



Security Conference

NearLink: What it is and Why it Matters for Secure AIoTI

Presented by:

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Alliance for IoT
and Edge Computing
Innovation

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The Alliance of IoT Innovation was founded in 2016 with the support of the European commission to promote and support collaboration in IoT, Edge Computing and other converging technology.

AIOTI members drive business, policy, standardisation, research and innovation development across the Digital Value Chain to support European digitisation and competitiveness

The Mobility Working Group supports Member initiatives on their deployment of Mobility Application and Services with a recent focus on User experience of next Generation vehicle, Electro-mobility and Spatial web

AIOTI



Car IoT – the in-vehicle IoT opportunities

Car IoT – growing challenges for in-vehicle connectivity

SW defined architecture

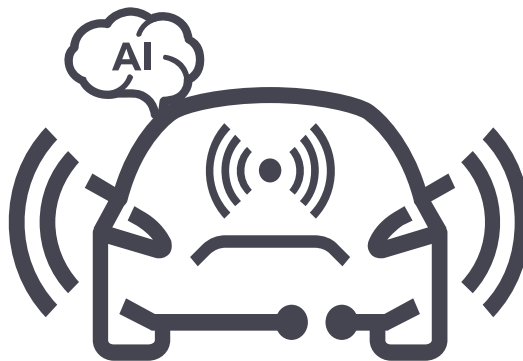
Applications

OS / VM

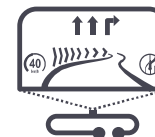
Device virtualisation

Hypervisor

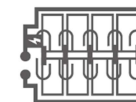
HW / SoC



Smart Cockpit



EV



Sensors

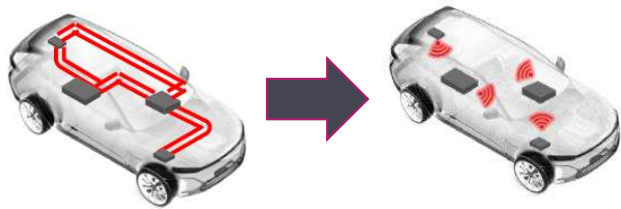


Smartphone Car Apps




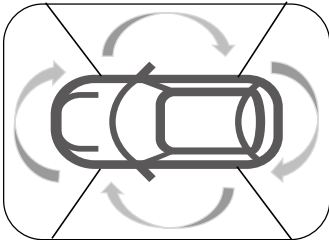


Short range communication for Car IoT

Use case examples



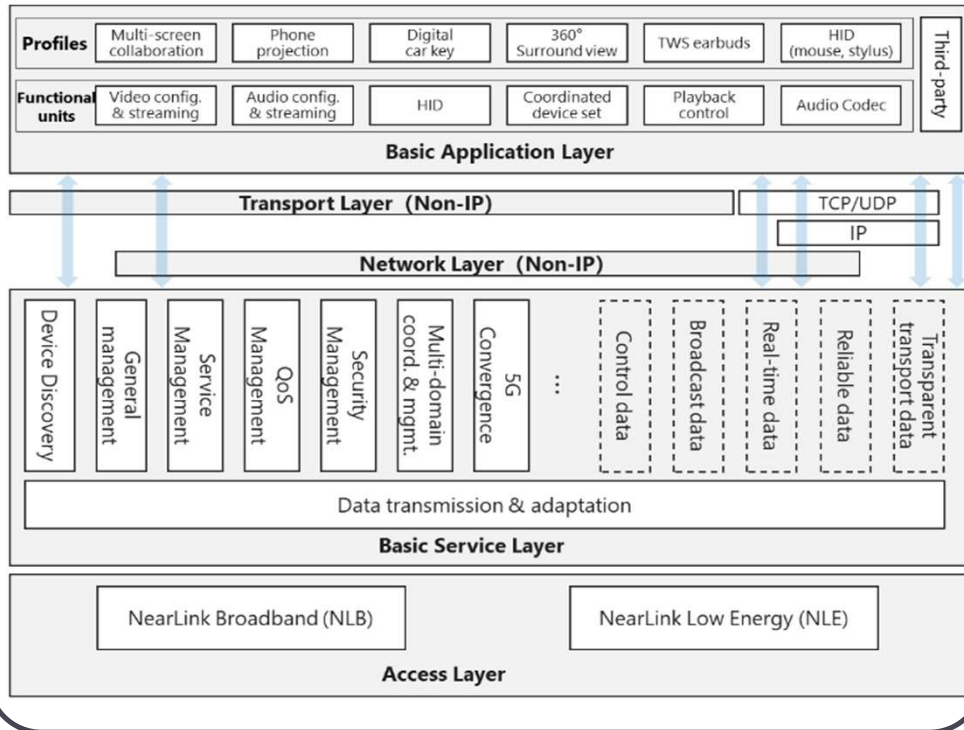
- Lower weight (~ 30kg) and number of connectors (300)
- Reduce design, integration and manufacturing costs
- Improve scalability and aftermarket

Sound & noise reduction	Screen interaction
 <ul style="list-style-type: none"> • End2end latency • Synch accuracy 	 <ul style="list-style-type: none"> • One way latency • Accurate synchronisation
Passive access/start	Wireless surround view
<ul style="list-style-type: none"> • Position accuracy • Reliability 	

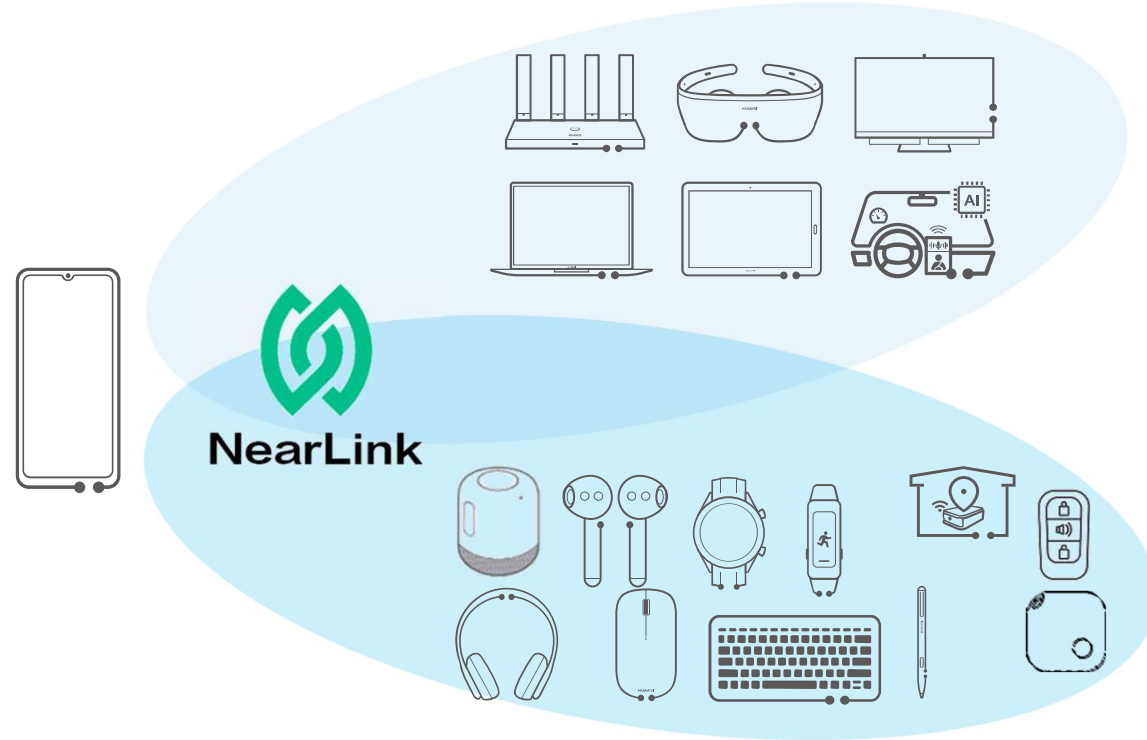
Introduction to NearLink short-range communication technologies

NearLink for low-latency & low-jitter applications

- Dual Mode (Broadband & Low Energy) radio access with unified upper layer protocol stack
- 5 Layer protocol architecture
- NearLink v1.0 ⇨ 11 Technical Specifications



NLB: NearLink Broadband



NLE: NearLink Low Energy

NLB & NLE superior performances for different use cases

Mice and keyboards



1/30 of BLE air-interface latency \Rightarrow True 4kHz polling rate

NLE **250 μ s** vs. BLE **7.5ms**

Digital car key



Measurement accuracy \uparrow 6 \times \Rightarrow \uparrow security
wireless backhauling \Rightarrow \downarrow cost

NLE: **dm-level** vs. BLE **m-level**

Wireless audio



Data rate \uparrow 6 \times & Rx sensitivity \uparrow 7.5dB \Rightarrow
Lossless hi-res listening experience

NLE **12Mbps** vs. BLE **2Mbps**

IoT



Piconet capacity: \uparrow 3 \times
mesh networking capacity: \uparrow 5 \times

- Piconet: NLE **15** devices vs. BLE **5**
- Mesh: NLE **200** devices vs. BLE **40**

Wireless home



Transport latency \downarrow 10 \times , μ s-level sync
 \Rightarrow Immersive user experience

- NLB **1ms** vs. Wi-Fi **30~50ms**
- Sync error $<$ **1 μ s**

Wireless 360° surround view

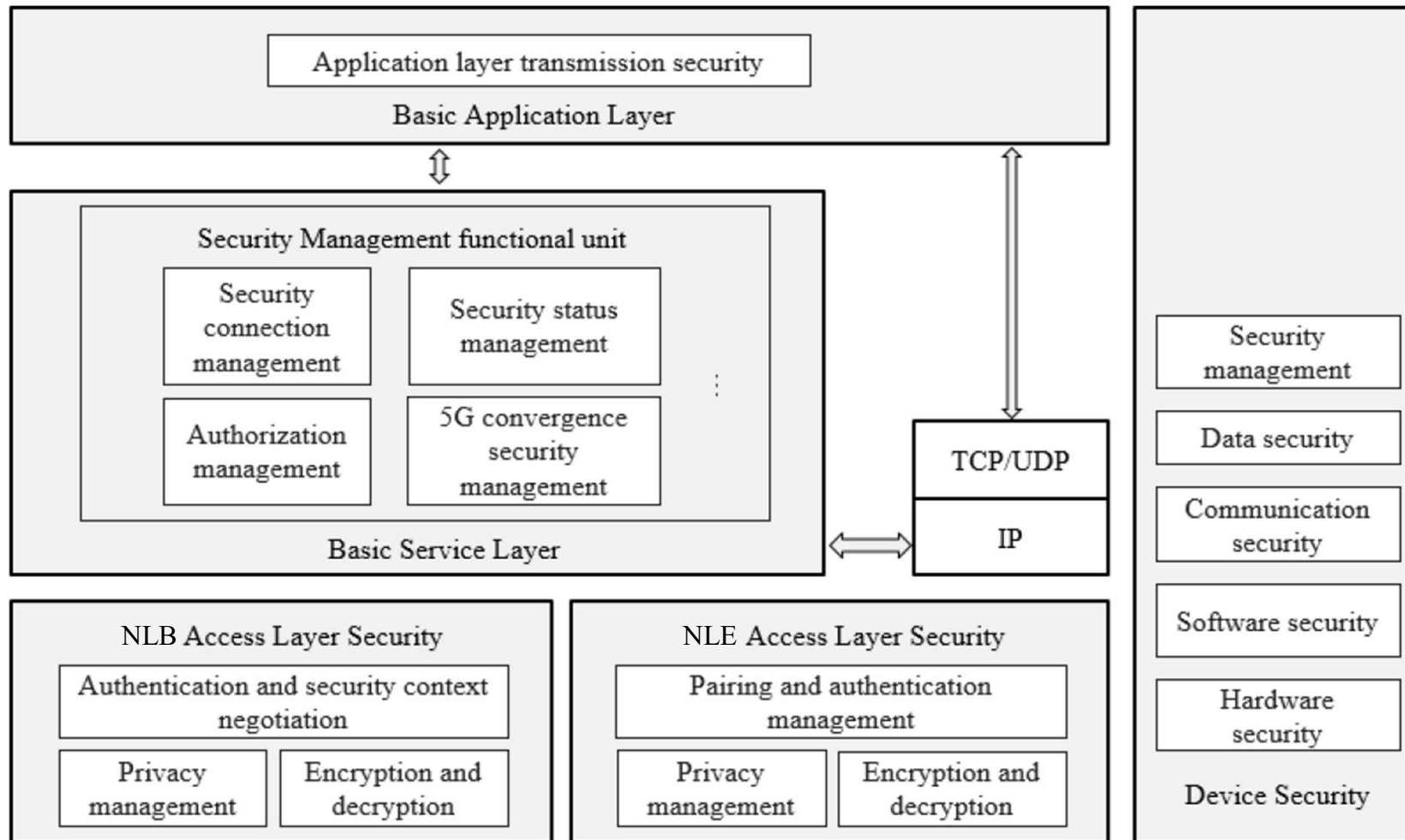


E2E latency \downarrow 50% & tight sync
 \Rightarrow Easy deployment

- NLB **170ms** vs. Analog HD **350ms**
- Sync error $<$ **1ms**

NearLink Security Features

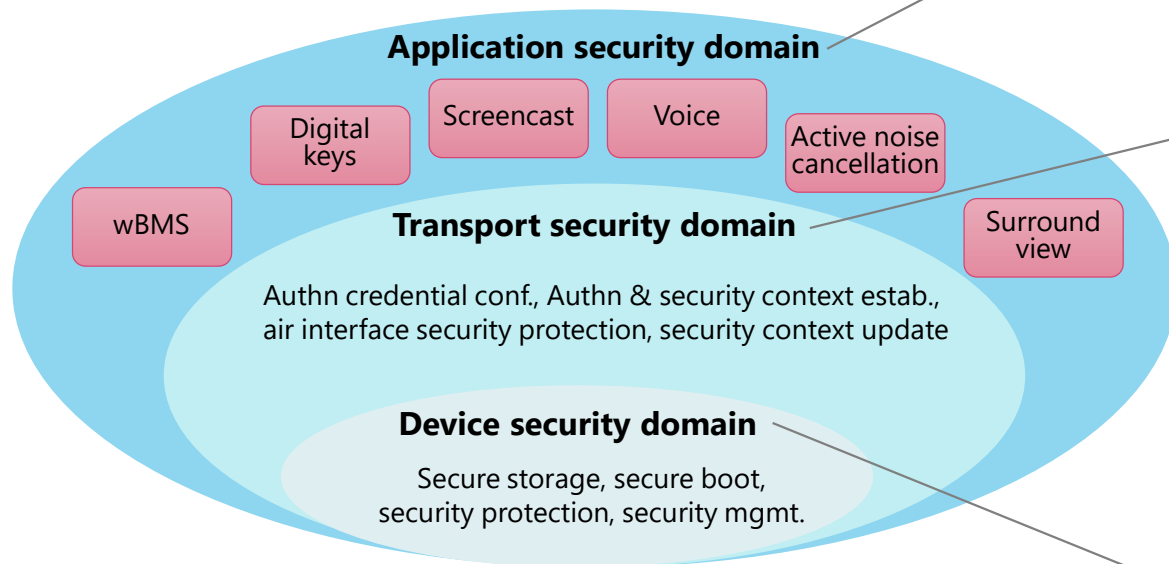
NearLink security architecture



NearLink security mechanism: Full-stack design for enhanced security

Full-stack security protection

- **Three-layer security mechanism design:** Device security, transport security, and application security
- **Application-based security configuration for each layer**



NearLink security architecture

Application security domain: Application specific full design of security configuration

- Service characteristics-based configuration of application, transport, and device security mechanisms
- Transport security requirements & mechanism for application layer

Strong authentication & authorization, high-security transport

- Mandatory two-way authentication, supporting locking of the number of authentication times
- High-security credentials: 256-bit pre-shared keys, strong password
- Negotiable security mechanism: Support of dual cryptographic algorithms, negotiable integrity & encryption

Physical layer security: Robust to relay attacks, random signal perturbation for anti-forgery

Device security: high-security isolation

- Secure storage ensures multi-account data isolation
- Domain-based security isolation: Domain firewalls block remote attack paths.

NearLink security vs. BT/Wi-Fi: Mandatory two-way authentication, GM cryptography, comprehensive security protection

		NearLink	Bluetooth 5.3	Wi-Fi (WPA3)
Application-layer security	Configuration	√	Undefined	Undefined
	Mechanism	√	Undefined	Undefined
	Requirements	√	Undefined	Undefined
Transport-layer security	Blocklist & trustlist protection	√	√	Undefined
	Mandatory two-way authentication	√	Customizable (No authn. for Just work mode)	Customizable (No authn. for Open mode)
	Strong credentials	√	Password complexity undefined	Password complexity undefined
	GM cryptography	√ (ZUC, SM2, SM3)	×	×
	Independent on/off between encryption & complete insurance	√	× (Simultaneous on/off)	× (Simultaneous on/off)
	No. signaling messages	Context present: 5 Context absent: 2	Context present: 10+ Context absent: 4	Context present: 8+ Context absent: 8+
Device security	Secure storage	√	Undefined	Undefined
	Domain-based security isolation	√	Undefined	Undefined

The International SparkLink Wireless Short-Range Communications Alliance

Introduction to SparkLink Alliance

The **SparkLink Alliance*** was founded on September 22, 2020, with the objective of:

- Promoting continued innovations in **NearLink**, the next-gen short-range wireless communications technology;
- Leading the ecosystems construction efforts for smart terminals, smart homes, smart automobiles, and smart manufacturing.



Mr. Zhang Xiaogang
President
Formerly President of ISO



Ms. Dai Xiaohui
Chief Supervisor
VP & Deputy Secretary, CCSA



Ms. Wang Zhiqin
Executive VP
VP, CAICT



Mr. Wu Hequan
Director, Committee of Experts
Fellow, Chinese Academy of Engr.

326+ members



Partnership with other industry consortiums and alliances



Official website: www.sparklink.org.cn/

* Official name: International SparkLink Wireless Short-Range Communications Alliance

You need to know more about NearLink?



NearLink

Participate in the NearLink workshop

Organized by Huawei in Brussels 28 November 2023

Contact teuvo.jarvela@huawei.com to get an invitation, ask questions or receive news about NearLink



Thank you for listening

Any questions?

Contact: francois.fischer@fscom.fr – AIOTI Mobility WG chair