



Remote Vehicle Interaction

May 11, 2017 | Project Update

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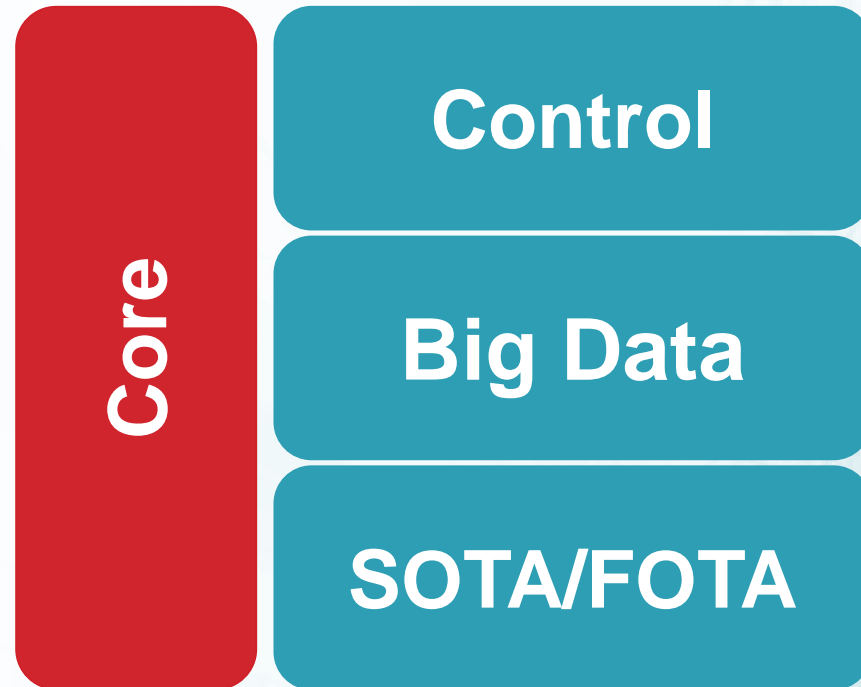
Networking Expert Group Lead, GENIVI Alliance

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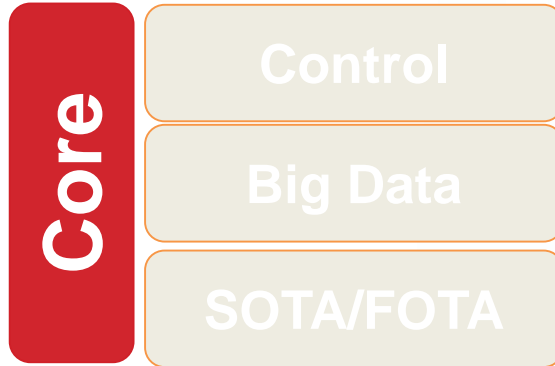
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RVI Core Enabling Three Macro Use Cases



RVI Core



Connectivity

- Utilize a wide array of data links to set up communication to and from vehicle, either with cloud backend or peer-to-peer.
- Provide encryption for secrecy, non-repudiation, replay attacks, MITM, etc.
- Work with OMA, IEEE, W3C, and other organizations for standardization and integration with existing communication standards.

Authentication

- Prove the identity of the communicating parties.
- Use best-of-breed open source technologies to drive peer-to-peer reviewed security.

Authorization

- Prove to communicating parties the right to discover and to invoke their services.
- Prove to communicating parties the right to publish and advertise services.

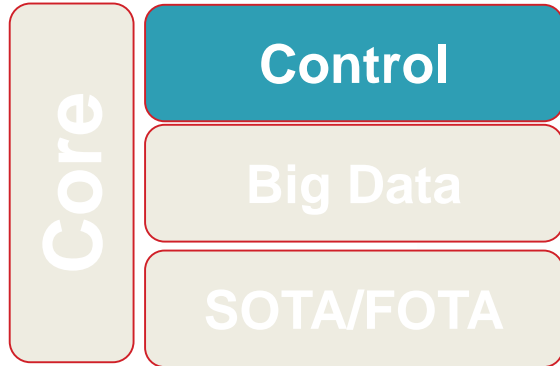
Service Discovery

- Announce services to communicating parties.

Service Invocation

- Invoke services and report the result over data links with changing QoS.
- Support retry and store & forward of service invocations to manage transient transport.

RVI Control



Vehicle Integration

- Utilize GENIVI Networking Expert Group components to integrate with vehicle buses.
- Implement W3C APIs and signal standards to provide access to vehicle information and control vehicle functions.

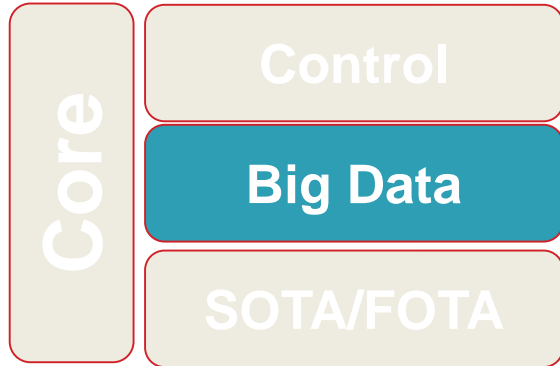
Service Protocol

- Define vehicle control protocols between vehicle and remote entities such as cloud-based services, mobile devices, home automation gateways, etc.

Web Services

- Utilize W3C-based standards to define web services for remote interaction from web browsers and web runtimes.

RVI Big Data



Data Collection

- Integrate with GENIVI components to harvest data infotainment and headunit data.
- Integrate with AUTOSAR components to collect data from ECUs and sensors.
- Utilize dynamically OTA-loadable code agents to securely collect, filter and preprocess data on-board.

Data Transmission

- Define, specify, standardize and implement secure transmission protocols for vehicle data to the cloud.

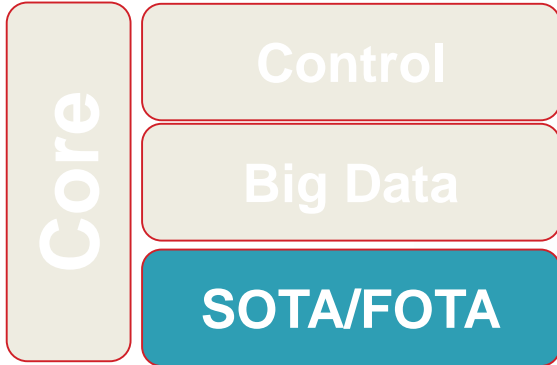
Data Reporting

- Specify and implement in-vehicle reporting services.

Data Analytics

- Big Data cloud services for data ingestion, storage and access.
- Real-time and batch processing pipelines.
- Based on best-of-breed big data technologies such as Apache Hadoop, Ambari, Spark, NiFi, etc.

RVI SOTA / FOTA



SOTA Client and Software Management

- Specify, define, standardize and implement SOTA client for receiving software update images.
- Specify, define, standardize and implement Software Management (SWM) to manage software updates on the headunit and other ECUs.
- Standardize and implement protocols for notification and transport.

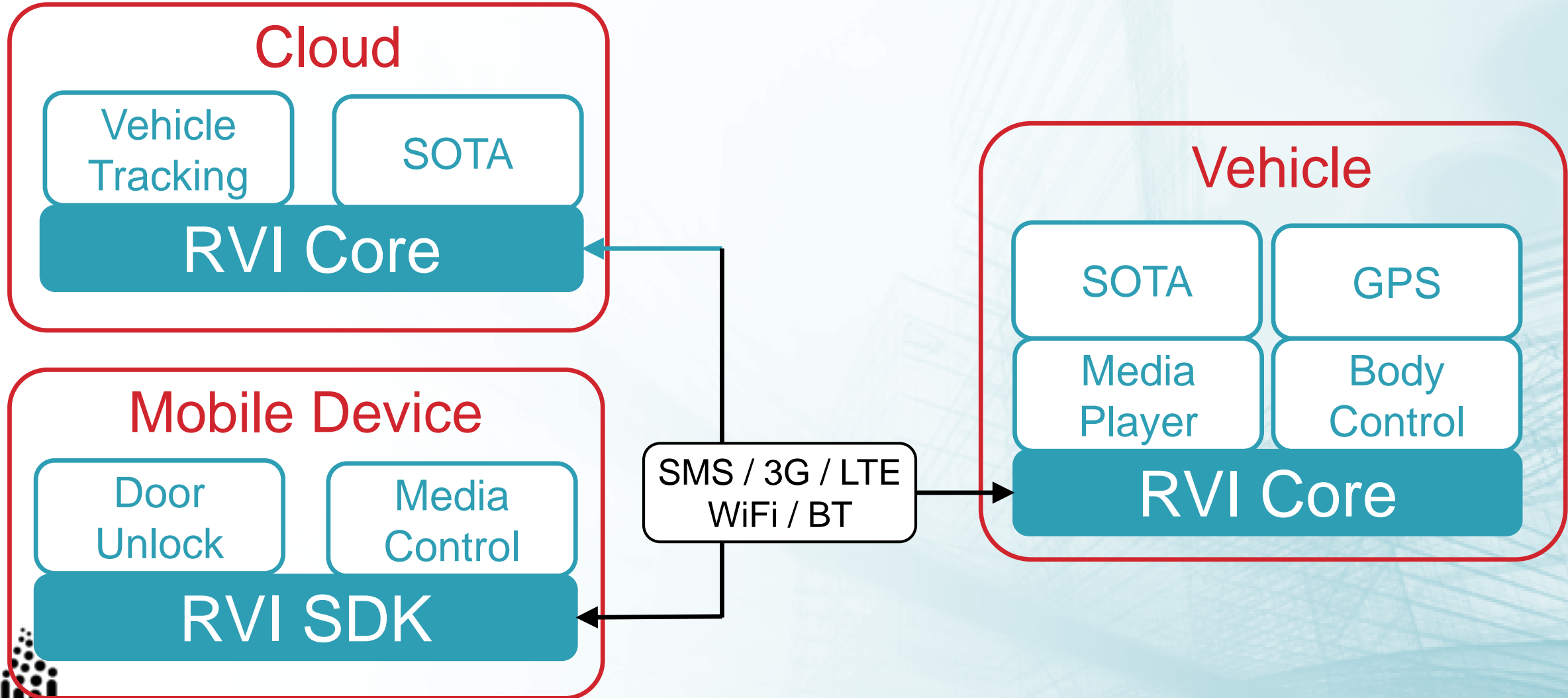
SOTA Server

- Define requirements for server backend supporting large-scale SOTA campaigns to thousands of vehicles.
- Define integration points with enterprise software systems.
- Implement SOTA server with database and user frontend for campaign management and reporting.

Industry Integration and Adoption

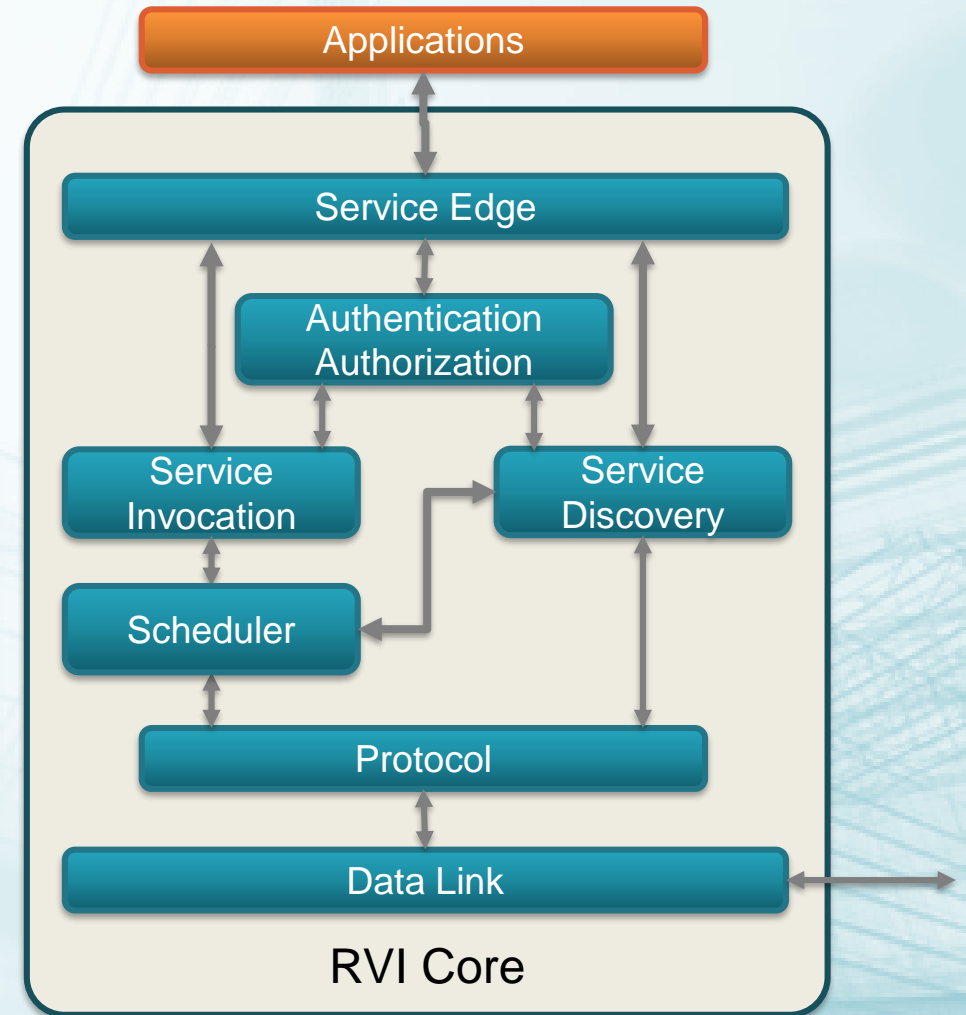
- Collaborate with vendors and open source projects to foster adoption.

RVI Schematics

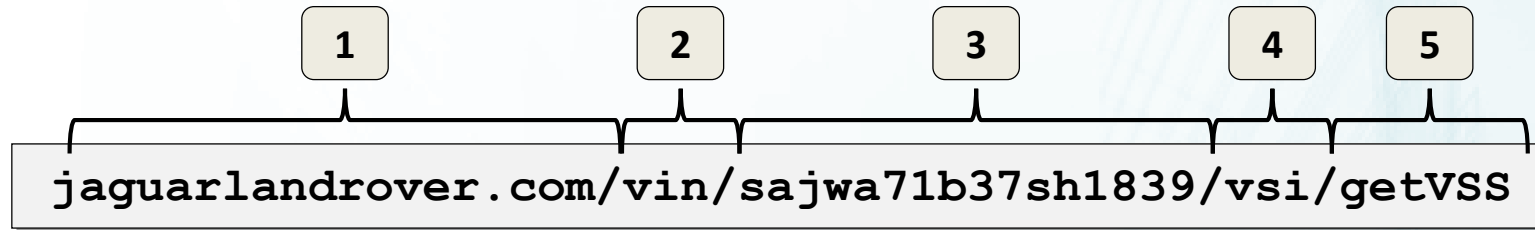


RVI Core

- **Service Edge**
 - Manages traffic from and to application.
- **Authentication / Authorization**
 - Manages certificates that allow applications to discover and invoke services.
- **Service Discovery**
 - Identifies and locates local and remote services.
- **Service Invocation**
 - Receives and dispatches local and remote service calls.
- **Scheduler**
 - Stores and forwards messages for unavailable destinations.
- **Protocol**
 - Encodes and decodes messages.
- **Data Link**
 - Controls data transmission to other RVI nodes.



RVI Service Addressing



#	Name	Description
1	Organization	Specifies a sub-section hosted by a specific entity
2	VIN sub-tree	Specifies sub section for all vehicles
3	VIN	Vehicle Identification Number
4	Service Domain	Domain of service
5	Service Command	Service command within the service domain

RVI Security

- TLS-protected Internode Communication
 - Prevent replay attacks.
 - Prevent man-in-the-middle attacks.
- Certificate-based Node Authentication and Service Authorization
 - Certificates, signed by a trusted provisioning system, attest application identity and grant access to services.
- Self-carried application authentication and service authorization
 - A Node presents its certificates to another node to authenticate itself and provide its service authorization. No connection to a server is required.
 - Each certificate carries the node's public key. Nodes sign all messages with their private key.

RVI Project Progress

- RVI C Library
 - Native RVI communication protocol.
 - Small footprint for embedded devices.
- End-to-End Provisioning
 - Connecting users to keys and credentials.
 - X.509 certificate creation, signing and management.
 - Self-provisioning with identity setup and dynamic assignment of authorizations.
- Security Audit by GENIVI Security Team
 - Thread models and attack vector analysis.

Thank you!

Weekly Networking Expert Group Call

Mondays 0800 PT / 1700 CET

<https://genivi.webex.com/genivi/j.php?MTID=mdb9482b92015e5cb7386c1a65e32a887>

Meeting number: 579 975 193

Mailing List

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