

CLOUD HOSTED SECURITY CREDENTIAL MANAGEMENT SYSTEM (SCMS) AND SITUATION DATA EXCHANGE (SDX) INTEGRATION

**Project 14.2: Apply Wyoming DOT Connected Vehicle Pilot Project
Results**

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1 BACKGROUND AND NEED

Connected and autonomous vehicles (CAVs) are poised to transform our streets, communities, and personal lives. As part of this transformation, the USDOT supported the advancement of connected vehicle technology with a pilot deployment program. In 2015, WYDOT, along with Tampa and New York City, were chosen to deploy a real-world pilot project for CV technology. A large portion of this pilot program was dedicated to WYDOT and the I-80 corridor. Trihydro was the technical and application development lead for the WYDOT CV pilot project and worked to develop and deploy various applications to create and deliver Traveler Information Messages (TIMs) depicting events ranging from road conditions, to parking availability, and variable speed limits.

As the world of Connected Vehicle development has evolved so have the CAV message types. The WYDOT CV Pilot project focused on the TIM message type to relay situational information. Since then, new standards are emerging and it is important for DOTs to be aware of which message types they should be supporting and what data needs to be collected in order to form the different CAV message sets. As of September 2021, different CAV message types include the TIM, Roadside Safety Message (RSM) currently in final draft from SAE, and WZDx version 3.1 (version 4.0 set to release in the next few months).

2 DOCUMENT PURPOSE

This document provides a level of effort on integrating the SDX with a cloud hosted SCMS system that would allow the SDX to sign and manage CV messages within the SDX system. The document will review the current options for cloud hosted SCMS systems and will then review the feasibility of integrating the SDX with those systems. Finally, the document will outline the steps needed to integrate the SDX with a given cloud hosted SCMS integration and finally layout conclusions on the overall feasibility.

3 BENEFITS TO SCMS CLOUD HOSTED SDX INTEGRATION

Currently SCMS integration requires a State agency to purchase Hard Security Modules that are required in order to sign CV messages through a SCMS service. This hardware is expensive to purchase and maintain. A cloud hosted SCMS system consists of a SCMS provider hosting a Cloud HSM that allows State agencies to bypass purchasing their own HSM.

A cloud hosted HSM may allow for simpler integration efforts for State agencies to build and deploy Connected Vehicle applications.

4 SCMS CLOUD HOSTED OPTIONS

At the moment, there is only one option for a cloud hosted Security Credential Management System. This option comes from the Integrated Security Solutions (ISS) team and is marketed as a TMC authority. The TMC authority requires a State to setup a SCMS portal and then the State can purchase an annual license to the TMC Authority.

The TMC Authority consists of a Cloud Hosted Hardware Security Module (HSM) that meets all of the requirements needed to properly sign a Connected Vehicle message with a SCMS Certificate. Costs and pricing information can be found by contacting the ISS team.

The other SCMS provider, Blackberry, has expressed interest in creating a Cloud hosted HSM solution similar to ISS's TMC Authority but as of now no reported system is currently in operation.

5 SITUATION DATA EXCHANGE INTEGRATION

As the SDX is currently designed there is no integration within the SCMS System. The steps required to be able to integrate with the ISS Cloud hosted solution is below:

- 1) Add the credential system within the SDX database to store SCMS credential information or API key information associated with a State Agency.
- 2) Update the SDX deposit endpoint to recognize an unsigned message from an organization that has a subscription to a Cloud Hosted SCMS Service.
- 3) Update the logic in the SDX to use the Cloud Hosted SCMS Service associated with an authorized State Agency and use the SCMS API to sign the given message.
- 4) Update the deposit logic to deposit and monitor the CV Messages to ensure all messages have updated SCMS certificates for the life of the CV message.

These steps would require minimal updates to the SDX interface, and no updates would be needed on the SDX interface to query the CV messages. That said, a good amount of effort would be required to integrate the security surrounding the SCMS interface and the TMC communications coming from State Agencies. To take this work on serious interest would need to be shown from States willing to integrate with a SCMS cloud hosted solution.

6 CONCLUSIONS

A cloud hosted SCMS integration with the SDX is possible and does provide clear benefits for maintaining and integrating with State agencies. This solution could significantly simplify the deployment and management of CV messages. The only drawback would be the requirements on the SDX side to integrate this solution.