

Apr. 2023

# Digital Instrument Cluster Operating System Report: QNX commanded 71% of the Chinese intelligent vehicle cluster operating system market.

Amid the trend for the integration of digital cluster and center console displays, the requirements for SoCs and cluster operating systems are getting ever higher, especially the computing power of chips and the real-time performance of operating systems. The main digital cluster operating systems in the automotive market include BlackBerry QNX Neutrino, Wind River VxWorks, Linux RT-Linux, Siemens Nucleus, Green Hills Integrity and FreeRTOS, among which QNX Neutrino and RT-Linux are used most widely. According to the statistics of ResearchInChina, QNX swept

71% of the Chinese intelligent vehicle cluster operating system market in 2022; Linux took a 26% share. Intelligent vehicles refer to passenger cars with L2 and higher-level functions.

#### Market Shares of Intelligent Vehicle Cluster Operating Systems in China, 2022



Source: ResearchInChina



The virtue of Blackberry lies in its kernel stability and high security level. In the trend for integrated displays, QNX Neutrino dominates the digital cluster operating system market; RT-Linux remains superior due to free of charge and open source.

Cluster operating system providers tend to cooperate with chip vendors such as Qualcomm and Renesas, and bind operating systems with specific models of chips to form comprehensive solutions.

#### Features of Main Digital Cluster Operating Systems

System	Company	Openness	Real time	Safety	Charge model
Neutrino	BlackBerry	Semi- closed	High, microsecond -level	ASIL-D	Seat fee, license fee and service fee
VxWorks	Wind River	Open source	High, microsecond -level	ASIL-D	Development fee and license fee
RT-Linux	The Linux Foundation	Open source	Moderate, microsecond -level	ina.co	Free
Integrity	Green Hills	Non-open source	High	EAL6 + High Robustness	Development fee

Source: ResearchInChina

#### Some Solutions Combing Mainstream Chips with Cluster Operating Systems

Oper <mark>atin</mark> g Sys <mark>tem</mark>	Chip Solution	Models Supported	
QNX	Qualcomm SA8155P	Haval Shenshou, Haval H6S, LYNK OS N, WM W6, NIO ET7, ET5.	
	NXP i.MX8QM	Ford EVOS	
Linux	NXP i.MX8QM	Dongfeng Voyah Free	
	Atom X7-3960	BMW 3 Series	
	TI Jacinto 6	Li ONE	

Source: ResearchInChina



QNX Neutrino-based clusters have passed ASIL-D certification, and are equipped with optimized OpenGL-based graphics framework and GPU for multiple hardware SoCs.

Starting from 2023, cross-domain integration, for example, the integration of cockpit and autonomous driving domains, becomes available. BlackBerry QNX is developing a cross-domain integrated platform together with its partners Qualcomm and Nvidia. The hypervisor solution provided by BlackBerry QNX will run on chips, so that the chips can carry various domains.

BlackBerry QNX not only cooperates with global mainstream chip companies, but also joins hands with high-compute chip bellwethers in China. For example, its cooperation with SemiDrive has begun since 2020. In China, it has secured multiple designated projects in the fields of cockpit and autonomous driving. In addition, BlackBerry has teamed up with Rockchip, a Chinese digital cockpit chip company.

#### Architecture Diagram of QNX Neutrino



Source: Blackberry QNX



QNX is still the main operating system for digital LCD clusters of conventional OEMs (BMW, Audi, Geely, Chery, etc.).

OEM	Model	Cluster solution	Cluster supplier	Cluster OS
Renault JMEV Yi HUD + intelligent digital cluster wir display		HUD + intelligent cockpit digital cluster with dual display	BICV	QNX
HAVAL	Shenshou	V-type digital cluster with dual display	Continental	
	H6S	HUD (partial) + intelligent cockpit digital <mark>clu</mark> ster	Nobo Automotive Systems	
Ford	EVOS	LCD digital dashboard	Visteon	
Chery	Tiggo 8 Plus	Digital cluster with integrated display	Desay SV	
	JETOUR X90	Digital cluster with integrated display		
Geely	Yinhe L7	Digital dashboard	Yazaki	
Audi	Q7/A8	Digital dashboard	na.co	
	Π	Digital dashboard	Bosch	
SAIC Roewe	RX5	Cluster with Mini-LED integrated interactive sliding screen	-	AliOS
BMW Brilliance	3 Series	Digital cluster with integrated floating curved screen	Continental	Linux
Dongfeng Voyah	Free	Digital cluster	PATEO	Linux

#### Cluster System Solutions of Some Conventional OEMs

Source: ResearchInChina



Among the new models launched in recent two years, emerging carmakers prefer diversified cluster operating system solutions.

OEM	Model	Cluster Solution	Cluster Supplier	Cluster OS	
Tesla	Model 3/Y	Cluster and center console integrated solution	-	Linux	
NIO	ET7	HUD + Mini-LED backlight digital clu <mark>st</mark> er		QNX	
Leapmotor	C01/C11	Digital cluster	Leapmotor		
IM	L7	Cluster and center console integrated solution	Banma SmartDrive	AliOS	
Li Auto	ONE	Digital LCD cluster	Desay SV	Linux	
	WL9 C	HUD + cluster with Mini-LED safe driving interactive screen	HUD: Futurus Interactive screen: Jufei Optoelectronics	QNX	
HiPhi	HiPhi Z	HUD + cluster and center console integrated solution	Human Horizons		
		Source: ResearchInCh	ina		

#### Cluster System Solutions of Some Emerging OEMs



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