GENIVI Tech Summit

Bangalore, India

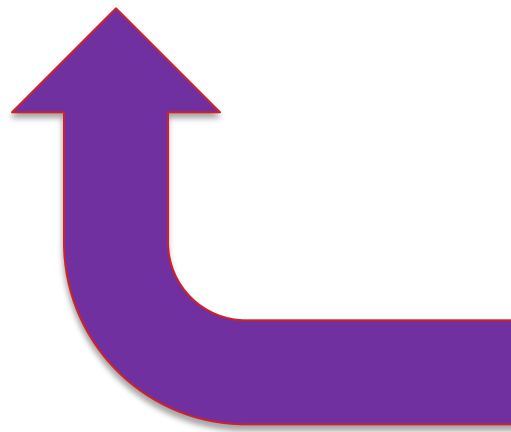**Steve Crumb, Executive Director**

October 10, 2018

# Bangalore Technical Summit Sponsors

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Ideas, Skills, Community

✓ GENIVI introduced open source software and Linux operating system into the automotive industry
- Idea sparked by BMW, Intel, Wind River
- Much learning in early days until Linux & open source software skills established

✓ GENIVI built a global, collaborative community where standards and software could be jointly developed, demonstrated, and adopted in commercial products
- Grew to 150 members worldwide
- GENIVI software in 25+ brand/model combinations around the world

✓ GENIVI established a global, buyers/sellers community and facilitated high-visibility events where business relationships could develop and grow
- Well attended annual GENIVI events, showcases & receptions at CES, TU-Automotive

GENIVI is a front door open to other industry bodies

Open, Global, Automotive Software Community

WELCOME
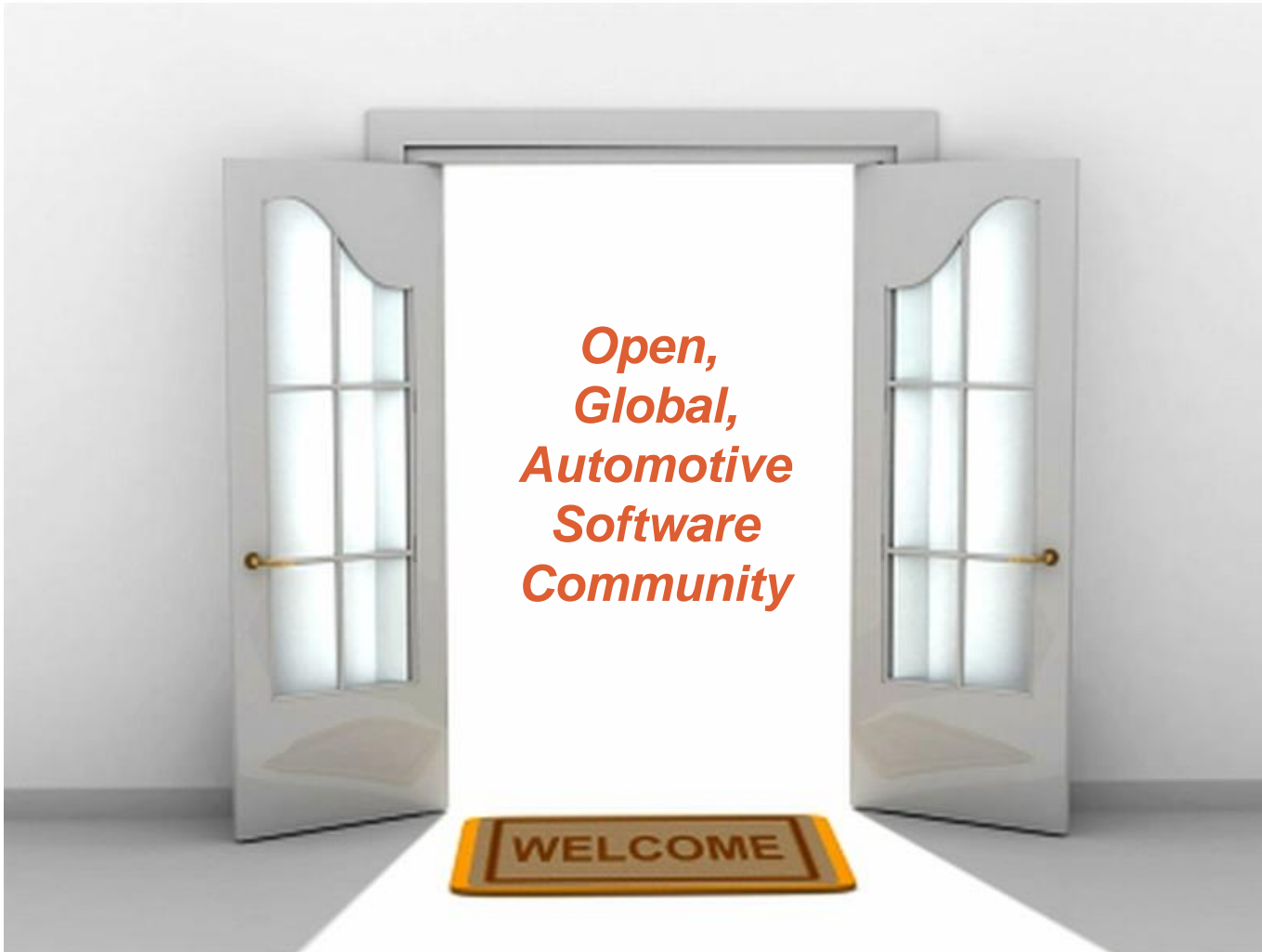
Collaborations

- NAB (Radio)
- FASTR (Security)
- W3C (Web)
- OCF (Smart Home)
- FSF (FOSS)

GENIVI Priorities

Aid OEMs and suppliers with the **increasing complexity of vehicle software** development and deployment

Identify and leverage automotive trends for the **software-powered vehicle** beginning with **vehicle domain interaction**
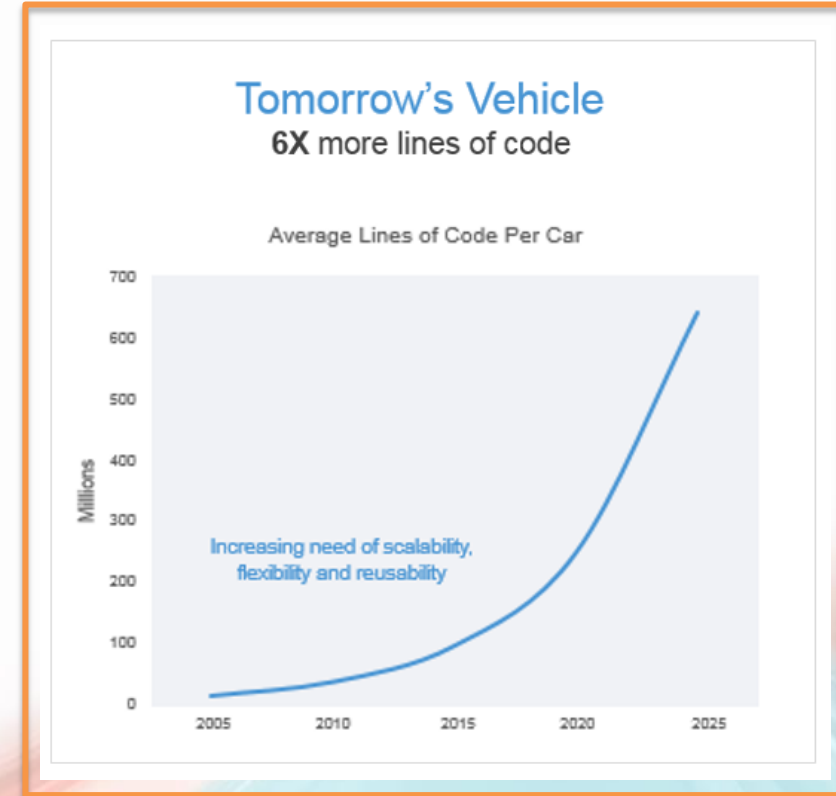
Define **integrated security concepts** for the highly connected vehicle

Increasing Complexity of Vehicle Software

- Many OEMs are moving from a pure, Tier-1 delivery model to becoming (partial) software houses either in-house or by acquisition

- As OEMs deploy features over the air, software change management issues increase

- Size of code base has resulted in quality issues

Tomorrow's Vehicle
6X more lines of code

Average Lines of Code Per Car

Increasing need of scalability, flexibility and reusability

# Preparing for the Software-powered Vehicle

- Service-oriented architecture (SOA) based on generalized computing platforms

- Differentiation in software-driven features, not merely in traditional vehicle hardware

- Virtualization of software functionality and abstraction from hardware

- Open interfaces to deploy 3rd party content, software upgrades, and new features

Defining Integrated Security Concepts

- Increased connectivity increases attack surfaces

- End-to-end security solution across all layers of the software stack outside the vehicle to the ECUs in the vehicle

- Requires holistic view of vehicle context and an understanding of methods and models for mitigating attacks

- Developer training essential to deliver reliable and secure solutions
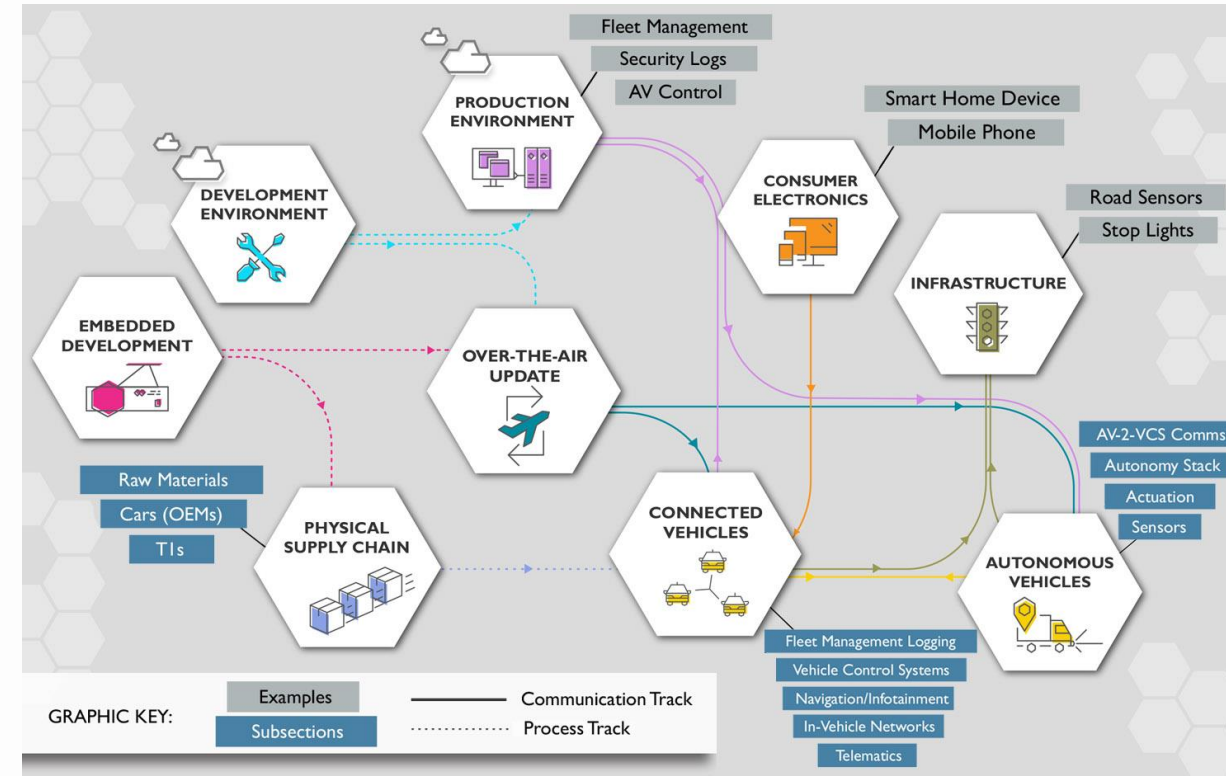
Event Theme: The Multi-domain Challenge

- A unified, in-car experience now requires interaction between multiple car software domains (e.g., safety, IVI, consumer electronics, cloud)
- Multi-domain product complexity increases proportionally to the number of cross-connected domain's interfaces
  - Many suppliers building one product using many APIs
  - OEMs pushing suppliers to standardize internal interfaces
  - Dynamic API changes – 4-5 times per year for 2 to 4-year lifecycle -> big development impact
  - Because of that – low SW reuse, maturity and efficiency

Vehicle Domain Interaction Strategy

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- Essential vehicle software architecture & software required for cross vehicle domain functions

| Cluster/ Combi | | IVI • Linux • Android • QNX | | CE Device | AUTOSAR |

Cluster/Combi ← Graphics ← IVI
Cluster/Combi ← Video ← IVI
Cluster/Combi ↔ Audio ↔ IVI

IVI ← Signals/ Messages Graphics ← CE Device
IVI ← Video ← CE Device
IVI ↔ Audio ↔ CE Device

Cluster/Combi ↕ Signals/ Messages

IVI ↕ Signals/ Messages

AUTOSAR ↕ Signals/ Messages

Network/Hypervisor

■ Non-safety Domain   ■ Safety Domain   ■ External Domain
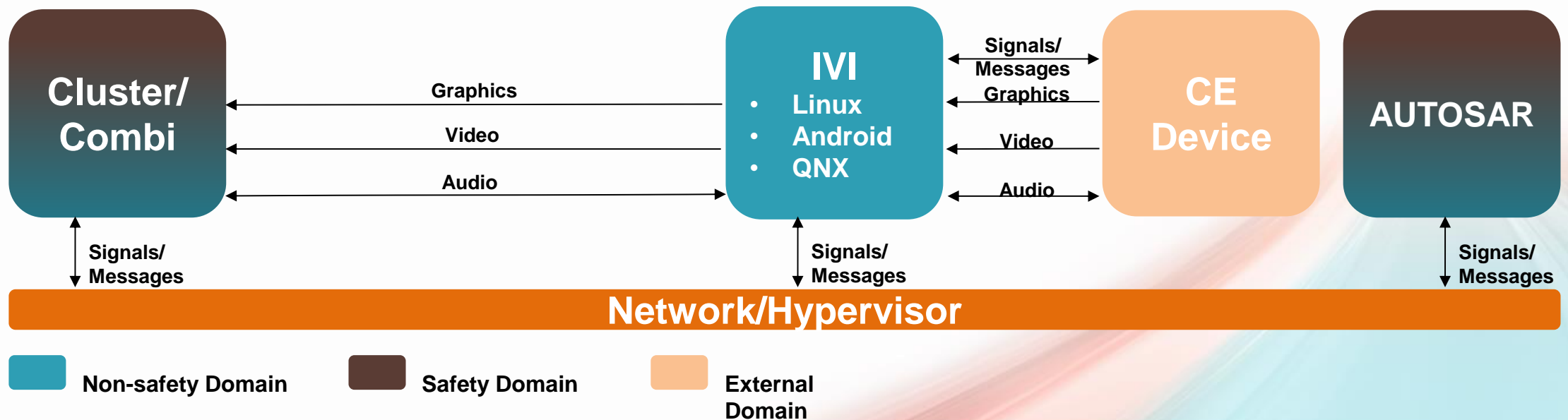
What is on GENIVI's mind? (GENIVI Member Survey)

- Car to Cloud Connectivity
- Driver Monitoring
- Standard method for managing messaging apps
- Integrated personal assistants
- Blockchain in automotive
- Standard method for managing streaming content
- Personalization/User Profiles
- V2X/Smart Mobility/Smart Cities
- V2V Safety

- Car as a Service (e.g., key provisioning)
- In-vehicle networking
- Hybrid radio
- Software platform for autonomous vehicles
- Automotive Cybersecurity
- Other Topics (please specify)

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Q1: Please indicate your organization's role in the automotive industry (select all that apply).

Role	Count
Automotive OEM	18
Tier 1 Supplier	10
Tier 2 Supplier	5
Silicon Provider	6
Operating System Vendor	3
Independent Software Vendor	5
Security Provider	1
Other (please specify)	4
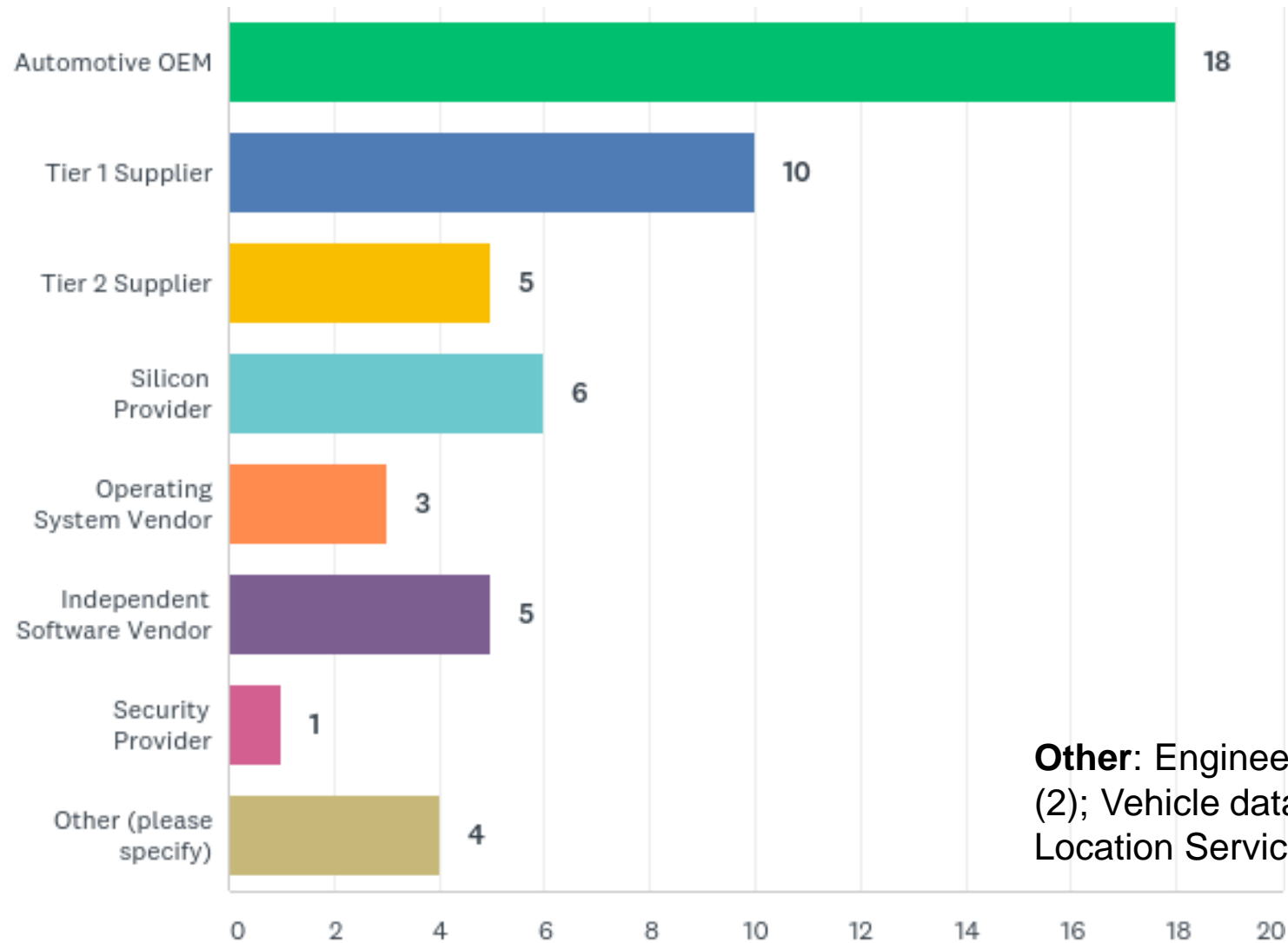
Other: Engineering Service Supplier (2); Vehicle data analytics (1); Location Services provider (1)

Q2 Please indicate your personal position in your organization (select only one).

Position	Count
C-Level Executive	2
Mid-level Management	11
Developer	13
Software Architect	13
Security Specialist	1
Sales or Product…	
Product Management	
Project Management	2
Business Development	2
Other (please specify)	2
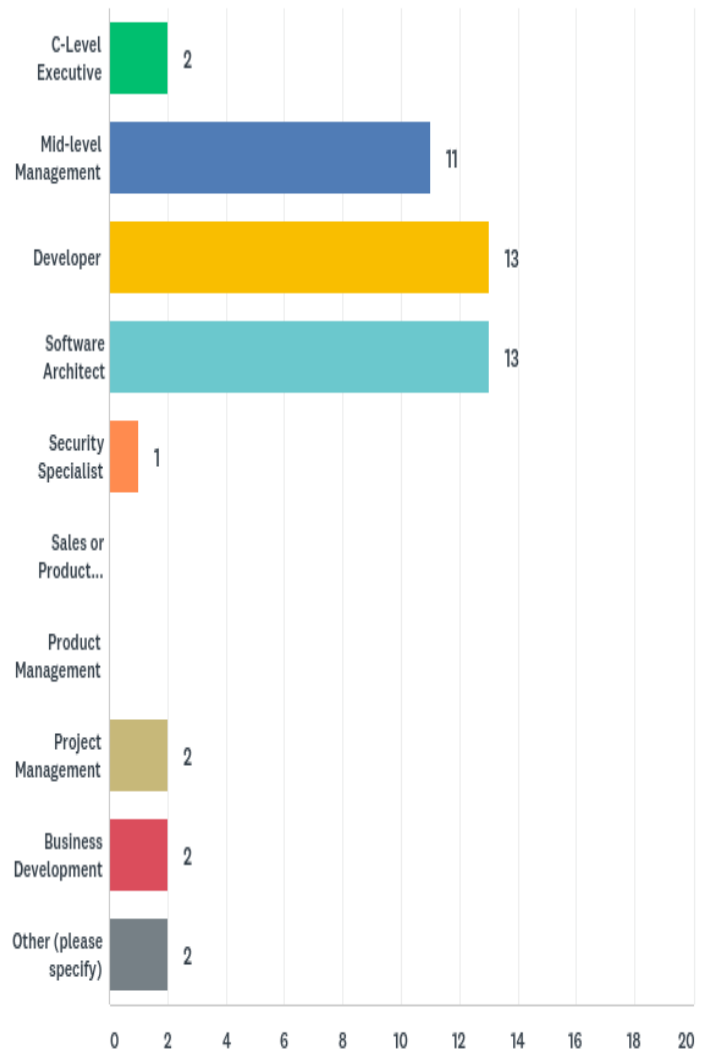
Q3 Please indicate your organization's level of membership.

Level	Count
Founding Charter or…	2
Core	24
Associate	13
Start-up Associate	1
Not a GENIVI Member	1
Not sure of my organization…	5
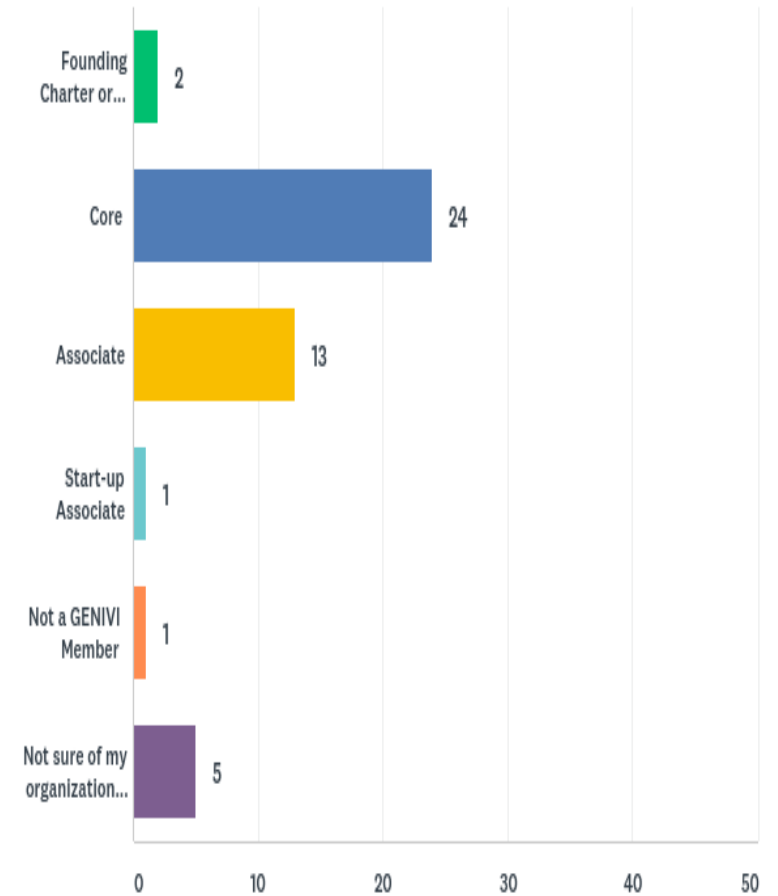
Q4: Please select which of the following potential GENIVI topics <u>are of interest to</u> your organization.

Topic	Value
Car to Cloud Connectivity	30
In-vehicle networking	25
AV Software Platform	25
Automotive Cybersecurity	24
Driver Monitoring	22
V2X/Smart Mobility/Sma...	22
Personalization /User Profiles	20
Streaming Content API	18
Integrated personal...	17
V2V Safety	17
Car as a Service (e.g...	15
Messaging App API	13
Hybrid Radio (i.e.,...	10
Blockchain in automotive...	9
Other topics (please...	5
None of these topics inter...	

Other: Open APIs for all the above; Performance; Nav Map Stds (NDS); Loc-based nav service; Auto functional safety, AutoSAR, Common Architecture and nomenclature for autonomous driving software

Q5 In which of the following topics would your organization actively participate if GENIVI launched projects in them?

Topic	Value
AV Software Platform	20
Car to Cloud Connectivity	15
Driver Monitoring	13
Personalization /User Profiles	11
Automotive Cybersecurity	11
In-vehicle networking	10
Streaming Content API	8
Messaging App API	7
V2X/Smart Mobility/Sma...	7
V2V Safety	7
Car as a Service (e.g...	7
Integrated personal...	6
Hybrid Radio (i.e.,...	5
My organization...	4
Other topics (please...	4
Blockchain in automotive...	3

Other: OTA for GENIVI Platform;; Loc-based nav service; Auto functional safety, AutoSAR, Common Architecture and nomenclature for autonomous driving software

Survey Conclusions

- New GENIVI work in car to cloud is under active discussion
  - Contact Philippe Robin, PMO Lead (philippe.robin@technoveo.com) to participate
- GENIVI Security Team is becoming core to future work
  - Contact Stacy Janes, Security Team Lead (stacy.janes@irdeto.com) to participate
- Learn more in next session about other new projects launching soon

Consumer Electronics Show (CES) 2019 Connect2Car Panels

- Panel topics:
  - Connecting the Autonomous World
  - The Future of In-Vehicle Infotainment

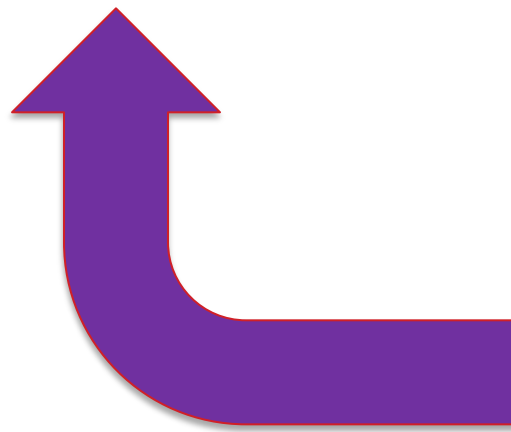# Consumer Electronics Show (CES) 2019 Showcase & Networking Reception

- Over 40 showcase tables
- Over 1050 visitors
- Bigger, better in 2019!

Today's Schedule

10:00-10:45	Vehicle Domain Interaction Strategy
10:45-11:00	Break
11:00-11:45	Remote Graphics & Distributed HMI Readout
11:45-12:30	GENIVI Development Platform Activities
12:30-2:00	Networking Lunch
2:00-3:30	Graphics Sharing & Distributed HMI Case Studies
3:30-3:45	Break
3:45-5:00	Hypervisor Project Readout
5:00-5:30	Bringing the Car to the Internet
5:30 -8:00	**Welcome Reception & GENIVI Member Demos**

Thank you!

Visit GENIVI at http://www.genivi.org or
http://at.projects.genivi.org

Contact us: help@genivi.org