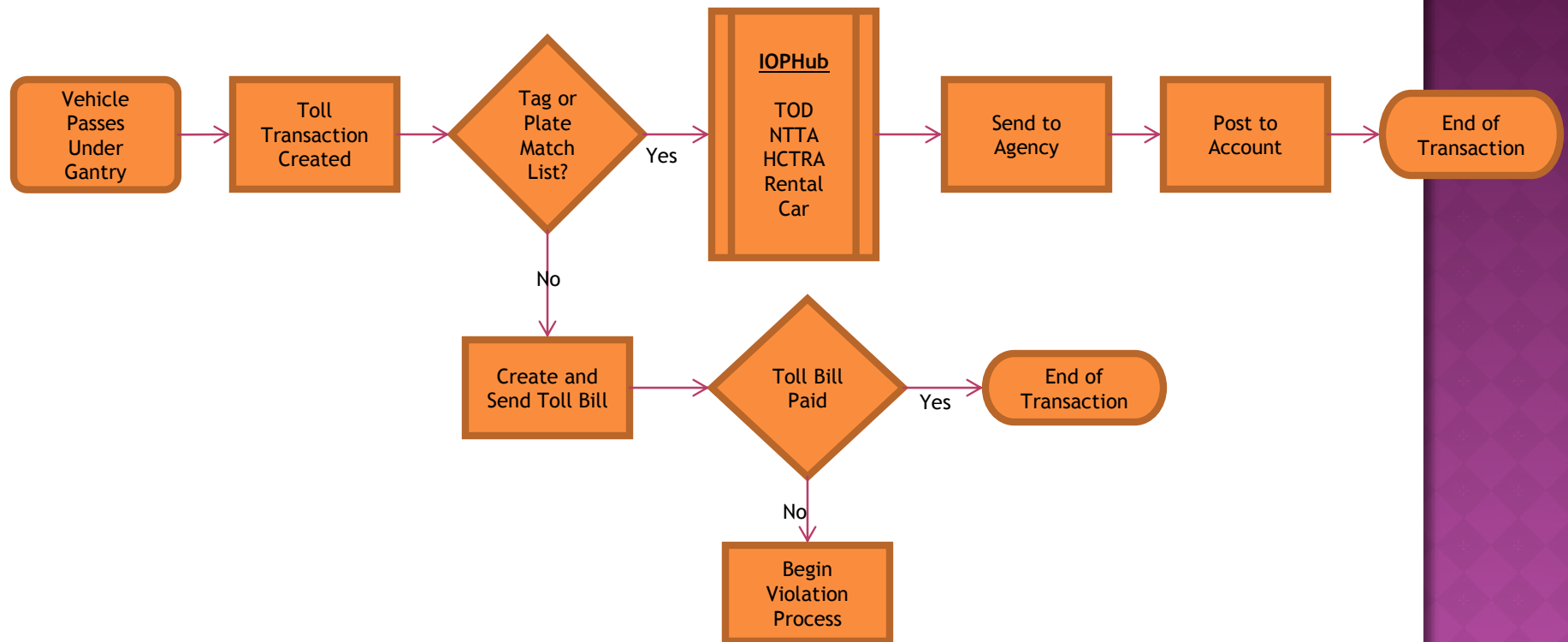
# Electronic Toll Collection (ETC) Process



# MAJOR SYSTEM COMPONENTS



# TOLL TRANSACTION PROCESS





# MAJOR SYSTEMS INTEGRATORS IN U.S.

Company	Lane	CSC/VPS	Selected Agencies where Implemented
ACS	√	√	North Carolina, BATA/Golden Gate Bridge
ETCC	√	√	NTTA, HCTRA, SRTA, MDX, THEA, Illinois Tollway, WSDOT
Federal Signal	Sirit	VESystems	TOD (TXDOT)
Raytheon	√		407 Canada, 495 HOT Lanes, Cross Israel Highway, MnDOT
Telvent	√		CTRMA, CCRMA, NET RMA, New Hampshire, Rhode Island, WSDOT
TransCore	√	√	TOD, OOCEA, VDOT, Oklahoma Turnpike, Kansas, WSDOT
TRMI	√		Golden Gate Bridge, Powhite Parkway, , Chesapeake Bay Bridge & Tunnel, New Hampshire DOT, El Paso Bridge System

CSC - Customer Service Center  
VPS - Violation Processing System

# ***System Testing***

# WHY TEST?

- ◉ Customer service

“At the lowest level, customers expect accuracy.” First Break All The Rules

- ◉ Accurate revenue collection

- ◉ Agency reputation

- ◉ Media
- ◉ Rating agencies
- ◉ Violation enforcement
- ◉ All Electronic Toll Collection

# TESTING

- ◉ Factory acceptance testing
- ◉ Prototype onsite testing
- ◉ Interface testing
- ◉ Commissioning and integration testing
- ◉ Operational testing
- ◉ Project acceptance

# AUDIT VALIDATION

- ◉ Independent
- ◉ Competent
- ◉ Objective
- ◉ The brutal facts

# ***Violation Enforcement***

# FAILURE TO PAY TOLL

- ◉ Reasons for nonpayment of tolls
- ◉ What rate is acceptable?
- ◉ Risk to agency
  - Loss of revenue
  - Rating agencies
  - Paying customers
  - Community confidence and support

# VIOLATION ENFORCEMENT SYSTEMS

- ◉ Cameras take images of license plates
- ◉ Process the images
- ◉ Owner information from VTR
- ◉ Bill is mailed to the owner
- ◉ Set time to pay
- ◉ Failure to pay results in fines



# TEXAS TRANSPORTATION CODE

## SEC 370.177

- ◉ Toll plus Administrative fee up to \$100
- ◉ 30 days to pay
- ◉ Court is an option
- ◉ Misdemeanor punishable up to \$250
- ◉ Firm but fair



# DISCUSSION