

THE EVOLUTION OF AUTOMOTIVE PROCESSING

NEW GROWTH OPPORTUNITIES IN THE
AUTOMOTIVE EMBEDDED MARKET

NXP Investor Teach-In
MAY 12, 2021



SECURE CONNECTIONS
FOR A SMARTER WORLD

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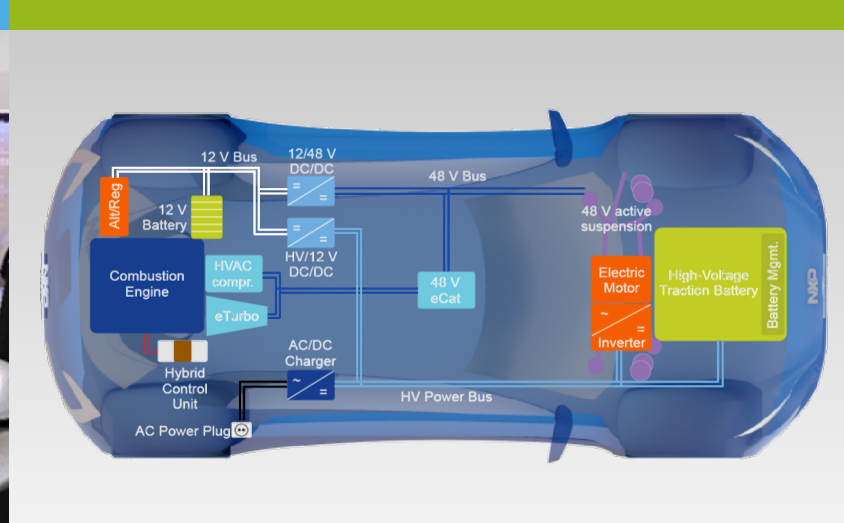


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NXP AUTOMOTIVE PROCESSORS

FOUNDATIONAL TO THE THREE PILLARS OF AUTO OEM DIFFERENTIATION



SAFETY



ELECTRIFICATION



CONNECTED CAR



VEHICLE INFRASTRUCTURE EVOLVES AS A PLATFORM

CORE VEHICLE PLATFORM

Focused on safe control and driver comfort

Auto quality: Robust, safe, secure and reliable

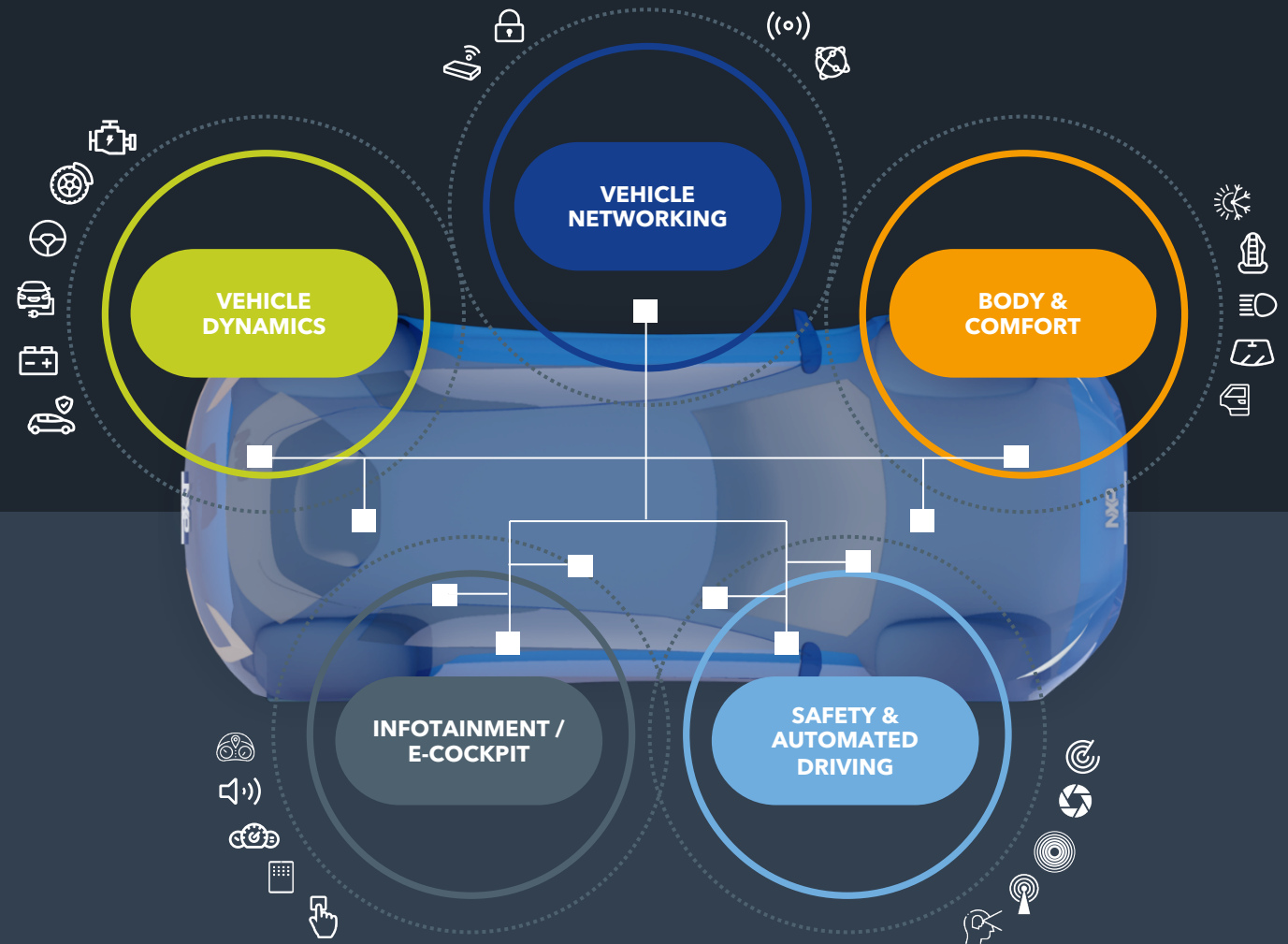
Foundational across all types of vehicles

OPTIONAL AND VEHICLE DEPENDENT

Regularly upgraded

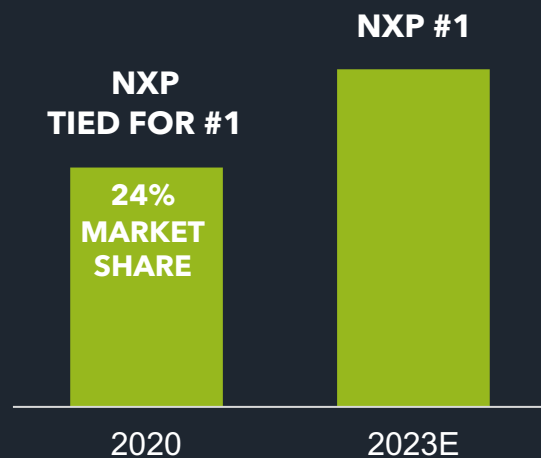
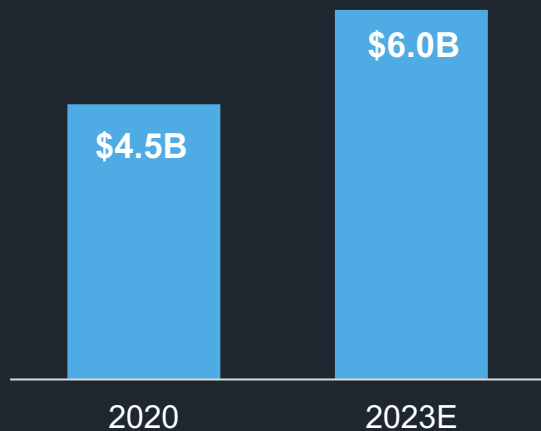
Optional features across a vehicle line

Fashion and time sensitive

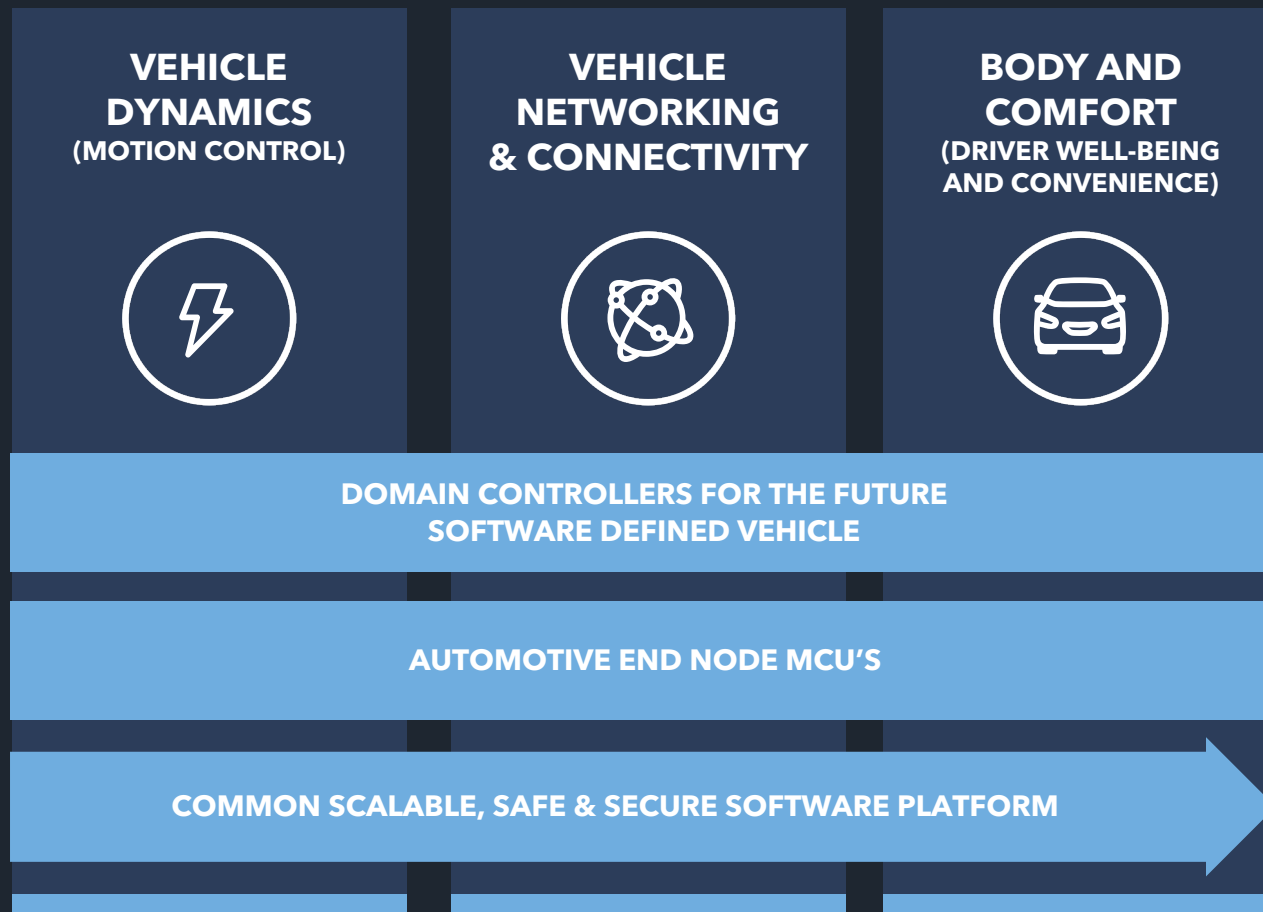


NXP LEADS EVOLUTION OF VEHICLE INFRASTRUCTURE PROCESSING

VEHICLE INFRASTRUCTURE PROCESSOR TAM 10% 3 YEAR CAGR



NXP VEHICLE INFRASTRUCTURE PROCESSING FOCUS



NEW FUNCTIONALITY INTEGRATION BECOMES INCREMENTALLY MORE CHALLENGING



	YEAR 2000	YEAR 2010	YEAR 2020
TOTAL PROCESSORS PER CAR	~10	~30	~45
LINES OF CODE	4K	10M	100-200M
COPPER WIRING	20m	0.5Km	1.2Km
WEIGHT OF WIRING	10Kg	30Kg	75Kg

LOGICAL AND PHYSICAL TRANSITIONS ACCELERATE MPU & MCU OPPORTUNITY

TODAY

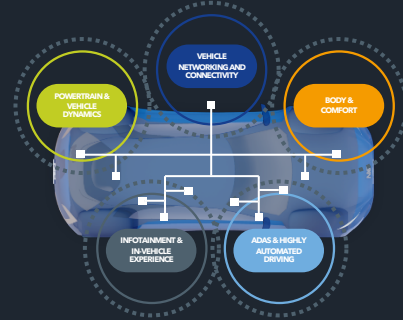
TRADITIONAL
FLAT ARCHITECTURE



2025+

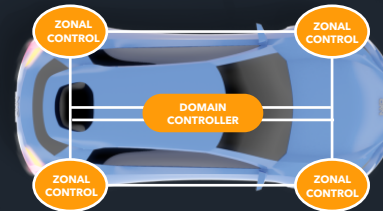
DOMAIN PLUS ZONALIZATION
PLATFORMS

FUNCTIONAL SOFTWARE DOMAINS



+

ZONAL TOPOLOGY



1

DOMAIN FOCUS: SCALABLE AND CENTRALIZED SOFTWARE DEVELOPMENT

1. Flexible & scalable software environment
2. Efficiently supports the user defined vehicle
3. Centralized OTA, easily upgradable Software

+

2

ZONAL FOCUS: SIMPLIFIED WIRING AND CONNECTIVITY

1. Dramatically reduced wire routing and cable costs
2. Flexible data monetization
3. Easily upgradable Hardware

NXP OPPORTUNITY

S32 FAMILY

S32G MPU

Secure Networking
Domain Processor

S32S MPU

Safe Real Time Multi
Application Domain
Processor

S32K3/5 MCU

Zonal Network Control
Processors

S32K1 MCU

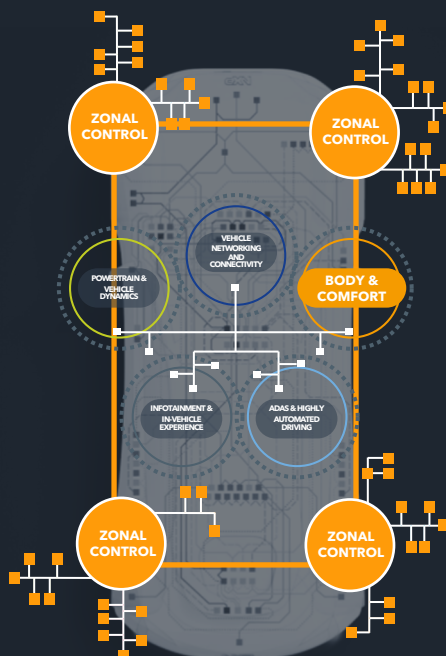
Low Power Secure Smart
Actuation End Nodes

LOGICAL AND PHYSICAL TRANSITIONS ACCELERATE MPU & MCU OPPORTUNITY

TODAY TRADITIONAL FLAT ARCHITECTURE



2025+ DOMAIN PLUS ZONALIZATION PLATFORMS



BODY DOMAIN AND ZONE EXAMPLE

TWO PARALLEL ARCHITECTURAL CHANGES

1

DOMAIN FOCUS: SCALABLE AND CENTRALIZED SOFTWARE DEVELOPMENT

1. Flexible & scalable software environment
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3. Centralized OTA, easily upgradable Software

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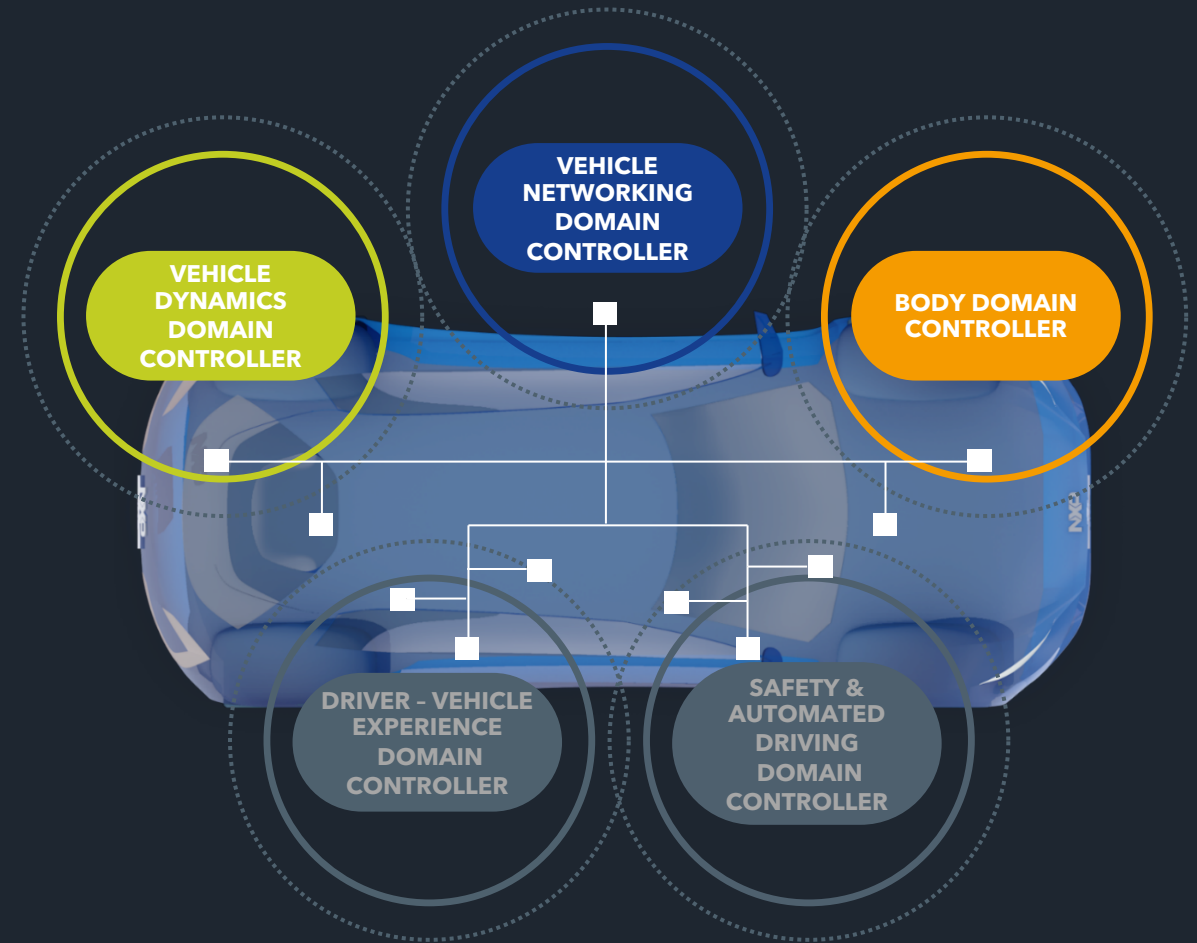
Zonal Network Control
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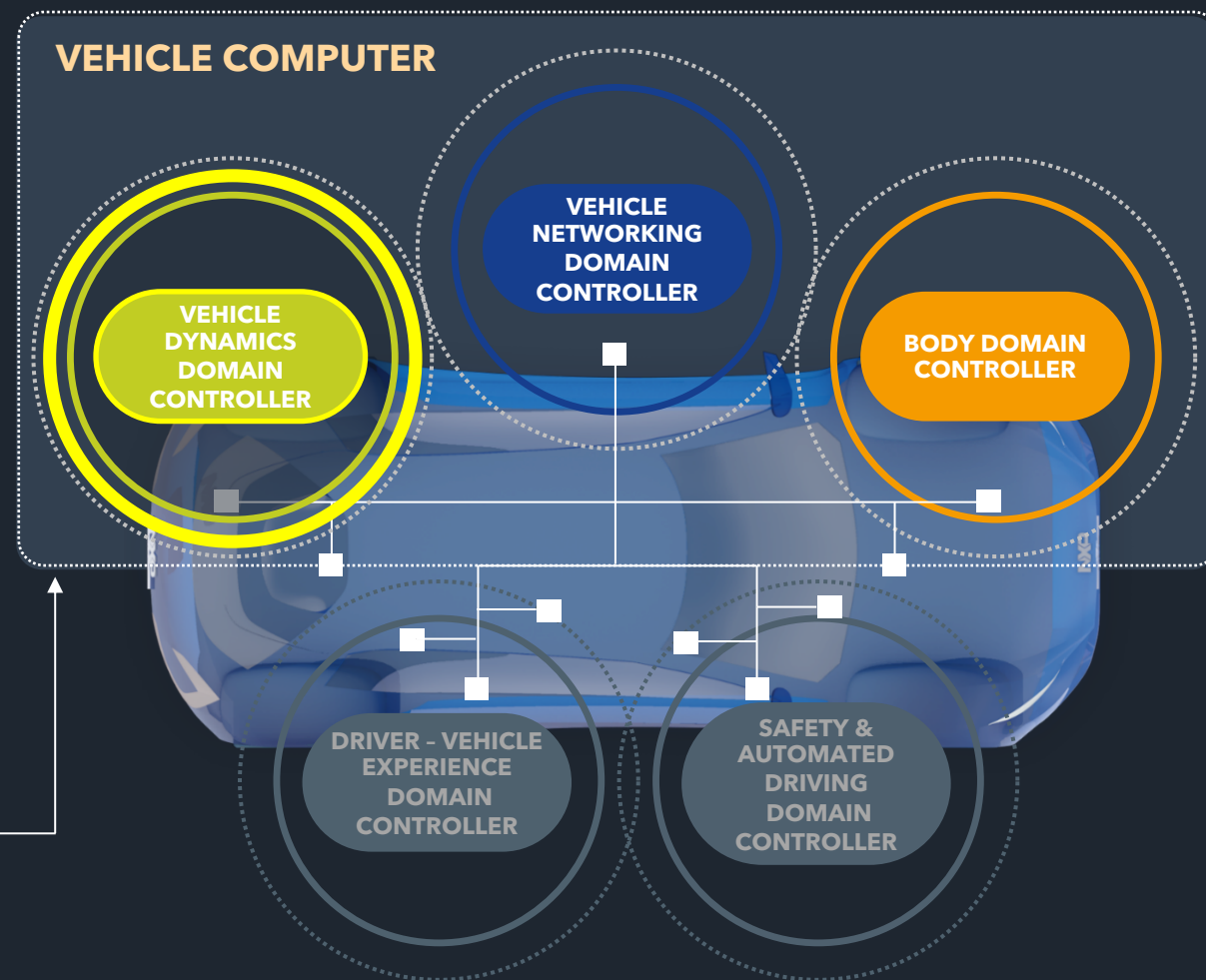
DOMAIN CONTROLLERS SIMPLIFY SOFTWARE ARCHITECTURE

- 1 Control software “Up-Integrated” into powerful multi application safe domain controllers
- 2 Actuation relocated to ultra low-power MCUs
- 3 All OTA and update features handled in central domain controllers allowing new features and fixes to be easily distributed
- 4 Initial implementations use five traditional domains (shown)

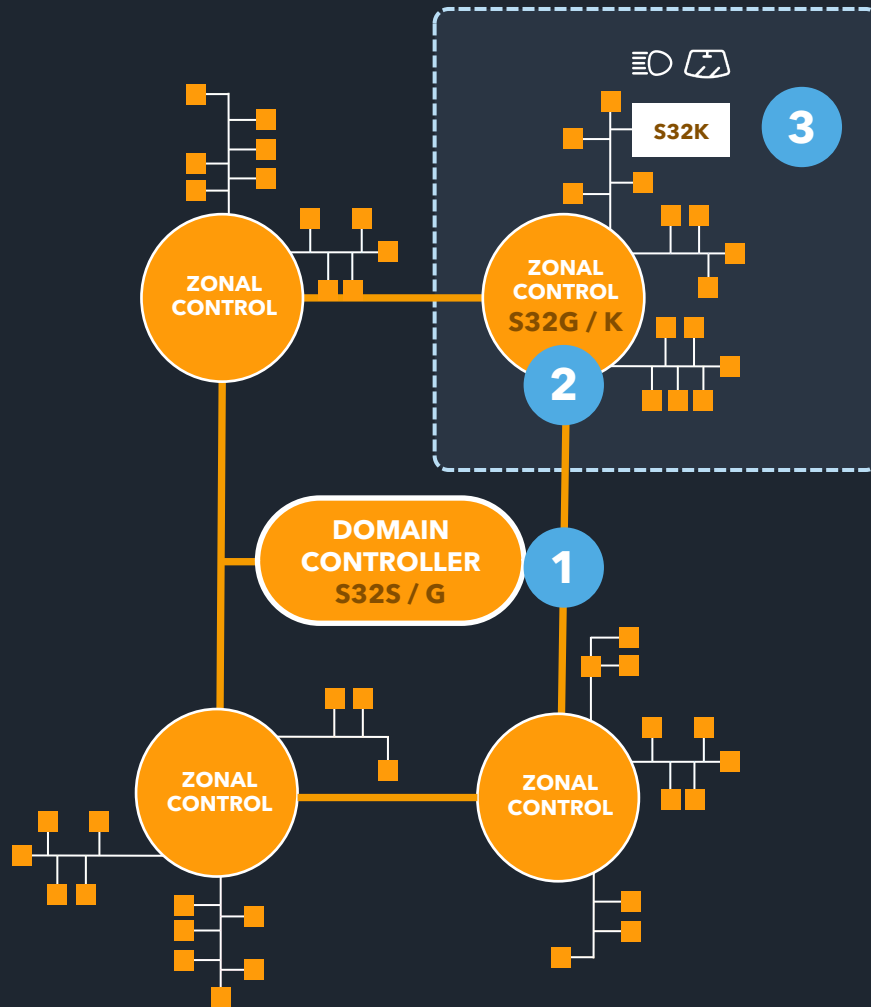


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- 3 All OTA and update features handled in central domain controllers allowing new features and fixes to be easily distributed
- 4 Initial implementations use five traditional domains (shown)
- 5 Long term, applications will integrate, dynamics, networking and body into a single cross (X-domain) **“vehicle computer”** using even more powerful auto computing platforms



ZONAL TOPOLOGY SIMPLIFIES WIRING AND REMOVES COST



- 1 Ethernet bus routes communication from domains to physical zones of the vehicle
- 2 Local zone control processors “off-ramps” the high speed communication and routes to local standard automotive connectivity bus (CAN, LIN etc.)
- 3 End node MCU’s/smart actuators take on physical function. (Wipers, switch panel, lighting etc.)

NXP sees significant growth opportunities in both Zonal control and Edge processors with our S32 product lines

NXP ZONE CONTROLLER REFERENCE PLATFORM



VALUE SHIFT FROM COPPER TO MORE SAFE AND SECURE MPUS & MCUS

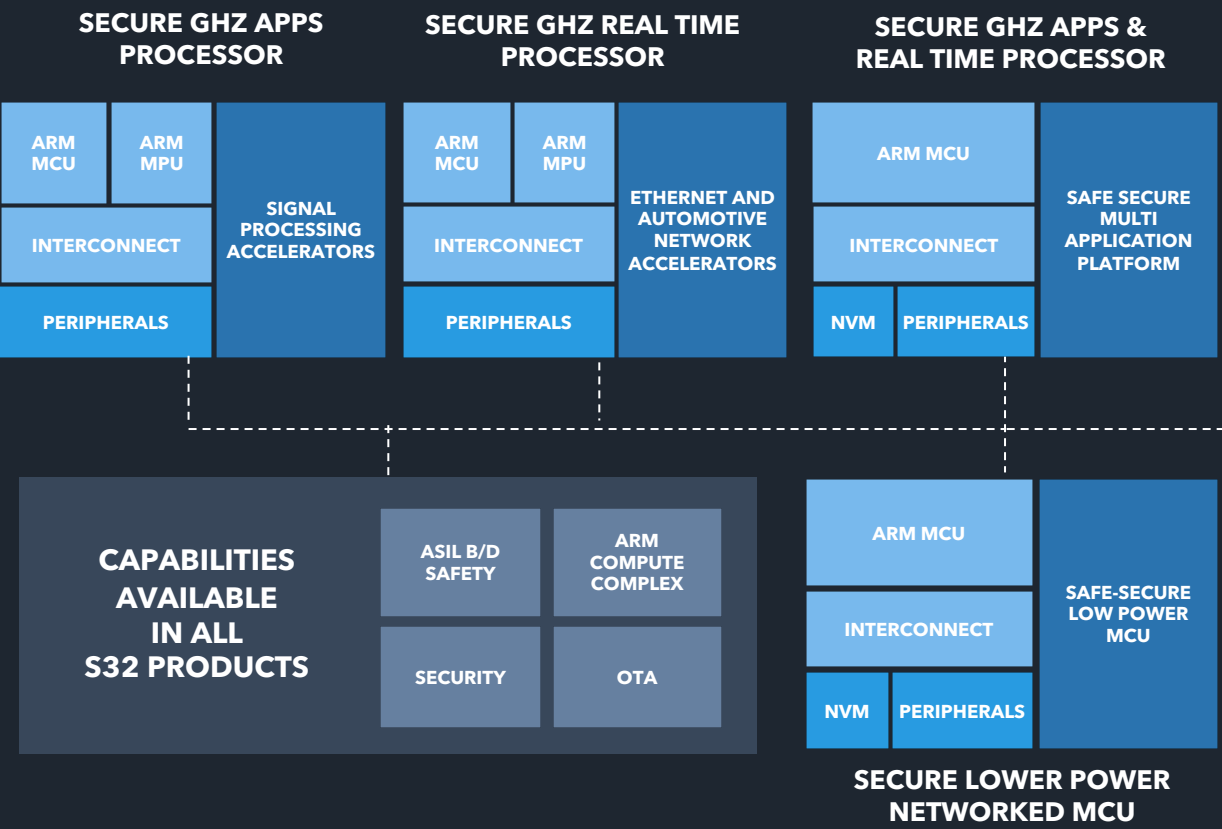


	YEAR 2000	YEAR 2010	YEAR 2020	YEAR 2030
TOTAL PROCESSORS PER CAR	~10	~30	~45	~60
DOMAIN/ZONAL CONTROLLERS			EMERGING	~4
LINES OF CODE	4K	10M	100 - 200M	500 - 1,000M
COPPER WIRING	20m	0.5Km	1.2Km	COPPER WIRING REDUCED ~50%
WEIGHT OF WIRING HARNESS	10Kg	30Kg	75Kg	WEIGHT REDUCED ~50%
DATA GENERATED PER DAY	MB's	2-3GB	50GB	10-12TB
DATA TRANSFER PER DAY	MINIMAL	50 MB	1-2GB	40-50GB

S32 PORTFOLIO UNIQUE CAPABILITIES AND BREADTH

NXP STANDARD AUTOMOTIVE PLATFORM

40nm, 28nm, 16nm & 5nm Technologies



NXP AUTO PROCESSOR MARKET CAPABILITY

Deep application understanding

Leadership automotive safety

- ASIL-D safety capability for 10+ years
- System-level safety expertise

Best automotive networking

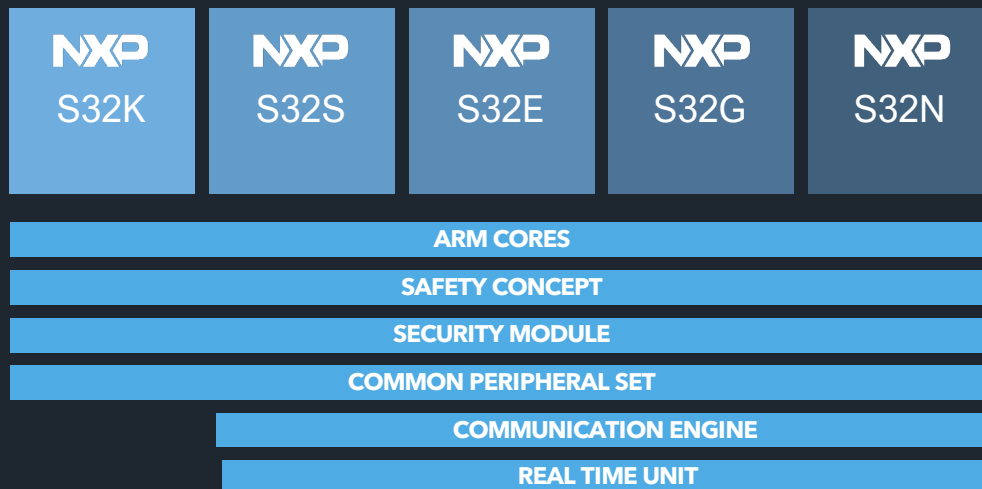
- 4th generation gateway
- Unique combination: enterprise networking compute & IP

World-class security

FULLY SCALABLE & CONSISTENT SOFTWARE DEVELOPMENT PLATFORM ACROSS MPU AND MCU SOLUTIONS

S32 PORTFOLIO UNIQUELY POSITIONED TO SERVE DOMAIN, ZONAL, END NODES

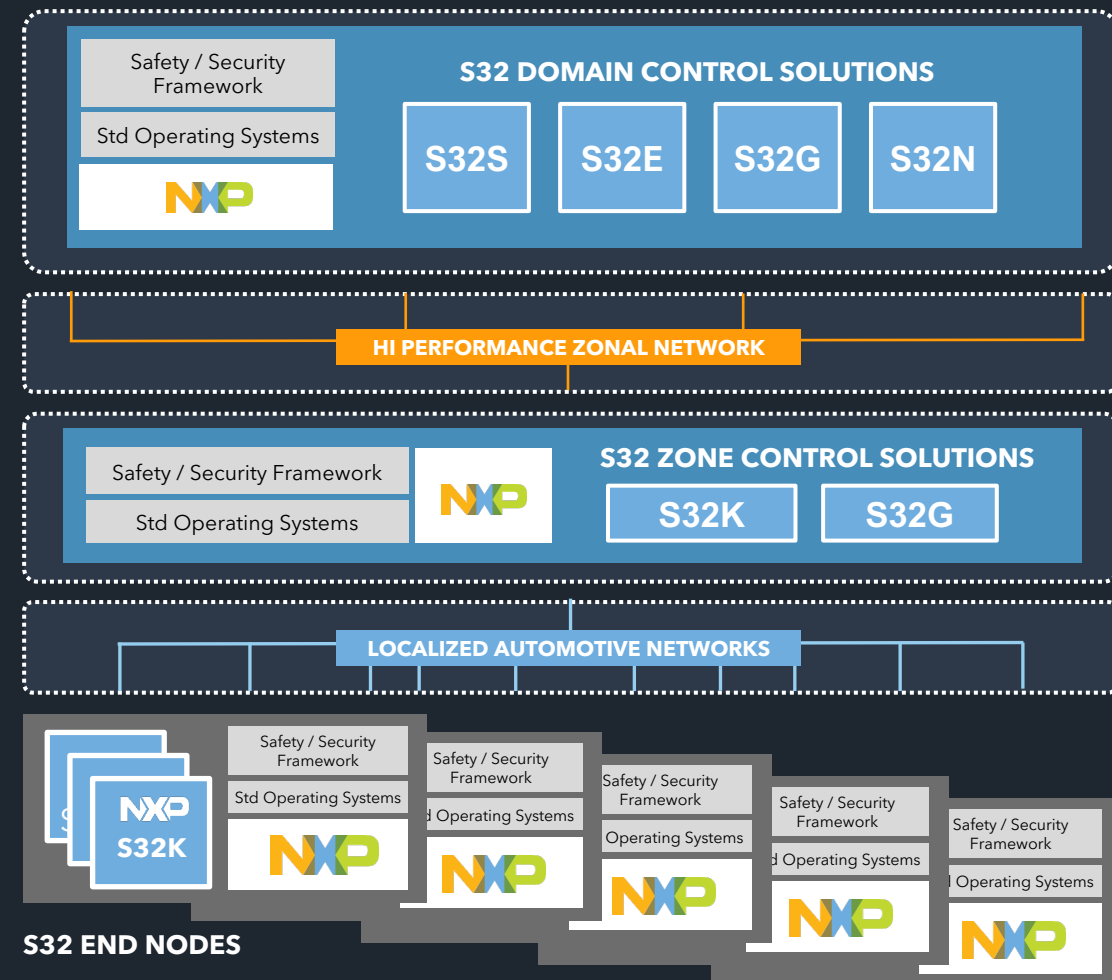
S32 PRODUCTS OPTIMIZED FOR EACH DOMAIN



S32 FAMILY SUCCESS DRIVERS

1. Common software platform across domains and edge processing
2. Common safety and security architecture across all products
3. Common inter-processor communications across platform
4. Full automotive quality and reliability for ALL apps processors and MCU family's

BROADEST COVERAGE OF OPPORTUNITY



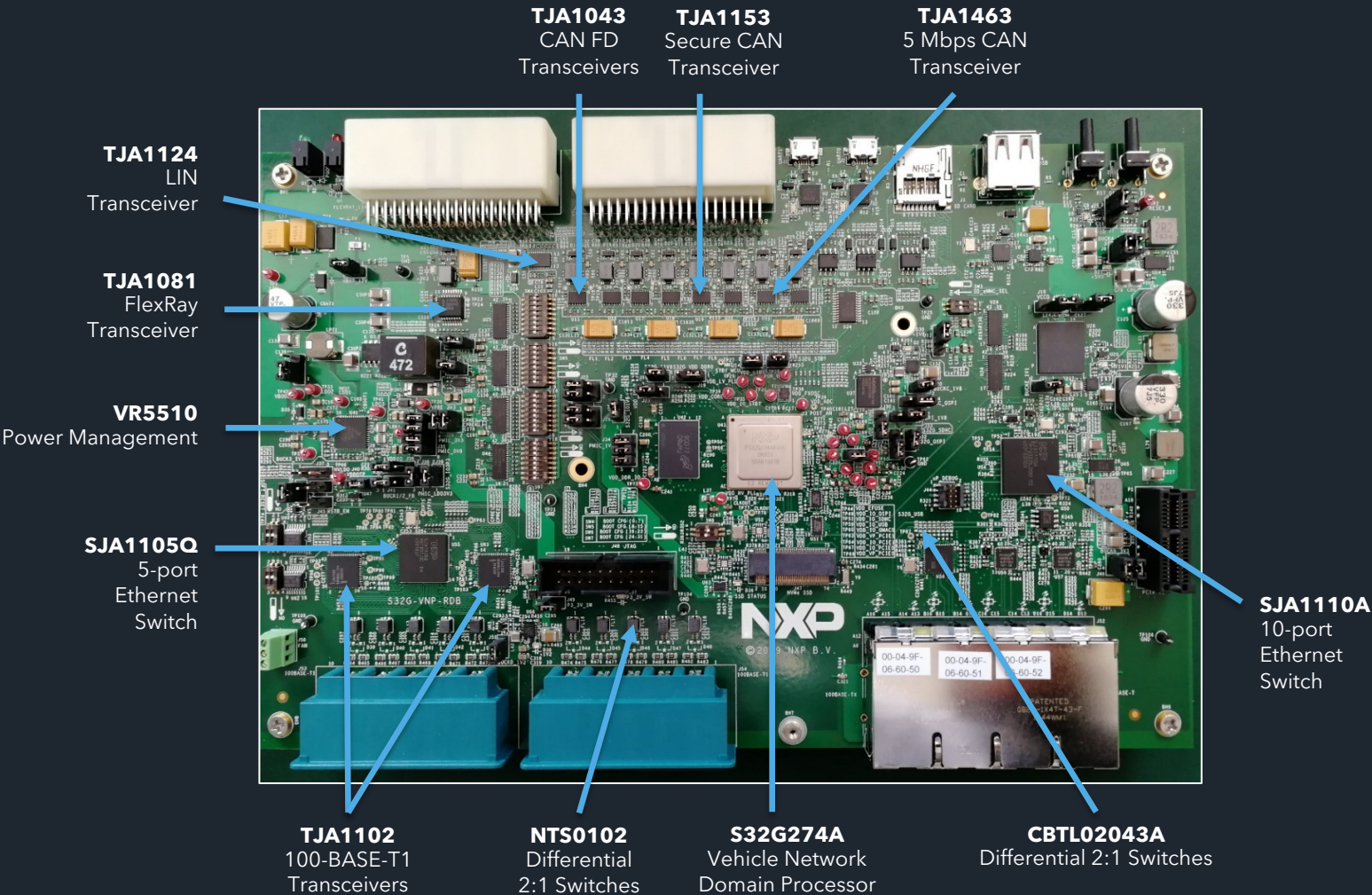
NETWORKING DOMAIN CONTROL REFERENCE SOLUTION DRIVES HIGH VALUE NXP ATTACH

29

UNIQUE NXP DEVICES

~\$40

ATTACHED CONTENT



S32 PORTFOLIO TO ACCELERATE GROWTH OF CORE AUTOMOTIVE PROCESSING

STRONG 10% CAGR MARKET

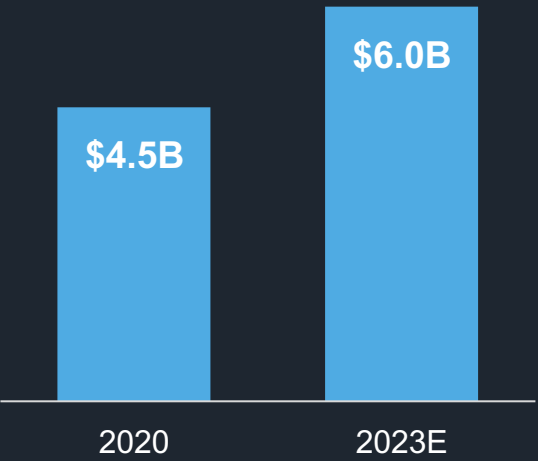
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OUTGROWING THE MARKET

=

TRUE LEADER

LARGE MISSION CRITICAL TAM



GROWTH FROM NEW APPLICATIONS
SAFETY
ELECTRIFICATION
DRIVER-VEHICLE INTERFACE

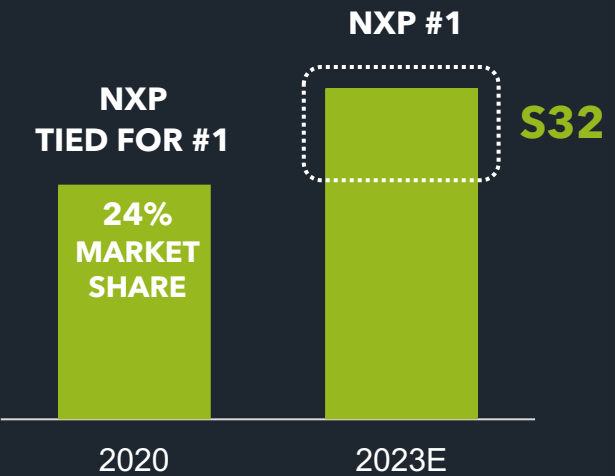


**NXP GROWTH
ESTIMATED 2020-2023**



**OF FORECAST IN 2023 BASED ON
DESIGNS WON AND ALREADY IN
CUSTOMER DEVELOPMENT**

**RECOGNIZED AUTO PROCESSING
THOUGHT LEADER**



S32 PLATFORM DRIVING SIGNIFICANT GROWTH
**FUNDAMENTAL TO MOBILITY, SAFETY AND
CONNECTIVITY**
**LEADING IN NEW VEHICLE ARCHITECTURAL
DEVELOPMENTS**



SECURE CONNECTIONS
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