RISC-V: THE CPU OF CHOICE FOR GRAPHICS PROCESSING UNITS

Andrew Johnston, Senior Functional Safety Manager andrew.johnston@imgtec.com
Dr. Varadan Veeravalli, Principal Functional Safety Engineer varadan.veeravalli@imgtec.com
Kenneth Rovers, Senior Principal Hardware Architect kenneth.rovers@imgtec.com

DID YOU KNOW?

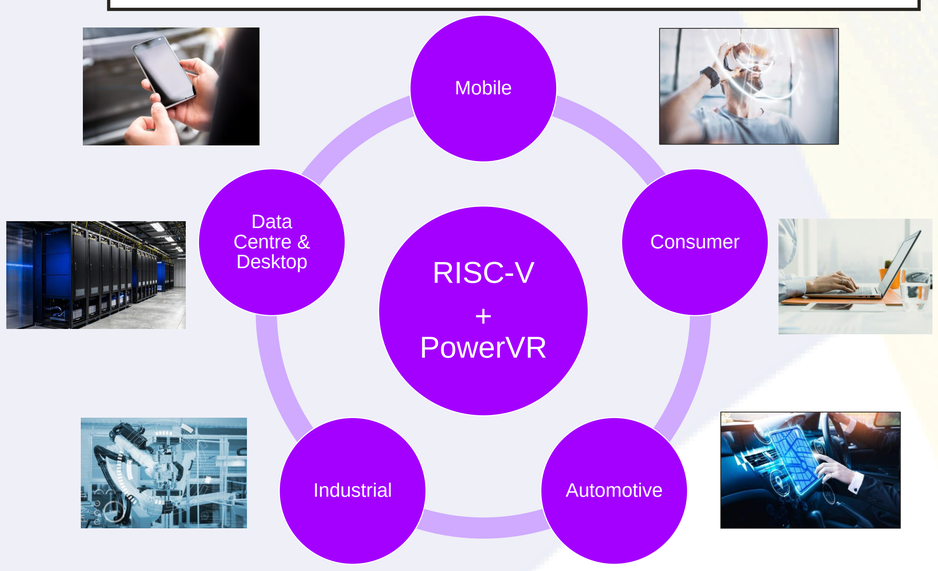
Imagination Technologies have been pioneering GPU design and technology for over **30 years**, and since 2019 have been incorporating **RISC-V** CPUs in our **PowerVR GPU** products.
This includes independently certified **ISO 26262** ASIL-B GPUs from 2021 onwards.

GPU ARCHITECTURE EVOLUTION

ISO 26262 *ASIL-D Systematic Development Process Certified*

Since 1995… **Series 7** **Series 8** **Series 9** **A series** **B Series** ***BXS*** *ASIL-B HW* **C Series** **D Series** ***DXS*** *ASIL-B HW* **...Future**

FLEXIBLE & SCALABLE IP



THE CHALLENGE...

- Power is nothing without Control
- PPA improvements on every generation
- Need high performance area-efficient silicon
- Need to support tomorrow's complex compute intensive use-cases today
- Need both Flexibility and Scalability
- Need Secure, Safe and Reliable IP

Functional Safety
Efficiency
Performance
Scalable

GRAPHICS PIPELINE & DXS GPU SAFETY ARCHITECTURE

GPU BENEFITS

RISC-V:
- Clean, simple, compact
- High Performance
- Easy to integrate

ISO 26262

BXS & DXS GPU: ISO 26262 ASIL-B HW architectural metrics achieved:
- **Independently certified** Safety Management Process: ASIL-D Systematic Process and tools
- **Distributed Safety Mechanisms**
- **Defence-in-Depth** approach, each major subsystem has more than one safety mechanism; **Graceful Degradation**
- **Embedded ASIL-D compliant RISC-V CPU**
- Performance, Power, Area (PPA) and Safety objectives achieved

Supported by our advanced **Catapult** range of RISC-V CPU IP:
- **RTXM-2200** (32 Bit)
- **APXM-6600** (64 Bit)

Result: Low power consumption, high performance, Safe embedded IP cores

ASIL-B Distributed Safety with Defence-in-Depth Safety Mechanisms, Controlled by an ASIL-D compliant RISC-V CPU

www.imaginationtech.com

Copyright © Imagination Technologies Limited 2024. All Rights Reserved