Connected Vehicle Policy Program

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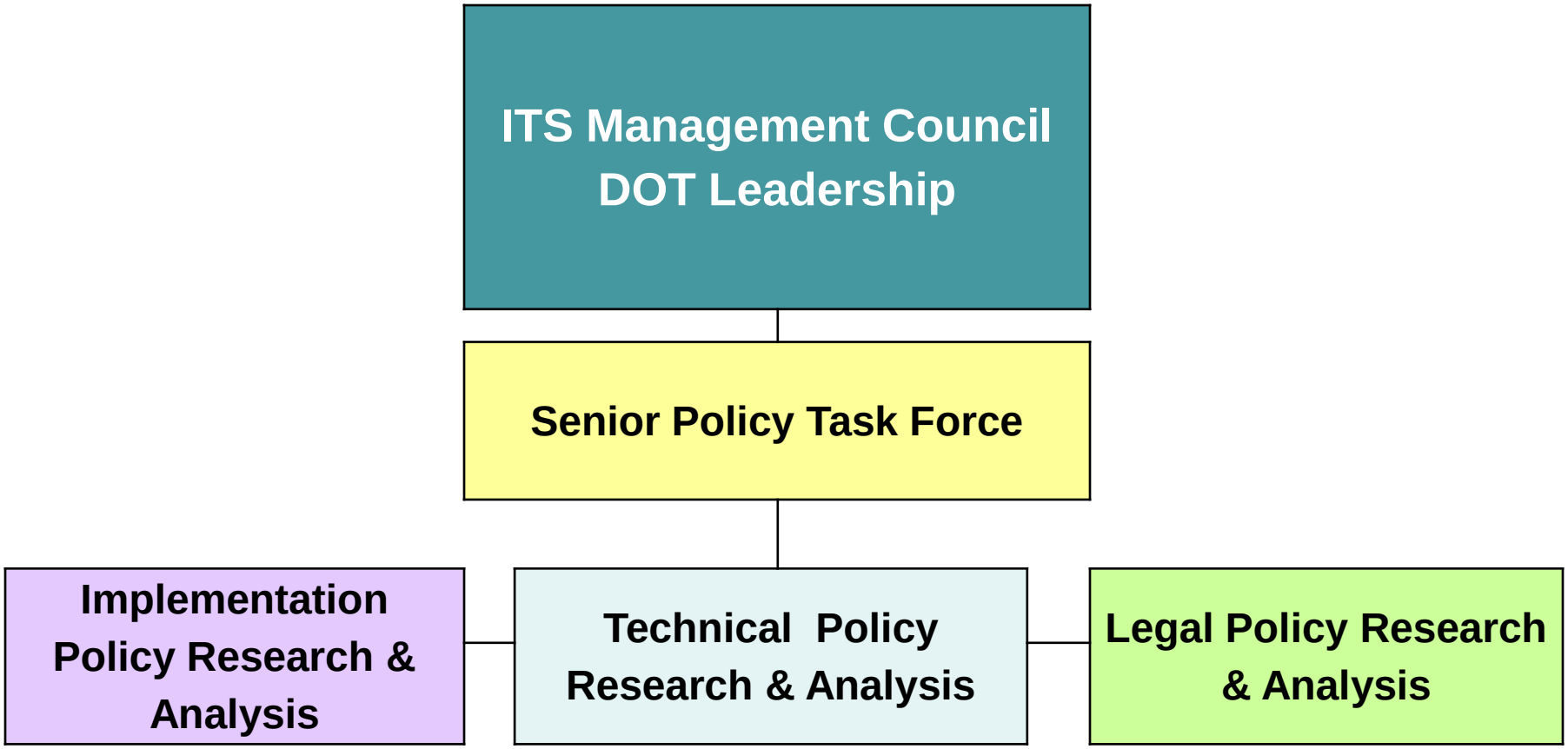
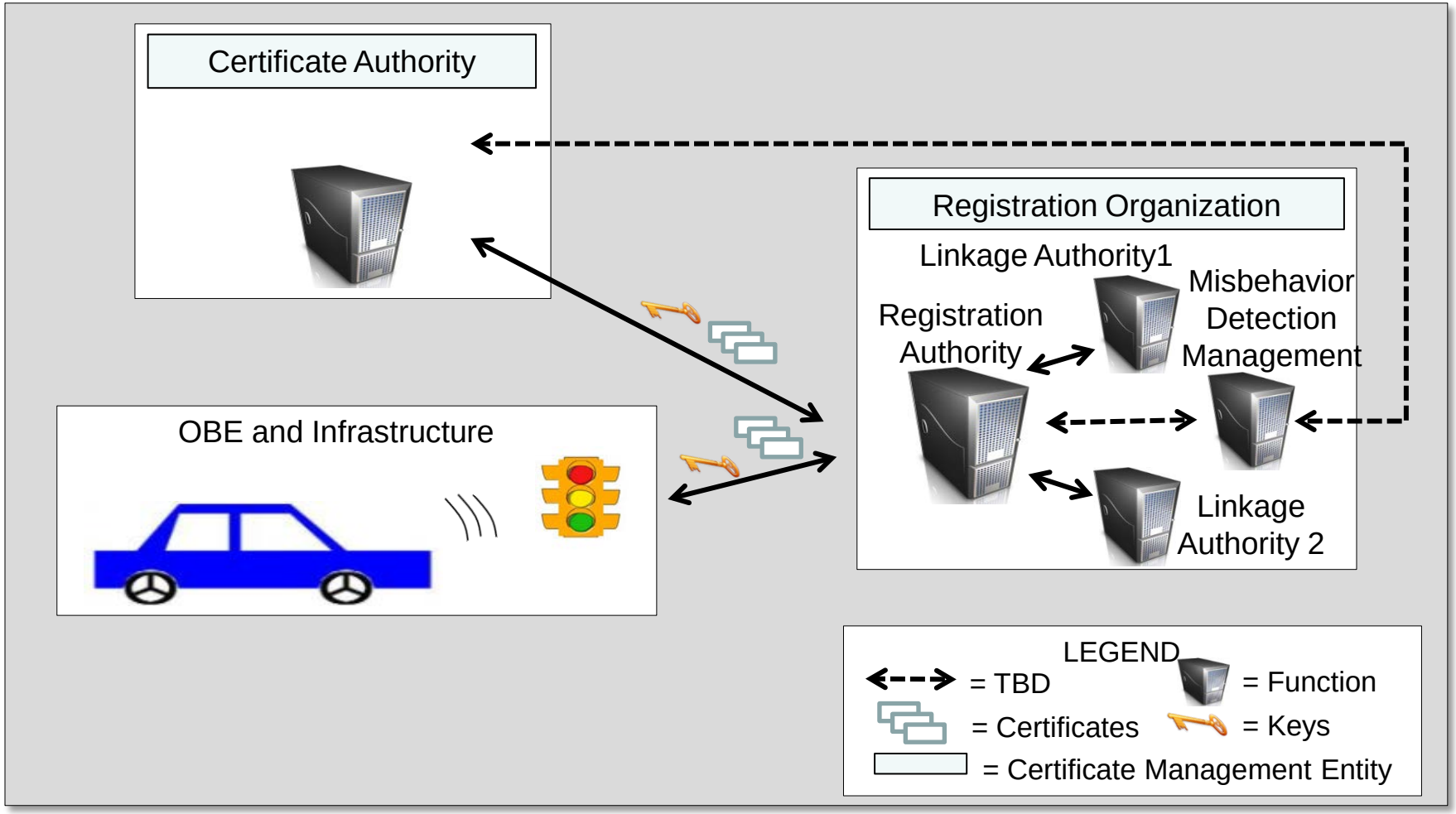
USDOT Connected Vehicle Policy Program Organizational Structure 9/2012



Security Credential Management System (SCMS)

SCMS represents the entire system, and CMEs house the functions



Organizational Implications of the SCMS

Organizational, Institutional, and Policy Considerations

- Different organizational models are being considered for the system
- Current analysis based on new design
- Major cost drivers of SCMS:
  - Hardware and software needs (~50-60% of total costs)
  - Numbers of physical locations of functions and organizations
  - Choice of organizational model – oversight, management, and efficiency
- Various ownership options being analyzed
  - Public-private partnership, all private
  - Will impact organizational models and costs
- If or how PII may be collected as part of registration into the system is being analyzed
- Internal controls and policies needed to protect security and privacy are being analyzed

Communications System for Security

- **Four scenarios:**
  - Mostly cellular system
  - Mostly cellular with some installation of DSRC RSE
  - “All DSRC”
  - CAMP Phased Deployment Scenarios
- **Three principal cost drivers:**
  - On-Board Equipment (OBE) is a significant in-vehicle cost in all scenarios
  - Road-Side Equipment (RSE) is a significant infrastructure cost in an “All DSRC” scenario
  - Cellular may be a significant cost in those scenarios that rely on it for certificate delivery

Communications System for Security

- **Delivery of the Certificate Revocation List (CRL) is expensive and technically demanding**
- **With incremental or no CRL delivery:**
  - Certificate Authority maintains CRL, but does not distribute. Instead, certificates are withheld from misbehaving vehicles.
  - Cellular data costs drop substantially.
- **With no CRL distribution, OBE costs are the most expensive part of the system:**
  - OBE costs vary slightly for each scenario due to cost and power consumption of subcomponents
  - OBEs are necessary for safety, so the incremental costs to serve the function of communicating to the SCMS are relatively small
  - Results are very sensitive to inputs; uncertainty in conclusions is high

Communications System for Security

- **For an "All DSRC" scenario, the number of RSEs nationwide depends on risk tolerance and coverage requirements:**
  - Estimates vary from 1300 RSEs to150,000 RSEs
  - Unanswered Questions:
    - What level of coverage is acceptable?
    - How frequently must a vehicle interact with the system?
- **Lowest cost scenario hinges on number of RSEs required**
  - Cellular scenarios are lowest cost if "All DSRC" requires many RSE
  - OBE costs become most important if "All DSRC" requires fewer RSE

Communications System for Security

- **Operational issues and unknown variables dramatically impact costs of cellular options**
  - Cellular scenario highly sensitive to changes in the misbehavior rate, CRL variable data size, and peak prices
- **Installation, operation and maintenance of RSE's pose significant challenges for DRSC options**
  - Placement of RSE's in state or locally owned equipment cabinets and rights-of-way would require a significant implementation permitting, coordination and system integration effort
  - Placement of RSE on private property may be an alternative but would also require a strategy for implementation

Other Implementation /Technical Policy Issues

- Business Models
- Infrastructure Analysis - AASHTO
- Spectrum
- Core System Architecture Analysis
- Standards and Certification Needs Identification

Legal Policy - Scope of Authority

- NHTSA has authority to support:
  - Key aspects of V2V communications
  - Regulation of critical equipment, messages and applications if related to safety
  - Provision of the security required to support a V2V rule by a non-Federal entity, as through a procurement or other form of agreement or indirectly via a V2V regulation
- FHWA does not have authority to require installation of roadside infrastructure

Other Legal Policy Issues

- Intellectual Property
- Privacy
  - Need to distinguish between trip-trackability and ability to identify bad actors on the system
  - DOT will do comprehensive review of any final system and involve appropriate privacy community