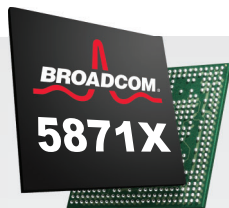# BCM5871X Series Processors

Quad-Core 64-bit ARMv8 Communications Processor

- ARM v8 64-bit architecture
- FlexSPARX™ accelerators
- Two (2) 10G Ethernet SerDes integrated in the processor
- Hardware virtualization support
- NIC interface
- BroadSAFE™ secure architecture
- Broadcom Linux Development Kit

BCM5871X

✓	Enterprise Routers
✓	NAS
✓	SDN Open Flow Switching
✓	NFV Solutions
✓	Wireless Access
✓	Control Plane CPU
✓	Wireless Controllers
✓	Data Center Processing
✓	Carrier Ethernet Control Plane
✓	Mobile Backhaul
✓	MTU/MDU Access

OVERVIEW

The BCM5871X series of processors are the first wave of SoCs that provide server-class performance using the latest and most advanced ARM v8 64-bit CPU core.

The Broadcom® BCM5871X series of processors are designed to enable incredibly fast control plane and data plane performance for the next generation of 10G enterprise routers and for use as a high-performance control plane CPU with StrataXGS® switches.
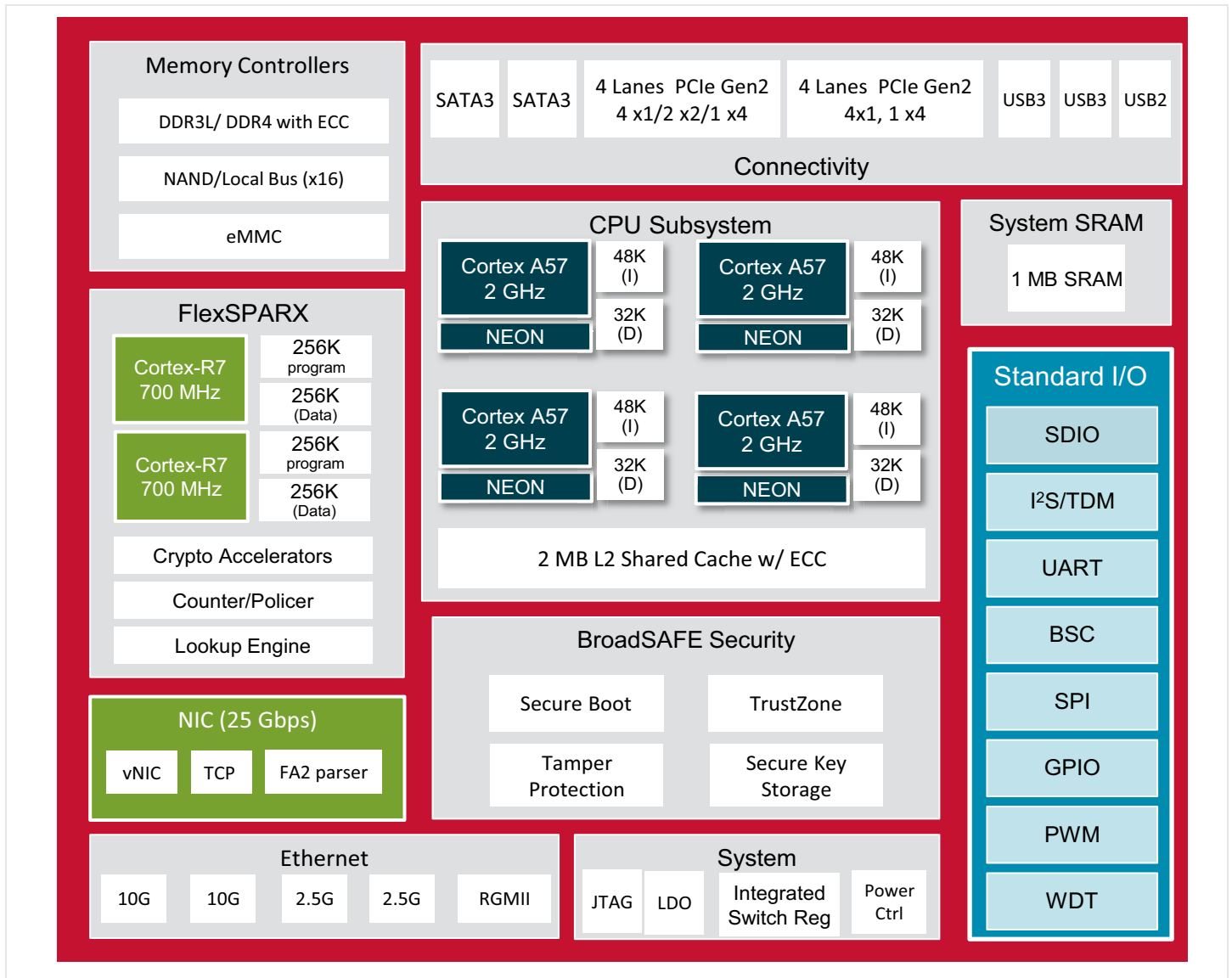
The BCM5871X series of processors represent a new generation of 64-bit ARM-based SoCs that set a new bar on performance and power efficiency. The new ARM architecture provides native virtualization support. The CPU cores provide full software compatibility with 32-bit v7 ARM architecture. At the center of the BCM5871X device is a high-performance 1.8 GHz ARM Cortex-A57 quad-core with a 48 KB four-way set associative instruction cache and a 32 KB four-way set associative data cache. The memory system supports the latest DDR4 memories in addition to DDR3 and DDR3L. Optional ECC support is provided as well. The device has a highly flexible programmable acceleration engine that can process packets and leave the main CPU cores to do other application and service-level processing.

BENEFITS

- Address space beyond 4 GB
- FlexSPARX accelerators offload packet processing from main CPU cores freeing them for application and service processing
- High-speed connectivity and network offload
- High-performance execution of multiple virtual machines with native support for shared memory and interfaces
- 16 Gbps cryptographic accelerator, secure boot, tamper protection—protects sensitive data on chip and across network
- Highly optimized software with support for data path acceleration, security coprocessors and other hardware accelerators

FEATURES

- CPU
  - Quad-core Cortex-A57 64-bit ARMv8 up to 1.8GHz
  - Two-stage address translation for virtualization with I/O memory management unit (MMU)
  - 48 KB I-cache and 32 KB D-cache per core
  - 2 MB shared L2 cache
- Interconnect
  - Coherent interconnect with I/O
  - Per-master memory IP address virtualization
- Memory
  - 1MB of platform SRAM
  - 72-bit wide DDR3/3L/4 memory controller with error correction coding (ECC) (64b data, 8b ECC) up to DDR4-2400
- Virtual NIC/DMA functions
  - 16 multichannel virtualized NICs with dedicated direct memory access (DMA) rings
  - Class of service (CoS), flow-, TSS-, and RSS-based ring assignment
  - TCP/UDP offload [Transmit Send Offload (TSO), Large Receive Offload (LRO)]
  - Four Ethernet interfaces
- Secure Boot Engine
  - Secure key storage, Public Key Algorithm (PKA) engine, random number generator, timers
- High-speed I/O connectivity
  - Four (4) SerDes ports – 10G/5G/2.5G/1G
  - Dedicated RGMII Ethernet management port
  - Eight PCIe Gen 2 root complex (configurable as 8 by 1, 4 by 2, 2 by 4, 1 by 8)
  - Two USB3 (SS/HS/FS/LS) host controllers with integrated PHY
  - USB2 (HS/FS/LS) dual role (DRD) controller with integrated PHY
  - Two-port SATA3.0 (6 Gbps) AHCI controller with integrated PHY
- Standard connectivity
  - Two SDIO/e.MMC 4.41
  - NAND SLC/MLC Flash interface
  - 4x UART, two BSC, two SPI, MDIO, GPIO (32), Local Bus, TDM

BCM5871X Block Diagram

Memory Controllers
- DDR3L/ DDR4 with ECC
- NAND/Local Bus (x16)
- eMMC

FlexSPARX
- Cortex-R7 700 MHz
  - 256K program
  - 256K (Data)
- Cortex-R7 700 MHz
  - 256K program
  - 256K (Data)
- Crypto Accelerators
- Counter/Policer
- Lookup Engine

NIC (25 Gbps)
- vNIC
- TCP
- FA2 parser

Connectivity
- SATA3
- SATA3
- 4 Lanes PCIe Gen2 4 x1/2 x2/1 x4
- 4 Lanes PCIe Gen2 4x1, 1 x4
- USB3
- USB3
- USB2

CPU Subsystem
- Cortex A57 2 GHz / NEON — 48K (I), 32K (D)
- Cortex A57 2 GHz / NEON — 48K (I), 32K (D)
- Cortex A57 2 GHz / NEON — 48K (I), 32K (D)
- Cortex A57 2 GHz / NEON — 48K (I), 32K (D)
- 2 MB L2 Shared Cache w/ ECC

BroadSAFE Security
- Secure Boot
- TrustZone
- Tamper Protection
- Secure Key Storage

System SRAM
- 1 MB SRAM

Standard I/O
- SDIO
- I²S/TDM
- UART
- BSC
- SPI
- GPIO
- PWM
- WDT

Ethernet
- 10G
- 10G
- 2.5G
- 2.5G
- RGMII

System
- JTAG
- LDO
- Integrated Switch Reg
- Power Ctrl

BCM5871X Block Diagram

For more information, visit:
www.broadcom.com