AutoCrypt® CLS

Smart Edge Servers for Vehicle-to-Infrastructure Communication

AUTOCRYPT's C-ITS Local Stations (CLS) are edge servers that each connect to a roadside unit (RSU) and a set of sensors, bringing roadside sensor data into V2I communication.

Building the foundation of connected autonomous driving

Vehicle-to-infrastructure (V2I) technology is a subset of V2X technology that enables wireless communication between road vehicles and roadside infrastructure via end entities like onboard units (OBU) and roadside units (RSU). V2I technology is the foundation for connected autonomous driving and real-time traffic coordination.

AutoCrypt® CLS (C-ITS Local Station) lies at the center of V2I communication. The CLS server acts as an intermediary between the RSU and a set of sensors (e.g. cameras, LiDAR, and radar). It utilizes its proprietary Traffic Analysis System (TAS) to process and analyze data collected from these sensors. It then shares the combined information with the RSU. The RSU then uses the V2X protocol to transmit this information to nearby OBUs and smartphones for a wide range of use cases.

Main Benefits

Pedestrian Safety

- Roadside sensors from above capable of detecting greater range and distance
- Eliminates blind spots from driver's perspective

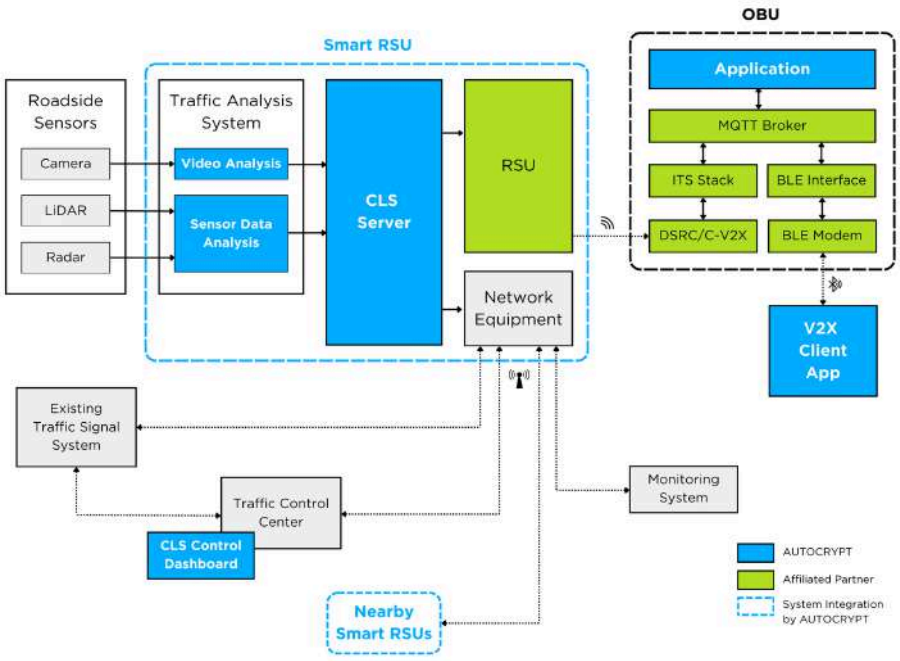
Traffic Coordination

- Calculates right-of-way of vehicles in real-time
- Helps direct vehicles on zipper merges and uncontrolled intersections

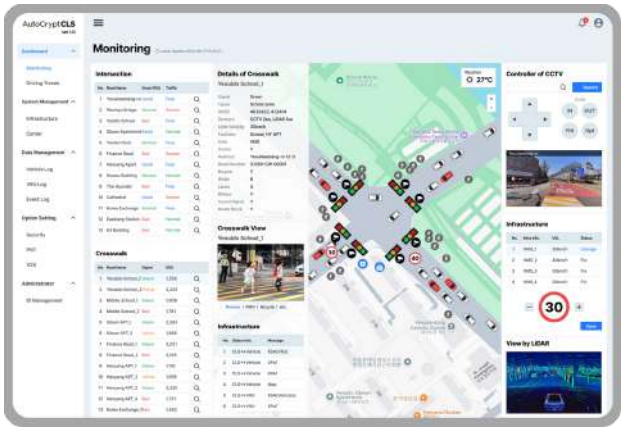
Monitoring Services

- Enables continuous tracing and tracking of vehicle speed
- Control center for real-time situational monitoring

AutoCrypt CLS Architecture



Real-time monitoring



Driving trend analysis

Modules and Features

AutoCrypt® CLS can be deployed using four different modules. M0 provides the fundamental functions, while M1, M2, and M3 each provides more specialized features designed for specific use cases.

Module	Usage	Main Features
M0	Basic (mandatory)	• object identification and event detection • position, direction, and speed measure • traffic analysis based on sensor data • control center and dashboard (remote camera control) • data storage and security features • traffic coordination services based on V2X protocol
M1	School zone Unsignalized intersection	• pedestrian safety alarms and signals to drivers and pedestrians • right-of-way calculation and coordination • live speed and blind spot footage on roadside screens
M2	Signalized intersection	• congestion measure • left-turn coordination • speed reduction on yellow signal
M3	Complex roadway	• speed reduction on ramps • highway merging assist • tunnel congestion measure • lane closure warning • HOV lane warning

Traffic Analysis System

AutoCrypt® CLS utilizes three types of sensor technologies for traffic analysis. These are cameras, LiDAR, and radar. Two types of traffic analysis systems can be deployed depending on the use case: **Type 1 (camera + LiDAR)**, and **Type 2 (camera + radar)**.

Type	Type 1 (camera + LiDAR)	Type 2 (camera + radar)
Camera	4 per unit	4 per unit
LiDAR	1 per unit	none
Radar	none	4 per unit
Smart RSU	1 per unit	1 per unit
Usage	low-speed environments (discontinuous)	high-speed environments (continuous tracing)
Examples	school zone intersection roundabout	highway lane merge tunnel

AUTOCRYPT's Advantages

V2X Compatible

- Converts sensor data and analyses to V2X messages
- Utilizes proprietary smart RSU protocol

Data Security

- Security integration
- Security management
- Security services

Driving Trend Analysis

- Data visualization
- Path tracing

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