VII Consortium

SCMS Manager Considerations

AASHTO ITS Working Group
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This presentation represents work underway at VIIC
under cooperative projects with the USDOT

**The views and findings herein are those of VIIC alone
and not those of the USDOT**

VII Consortium (VIIC)

Industry consortium (Michigan 501 (c) (06) non-profit)
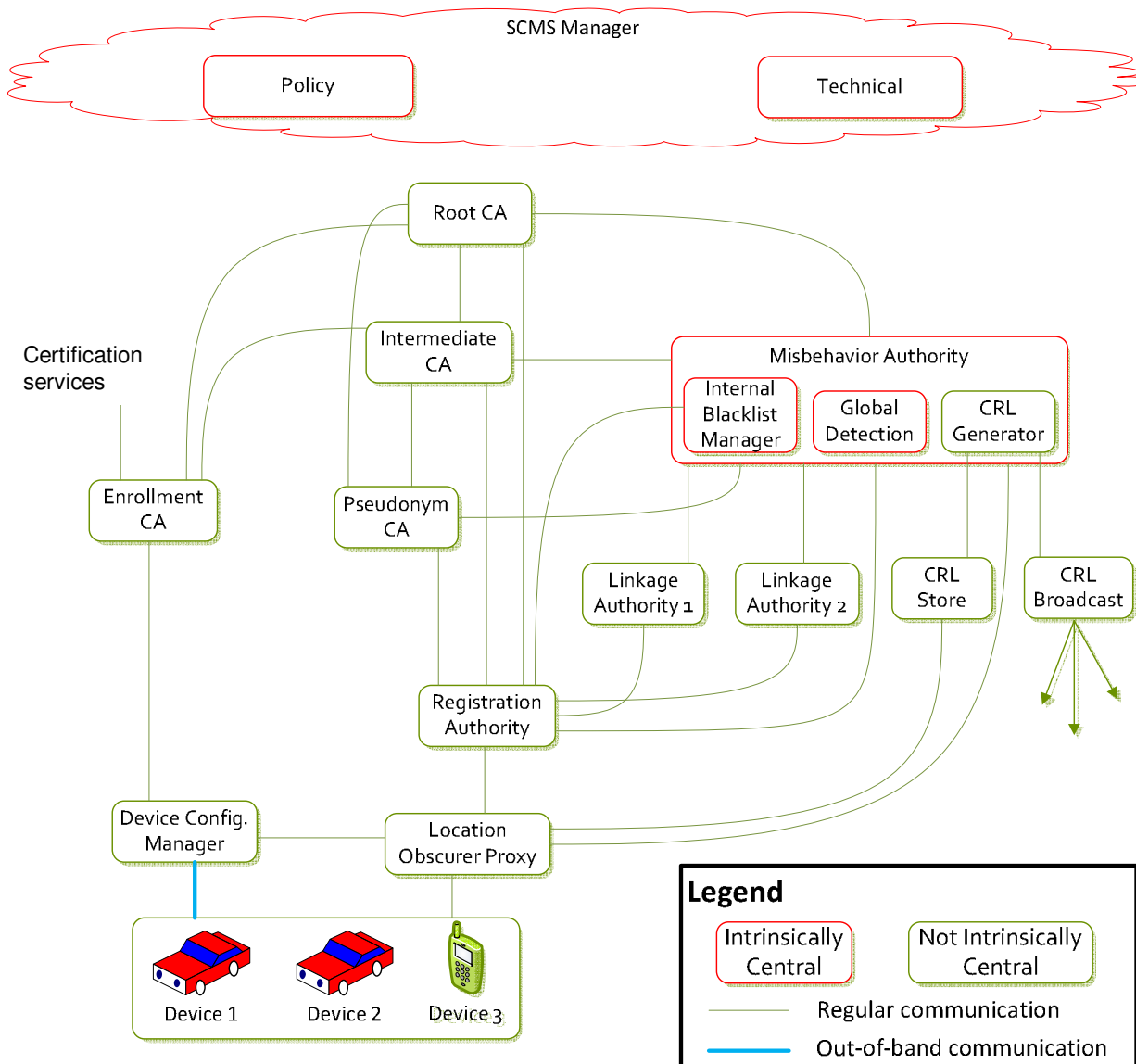consisting of ten light-duty vehicle manufacturers

Opportunities with a Coordinated Nationwide Deployment

- DSRC appears to provide similar opportunities to other long-term technology systems (e.g., GPS, Internet) that have enabled large-scale commercial innovation

- The core system, including security, should provide maximum flexibility for these types of commercial and proprietary innovations, without compromising safety

- Expect the development of a wide-spread ecosystem of entrepreneurial commercial applications enhancing customer value

VII CONSORTIUM

Security System as Trust Anchor for V2V and V2I/I2V Functions

- Need for consistent trust anchor (via security system) throughout:
    - United States
    - Likely range of vehicle-based travel (e.g., NAFTA zone)

- Separating the core security systems for vehicles and infrastructure would likely result in:
    - Challenges to interoperability
    - Diverging security technologies and protocols
    - Reduced benefits to end users

- Implementing the same trust anchor for vehicles and infrastructure enables:
    - Transparent support for interoperability
    - Cohesive security policies
    - Ease of developing and deploying applications
    - Enhanced opportunities for creating customer value

SCMS Deployment Model

SCMS Manager

Policy

Technical

Root CA

Intermediate CA

Certification services

Misbehavior Authority

Internal Blacklist Manager

Global Detection

CRL Generator

Enrollment CA

Pseudonym CA

Linkage Authority 1

Linkage Authority 2

CRL Store

CRL Broadcast

Registration Authority

Device Config. Manager

Location Obscurer Proxy

Device 1   Device 2   Device 3

Legend

Intrinsically Central

Not Intrinsically Central

Regular communication

Out-of-band communication

Key Functions:

1. Device Initialization

2. Certificate Provisioning

3. Misbehavior Detection and Revocation

SCMS Manager Research

The VIIC has been conducting precompetitive research to address the following key questions:

▸ What is the legal relationship between SCMS Manager and SCMS elements?

▸ Is there a preferred organizational structure?

▸ Who are the recommended members of the SCMS Manager entity – private, public, both?

▸ What are the membership responsibilities?

▸ What legal protections will the SCMS need?

Mission of the SCMS Manager

The expected mission of the SCMS Manager is to:

- ❖ Set the SCMS organization structure
- ❖ Establish operational rules and processes
- ❖ Define means for separation of functions
- ❖ Ensure all required functional elements are provided
- ❖ Provide a mechanism for certification, audit, enforcement and adjudication
- ❖ Establish funding mechanisms
- ❖ Provide adequate risk management, and
- ❖ Have an ability to address cross-border issues

SCMS Manager Entity

The first step in risk management is the form of the legal entity under which the SCMS Manager operates.

➢ This determines what may be at risk, how it conducts operations, which entities may be members/shareholders/partners, how it is protected, etc.

➢ VIIC has identified the strengths and weaknesses for these legal entity types:

Business (For Profit) Corporation

Limited Liability Company (LLC)

Limited Partnership (LP)

Nonprofit 501(c) Corporation

Establish Operational Rules and Processes

The business of the SCMS would be managed through the oversight and direction of a Board of Directors (BoD)

- Anticipated participants on the SCMS Manager BoD:
  - Individual or Consortium of automakers
  - AASHTO and/or State DOTs
  - USDOT and possibly other federal agencies
- Other stakeholder interests would potentially be accommodated by:
  - Direct participation on the BoD
  - Establishing external advisory groups
  - A dedicated Ombudsman within the external liaison function

Define Means for Separation of Functions

Separation of functions could involve both physical separation and separation by policy for the Certificate Management Entities (CMEs)

– The SCMS Manager will define the separation requirements for both central and non-central CMEs

– These requirements will be part of the contractual agreement between the SCMS Manager and each CME

– An audit function will be part of that agreement

Ensure All Required Functions are Provided

It is the responsibility of the SCMS Manager to ensure that all necessary functions are provided by default CMEs during operation

The SCMS Manager is further responsible for setting polices and processes to support emergency operations under atypical events, for example:

– Natural disasters

– Security breach

– Loss of network functionality

Establish Funding Mechanisms

Start-up financing needs to be in place before Day 1

– Funding of startup expenses, as well as ongoing operating costs of the SCMS, are needed until such time as a sustainable business plan is implemented.

- Initial funding will likely come from those who will operate the SCMS. This may include:

   Automakers

   AASHTO

   USDOT and other federal agencies

- Other funding mechanisms under consideration include:

   Investors

   Commercial loans

- Longer-term funding streams potentially involve:

   Fees per certificate or per certified node

   Laboratory Certification fees

   Audit fees

Provide Adequate Risk Management

The SCMS Manager is expected to manage corporate risk of daily operations through a dedicated legal function.
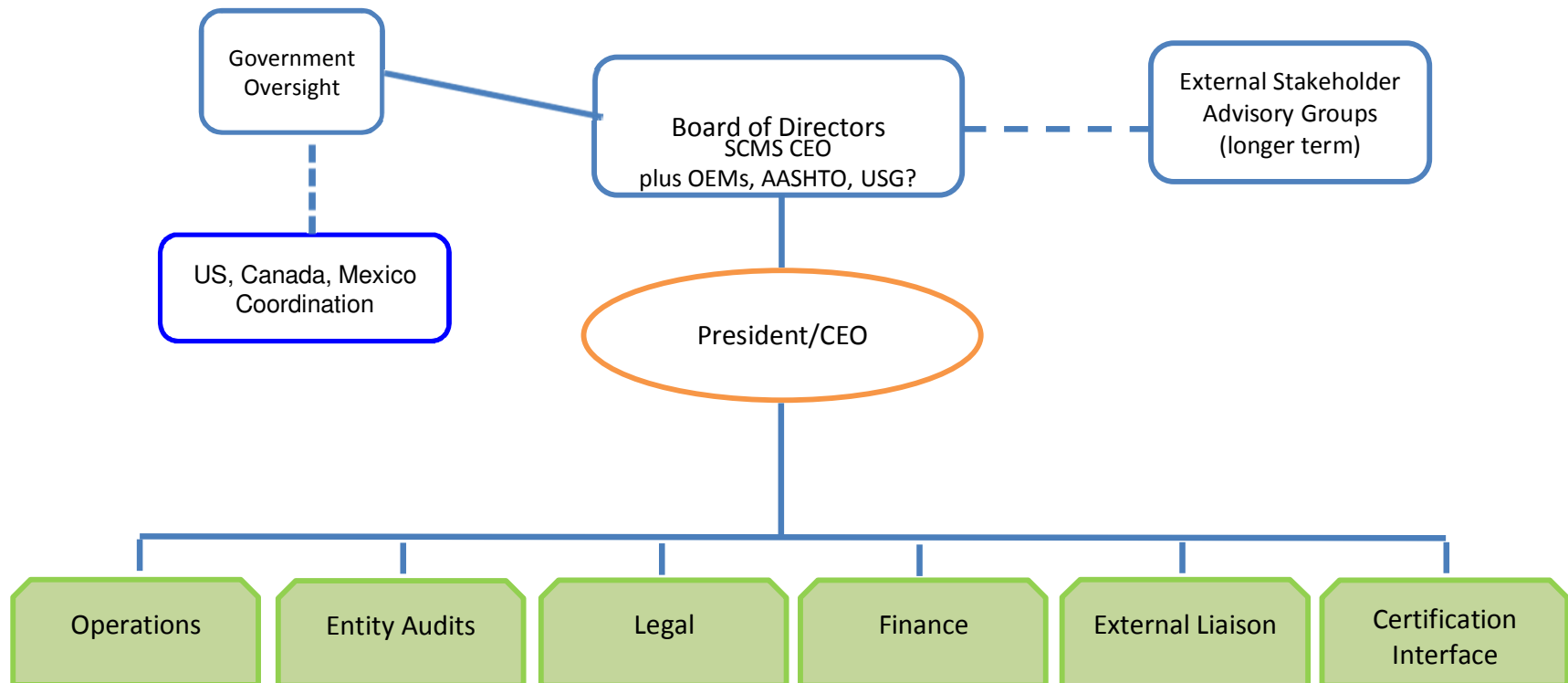
Risks unique to the SCMS include:

– Protection against challenges to the sovereignty of the SCMS Manager as the only entity that can authorize the issuance of security certificates and certificate revocation lists.

– Protection against individuals who seek legal remedy for perceived harm incurred due to certificate management or revocation.

– Protection from a technology change that fundamentally changes the SCMS operational abilities.

Provide a Mechanism for Certification, Audit, Public Input and Adjudication

The SCMS Manager needs to provide a certification interface, audit, and external liaison functionality.

- The certification interface function will define requirements to serve as the "gateway" into the SCMS for entities seeking security credentials for devices and applications and could have some responsibility for accreditation of certification entities that reside outside the SCMS.

- The audit function will define requirements regarding the need to monitor performance of SCMS CMEs through audits, including how audits can be established and the associated policy needs for both internal and external audit functions.

- The principal external liaison function is to establish and maintain transparency of SCMS activities to the general public; respond to input from interested parties; and, if needed adjudicate any concerns raised. A second key function is to monitor and identify any interoperability or security certificate issues related to cross-border traffic between the US, Canada and Mexico.

Possible SCMS Manager Functional Structure

Government Oversight

Board of Directors
SCMS CEO
plus OEMs, AASHTO, USG?

External Stakeholder Advisory Groups (longer term)

US, Canada, Mexico Coordination

President/CEO

Operations | Entity Audits | Legal | Finance | External Liaison | Certification Interface

Meeting the Joint Needs of the Public and Private Sectors

As a starting point the SCMS Manager should provide for the following core principles:*

- Participation: the degree of involvement of all stakeholders

- Decency: the degree to which the formation and stewardship of the rules is undertaken without harming or causing grievance to people

- Transparency: the degree of clarity and openness with which decisions are made

- Accountability: the extent to which political actors are responsible to society for what they say and do

- Fairness: the degree to which rules apply equally to everyone in society

*Guidebook on Promoting Good Governance in Public-Private Partnerships UN ECE/CECI/4 (2008)

Suggested Next Steps

▸ Pilot a preliminary SCMS Manager task group, with active involvement of principal stakeholders that may be Day 1 participants, in conjunction with SCMS technical work aimed at a deployment-focused SCMS pilot.

▸ Assess the ability of the proposed SCMS Manager functions and organization to meet the mission requirements for the deployment environment.

Thank You