CARCONNECTIVITY consortium®

Digital Key "Release 2"

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CAR CONNECTIVITY CONSORTIUM OVERVIEW

Global consortium, bringing car, handset and head-unit industries together

Objective is to develop smartphone-based connected-car solutions

CCC Work Items

• Established in February, 2011.

- Membership open to any interested company.
- Solutions are platform agnostic and not owned/governed by a single member.
- Runs certification programs to ensure compatibility.
- MirrorLink[®] (established).
- Digital Car Key (established).
- Car Data Market Place (new).



MEMBERSHIP DEVELOPMENT

7Layers	ADAC Automotive	AISIN SEIKI Co., Ltd.	AMOSENSE Co., Ltd.	AllGo Embedded Systems	Alps Alpine Co., Ltd.	Alticast Corporation	Apple Inc.	Apth Prive		BMW	BYD Auto Industry Co., Ltd	Blaupunkt (Shaghal Ltd.)	Brose Fahrzeugteile GmbH
CISC Semiconductor GmbH	CTC advanced GmbH	Cinemo GmbH	Clarion Co., Ltd.	Comprion GmbH	Continental Automotive GmbH	Cymotive Technologies Ltd.	DT&C	Da		Denso	Denso Ten Limited	Deutsche Telekom AG	Dyson Technology Limited
Faurecia Coagent Electronics S&T Co., Ltd.	ForgeRock Deutschland GmbH	Garmin International, Inc.	Gemalto	General Motors	Giesecke + Devrient Mobile Security GmbH	Google LLC	Guangdong OPPO M Telecommunicatio Ltd.		2020 Q1	Harman (106)	Hella	Honda R&D Co, Ltd.	Hosiden Corporation
Huf Secure Mobile GmbH	Huizhou Desay SV Automotive Co., Ltd.	Hyundai Mobis	Hyundai Motor	IDEMIA France	INVERS GmbH	Irdeto USA, Inc.	\square		Jiangsu Toppower Automotive Electronics Co., Ltd	Ksmartech, Inc.	LG Electronics	Marquardt GmbH	Mercedes-Benz Research & Development / Daimler
Minebea Mitsumi Inc.	Mitsubishi Electric Corporation	Mobase Electronics	NIPPON SEIKI CO.,LTD.	NXP	Noser Engineering AG	OÜ Bami		2019 Q1	(91)	Penta Security Systems Inc.	Pioneer Corporation	Preh Car Connect GmbH	Premium Sound Solutions SDN BHD
Qualcomm Incorporated	Renault	Robert Bosch LLC	SGS	SK Telecom	STMicroelectr		Shai InGeek Cyber Security Co., Ltd.	Shenyang MxNavi	Shenzhen Snowball Technology Co., Ltd.	Sirius XM Connected Vehicle Services Inc.	Sonim Technologies	Sony Imaging Products & Solutions Inc.	Stichting Imec Nederlands
Strattec Security Corporation	Subaru Corporation	Suzuki Motor Company	TA Technology (Shanghai) Co., Ltd.	ПА		2018 Research, Milit	Q2 (78)	Thatcham Research	Tokai Rika Co., Ltd.	Toyota	TrustKernel (Shanghai Pingbo Information Technology)	Trustonic	VNC Automotive Limited
				2017 (22 (68)	ZQ Automotive Technology (Shanghai) Co., Ltd.	Zhejiang Geely Holding Group	Zuken Elmic Inc.	iAUTO (Shanghai) Co., Ltd.	umlaut systems GmbH			



DIGITAL KEY – VEHICLE ACCESS TODAY



OEM 1

OEM 3

OEM 2

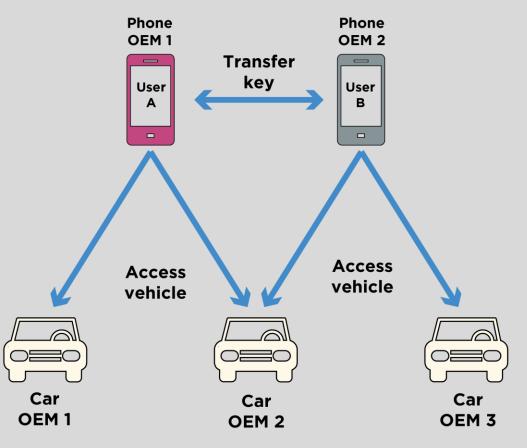


DIGITAL KEY – VEHICLE ACCESS TOMORROW



The future of vehicle access

- Digital keys are transferrable between phones.
- Intuitive: Easy overview over installed digital keys.
- Same user story on all vehicles and devices.
- High security.





DIGITAL KEY - SECURITY AND PRIVACY CONCEPT

High customer awareness:

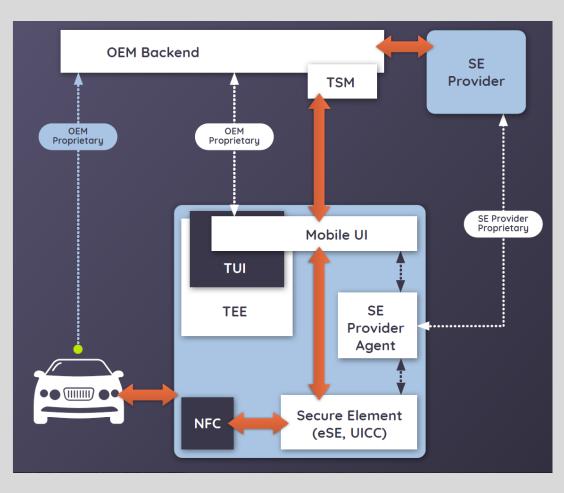
Current customer feedback: "Key in Smart phone – this cannot be secure"



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DIGITAL KEY RELEASE 1



Standardized approach to provision an applet to the Device. Main entities:

- TSM (Trusted Service Manager): Enables service providers (OEMs) to distribute and manage their contactless applications remotely by allowing access to the (embedded) secure element in smart devices.
- **Mobile UI:** Interface between OEM/TSM and smart device. This is also known as OEM application.
- **Secure Element:** Secure storage on smart device. It can be in the form of embedded Secure Element or UICC Secure Element.
- **SE Provider:** The owner of the SE which provides SE access to a TSM.
- Vehicle OEM Backend: Provisioning of digital key to the Secure Element using a vehicle OEM proprietary protocol.
- **Applet:** Vehicle OEM proprietary applet, securely provisioned to the SE. The applet implements a vehicle OEM proprietary protocol between vehicle and applet.



DIGITAL KEY RELEASE 2

Overview

- Release planned for Q2 2020.
- Has created high industry attention strong increase in membership numbers.
- Brings new features and use cases to the digital key ecosystem that were not included in Release 1.
- Standardized digital key applet.
- Standardized vehicle access protocol.
- Scalable architecture to support wide-scale deployment of the digital key services across different vehicle OEMs and device OEMs.
- Release 2 is not backward compatible with Release 1. Both releases can be deployed independently.



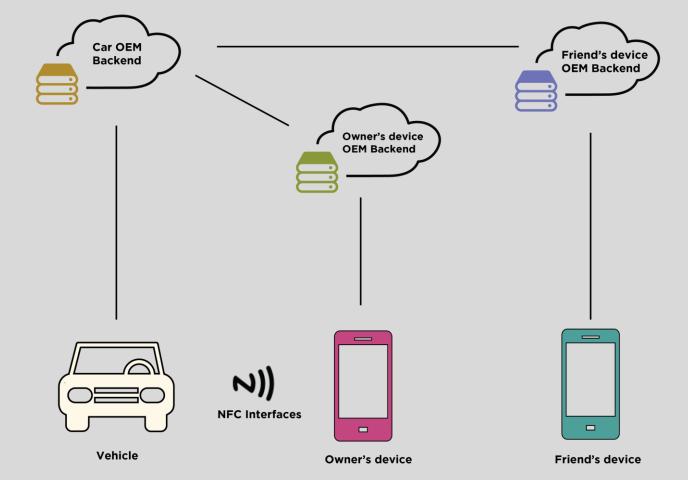
DIGITAL KEY RELEASE 2

Standardized Interfaces:

- Interface Vehicle Smart Device.
- Interface Vehicle OEM Backend Device OEM Backend.

Standardized Use Cases

- Unlock the Vehicle.
- Lock the Vehicle.
- Start the Engine.
- Digital Key Provisioning / Owner Pairing.
- Digital Key Revocation.
- Friend Key Sharing.
- Digital Key Entitlements Restricting (shared) key usage.
- Tracking of issued Digital Keys for insurance purpose.



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DIGITAL KEY RELEASE 3 OUTLOOK

Accomodate additional use cases:

- Passive entry / passive start use cases.
- Remote keyless entry use cases.
- Car sharing / car rental.



DIGITAL KEY ECOSYSTEM SUMMARY

Security

• High security to enable the application to vehicles.

Scalability

• Scalable to be the dominant vehicle access technology.

Market adoption

• High involvement from Vehicle and Smart phone industry.

Ecosystem

• Certification to ensure compliance with functional and security requirements.





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