

Verizon Improving Community Safety Challenge

Prizes: JBL Flip 6 speaker for each team member

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Challenge: Develop a solution that solves for an existing road safety problem that incorporates ultra-low latency communication across end-points using 5G and MEC architecture.

Video Info: <https://youtu.be/7C-BQXFjECo?si=VaiXKGtzUC5BVLuS>

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Context: Open communication between people, vehicles, and infrastructure is a goal for both the private and public sectors in order to improve the safety of the roads and community. With the increase in availability of Mobile Edge Computing (MEC) architecture and 5G Networks, this type of communication is now possible in the near real-time latency requirements needed for these types of use cases.

Looking at your community, identify a way that communication between Vulnerable Road Users (VRUs), personal vehicles, public transit, and infrastructure could improve safety for all parties.

Solution Parameters:

The solution should adhere to utilizing known devices and a known environment using standard architecture and messaging protocols, such as 3GPP standards 14 and 15, and SAE J2735. [Get creative with your build!](#)

For reference, please see our sample MEC environment using the following API's and message formats;

The URLs for the Rocklin vRSU MEC v2 instance are:

RS: <http://vzmode.rkln.wl.dltdemo.io:30413/registration>

MQTT: <tcp://vzmode.rkln.wl.dltdemo.io:31234>

Example **BSM** message from the OBU:

```
{"MessageFrame": {"messageId": "20", "value": {"BasicSafetyMessage": {"coreData": {"speed": "305", "elev": "459", "transmission": {"neutral": ""}, "brakes": {"abs":
```

```
{
  "unavailable": "", "scs": {"unavailable": ""}, "brakeBoost": {"unavailable": ""},
  "auxBrakes": {"unavailable": ""}, "wheelBrakes": "00000", "traction": {"unavailable": ""},
  "secMark": "36032", "accuracy": {"semiMajor": "1", "semiMinor": "1", "orientation":
    "65534"}, "lat": "407238380", "long": "-745343546", "heading": "15100", "angle": "0",
  "size": {"width": "246", "length": "619"}, "msgCnt": "87", "id": "00 00 00 00", "accelSet":
    {"yaw": "9193", "long": "0", "lat": "-2", "vert": "0"}}, "partII": {"PartIIcontent": [{"partII-Id":
    "0", "partII-Value": {"VehicleSafetyExtensions": {"events": "00000000000000", "lights":
    "000000000"}}, {"partII-Id": "1", "partII-Value": {"SpecialVehicleExtensions":
    {"vehicleAlerts": {"sspRights": "0", "sirenUse": {"notInUse": ""}, "lightsUse": {"notInUse":
    ""}, "multi": {"unavailable": ""}}}}}}}}}
```

Example **SPAT** for an intersection

```
{
  "MessageFrame": {"messageId": "19", "value": {"SPAT": {"timeStamp": "72480",
    "name": "SPAT-Message", "intersections": {"IntersectionState": {"id": {"id": "10226",
      "revision": "6", "status": "0000000000000000", "moy": "72480", "timeStamp": "400",
      "states": {"MovementState": [{"signalGroup": "8", "state-time-speed": {"MovementEvent":
        {"eventState": {"stop-And-Remain": ""}, "timing": {"likelyTime": "36001", "confidence":
        "0", "nextTime": "36001", "startTime": "36001", "minEndTime": "36001", "maxEndTime":
        "36001"}}}], {"signalGroup": "6", "state-time-speed": {"MovementEvent": {"eventState":
        {"permissive-Movement-Allowed": ""}, "timing": {"startTime": "36000", "minEndTime":
        "161", "maxEndTime": "161", "likelyTime": "161", "confidence": "3", "nextTime":
        "36001"}}}], {"signalGroup": "4", "state-time-speed": {"MovementEvent": {"eventState":
        {"stop-And-Remain": ""}, "timing": {"startTime": "36001", "minEndTime": "36001",
        "maxEndTime": "36001", "likelyTime": "36001", "confidence": "0", "nextTime":
        "36001"}}}], {"signalGroup": "1", "state-time-speed": {"MovementEvent": {"eventState":
        {"protected-Movement-Allowed": ""}, "timing": {"startTime": "36000", "minEndTime":
        "161", "maxEndTime": "161", "likelyTime": "161", "confidence": "3", "nextTime":
        "36001"}}}}}], "name": "Intersection 10226"}}}}}
```

Example associated intersection **MAP** message:

```
{
  "MessageFrame": {"messageId": "18", "value": {"MapData": {"timeStamp": "72480",
    "msgIssueRevision": "0", "layerType": {"intersectionData": ""}, "layerID": "0",
    "intersections": {"IntersectionGeometry": {"revision": "0", "refPoint": {"lat": "423295684",
      "long": "-830754888", "elevation": "1470"}, "laneWidth": "366", "laneSet":
      {"GenericLane": [{"connectsTo": {"Connection": {"connectingLane": {"lane": "2",
        "maneuver": "1000000000000"}, "signalGroup": "8"}}, {"laneID": "1", "ingressApproach":
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```

```

"laneAttributes": {"directionalUse": "01", "sharedWith": "0000000000", "laneType":
{"vehicle": "00000000"}, "nodeList": {"nodes": {"NodeXY": [{"delta": {"node-LatLon":
{"lon": "-830754673", "lat": "423294593"}}, {"delta": {"node-LatLon": {"lon": "-
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{"vehicle": "00000000"}, "nodeList": {"nodes": {"NodeXY": [{"delta": {"node-LatLon":
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"423296873"}}}]}, "connectsTo": {"Connection": {"connectingLane": {"lane": "7",
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{"lane": "3", "maneuver": "1000000000000"}, "signalGroup": "1"}}, {"id": {"id":
"10226"}}}}}}}

```

Deliverables:

- **Clearly describe how your solution can benefit community safety.** Where possible, support your target impact with data.
 - **Create visuals for how your solution would interact with drivers, VRUs, etc.**
- Presentation:** Community involvement is critical for these types of solutions to work. Make a presentation that excites people into action.

Judging:

- **Addresses Challenge:** Does the solution solve the challenge?
- **Originality of the solution:** Is something similar already in place? If so, why is this better? If not, why is this beneficial?
- **Clear and Near-Term Path to Adoption:** Have you thought about obstacles? Are there any secondary benefits, and to whom? Who would pay for it and why?

- **Scalability:** Is it scalable?