API Design Document for Intersection Programming Interface (IPI)

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| Version Number | Editor | Reviewer |
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# Abbreviations and Terminology

| **Abbr.** | **Terminology** |
| --- | --- |
| IPI | Intersection Programming Interface |
| V2X | Vehicle to Everything Communications |
| BSM | Basic Safety Message |
| SPaT | Signal Time and Phasing |
| ADAS | Advanced Driving Assistance System |
| AV | Autonomous Vehicle |
| CAV | Connected and Autonomous Vehicle |
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# 00 : J2735 Support

| **Function ID** | **F00 - 0000** |
| --- | --- |
| **Description** | Infrastructure is able to receive and correctly parse J2735 messages for downstream tasks. |
| **Function Name** | void v2xReceive(msgType, asn\_msg) |
| **Function Signature** | string msgType, asn\_DEF asn\_msg |
| **Function Output** | NULL |
| **Application ID** | **A00 - 0000, A00 - 0002, A00 - 0003** |

| **Function ID** | **F00 - 0001** |
| --- | --- |
| **Description** | Infrastructure is able to correctly encode and broadcast J2735 V2X messages |
| **Function Name** | void v2xBroadcast(msgType, msg) |
| **Function Signature** | string msgType, MessageFrame msg |
| **Function Output** | NULL |
| **Application ID** | **A00 - 0001, A00 - 0004** |

# 01 : Personal Connected Vehicles - Intersection

| **Function ID** | **F01 - 0000** |
| --- | --- |
| **Description** | PCV sending message to intersection (intersection receiving message from PCV) |
| **Function Name** | void servicePCV2I(serviceType, ID) |
| **Function Signature** | string serviceType, Identification ID |
| **Function Output** | NULL |
| **Application ID** | **A01 - 0000, A01 - 0001** |

| **Function ID** | **F01 - 0001** |
| --- | --- |
| **Description** | PCV receiving message from Intersection (intersection sending PCV message) |
| **Function Name** | void serviceI2PCV(serviceType, ID) |
| **Function Signature** | string serviceType, Identification ID |
| **Function Output** | NULL |
| **Application ID** | **A01 - 0000, A01 - 0001, A03 - 0000** |

# 02 : Personal Connected and Autonomous Vehicles - Intersection

| **Function ID** | **F02 - 0000** |
| --- | --- |
| **Description** | Receiving Personal CAV request for services related to ADAS or AV functions |
| **Function Name** | void servicePCAV2I(serviceType, ID) |
| **Function Signature** | string serviceType, Identification ID |
| **Function Output** | NULL |
| **Application ID** | **A02 - 0000, A02 - 0001, A02 - 0002, A02 - 0003, A02 - 0004, A02 - 0005, A02 - 0006** |

| **Function ID** | **F02 - 0001** |
| --- | --- |
| **Description** | Sending Personal CAV information or guidance related to ADAS or AV functions |
| **Function Name** | void serviceI2PCAV(serviceType, ID) |
| **Function Signature** | string serviceType, Identification ID |
| **Function Output** | NULL |
| **Application ID** | **A02 - 0000, A02 - 0001, A02 - 0002, A02 - 0003, A02 - 0004, A02 - 0005, A02 - 0006** |

# 04 : Intersection to Person

| **Function ID** | **F04 - 0000** |
| --- | --- |
| **Description** | Sending Warning Messages to Pedestrian’s Personal Devices |
| **Function Name** | void serviceI2P(warningType, intersectionID) |
| **Function Signature** | string warningType, int intersectionID |
| **Function Output** | NULL |
| **Application ID** | **A04 - 0000** |

| **Function ID** | **F04 - 0001** |
| --- | --- |
| **Description** | Receive Warning Messages sent to Pedestrian’s Personal Devices |
| **Function Name** | void serviceP(warningType, intersectionID) |
| **Function Signature** | string warningType, int intersectionID |
| **Function Output** | NULL |
| **Application ID** | **A04 - 0000** |

# 05 : Intersection to Cloud

| **Function ID** | **F05 - 0000** |
| --- | --- |
| **Description** | Send Data to Cloud for Storage |
| **Function Name** | void uploadI2Cloud(intersectionID, data) |
| **Function Signature** | int intersectionID, char[] data |
| **Function Output** | NULL |
| **Application ID** | **A05 - 0000** |

# 05 : Intersection to Intersection

| **Function ID** | **F05 - 0000** |
| --- | --- |
| **Description** | Send Data to Other Intersections |
| **Function Name** | void propograteI2I(from\_intersectionID, dest\_intersectionID, data) |
| **Function Signature** | int from\_intersectionID, int dest\_intersectionID, char[] data |
| **Function Output** | NULL |
| **Application ID** | **A06 - 0000** |

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