



# PS4 ARCHITECTURE

JERRY AFFRICOT

# OVERVIEW

- Evolution of game consoles
- PlayStation History
- CPU Architecture
- GPU architecture
- System Memory
- Future of the PlayStation

# EVOLUTION OF GAME CONSOLES

- 1967

- First video game console with two attached controllers
- Invented by Ralph Baer
- Only six simple games: ping-pong, tennis, handball, volleyball, chase games, light-gun games

- 1975-1977

- Magnavox Odyssey consoles
- Same games with better graphics, controllers.

# EVOLUTION OF GAME CONSOLES

## (continued)

- 1978-1980

- First Nintendo video gaming consoles
- First color TV game series sold only in Japan

- 1981-1985

- Development of games like fighting, platform, adventure and RPG
- Classic games:
  - Pac-man, Mario Bros, the Legend of Zelda etc.

# EVOLUTION OF GAMES CONSOLES

## (continued)

- 1986-1990
  - Mega Drive/Genesis
  - Super Nintendo Entertainment System (SNES)
- 1991-1993
  - Compact discs
  - Transition of 2D graphics to that of 3D graphics
  - First CD console launched by Philips (1991)

# EVOLUTION OF GAME CONSOLES

## (continued)

- 1994-1997
  - PlayStation release
  - Nintendo 64 (still using cartridges)
- 1998-2004
  - PlayStation 2
  - GameCube
  - Xbox featuring Xbox Live

# HISTORY OF THE PLAYSTATION

- PlayStation (1994)
- PS1 (2000)
  - Smaller version of the PlayStation
- PS2 (2000)
  - Backward compatible with most PS1 games
- PS2 Slim line (2004)
  - Smaller version of the PS2

# HISTORY OF THE PLAYSTATION (continued)

- PSP (2004)
- PS3 (2006)
  - First console to introduce use of motion sensing technology
  - Slimmer model released in 2009
- PSP Go (2009)
- PS Vita (2011)
- PS4 (2013)



# HISTORY OF THE PLAYSTATION (continued)

Console	PS1	PS2	PS3	PS4
Launch price	\$299	\$299	\$499, \$599	\$399
Units sold (millions)	102.49	155	84	35
Best selling game	Gran Turismo	GTA: San Andreas	GTA V	Kill zone Shadow fall
Media	CD-ROM	DVD-ROM	BD-ROM	Blu-ray, DVD
CPU	32 bit RISC chip	MIPS "Emotion Engine"	Cell broadband (Power Architecture)	8-core AMD Jaguar

# CPU ARCHITECTURE

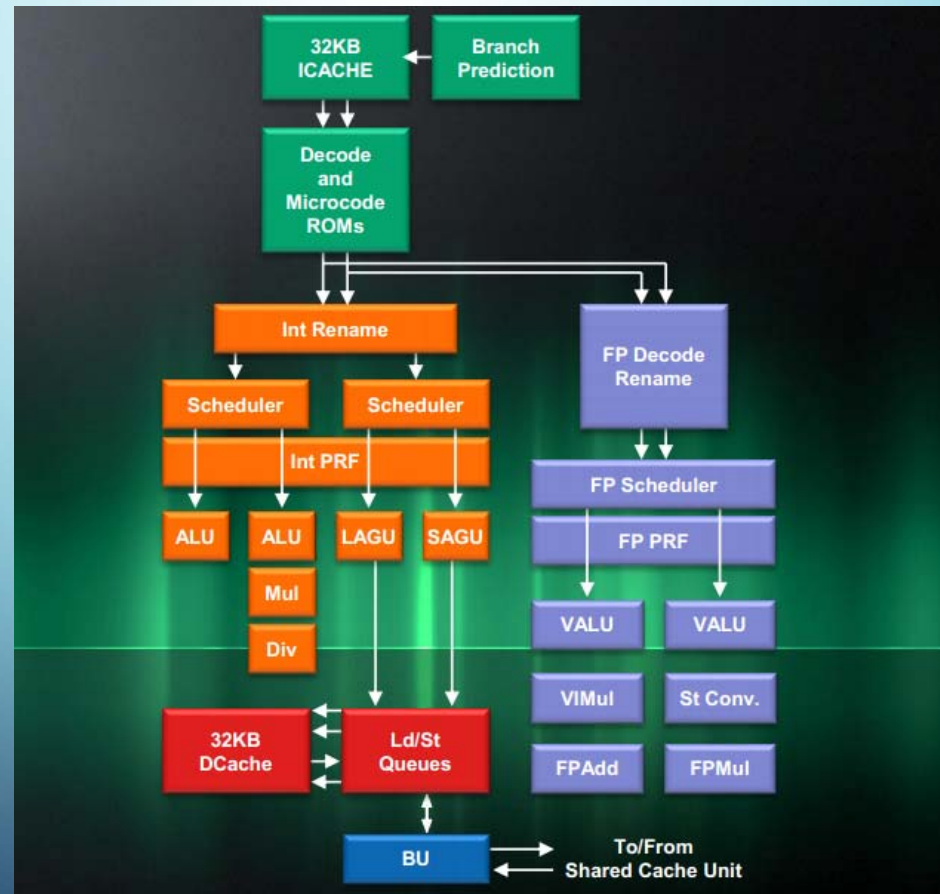
- Specifications:

- Based on the Jaguar CPU architecture from AMD
- Consists of 2 x86-64 quad core modules (8 cores total)
- 32 KB L1 instruction and 32 KB data caches for each core
- One 2 MB L2 cache per four cores
  - Share cache between cores
- Frequency of 1.6 GHz

# JAGUAR CPU

- From AMD
- Succeeded the Bobcat family
- L1 cache includes parity error detection
- 2 way superscalar
- Out-of-order execution
- Speculative execution
- Instruction set:
  - AMD 64
- Complex Instruction Set Computing (CISC)

# JAGUAR CPU (continued)



## JAGUAR CPU (continued)

- Improvements over Bobcat:
  - 10% increase in clock frequency
  - 15% improvement in IPC
  - Doubled bandwidths for load and store units
  - Smaller core size
  - FPU data path width increased to 128 bits
  - Up to 4 cores

A glowing yellow hexagonal icon with the letters 'GPU' inside, surrounded by concentric circles, set against a blue background with circuit-like patterns.

## GPU

- Customized version of AMD's 7870 GPU with 2 compute unit disabled
- GPU Clock: 800 MHz
- 18 compute unit:
  - 64 cores per compute unit
  - 1152 cores total

# COMPUTE UNIT

- AMD's latest processing architecture :
  - Heterogeneous System Architecture
- Bridges the gap between CPU and GPU cores
- Allows the CPU and GPU to share workloads and memory
- More efficient way to accelerate application while delivering great performance

# AMD RADEON 7870 GPU

- Engine Clock: 1000 MHz
- 2 GB DDR5 memory
- Memory clock: 1200 MHz
- 20 Compute Units
- PCI-e 3.0



# MEMORY

- 8 GB of GDDR5 unified system memory
- Max frequency of 2.75 GHz
- GDDR5:
  - Based on DDR3 SDRAM
  - Uses 8-bit wide pre-fetch buffers
- Bandwidth of 176 Gb/s
- Bus Width:
  - 256 bits

# FUTURE OF THE PLAYSTATION

- Just Speculations:

- PS5 release in 2020
- Optical computing for the CPU
- 3D Xpoint or 3D Stacked RAM
- GPU:
  - 4K UHD