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China Automotive Cybersecurity Software Research Report, 2022

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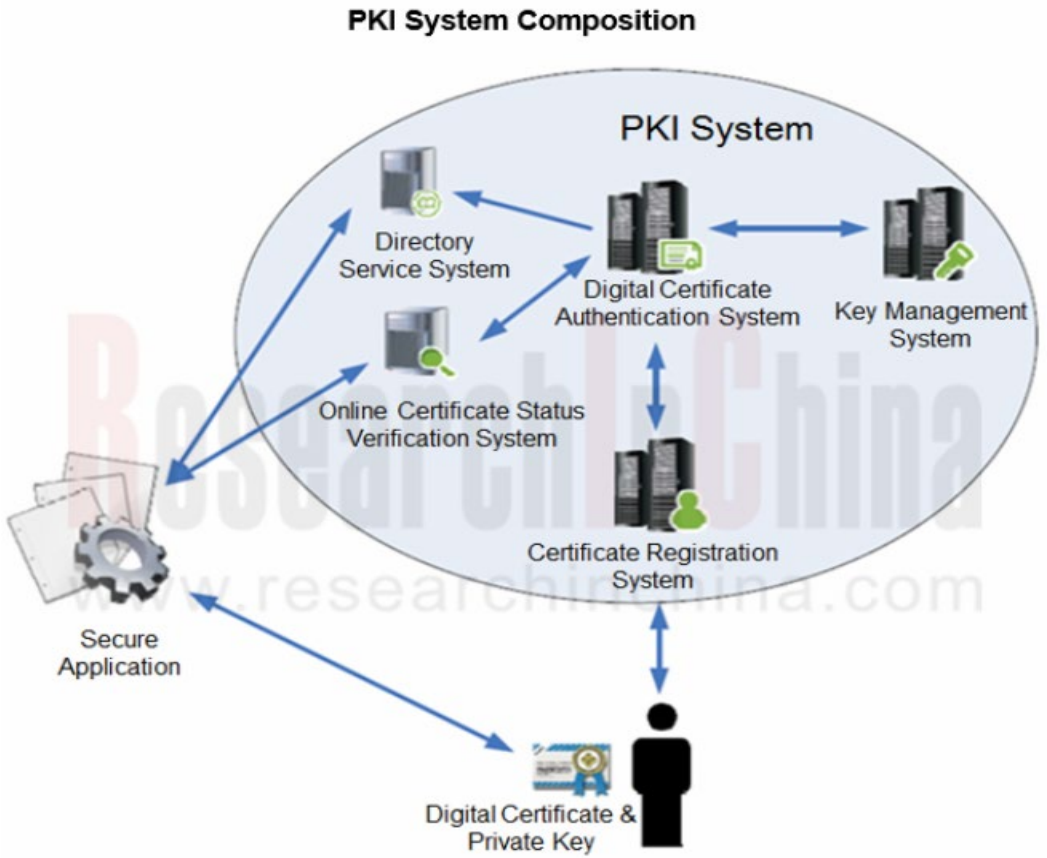
Chinese in-vehicle terminal PKI market will be worth RMB1.89 billion in 2025.

The working principle of PKI (Public Key Infrastructure) is: the infrastructure that provides security services established by leveraging public key cryptography technology, and provides users with certificate management and key management, etc., in a bid for identity authenticity, information confidentiality and other goals.

China's automobile cybersecurity is protected mainly by the PKI system by far. The asymmetric encryption technology based on PKI is applied to various links such as onboard devices, Internet of Vehicles operation, and network communication, and plays a core role in the security protection at all levels of cloud, communication, and terminals. As for in-vehicle terminals, various terminal devices need to be embedded with security chips to manage keys and encryption operations; all communications with the outside world also require to be encrypted, driving the robust demand for PKI.

Facilitated by the factors like the expanding demand for automotive cybersecurity protection and the rapid rise in the penetration rate of Internet of Vehicles, Chinese PKI market size of in-vehicle terminals will expectedly reach RMB920 million to RMB1,890 million from 2022 to 2025, with an average annual growth rate of 27%.



Source: KOAL Software

China In-Vehicle Terminal PKI Market Size, 2021-2025E

Of the PKI application scenarios, V2X is the focus of major suppliers. The use of PKI system to on-board unit (OBU), roadside unit (RSU), service provider (SP), and secure communication and identity authentication between cloud platforms will be the mainspring of future development.

Source: ResearchInChina

China Internet of Vehicles PKI System Suppliers

China Internet of Vehicles PKI System Suppliers

Supplier	PKI Application & Features	Progress
KOAL Software	Mainly used for V2X, "vehicle-cloud" two-way authentication and secure communication.	In 2022, it will provide multi-tenant capability for V2X infrastructure and pilot it in the project, has completed adaptation to multiple vehicle environments, and access to the mass production of some vehicle models. Cooperative OEM: SAIC
JIT	Mainly used for V2X, providing registration, identity, pseudonym, application and other certificate issuance services for OBU, RSU and service provider (SP) and other IoV devices, providing abnormal behavior management and certificate revocation list issuance services, to build a secure and reliable identity authentication system for IoV.	Cooperative OEM: FAW, Changan Automobile, Dongfeng Motor, SAIC, BAIC, GEELY, WM Motor, JMC, QOROS, T3Go, Human Horizons, etc.
Beijing i-wall Institute of Technology	Provide digital certificate and identity authentication services, support certificate life cycle management, identity authentication management, authorization policy management, security monitoring and auditing, etc. With a new technical architecture, the system can serve custom application of new scenarios based on IoT and IoV, and has the 'China Cryptography' product certification model.	Deep cooperation with FAW, BAIC, SAIC, Geely, PATAC, Didi, etc., and massive availability on more than 20 models
Sheng An Information	Cloud certificate issuance and certification services, V2X certification, OTA security, and in-vehicle CAN bus encryption capabilities.	It has been applied in security platforms or vehicle models of Audi, GM, Human Horizons, China Intelligent and Connected Vehicles (Beijing) Research Institute (CICV) , etc.
Panqi Tech	Focus on the issuance and management of certificates in the process of intelligent vehicle information communication. By issuing mission certificates, anonymous certificates and application certificates to OBU and RSU, to monitor improper/abnormal behaviors in the communication process and manage CRL (Certificate Revocation List).	
GFA E-Commerce Security CA	Aiming at the communication protocol between the vehicle terminal and the cloud server, a PKI authentication system architecture and a unique TLS encryption process are proposed, which can effectively solve the communication security problem of the Internet of Vehicles and prevent the serious harm caused by user identity impersonation and information leakage.	

Source: ResearchInChina

KOAL Software

KOAL Software is one of the early developers of PKI products in China, and has formed three major product systems: PKI infrastructure products, PKI security application products, and general security products.

KOAL's PKI solution for intelligent vehicle connectivity is centered round the V2X-PKI security service system, integrates IEEE1609.2 international standards and GB/T 37374 national standards, meets ITS standards and Ministry of Transport standards, and also supports GM (China Cryptography) algorithms.

In the automotive sector, KOAL Software has SAIC as its main customer and has built a security certificate management system for the wireless communication technology of the Internet of Vehicles for SAIC Prospective Technology Research Department, including V2X and V2N security certificate systems. In addition, it also built a comprehensive certificate management system, digital certificate authentication system, and signature verification system for SAIC Cloud Data Center mobile office project, and built a cloud PKI system for SAIC Motor Overseas Intelligent Mobility Technology Co., Ltd.

In 2022, KOAL Software's products in automotive field expand from identity authentication system to data security system of the Internet of Vehicles. The "Guidelines for the Application of Internet of Vehicles Transmission Security Protection Based on Domestic Cryptography" has been successfully approved, becoming the first group standard to pass the expert review of Shanghai Business Cryptography Association.

Key Customers of KOAL Software, 2022

Related Party Transaction Category	Related Party	Estimated Amount (RMB)	Actual Amount (RMB)	Content
Goods Sale	Xinjiang CA	5,000,000.00	300,000.00	PKI products, digital authentication systems, gateways, etc.
	Zhejiang CA	1,000,000.00	0	PKI products, digital authentication systems, gateways, etc.
	Shanghai Koal Automobile Technology Development	500,000.00	0	PKI products, digital authentication systems, gateways, etc.
	Shanghai Thinktech	1,000,000.00	0	PKI products, digital authentication systems, gateways, etc.

Source: KOAL 2022H1 Report, statistics data: June 30, 2022

Changchun Jilin University Zhengyuan Information Technologies Co., Ltd.

Changchun Jilin University Zhengyuan Information Technologies Co., Ltd. (hereinafter referred to as JIT) is the main member and sub project convener of WG3 (cryptography Working Group), WG4 (Authentication and Authorization Working Group), WG5 (Cybersecurity Assessment Working Group), WG7 (Cybersecurity Management Working Group) and SWG-BDS (Special Working Group on Big Data Security Standards) of National Cybersecurity Standardization Technical Committee. JIT is also one of the main constitutors of standards about PKI electronic certification products in China.

JIT has developed product lines such as password security, identity and access security, data security and security applications, and formed six star products: PKI, V2X PKI, identity and access management (IAM), password comprehensive service management platform, secure blockchain platform and data security solutions.

In respect of V2X PKI, based on the digital certificate format specification of GM/T 0015 SM2 cryptographic algorithm, JIT combines various application scenarios of transportation information systems, and focuses on the requirements of ITS (Intelligent Transportation System) application on the length, computing efficiency, etc. of digital certificates. The format of the ITS equipment certificate has been redefined, and JIT developed the ITS digital certificate product independently to provide technical and product support for intelligent transportation.

Highlights of China Automotive Cybersecurity Software Research Report, 2022

China Automotive Cybersecurity Software Research Report, 2022 highlights the following:

- Automotive cybersecurity system architecture and key software product range;
- The application of cryptographic technology and PKI system in the Internet of Vehicles system, main enterprises and products;
- The application of IDPS in automotive cybersecurity defense system, main enterprises and solutions;
- Status quo of China's automotive cybersecurity testing, major companies and testing platforms;
- Development trends and suggestions for automotive cybersecurity.

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