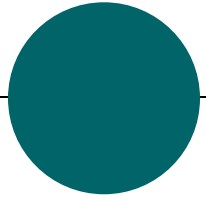# asamicro

ASA RISC Processor

Optimized For

Edge AI/ML, Security, Smart IoT Sensors

asamicro

ASA Processors and SoC Solutions

ASA Processor Core overviews (32-bit RISC-V)

AR32Z

- **Proprietary scalar micro-architecture.**
- Core is ready for customer evaluation.
- FPGA development platform ready for prototyping.
- 1/3 of the AR32E footprint
- Applications
  - Sensors interface
  - Energy harvesting
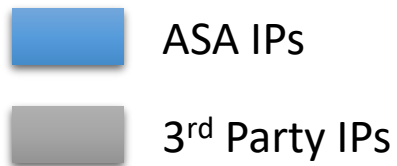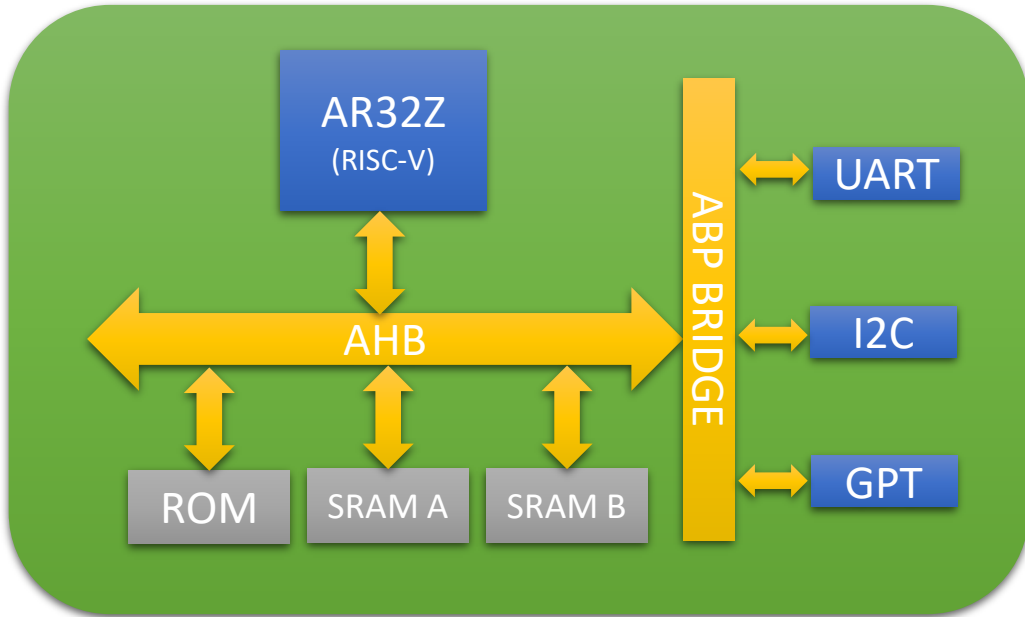 - Battery operated embedded IoT & Medical applications

AR32E

- **Proprietary micro-architecture with parallel execution unit (superscalar)**
- To deliver highest performance at reasonably lower power consumption.
- Small footprint
- Lowest power with highest performance (GHz+ at 28nm)
- Applications
  - Edge computing
  - MPSoC for AI/ML
  - Accelerator coprocessor

AR128V

- **Proprietary micro-architecture with vector execution unit as accelerator**
- High Performance vector operation at lowest power.
- Proprietary Memory Controller
- Applications
  - AI
  - Vision Processing
  - Image Processing/DSP

Optional SIMD/MAC/DSP Co-Processor

asamicro

ASA A32Z Evaluation Platform (Xenon)

AR32Z
(RISC-V)

ABP BRIDGE

UART

I2C

GPT

AHB

ROM   SRAM A   SRAM B

ASA IPs

3rd Party IPs

- Architecture validation completed.
- FPGA development platform available (Initial release).
- Available open source software toolchain, compiler, debugger, Linux, security.

asamicro

Xenon (AR32Z based SoC) Implementation result in FPGA

Table shows hierarchical implementation result for the AR32Z SoC (reported the core part only) using ARTIX-7-100T device at 100MHz operating frequency

Name	Slice LUTs	Slice Registers	Slice	LUT as Logic	DSP slices	Dynamic Power (mW)
ahb_soc	3502	2297	1245	3454	4	25
ar32z (ar32z_ahb_top)	1726	1005	592	1678	4	9
core_inst (core)	1464	639	478	1416	4	7

asamicro

Comparing AR32Z with MicroBlaze in FPGA

FPGA chip : Xilinx Artix-7 100T (speed grade -1)
FPGA Board : Nexys A7 (https://store.digilentinc.com/nexys-a7-fpga-trainer-board-recommended-for-ece-curriculum/)
Operating Clock Frequency : 100MHz

	AR32Z (core)	MicroBlaze* (core)
LUT count	~1500	~1550
Dynamic Power	7 mW	31 mW
DMIPS/MHz	~1.0	~0.9
Board Current Consumption**	~187mA	~209mA

- *MicroBlaze Processor is generated for equivalent Microcontroller configuration.
- **Board current is measured while processor is executing Dhrystone Program

asamicro
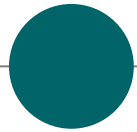
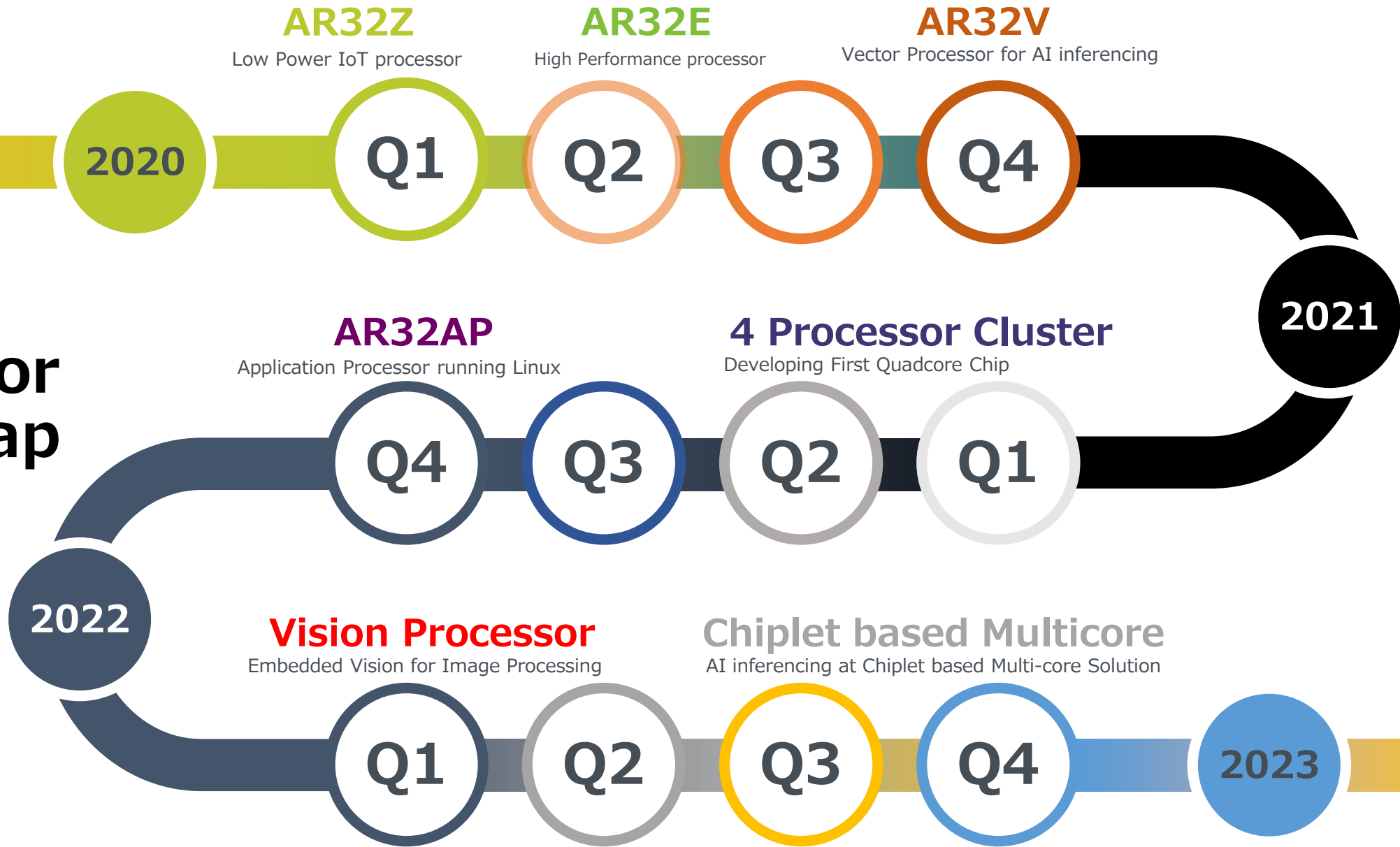# Multicore A32E/Z IoT Edge SoC Platform
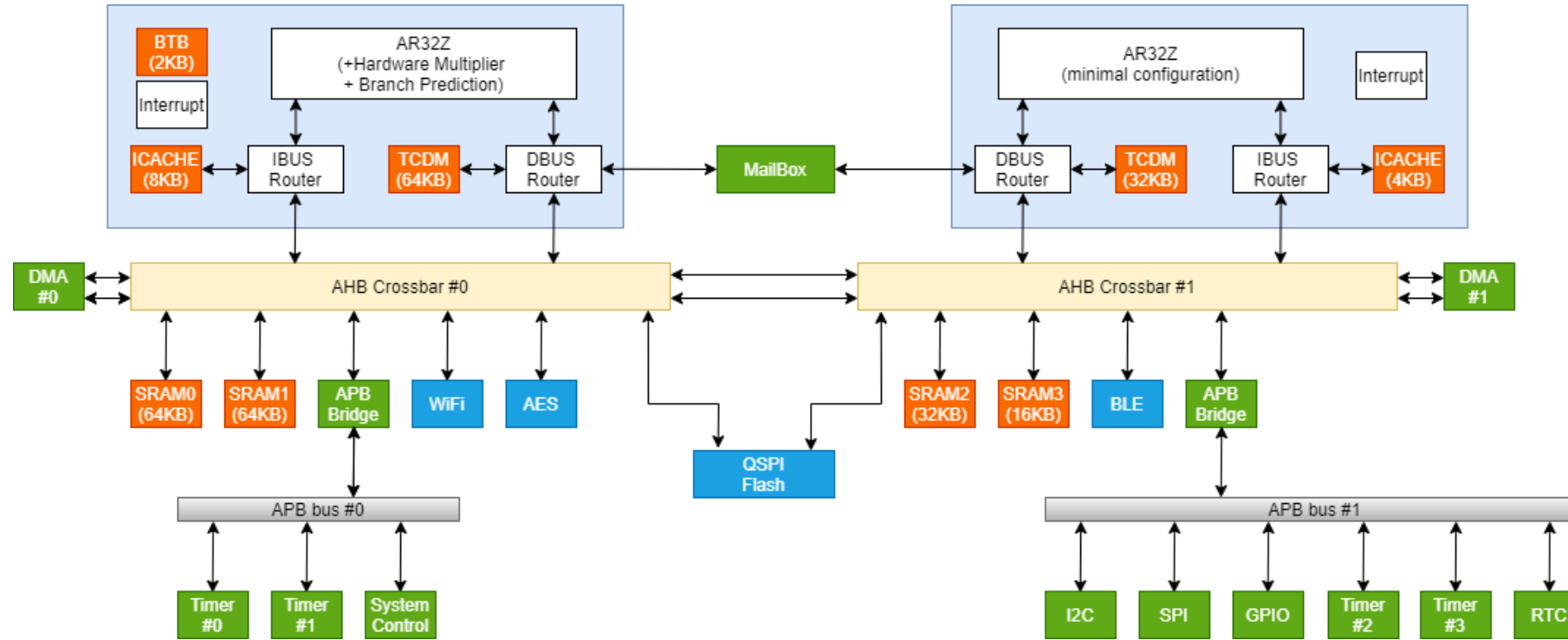
- 2-core Architecture defined. Optimized for IoT/Edge platform and applications
- FPGA development platform available Q4/E 2020.
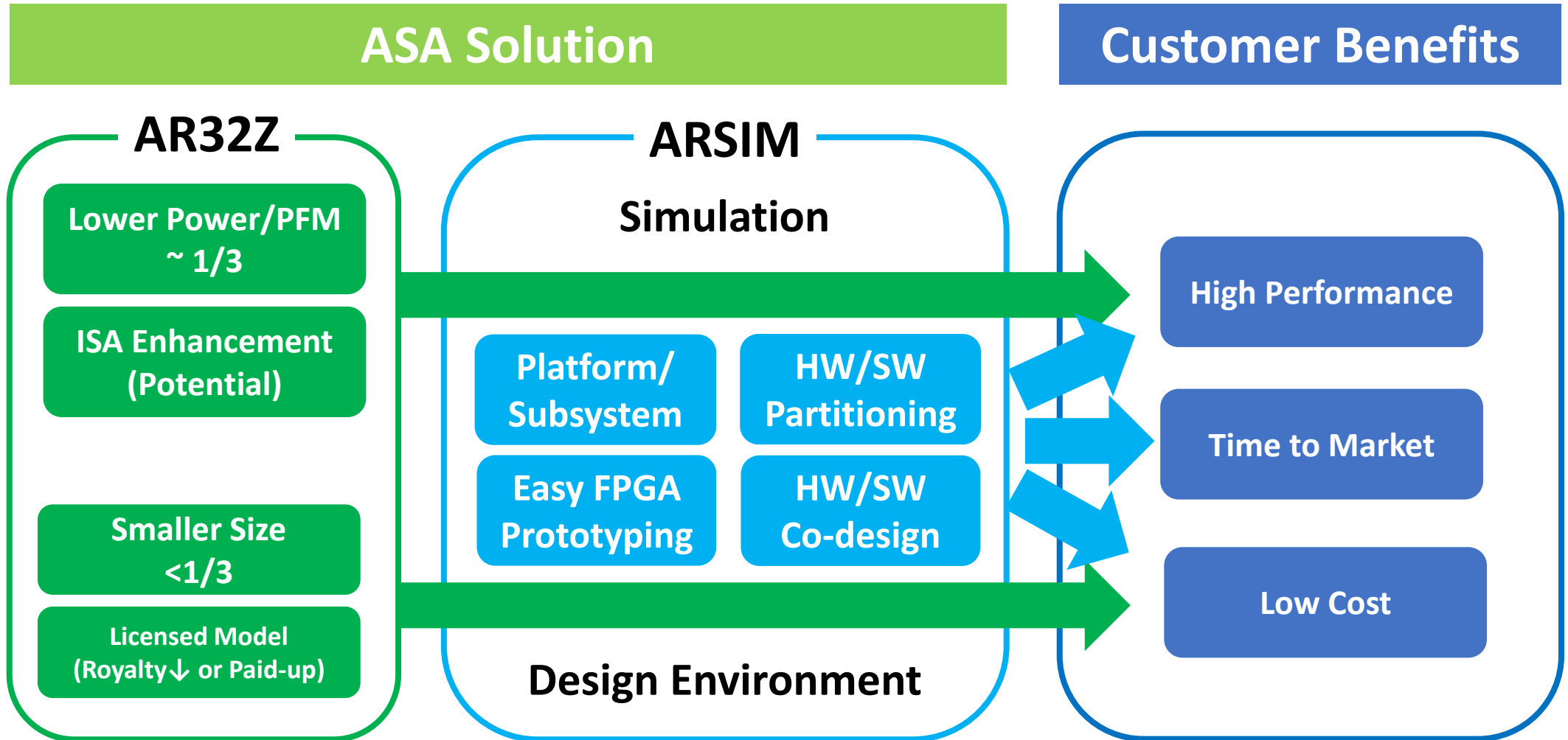- First customer identified

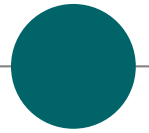# What's Customer Benefit with ASA's Solution?

ASA Solution

Customer Benefits

AR32Z

Lower Power/PFM ~ 1/3

ISA Enhancement (Potential)

Smaller Size <1/3

Licensed Model (Royalty↓ or Paid-up)

ARSIM

Simulation

Platform/ Subsystem

HW/SW Partitioning

Easy FPGA Prototyping

HW/SW Co-design

Design Environment

High Performance

Time to Market

Low Cost

asamicro

ASA Business Model

- IP Licensing, Services and Royalties
  - Custom Processor (custom instruction) Development
- FPGA Development and Embedded Software Services
- Simulation Software for Architecture evaluation, rapid prototyping and verification

asamicro

asamicro

Thank You