• 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
• 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
"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
“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
“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
• 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
• W3C standards work needs to 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
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.
## Economic Value of Standards

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<thead>
<tr>
<th>Actions and Costs</th>
<th>Standards Approach</th>
<th>Proprietary Approach</th>
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<tbody>
<tr>
<td>• Commit time of in-house developers to leverage standard APIs to attract third parties and new apps</td>
<td>• One-off APIs not interesting for third party content providers due to high development costs</td>
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<td>• Work with competitors to share best practices</td>
<td>• Work in isolation; slow to update</td>
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<td>• Accelerate product development with standard</td>
<td>• Limited closed product development</td>
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<td>• Faster time to market, promotion by many implementers</td>
<td>• Company bears all product promotion costs</td>
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<table>
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<tr>
<th>Result: Standard Succeeds</th>
<th>Standards Approach</th>
<th>Proprietary Approach</th>
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<tr>
<td>• Development “head start” and better ROI on development investment</td>
<td>• Less understanding of proprietary standard</td>
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<tr>
<td>• Market size grows</td>
<td>• Market share shrinks</td>
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<tr>
<td>• Market share grows</td>
<td>• Catch-up costs</td>
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<td>• Abandon investment in proprietary standard if ROI too low</td>
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W3C STRATEGY AND APPROACH

Industry Collaboration

Technical Roadmap
• 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
w3c ... working with other standards bodies, bridges the gap between automotive engineering standards and the potential of the web
TECHNICAL ROADMAP ... BUILDING BLOCKS

- Vehicle Signal API v1
- Vehicle Signal API v2
- Location Based Services
- Vehicle Payments
- Security
- Media
- User Notifications

Auto Working Group
Auto Business Group
**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
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/
• Task force identifying use business and technical use cases

• Early specification work in progress

• Alibaba, PSA, GENIVI leadership in this area
• 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
• 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

- Web Application Security - standards to secure the web
- Web Cryptography - encrypting the payload
- Web Authentication - multi-factor authentication ("kill the password")
• 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]
• 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
• 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
• 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
"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
Help us accelerate API standards work for Automotive at W3C