CONNECTED VEHICLES WEB AND AUTOMOTIVE STANDARDS

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AGENDA

- Overview W3C
- Common Platform & Open Standards
- Automotive Market Changes/Impact
- Addressing New Market Challenges
- W3C Strategy & Approach

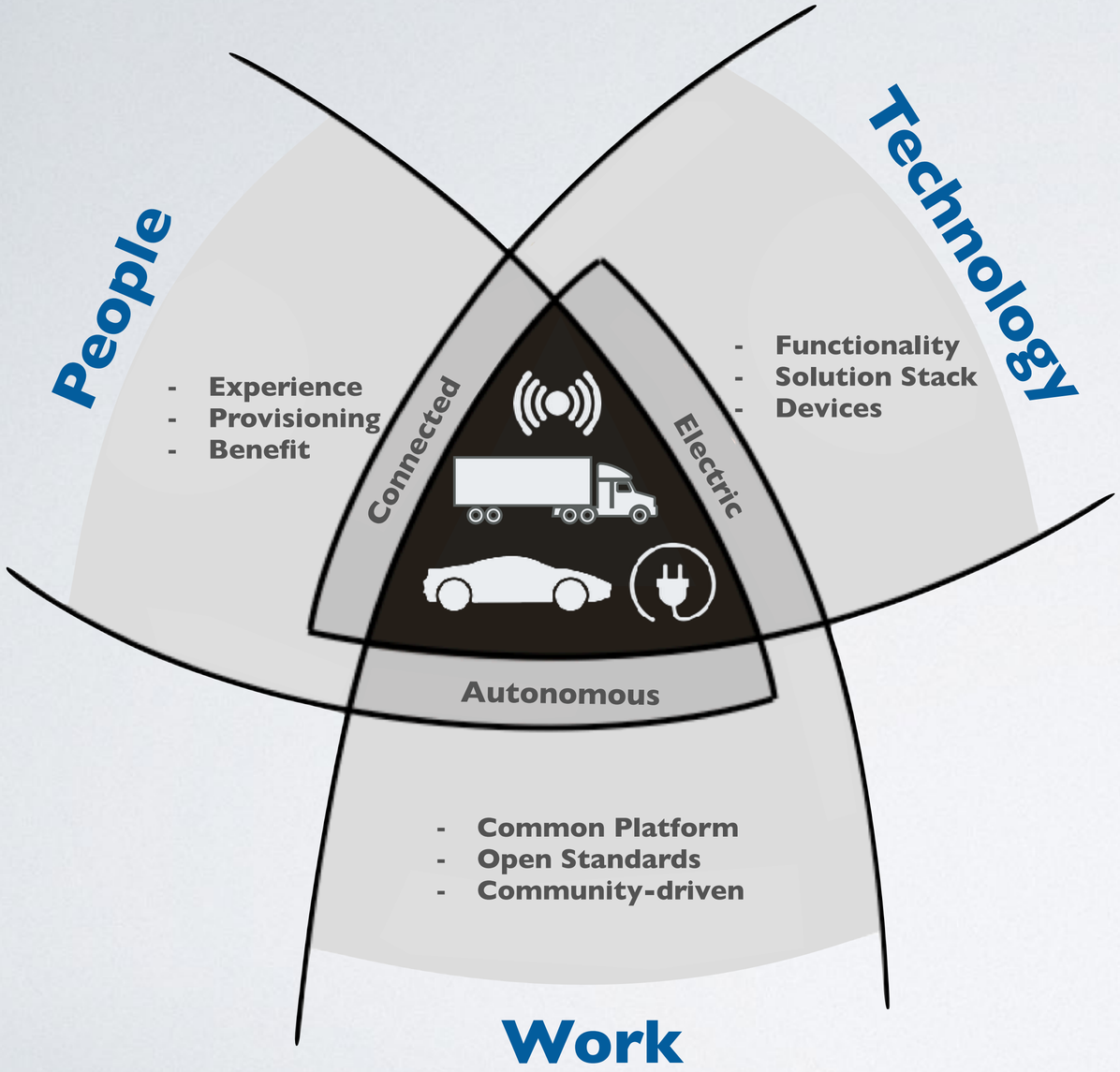
W3C Member Organization

- Founded 1994 by Web inventor Tim Berners-Lee
- Non-profit, membership organization
- Headquartered in US (MIT)
  with staff in 20 + offices worldwide including
  France (ERCIM), Japan (Keio) and China (Beihang)
- Successful track record developing Web standards
- 450 + member companies and organizations
- Large participatory community numbered in the thousands

COMMON PLATFORM & OPEN STANDARDS

- Organization of Industry members driving an industry-defined, standards-based, common platform
- Enabling cost effective, rapid integration of applications and data required for new in-vehicle and connected services

A SYSTEMS PERSPECTIVE



"Joint System" adapted from Dekker and Woods"

People

- Operators/Occupants
- Fleet Managers
- OEMs
- Suppliers/Developers
- Government

Technology

- Applications
- Operating Systems
- Networks
- Data
- Devices

Work

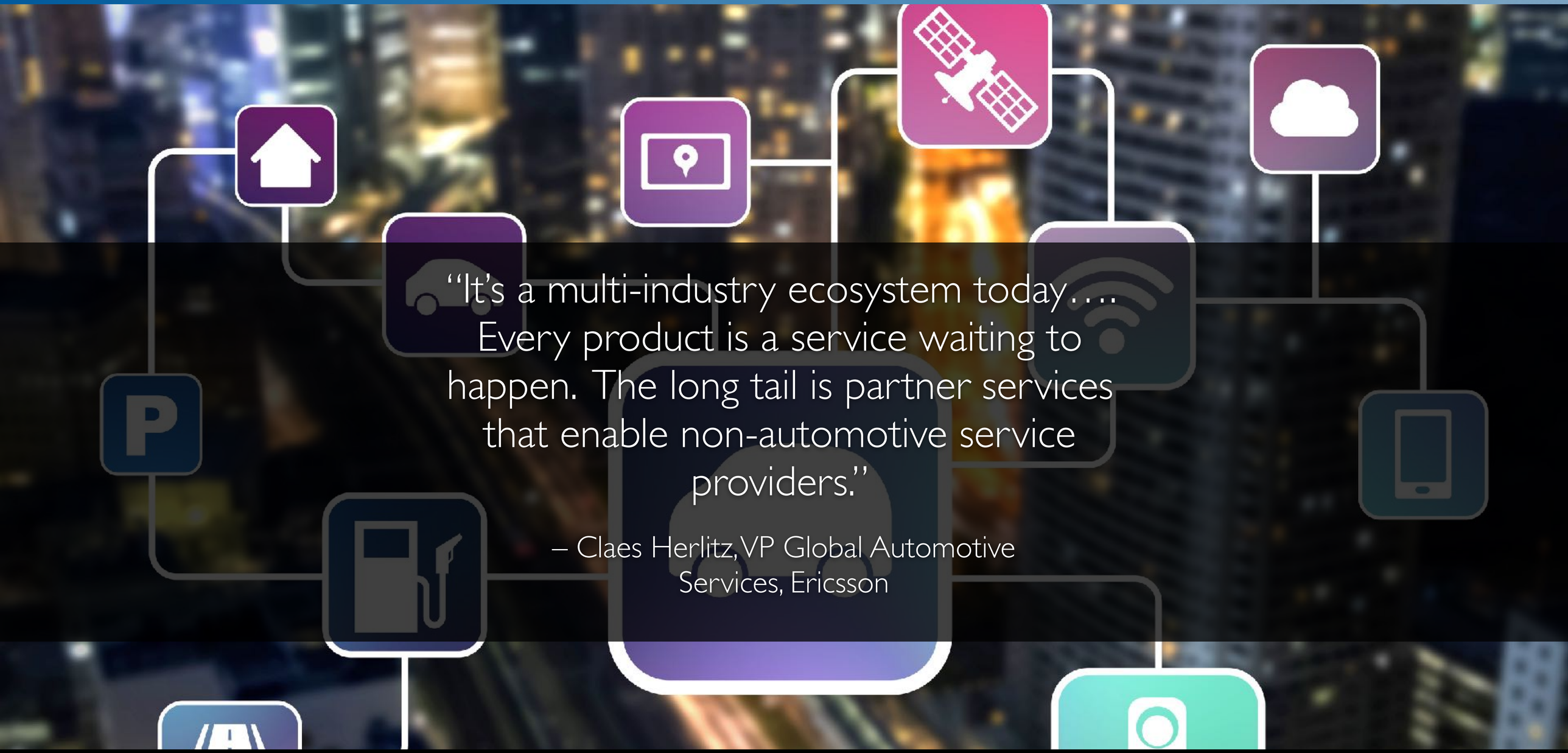
- W3C
- Domains
- Building Blocks

W3C VALUE APPROACH

COMMON PLATFORM & OPEN STANDARDS

- Enables collaboration, innovation and profitability thru new revenue streams
- Provides incentive for Content Providers to port/support solutions across major OEM frameworks creating an Application Eco-System
- Addresses the demands/challenges …
  connectivity, digitalization, electric vehicles, autonomous driving and Services-and-Data-Driven business models

TODAY'S CONNECTED VEHICLE ECOSYSTEM



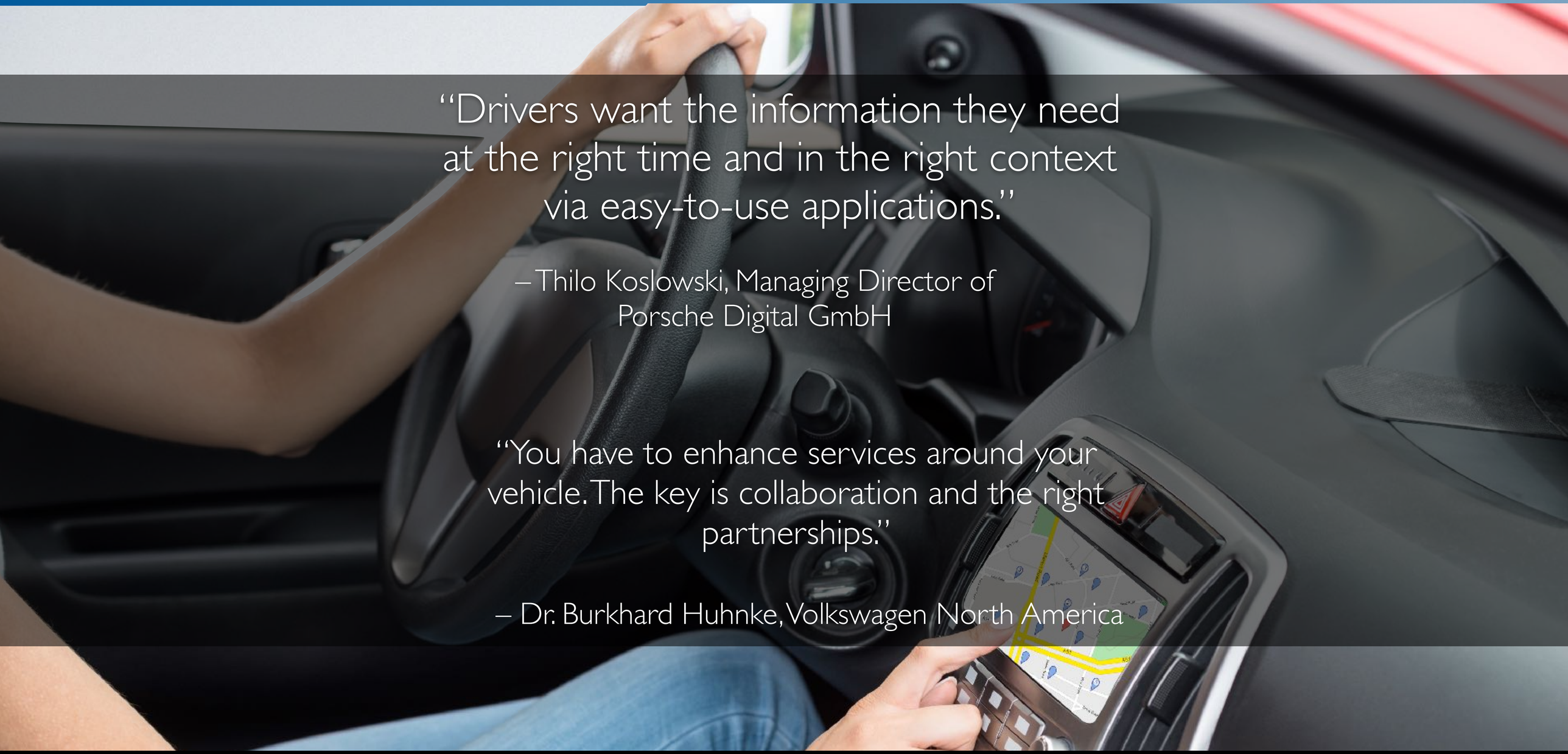
"It's a multi-industry ecosystem today…. Every product is a service waiting to happen. The long tail is partner services that enable non-automotive service providers."

– Claes Herlitz, VP Global Automotive Services, Ericsson

Growth of Web Developer Ecosystem

- More developers for the Web than any other platform
- Web and software developers write the code for today's connected cars, cities and services
- More than 500K web developers have enrolled in W3Cx training courses for HTML5, CSS and JavaScript

IN THE DRIVER'S SEAT



"Drivers want the information they need at the right time and in the right context via easy-to-use applications."

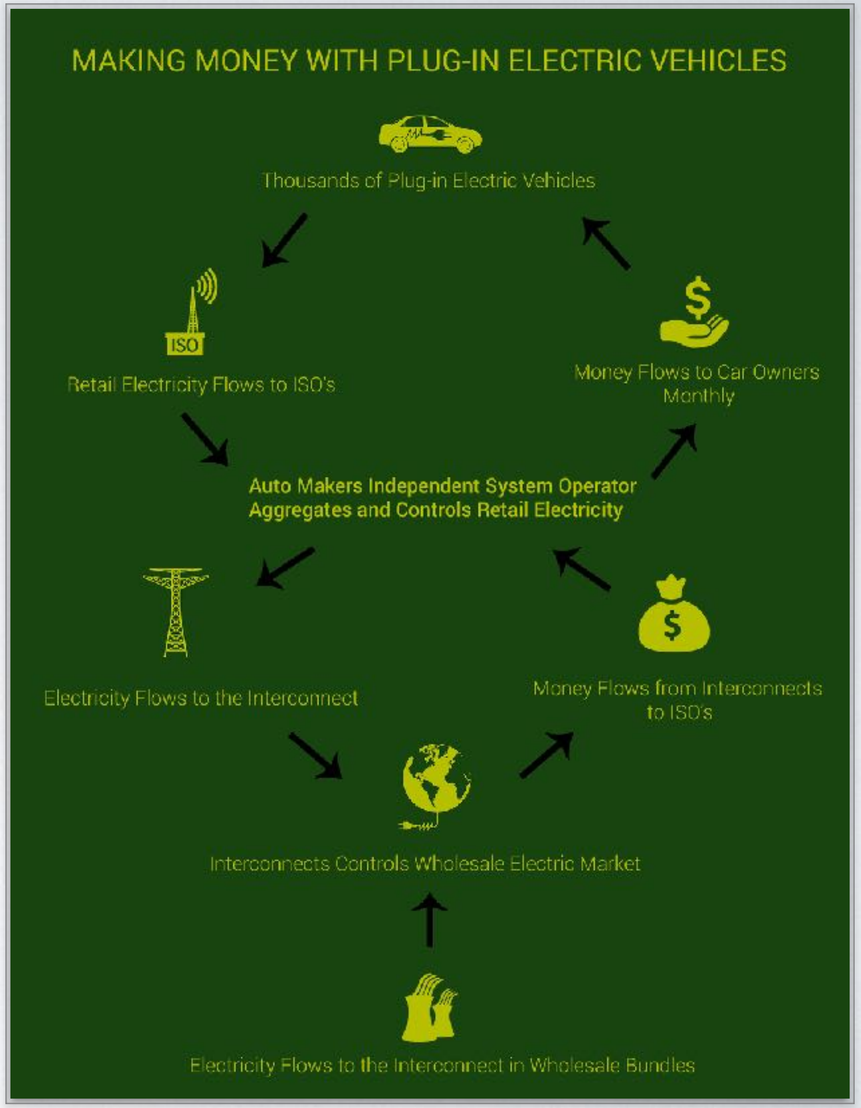
– Thilo Koslowski, Managing Director of Porsche Digital GmbH

"You have to enhance services around your vehicle. The key is collaboration and the right partnerships."

– Dr. Burkhard Huhnke, Volkswagen North America

PLUG-IN ELECTRIC VEHICLES

- Increasing trend towards electrification of vehicles
- Utilities poised to become major players in the transportation sector
- Electric vehicles provide new energy sales to utilities, and a resource to help manage the grid (V2G; Vehicle to Grid) for bidirectional charging and payment management



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AUTONOMOUS VEHICLES

- W3C standards work needs be extensible to this future platform
- Critical interdependency on security, reliability, and connectivity
- Increased emphasis on partnerships Service and Data-Driven business models

ADDRESSING THE CHALLENGES

- New changes drive new challenges, and sources of complexity
- Staying ahead of competitive pressure to meet the demand for digitalization
- Managing new interconnected services, complex systems, and large-scale critical data

OEMS ARE TELLING US…

- They are frustrated getting content providers to write applications for their proprietary solutions.
- **Solution:** Having a standards-based, common platform for applications will increase the market and enable apps to run on all vehicles

BETTER DEVELOPMENT THROUGH WEB STANDARDS

Economic Value of Standards	Standards Approach	Proprietary Approach
Actions and Costs	• Commit time of in-house developers to leverage standard APIs to attract third parties and new apps • Work with competitors to share best practices • Accelerate product development with standard • Faster time to market, promotion by many implementers	• One-off APIs not interesting for third party content providers due to high development costs • Work in isolation; slow to update • Limited closed product development • Company bears all product promotion costs
Result: Standard Succeeds	• Development "head start" and better ROI on development investment • Market size grows • Market share grows	• Less understanding of proprietary standard • Market share shrinks • Catch-up costs • Abandon investment in proprietary standard if ROI too low

W3C STRATEGY AND APPROACH

Baidu 百度
Alibaba.com
SAMSUNG
JAGUAR
LAND ROVER
OpenCar
The App Platform for Connected Cars
03GO
Clear Channel
HYUNDAI
KDDI
MITSUBISHI ELECTRIC
Changes for the Better
ACCESS
VOLVO
JEITA
intel
MOBIWIZE
eco-driving solutions
Atlassian
JIRA
KBM Systems Ltd
LG Electronics
vinli
ISRAEL INTERNET ASSOCIATION
OPERA software
Openstream
Making Communications Smarter
PORSCHE
Bluemove
Carsharing
IBM
PEUGEOT
PORSCHE
BSQUARE
FORGING SMART CONNECTIONS
Visteon
covea
Insurance
Fraunhofer
telenor
GENIVI
ETRI
Electronics and Telecommunications Research Institute
WIPRO
vodafone
SHARP
DRIVEN
Neusoft
Beyond Technology
TWEDDLE GROUP

INDUSTRY COLLABORATION

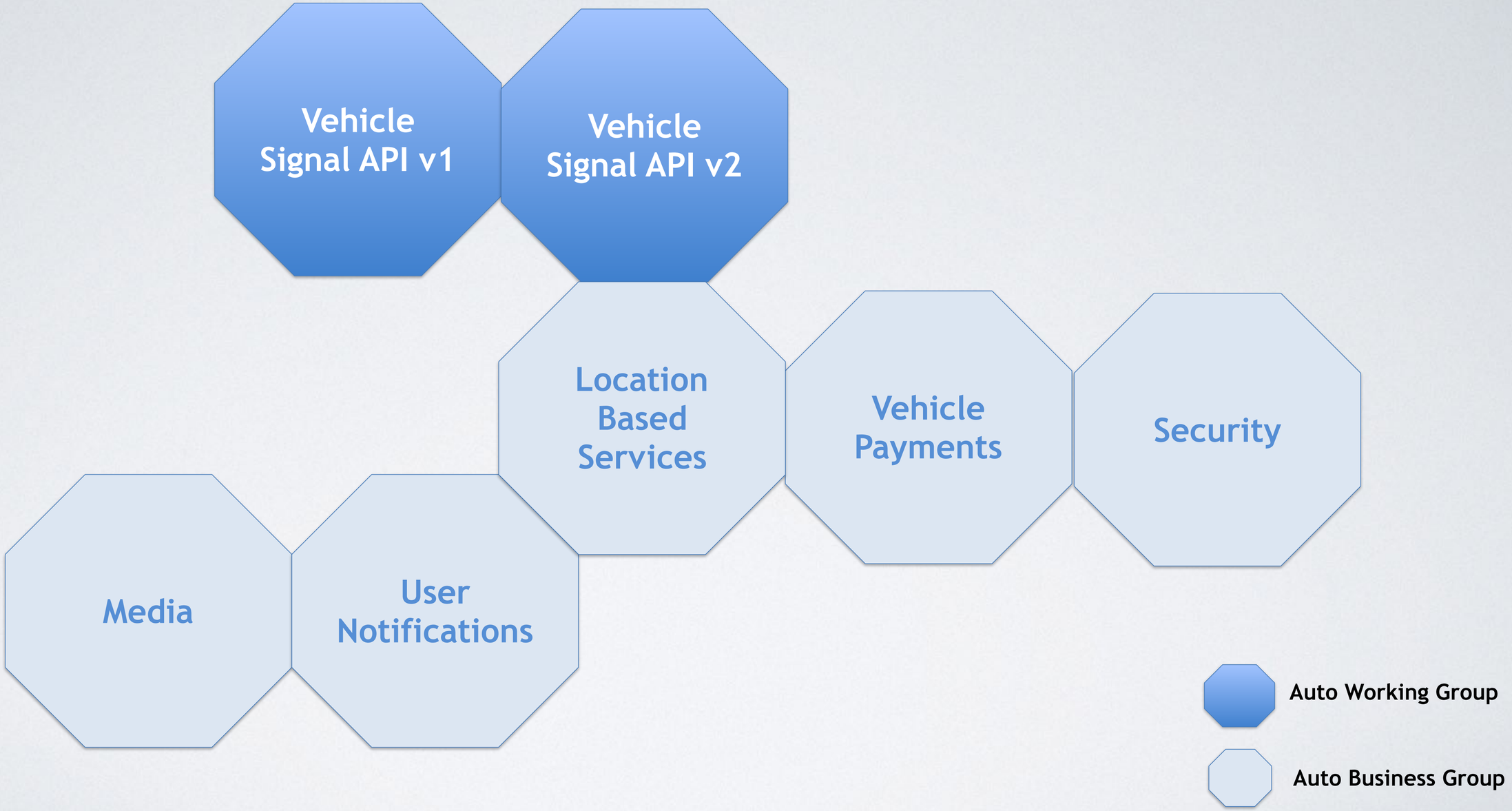
- Automotive Industry standards groups - GENIVI, AGL, SAE, IFSF, and Auto-ISAC for vehicle signal and cybersecurity work
- IoT Industry groups such as OCF, oneM2M, IRTF and others to create standard data formats
- Financial Services and Retail industries to create standard APIs for easier payments and commerce on the Web
- Security industry experts and establishing task forces and Cybersecurity research partnerships

INDUSTRY COLLABORATION

W3C …

working with other standards bodies, bridges the gap between automotive engineering standards and the potential of the Web

TECHNICAL ROADMAP … BUILDING BLOCKS



TECHNICAL ROADMAP

Vehicle Signal API

Business Benefits

- Successful standards collaboration with W3C and GENIVI for OEMs and Tier One's
- Exposes vehicle signals for applications running in vehicle
- Royalty-free and low development costs

Technical Features

- Services approach; Web Sockets and poss. HTTP REST
- Works in HTML5, Qt, headless applications in any program language
- Implementations from: ETRI, Mitsubishi and Access

TECHNICAL ROADMAP

Vehicle Signal API

In only five months, GENIVI and W3C delivered a draft specification and after review by the broader W3C community, full standardization in the form of sample implementations and test frameworks is being finalized.

- Readers can find the VSS source code with documentation and examples in the GENIVI Github repository at: https://github.com/GENIVI/vehicle_signal_interface

- The first Public Working Draft of the Vehicle Information Service Specification from the W3C Automotive Working Group is available at: https://www.w3.org/TR/vehicle-information-service/ https://www.w3.org/auto/wg/

LOCATION BASED SERVICES

Location Based Services

- Task force identifying use business and technical use cases
- Early specification work in progress
- Alibaba, PSA, GENIVI leadership in this area

NOTIFICATIONS TO DRIVER

User Notifications

- Goal is to standardize the way vehicle notifications and messages are communicated to drivers in ways they understand
- More information than the just the simple "check engine light" will provide car systems diagnostics to drivers
- Visible on IVI and Dashboard
- Being discussed in Auto Business Group

AUTO SECURITY TASK FORCE

- Goal to improve security of applications in vehicles
- Joint work with GENIVI Security Expert Group
- Collaborations forming with SAE, Auto-ISAC, MIT/CSAIL

CORE WEB SECURITY WORK

Security

- Web Application Security - standards to secure the web
- Web Cryptography - encrypting the payload
- Web Authentication - multi-factor authentication ("kill the password")

CYBERSECURITY

Security

- Agreement that the industry sets its own standards and guidelines thru organizations like SAE and Auto-ISAC

- Jeff Jaffe, CEO of the World Wide Web Consortium, said: "Let's understand the technology first rather, than have bureaucrats who don't understand the technology making regulations. The best way to move forward is to get the entire ecosystem involved in the definition of these standards." [link]

MEDIA TASK FORCE

Media

- Goal to standardize APIs for media tuner in vehicles
- Joint work with W3C Media Tuner API Group and W3C Auto Business Group
- Draft specification from Volkswagen member submission being evaluated

AUTO & PAYMENTS TASK FORCE

Vehicle Payments

- Goal to support streamlined and secure Web payments from connected vehicles
- Joint Task Force with W3C Commerce Interest Group
- Identifying use cases for:
  - Fuel/charging
  - Tolls and use
  - Traffic violations
  - Parking
  - Retail, Services
  - Entertainment/content provider applications

RELEVANT WORK AT W3C

- Vehicle Information Service Specification (VISS)
- Vehicle Information API Specification (VIAS)
- RESTful Service Interface (v2 based on VW submission)
- Location Based Services
- Automotive Web Payments
- Efficient XML Interchange (EXI)
- Second Screen Working Group
- Near Field Communication Community Group
- Web Accessibility Initiative for possible Distractability concerns

RELEVANT WORK AT W3C

- Web Sockets
- Speech API Community Group
- WebAuthN Working Group
- Web Application Security Working Group
- W3C Crypto API
- Privacy Interest Group
- Blockchain Digital Assets Community Group
- Web of Things

W3C MEMBERSHIP

- Participation in W3C
- Membership Benefits
- "It's All About the Apps"

HOW TO PARTICIPATE IN W3C

1. **Observe**
2. **Engage**
3. **Join**
4. **Actively Contribute**
5. **Host Meetings**
6. **Sponsor Events**

- Web and Auto Business Group
- Web and Auto Working Group
- Other Relevant W3C Groups:
- Web Commerce Interest Group
- Spatial Data and Geolocation Groups
- Web of Things Working Group and Interest Group

BENEFITS OF YOUR PARTICIPATION

- Direct influence on use cases, requirements and prioritization
- Earlier adoption and insight leads to faster testing and product implementations
- Compare and develop industry best practices
- Collaborate with new industry players for new opportunities
- Access to new expertise; enhance skills of current employees
- Leadership to drive business needs forward
- Creation of royalty-free standards to expand ecosystem

AUTO INDUSTRY ENGAGEMENT IS ESSENTIAL

“"The W3C, through the Automotive Business Group, has provided an excellent forum, bringing together a diverse set of stakeholders, where traditional automotive businesses such as OEMs and Tier 1's can openly collaborate with content and technology companies —not typically associated with the automotive industry— on use cases, requirements and draft specification reports.”

– Paul Boyes, Director of Telematics & Standards, OpenCar/INRIX

IT'S ALL ABOUT THE APPS!

Help us accelerate API standards work for Automotive at W3C

THANK YOU