Introducing the S32G Vehicle Network Processor

January 6, 2019
VEHICLE BIG DATA OPPORTUNITIES

44 MILLION CONNECTED VEHICLES
Shipped in 2019*

4+ TERABYTES VEHICLE DATA
Generated per hour**

49% 2019
73% 2025

CONNECTED VEHICLE PENETRATION

Represents global data
Sources: *Strategy Analytics, 2019; **ABI Research, 2018 – L5 Autonomous Vehicle
Vehicle Data Unlocks New Opportunities and Experiences

New Revenue Streams
Service subscription model, insurance revenue

New Business Opportunities
Usage-based insurance, Mobility-as-a-Service

Enhanced Safety and Security
Fault, crash and intrusion detection and prevention

Improved User Experiences
Personalization and post-sale feature upgrades

Reduced Costs
Predictive maintenance and fleet management
New Data-Driven Services Require New Capabilities

- End-to-end security between vehicle and cloud with PKI* support
- Gigabit Ethernet, Packet Acceleration, Time Sensitive Networking
- Edge Data Analytics and Storage
- Higher Level of Functional Safety

*PKI: Public Key Infrastructure
Service-oriented Gateway
Secure central access to connected vehicle data

A new class of gateway based on Service-oriented Architecture (SoA)

Lowers cost to develop, deploy, and integrate software

Supports rapid deployment of new services through OTA updates

Requires higher performance processing and networking
Service-oriented Gateways Require ~10x* Processing and Networking Performance

**Processing**
- ~1000 DMIPS
  - New services, ECU consolidation, edge data analytics, data reduction

**Networking**
- 100 Megabit Ethernet
  - Vehicle data growth – more sensors, AD/ADAS, Infotainment
- 1+ Gigabit Ethernet

**Safety**
- ASIL B
  - Higher safety – ability to recover from faults (fail operational)
- ASIL D

**Security**
- HSM
  - Public Key Infrastructure support, side-channel protection against hackers
- HSE + ISOLATION

*10x relative to automotive gateway microcontrollers in vehicles today*
Introducing the S32G

NXP Unlocks the Full Potential of Vehicle Data with S32G Automotive Network Processors

Enables new service-oriented gateways to rapidly deploy new services and upgradable features in future cars

Supports shift toward domain-based vehicle architectures that require 10x increase in processing and networking

Helps reduce software complexity with its modern multicore architecture with hardware acceleration

In keeping with NXP’s long-term automotive reputation, S32G delivers new levels of functional safety and security
S32G is a New Type of Automotive Processor:
Vehicle Network Processor

**Processing**
- Lockstep Microcontrollers
- Cluster Lockstep Microprocessors
- Automotive Networks Acceleration
- Ethernet Packet Acceleration

**Networking**
- 20 x CAN/CAN FD Interfaces
- 4 x Gigabit Ethernet Interfaces
- PCI Express Gen 3 Interfaces

**Safety & Security**
- ASIL D Functional Safety Support
- Advanced Hardware Security Engine
S32G: Bringing Together Automotive and IT Worlds to Enable Disruptive Opportunities

### Technology Convergence

- **Automotive Networking**
  - CAN/LIN/FlexRay Interfaces
  - Real-time Processing
  - Gateway
  - Gigabit Ethernet
  - HLOS/Virtualization
  - Applications/Services

### Edge-to-Cloud Processing

- **Automotive Sensors**
- **Service-oriented Gateway**

### New Opportunities

- **Vehicle Health**
- **Usage-Based Insurance**
- **Over-the-Air Upgradeable Vehicles**
- **Other Monetization Opportunities**
The Versatile Uses of the S32G Vehicle Network Processor

**DOMAIN VEHICLE ARCHITECTURES**

- POWERTRAIN & VEHICLE DYNAMICS
- BODY & COMFORT
- ADAS & HIGHLY AUTOMATED DRIVING
- SERVICE-ORIENTED GATEWAY
- CONNECTIVITY
- INFOTAINMENT & IN-VEHICLE EXPERIENCE

**ZONE VEHICLE ARCHITECTURES**

- CENTRAL COMPUTE
- ZONAL GATEWAY

**Service-oriented Gateway**

- Domain Controller / ADAS Safety Controller

- Zonal Compute / Gateways
Summary

The S32G processor allows carmakers to unlock the value of vehicle data, enabling new revenue streams.

S32G delivers advanced levels of performance, security, ASIL D safety and system integration.

S32G enables edge-to-cloud processing as well as ECU consolidation to simplify vehicle architectures.
✓ S32G Reference Design Board (RDB)
✓ Software Enablement
✓ Demonstrations

Carmakers
Proof of concept
Benchmarking
Vehicle data insights
New services deployment

Application Developers
Innovation platform
Software development
Test and validation
Demo showcase

Cloud & Service Providers
Symbiotic compute
Over-the-Air (OTA) updates
Machine learning deployment
Edge service deployment

Accelerating Transformation Across the Automotive Ecosystem