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Automotive Cloud Service Platform Industry Report, 2023

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Research on Automotive Cloud Services: As Dedicated Automotive Cloud Platforms Are Launched, the Market Enters A Phase of Differentiated Competition

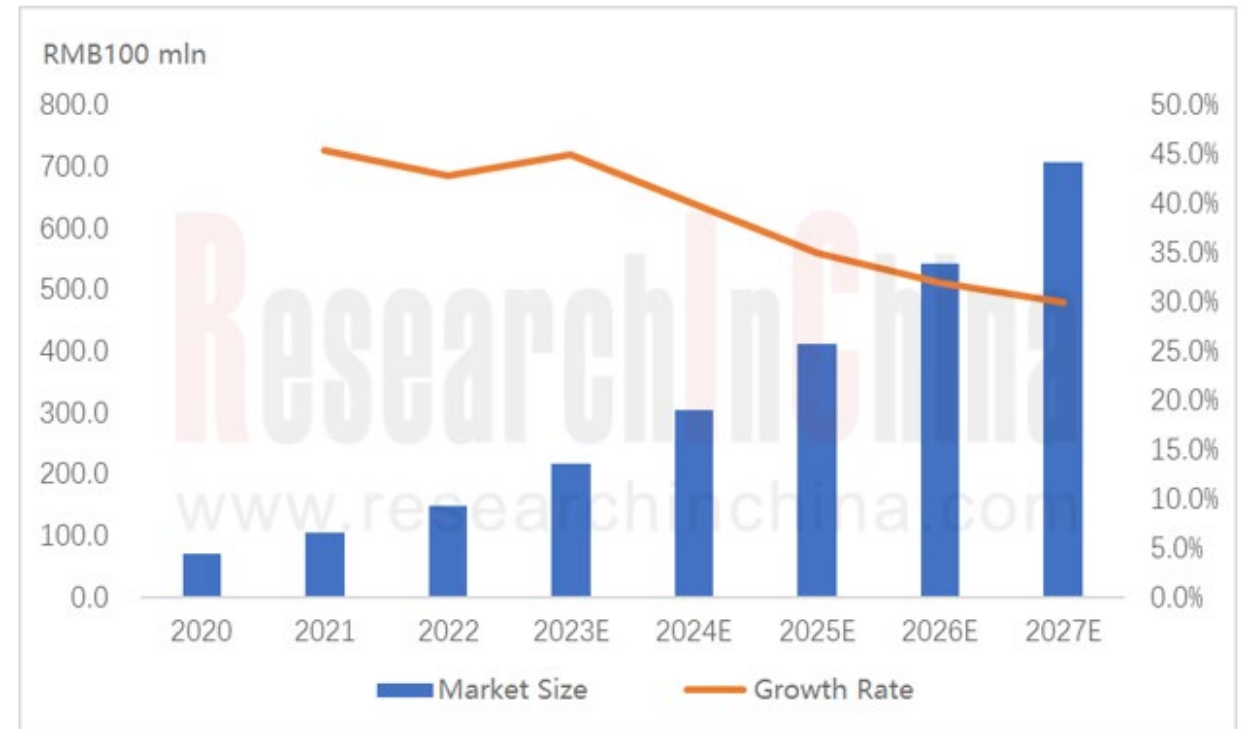
1. The exponentially increasing amount of vehicle data makes cloud migration an inevitable choice.

From the perspective of companies, the goals of digital transformation are to digitize all elements of the whole process throughout the full life cycle of vehicles, including R&D, production, sale, operation, and after-sales service; upload the data in the local servers and computer rooms of automakers to the cloud; connect the data channels of each link to gradually realize the integrated management of data in the whole industry chain, and the cloud-pipe-terminal integrated real-time interconnection; and build service operation models that span the full life cycle of users to enhance the connections between upstream and downstream partners in the industry and create greater value.

In terms of products, vehicle intelligence and connectivity are booming. For example, starting from L2, every time the autonomous driving functions evolve to a higher level, the consumption of cloud infrastructure platforms, applications, and services will rise by an order of magnitude. As high-level autonomous driving comes into mass production, the number of vehicle sensors and the amount of data multiply, making it difficult for local processing to meet the requirements. Cloud migration thus will be the best choice.

Automakers spend tens of millions of yuan every year building cloud services, which gives a big boost to the market. In 2022, China's automotive cloud service market was valued at over RMB15 billion, and it is expected to sustain the growth rate of 30-40% in the next five years.

China's Automotive Cloud Market Size, 2020-2027E



Source: ResarchInChina

As dedicated automotive cloud platforms are launched, differentiated competition becomes crucial

2. As dedicated automotive cloud platforms are launched, differentiated competition becomes crucial.

In 2021, ByteDance announced the "ByteDance Auto Cloud", which will provide cloud services in four segments: Digital Marketing, Intelligent Cockpit, Autonomous Driving, and Vehicle Services. In 2022, Tencent Intelligent Cloud Cloud, Baidu Auto Cloud, and Alibaba Auto Cloud became available. All the five giants (BATHD), i.e., Baidu, Alibaba, Tencent, Huawei and Douyin have stepped in the market, and the competition in automotive cloud services built on exclusive automotive cloud has become fiercer.

The service scope of each automotive cloud is much of a muchness, generally covering R&D, manufacture, marketing, and supply chain. The support for R&D is concentrated in the fields of autonomous driving, intelligent cockpit, telematics, and "three electrics" (battery, motor and ECU). How to gain differentiated competitive edges in the competition therefore has become the key to success for companies.

Automotive Cloud Platforms in China

Automotive Cloud	Launch Time	Application	Features / Advantages	Customers
Alibaba Auto Cloud	Dec. 2022	Contain three items: <ul style="list-style-type: none"> Autonomous Driving Cloud - R&D Intelligent Manufacturing Cloud - manufacturing Marketing Cloud - circulation 	<ul style="list-style-type: none"> The "Alibaba Cloud-DingTalk Integration" strategy: DingTalk and Alibaba Cloud are fully integrated, of which DingTalk accommodates more than 300 million users, 15 million organizations, and 200,000 developers; The Apsara + CIPU integrated architecture can manage and control millions of servers in Alibaba Cloud around the world; Technical bases: DAMO Academy, T-Head, Alibaba Cloud, DingTalk, Tmall Genie, and Lingyang. 	Having served more than 70% of automakers, and been available to Xpeng, FAW, Geely, Great Wall Motor, Changan Auto, and Horizon Robotics among others.
Baidu Auto Cloud	Sept. 2022	Contain three items: <ul style="list-style-type: none"> Corporate Cloud: R&D, production, service Connected Cloud: autonomous driving, intelligent cockpit Supply Chain Collaboration Cloud: industry collaboration, logistics scheduling 	<ul style="list-style-type: none"> Following the concept of "Cloud-AI Integration", build an intelligent closed loop of "chip-framework-foundation model-industrial application"; Apollo Autonomous Driving Base; Baidu Maps. 	Of the top 15 automakers in China, 10 are customers of Baidu AI Cloud; of the top 10 new energy vehicle companies, 5 are served by Baidu AI Cloud.
Tencent Intelligent Vehicle Cloud	Jun. 2022	Cover the full link of vehicle R&D, manufacturing, marketing, operation, and after-sales services	<ul style="list-style-type: none"> WeChat Social Ecosystem; Mobility Service Applet Ecosystem; Tencent Maps. 	Have cooperated with 100 automakers and mobility technology companies, and been available to NIO, Bosch, etc.
Bytedance Auto Cloud	Sept. 2021	Four application fields: digital marketing, intelligent cockpit, autonomous driving, and vehicle services	<ul style="list-style-type: none"> Content ecosystems, e.g., Toutiao, Dianchedi, and Douyin; Precision marketing capabilities. 	Neta Auto, Li Auto
Huawei Intelligent Vehicle Cloud Services	/	Five major business segments: intelligent connection, intelligent driving, intelligent cockpit, intelligent electric, and intelligent vehicle cloud services	<ul style="list-style-type: none"> "1+3+M+N" global automotive industry cloud infrastructure layout; Cross-border capabilities in technology, manufacturing, and marketing. 	BYD, Great Wall Motor, Human Horizons, etc.

Source: ResearchInChina

The differentiated competitive edges in cloud services are mainly built from two aspects: basic resource layer services and upper-layer R&D tool chains

3. The differentiated competitive edges in cloud services are mainly built from two aspects: basic resource layer services and upper-layer R&D tool chains.

In terms of basic resource layer, supercomputing centers are an important indicator for assessing service capabilities, and Alibaba and Baidu are the first to deploy.

In August 2022, Alibaba Cloud launched the two intelligent supercomputing centers located in Zhangbei County and Ulanqab, with total compute of 15 EFLOPS (15 exascale floating-point operations per second). At the same time, Alibaba Cloud also introduced the "Apsara Intelligent Computing Platform", an intelligent computing solution which opens up intelligent computing capabilities by way of "platform + intelligent computing center".

Following the five intelligent computing centers in Yangquan, Jinan, Fuzhou, Yancheng, and Tianjin, Baidu Cloud started construction of the Baidu AI Cloud-Shenyang Intelligent Computing Center in May 2023, a project with a land area of about 2.4 hectares, floor areas of 42,000 square meters, and the total planned computing power of 500P, 200P for Phase I. In the future, Baidu Shenyang Intelligent Computing Center will not only involve physical data center construction capabilities and intelligent computing infrastructure capabilities, but also comprehensive solutions for AI software and hardware ecosystem capabilities such as foundation models, supporting the computing tasks of companies in different business scenarios and meeting the industrial application requirements of foundation models in the era of intelligent computing.

With regard to R&D tool chains, cloud service providers are committed to creating "fully furnished" service experiences for users by offering "full-process" and "fully closed-loop" services.

*In Tencent's autonomous driving cloud platform, virtual simulation has become a key link.

*Huawei's autonomous driving cloud platform "Octopus" has built in a dataset with 20 million frame annotations, a library with 200,000 simulation scenes, a complete tool chain, and annotation algorithms, covering the full life cycle businesses such as autonomous driving data, models, training, simulation, and annotation, and helping automakers to build autonomous driving development capabilities on a "zero" basis.

*Baidu makes a full-stack layout and enables a data closed loop by virtue of from chip (Kunlunxin), deep learning (PaddlePaddle) and training foundation model (ERNIE) to search (Baidu Search), cloud platform (Baidu AI Cloud), autonomous driving (Apollo) and intelligent connection (Xiaodu).

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4. Under the multi-cloud strategy, the need of OEMs has changed from the pursuit of resources to efficiency.

With the in-depth migration to the cloud, the resource needs of OEMs for cloud migration have been overall met, and thus the underlying logic of the cloud strategy of companies has changed from the pursuit of resources to efficiency to finally improve their overall digitization capabilities in production and operation. In this process, OEMs are no longer tightly bound with some cloud platform, but implement a multi-cloud strategy where different business types are put on different cloud platforms.

Examples include:

*Based on the "1+6+N" Geely Hybrid Cloud Platform co-built with Baidu, Geely works with Alibaba to build the Xingrui Intelligent Computing Center, and teams up with Tencent on telematics and security solutions.

*FAW Group uses Huawei Cloud Stack to build hybrid cloud architecture, and also cooperates with Alibaba Cloud on intelligent manufacturing, digital marketing and other businesses.

Cloud Platforms Selected by Some Automakers

	Corporate Cloud (Incl. Private Cloud and Hybrid Cloud)	R&D Cloud		Manufacturing Cloud	Marketing Cloud	Overseas Cloud	Intelligent Computing Center
		Autonomous Driving Cloud	Telematics Cloud				
Geely	Baidu	Alibaba	Tencent	Baidu	Huawei, Tencent		Alibaba
FAW	Huawei	Huawei, Alibaba		Alibaba, Huawei	Alibaba		
Changan		Tencent	Tencent			Tencent	Baidu
Great Wall	Huawei	Alibaba	Huawei, Alibaba	Alibaba	Alibaba	Huawei	
NIO		Tencent	Tencent				
Xpeng	Alibaba	Alibaba	Alibaba				Alibaba
Li Auto	Baidu	Baidu	Baidu, AWS (Northwest)				ByteDance

Source: ResearchInChina

Without a doubt, the multi-cloud strategy offers benefits. It can integrate the advantages of various cloud platforms, enable refined business deployment, and reduce costs for companies, and also helps automakers to gain the core initiative in building cloud platforms and avoid being puzzled by the "soul" dispute. Yet the challenges of the multi-cloud strategy are also unavoidable. How to allocate storage/computing power among multiple clouds, cross-cloud data synchronization's dependency on bandwidth, and whether costs and network delays will have an impact are all urgent problems to be solved. Hence how to formulate a multi-cloud strategy is a problem for OEMs.

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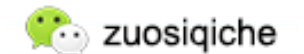
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