

AUTOSAR Software Industry Report, 2020

August 2020

STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications.

Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

Abstract

AUTOSAR Research Report: in the Era of Software Defined Vehicles (SDV), Will an OEM Acquire an AUTOSAR Software Firm?

Software defined vehicle (SDV) and architecture defined vehicle are hotly debated among insiders recently. Yet, the technical standard – AUTOSAR are essential for them.

AUTomotive Open System ARchitecture (AUTOSAR) is a worldwide development partnership of vehicle manufacturers, suppliers, service providers and companies from the automotive electronics, semiconductor and software industry. Since 2003, they have been working on the development and introduction of several open, standardized software platforms for the automotive industry. The "Core Partners" of AUTOSAR are the BMW Group, Bosch, Continental, Daimler, Ford, General Motors, the PSA Group, Toyota and the Volkswagen Group.

The 284 AUTOSAR Partners



Source: AUTOSAR

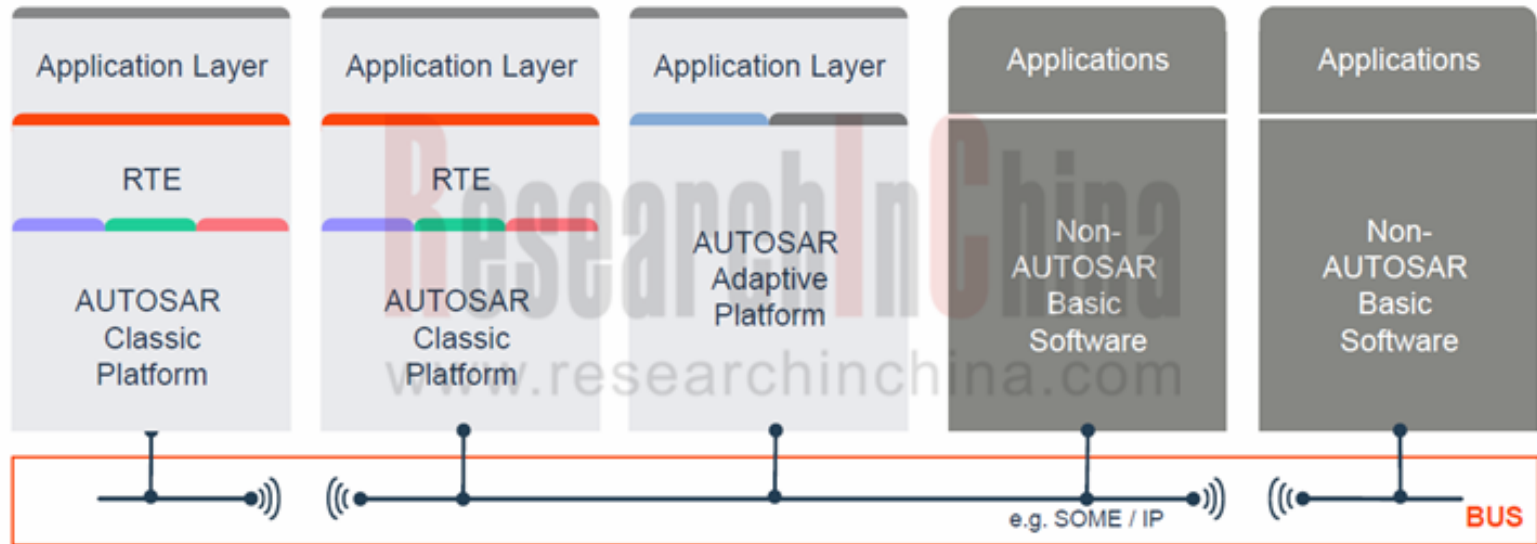
As of May 2020, AUTOSAR has accommodated 284 members, including some Chinese companies, like Great Wall Motor, FAW, Dongfeng Motor, HiRain Technologies, iSoft Infrastructure Software, SAIC and Neusoft Reach.

It seems that not many Chinese companies are on the AUTOSAR member list. Nevertheless, the Automotive Software Ecosystem Member Organization of China (AUTOSEMO), founded in July 2020, involves 9 automakers (FAW, SAIC, GAC, NIO, Geely, Great Wall Motor, Dongfeng Motor, FAW Jiefang and Xiaopeng Motors) and 6 suppliers (Neusoft Reach, HiRain Technologies, Shanghai Nasn Automotive Electronics, Shenzhen VMAX Power, Shanghai Re-Fire Technology and Horizon Robotics). Based on AUTOSAR, AUTOSEMO is striving to develop basic software architecture standards and an industrial ecosystem that are led by Chinese companies. AUTOSEMO will temporarily not include the AUTOSAR's application programming interface API standards (body, transmission, power, chassis, passive safety, HMI, multimedia and telematics) already under development in the business scope of its standard working groups. System software and testing standards of AUTOSEMO are consistent with AUTOSAR.

It can be seen that AUTOSEMO is basically compatible with AUTOSAR.

AUTOSAR standard aims to ensure standardization, reuse and interoperability of software. Currently, two complementary platforms, AUTOSAR Classic and AUTOSAR Adaptive (AP), have been introduced.

AUTOSAR standardizes two software platforms – Classic and Adaptive

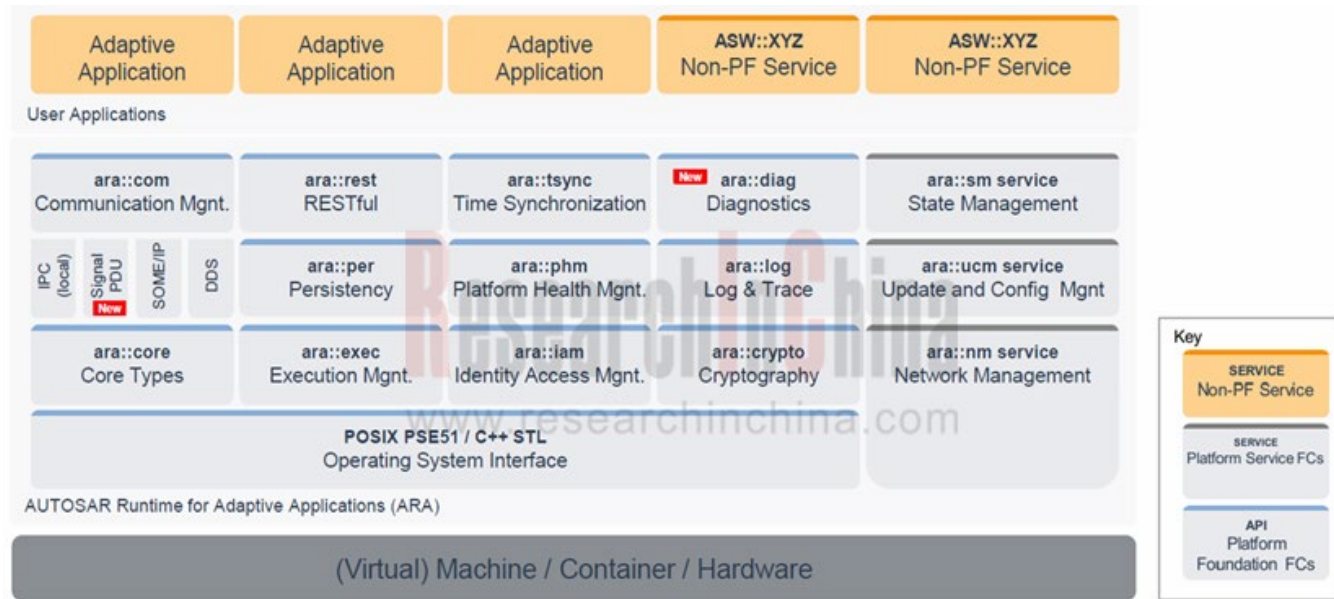


Common Bus Interface Specification

Source: AUTOSAR

Thereof, AUTOSAR Adaptive Platform is launched to meet needs for developing new-generation autonomous, intelligent connected, electrified vehicles, with features of high flexibility, high performance, HPC support, dynamic communication, and management update. The latest version is R19-11 released in in November 2019.

R19-11 is a layered architecture. It implements the AUTOSAR Runtime for Adaptive Applications (ARA) that consists of Foundation and Service, each of which is comprised of several modules with separate functions.

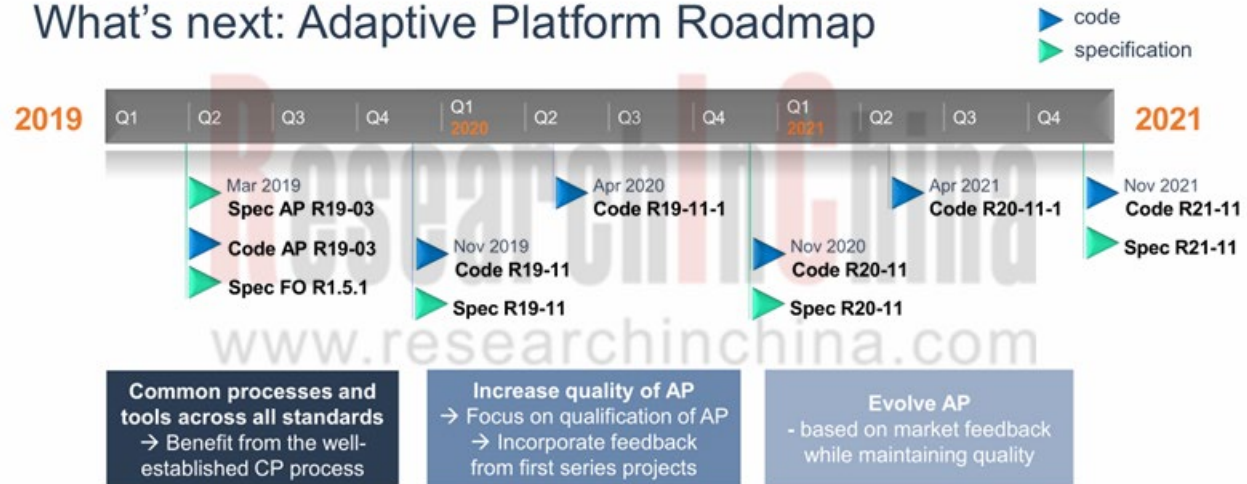


Source: AUTOSAR

The Service is composed of three functional modules: State Management (SM), Network Management (NM) and Update & Configuration Management (UCM); the Foundation incorporates: Communication Management (COM), Cryptography (Crypto), Log & Trace (Log), Diagnostics (Diag), Persistency (Per), Execution Management (Exec), Time Synchronization (Tsync), etc.. In addition, for OS in the Foundation, the Adaptive Platform requires OS should be those subject to POSIX OS standards, e.g., Linux mcos and QNX.

The future version of AUTOSAR Adaptive Platform is expected to pack 23 new features up to multiple requirements such as better interaction between AUTOSAR Classic and AUTOSAR Adaptive, and upgrade of Security and Safety. According to the roadmap, AUTOSAR will offer a new software architecture version every year.

What's next: Adaptive Platform Roadmap



Source: AUTOSAR

ADAS/AD Domain Controllers of Key Companies and Availability of AUTOSAR

AUTOSAR Adaptive Platform supports all future vehicle APPs, e.g., IVI, V2X, multi-sensor fusion and autonomous driving. AUTOSAR is a standard option of next-generation automotive basic software architecture, for most automakers, components suppliers, software providers and other companies.

ADAS/AD is an applied field of AUTOSAR Adaptive. All autonomous driving domain controllers rolled out by Bosch, Visteon, Continental, Huawei and more, support AUTOSAR Adaptive.

Vendor	Domain Controller Platform	Software Layer (OS/Middleware)
Visteon	DriveCore	AUTOSAR
		Adaptive AUTOSAR
		POSIX OS
Continental	In-car application server (ICAS1)	AUTOSAR
		Adaptive AUTOSAR
Bosch	DASy 1.0 base	AUTOSAR classic
	DASy 1.0 mid	AUTOSAR classic+Adaptive
	DASy 2.0	AUTOSAR Adaptive Posix OS
Veoneer	Zeus	AUTOSAR, Adaptive AUTOSAR
ZF	ProAI Gen1	AUTOSAR, Adaptive AUTOSAR or QNX
	ProAI Gen2	
	ProAI Gen3	
	ProAI Gen 4RoboThink	
Huawei	MDC domain controller	AUTOSAR, Adaptive AUTOSAR, Harmony OS
iMotion	iMo DCU3.0	AUTOSAR, Adaptive AUTOSAR
HiRain Technologies	ADC domain controller	AUTOSAR, Adaptive AUTOSAR
Neusoft Reach	CPDC-II domain controller	Self-developed NeuSAR2.0 (based on AUTOSAR)
	CPDC-III central computer	
Desay SV	IPU03 domain controller	AUTOSAR

Most of companies make partial use of AUTOSAR standard and few use in a full set, because AUTOSAR Adaptive came out late (the first version became available in 2017) and allows no mixed use of versions and AUTOSAR is complex and expensive with separate charge for every tool chain.

AUTOSAR has built a fairly complex technology system over a decade of development. Tool providers already develop support software to help OEMs accelerate application of AUTOSAR. Well-known AUTOSAR tool software developers include: WindRiver, EB, VECTOR, Mentor, ETAS, KPIT, Neusoft Reach, iSoft Infrastructure Software, HiRain Technologies, TaTa Elxsi and Autron. These AUTOSAR software firms also enrich product lines through mergers and acquisitions for greater competitive edges.

In 2014, Mentor Graphics announced to purchase the AUTOSAR assets, including the Mecel Picea AUTOSAR Development kit, from Mecel AB.

In September 2018, Vector acquired the Swedish embedded software specialist ARCCORE. This acquisition strengthens Vector's portfolio of products and services in the field of AUTOSAR.

In the coming age of software defined vehicles, AUTOSAR software developers are playing an increasingly important role. It is hard for OEMs to build veteran teams shortly to develop automotive software due to lack of talent, even though they already set up their software firms or software departments in no time. Investing or purchasing AUTOSAR software firms may after all be an option.

In May 2020, Evergrande High Technology Group led the investment of tens of millions of yuan in a Series A funding round of Novauto (Beijing) Co., Ltd.. The "Basic Software Support Platform", a product of the investee, carries the features: subject to ISO26262 ASIL D; support of AUTOSAR ADAPTIVE; compatibility with AUTOSAR Classic and ROS2; availability of middleware DDS for real-time data communication service; building of a unified, multi-QoS in-vehicle/V2V communication mechanism with high reliability, low latency and high scalability.

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