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Global and China Automotive Gateway Industry Report, 2021-2022

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Gateway Ushered in a Significant Transformation

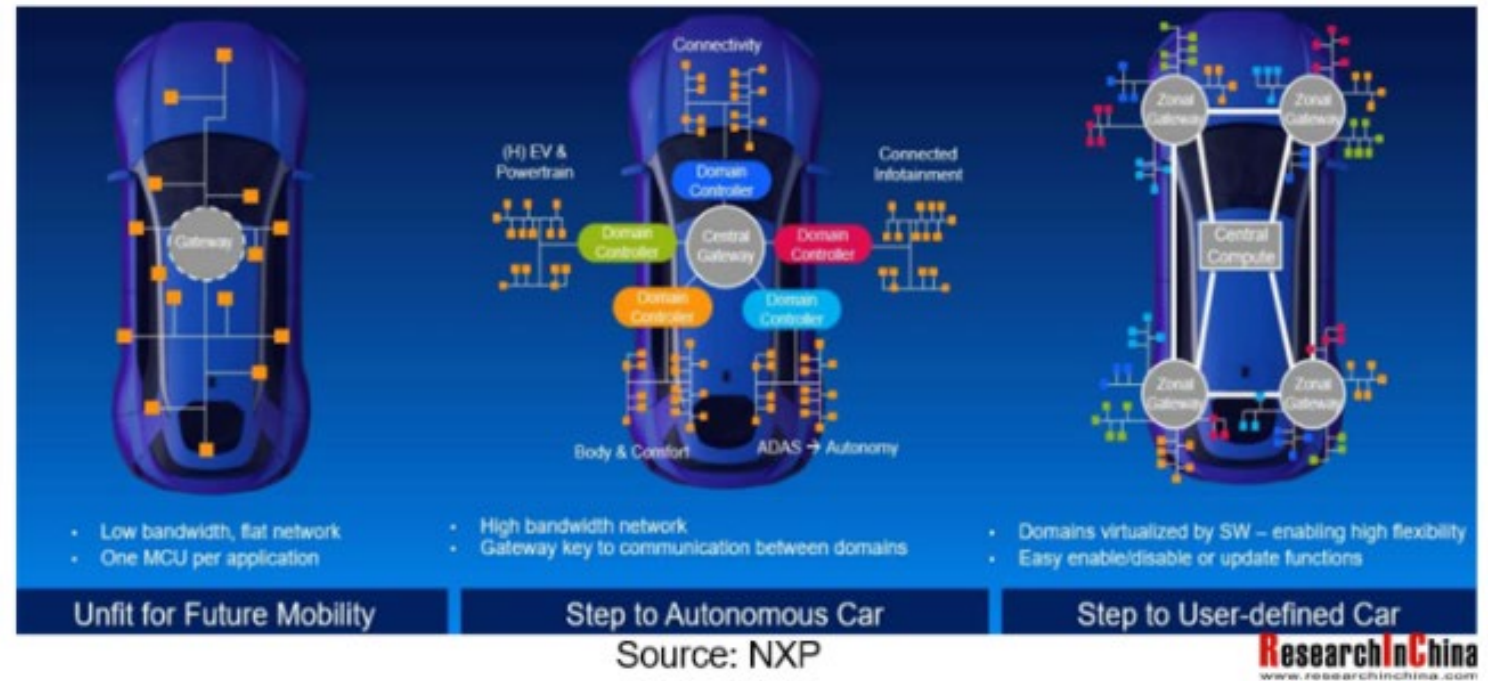
Automotive gateway industry research: the gateway ushered in a significant transformation while high-performance processors became the hot cakes.

Gateway serves as the core hub of vehicle network, handling functions such as data transmission, security prevention and control, and remote diagnostics.

As the E/E architecture evolves from distributed to centralized domain architecture, the central gateway also provides functions such as interconnection and processing of data between safety and functional domains (powertrain, chassis and safety, body control, infotainment and ADAS, etc.).

In the future, the central gateway will evolve into an HPC or central computer in the "Central Computer + Zone Controller" architecture, while the Domain Gateway will evolve into a Zonal Gateway.

Gateway at the Heart of E/E Architecture



Gateway Suppliers Introduced a Series of New Products

In line with market changes, the gateway suppliers introduced a series of new products

Since 2020, most Chinese OEMs make great efforts in functional domain architecture and achieve mass production in mid- to high-end models of Xpeng, FAW Hongqi, GWM, etc.

In accordance with the trend of change in automotive industry, automotive gateway suppliers, such as Inchtek, have launched a new generation of security gateway products.

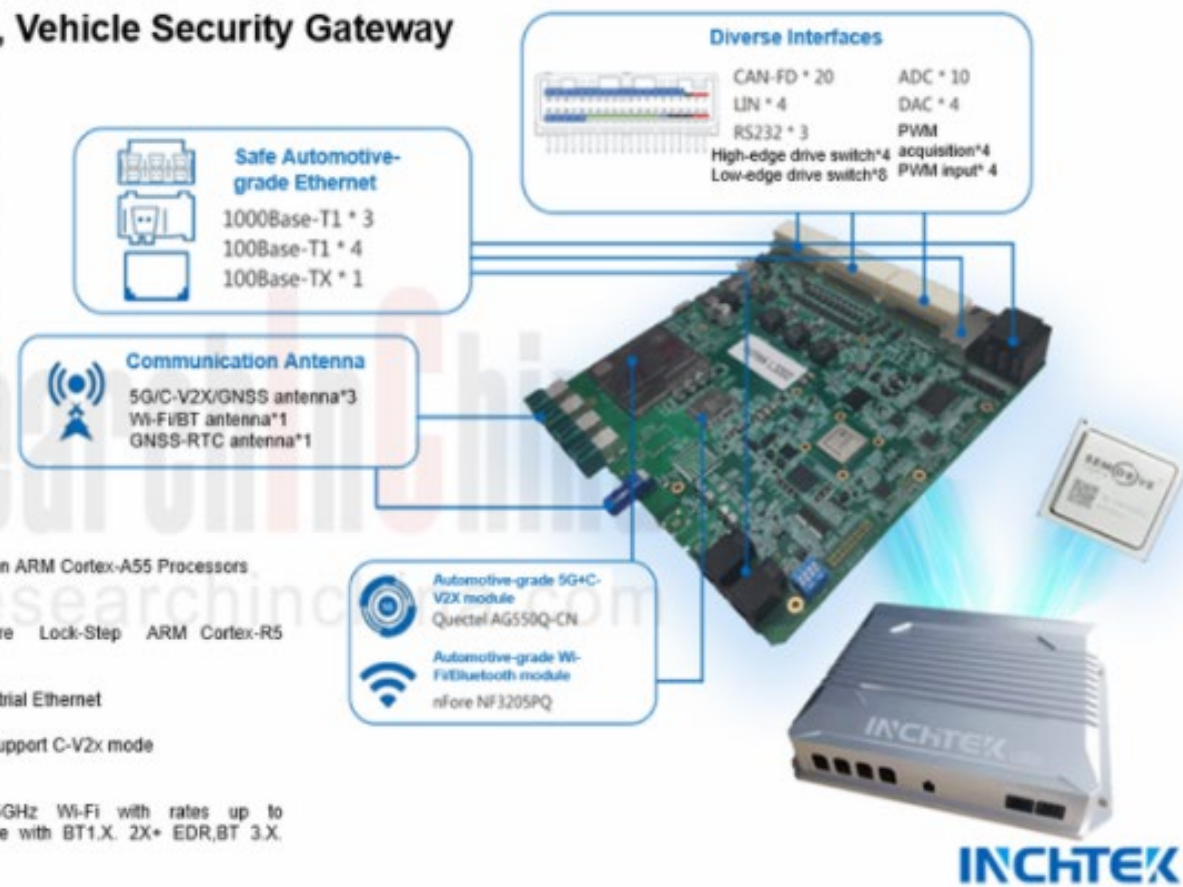
In August 2021, Inchtek released L3000, the first automotive-grade 5G autonomous driving in-vehicle safety gateway, which adopts G9 series central gateway processor from SemiDrive and integrates automotive-grade Ethernet, 5G/C-V2X, Wi-Fi/BT and high-precision GNSS/IMU modules, enabling the high-level real-time transmission of data such as C-V2X and 5G.

So as to further simplify the architecture, centralize the computing power, improve the communication transmission rate and OTA efficiency of the whole vehicle, some OEMs have started to try solutions such as domain convergence or HPC. Among them, the integration of body and Ethernet gateway has been the preferred solution.

INChTEK- L3000, Vehicle Security Gateway

- Fully automotive-grade hardware platform, which meets the functional safety design requirements;
- Multi-domain interconnection central gateway towards autonomous driving, supporting C-V2x and 5G;
- The L3000 leads the way in autonomous driving, providing a network environment with large bandwidth, low delay and high reliability, and meeting the requirements of security and strong computing power for automotive-grade service gateway applications.

- 4x High Performance Application ARM Cortex-A55 Processors
- 1x High Reliability Dual-Core Lock-Step ARM Cortex-R5 @800MHz Processors
- 7x on-board Ethernet, 1x Industrial Ethernet
- Support 5G NR SA and NSA Support C-V2x mode
- Support dual-band 2.4GHz/5GHz Wi-Fi with rates up to 433.3Mbps BT v4.2. Compatible with BT1.X, 2X+ EDR, BT 3.X, BT4.0, BT4.1



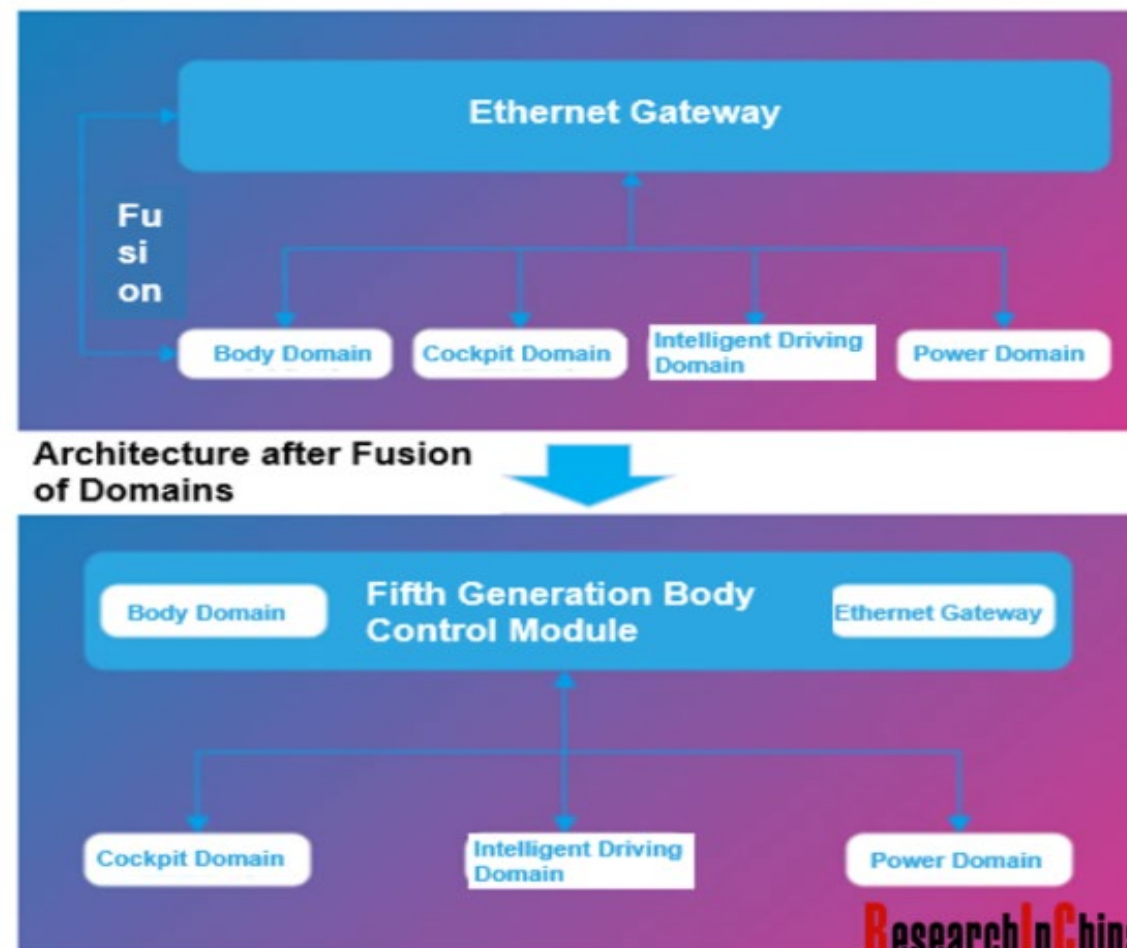
Source: Inchtek

Gateway Suppliers Introduced a Series of New Products

In December 2020, Ofilm rolled out the fifth generation of body domain controller, which integrates body domain with Ethernet gateway, reducing the delay of bus signal transmission and improving the depth of information sharing between systems.

Fifth-generation Body Domain Controller from Ofilm

Complete Vehicle Domain Control Architecture



Source: Ofilm; ResearchInChina

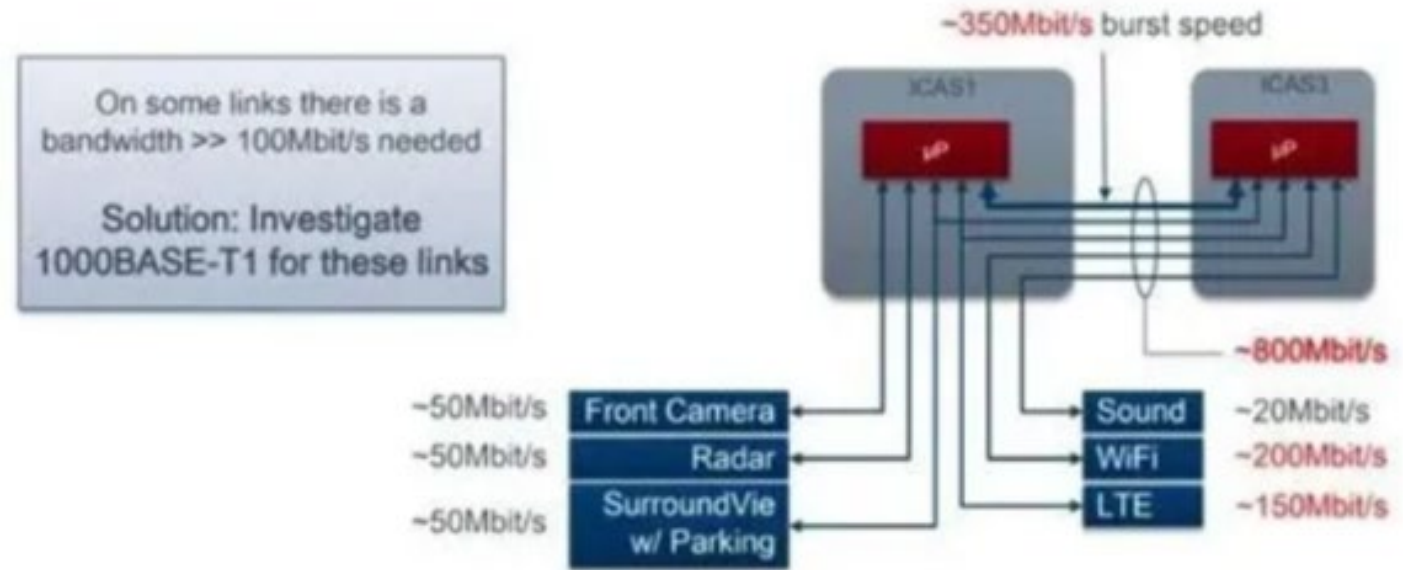
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Gateway Suppliers Introduced a Series of New Products

In 2020, the first generation of Continental's Body High Performance Computing Unit (Body HPC), as an in-vehicle application server (ICAS1), went into mass production on ID.3 of MEB-based platform at Volkswagen. In 2021, it was mass production again on ID.4.

The body HPC from Continental combines the previously separately implemented gateway function with the body controller function to act as a central gateway for all connected services, providing data processing and data security functions, as well as supporting vehicle OTA updates.

VW's ICAS Architecture Based on MEB Platform



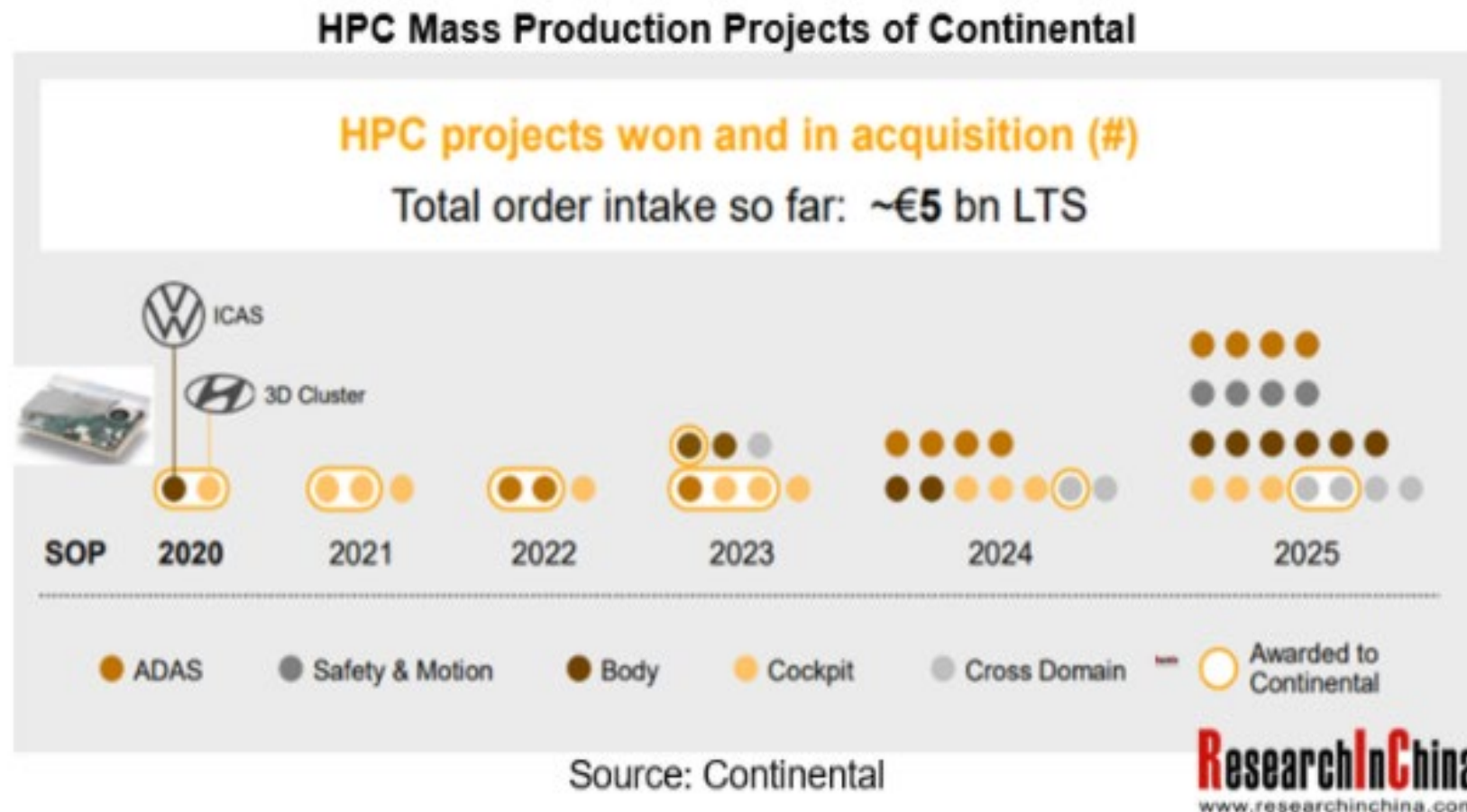
- The new E/E architecture is an enabler for a large number of new functionalities
- Most of the new functions are implemented in the ICAS ECUs
- Features like WiFi and LTE connectivity increases the bandwidth as well as Ethernet-based camera systems and other ADAS Sensors

Source: Volkswagen

Gateway Suppliers Introduced a Series of New Products

In 2021, Continental has also engaged in a strategic cooperation with GAC R&D Center, which will bring in high-performance central computing unit hardware and basic software platform development for GAC for creating a leading E/E architecture.

In the future, more features will be integrated into Continental's HPC, such as ADAS.



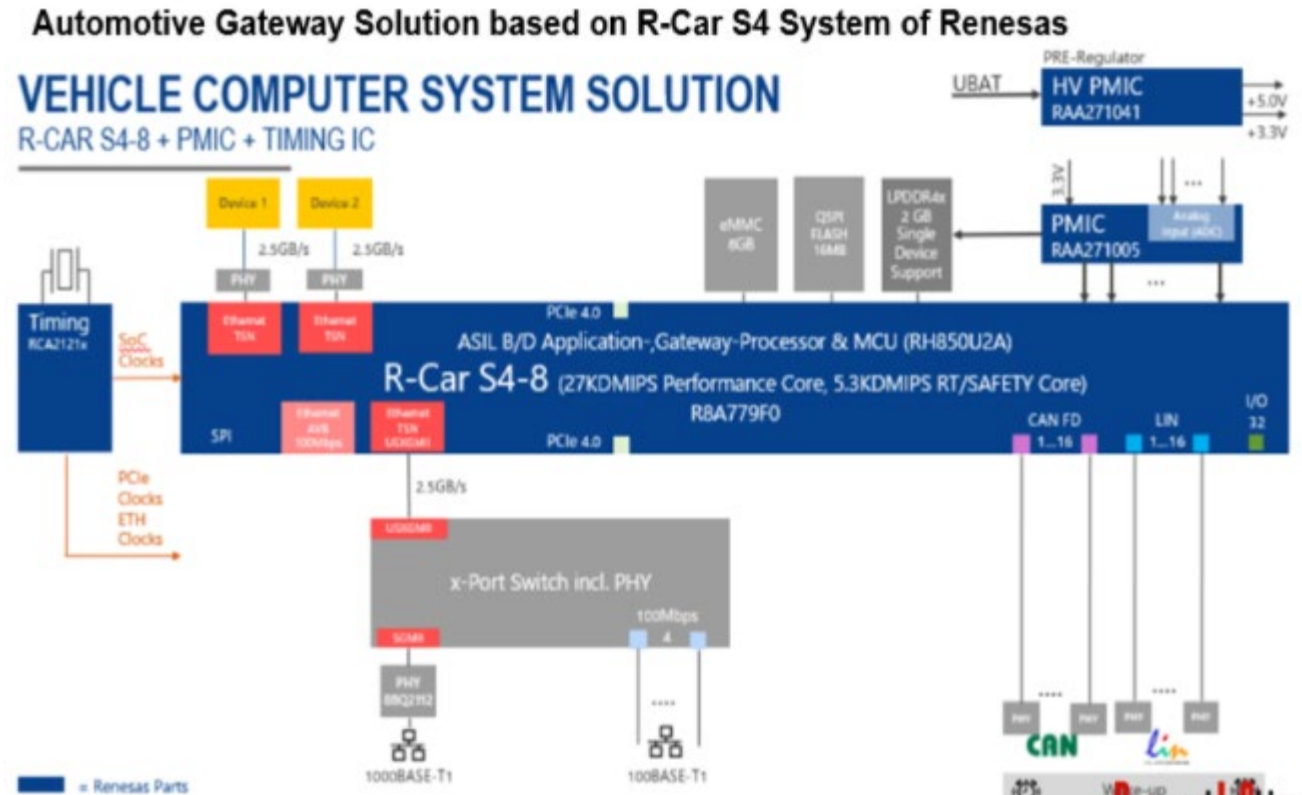
High-performance Gateway Processor Sparks New Round of "Battle"

High-performance Gateway Processor Sparks New Round of "Battle"

High-performance gateway processor, as the core of the SOA change for smart vehicles, has triggered a new round of "scramble".

- Since 2020, NXP, Renesas Electronics, TI, Infineon and other market-leading gateway processor suppliers have unveiled a new generation of gateway chips and solutions. In January 2020, TI released the DRA829V gateway processor based on Jacinto 7 processor platform;
- In March 2020, ST unveiled the SGP, a smart gateway platform targeted at automotive gateway and domain controller applications;
- In June 2021, the mass production of new S32G automotive network processor by NXP based on 16nm process;
- In October 2021, Renesas announced a new automotive gateway solution based on R-Car S4 system;
-

Among them, the above-mentioned Volkswagen ID series, which applied Continental's body HPC, uses the high-performance R-Car M3 system-on-chip (SoC) from Renesas Electronics, while the novel gateway solution developed based on the R-Car S4 system solution with SoC and power management IC will be used for next-generation automotive computers, communication gateways, domain servers and application servers.



Source: Renesas

High-performance Gateway Processor Sparks New Round of "Battle"

The second-generation body HPC, a product produced by collaboration between Continental and GAC, is equipped with the new S32G automotive network processor based on 16nm process, the latest mass production of NXP.

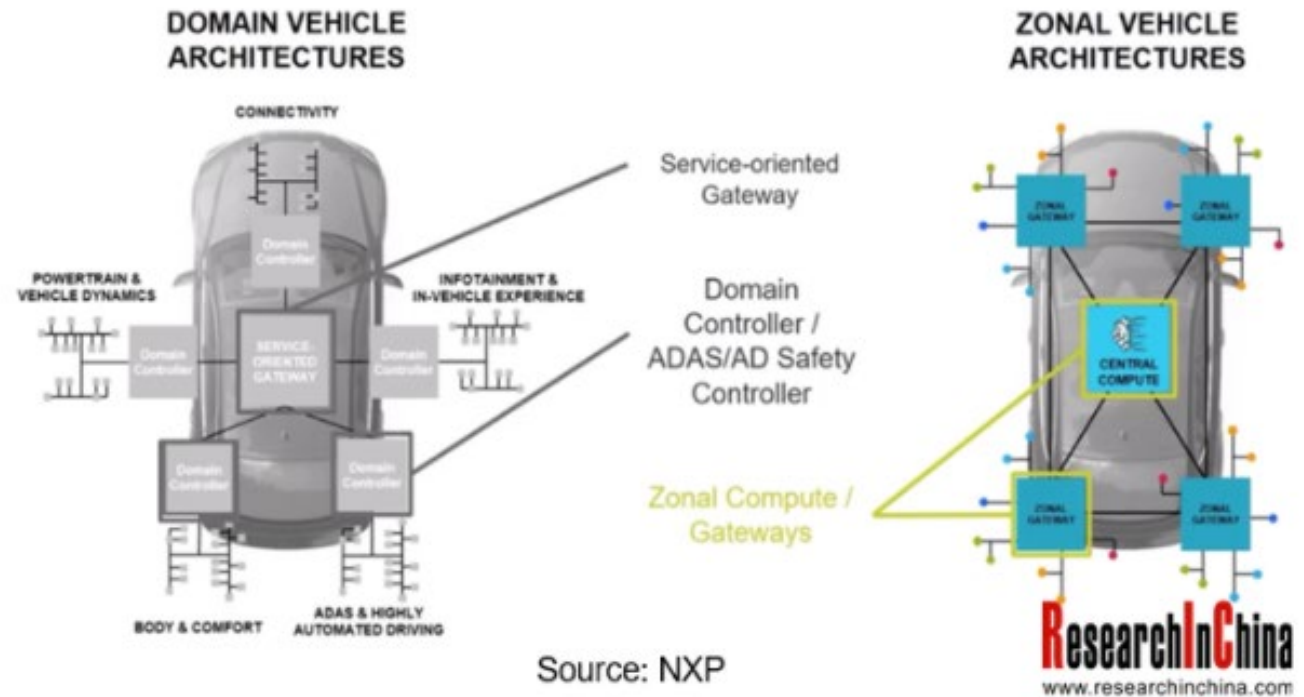
NXP S32G processor adopts 16nm process and has more than 10,000DMIPS of computing power which shows over 10 times of computing power than traditional NXP gateway chip. It combines ASIL D-level functional safety, hardware HSE encryption module and dedicated communication accelerator for service gateway, domain controller and co-processor of security domain.

In 2020, SemiDrive, a Chinese company, released G9X central gateway chip; based on G9X, it has joined hands with FAW General Research and Development Institute to launch "Longchi" central gateway platform, which will be installed in models such as Hongqi SUV and intelligent minibus.

In 2021, SemiDrive has launched G9Q, upgrading the single-core CPU to quad-core CPU so as to further enhance its computing power.

Gateway Solution of NXP S32G Vehicle Network Processor

THE VERSATILE USES OF THE S32G VEHICLE NETWORK PROCESSOR



Currently, the gateway industry is undergoing a great evolution, and all involved players are racing to grab the dividends of "software-defined vehicles". In this campaign, the gateway processor in the core is expected to become the focus of competition. At the same time, with the application of higher computing power, lower power consumption and lower cost gateway chip, it will certainly accelerate the advent of the era of unmanned vehicles.

Major Players in Automotive Gateway Industrial Chain

Gateway Security Software Enterprises



Gateway Chip Enterprises



Gateway Suppliers



Source: ResearchInChina

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