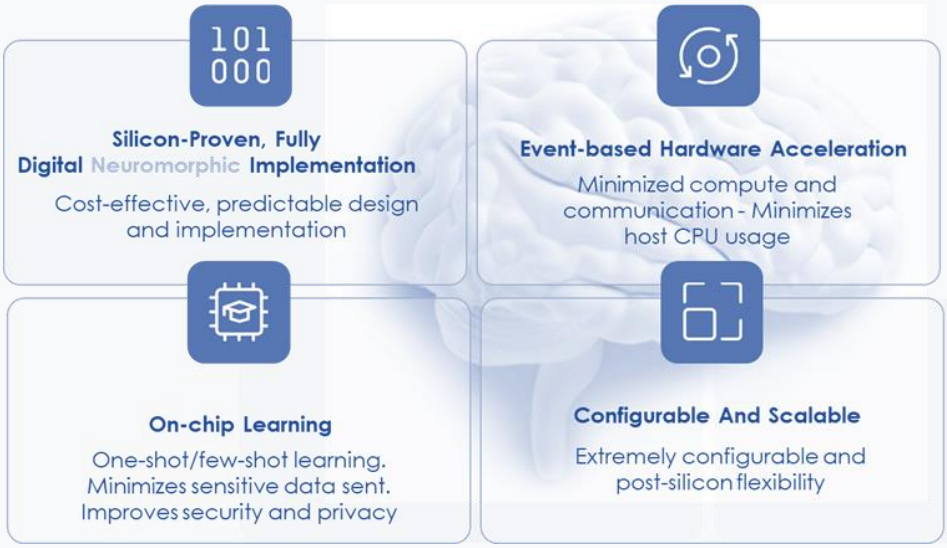
# Akida 1 IP Platform

## Product Brief

### BrainChip's Akida™ is the First Fully-Digital, Neuromorphic Processor IP

Akida is a neural processor platform inspired by the cognitive ability and efficiency of the human brain. The Akida 1 platform can independently operate complex inferencing and learning on extremely low-power AI devices, thus delivering highly accurate, intelligent, responsive, real-time applications with greater reliability and security. A scalable, self-contained co-processor for advanced neural networks.

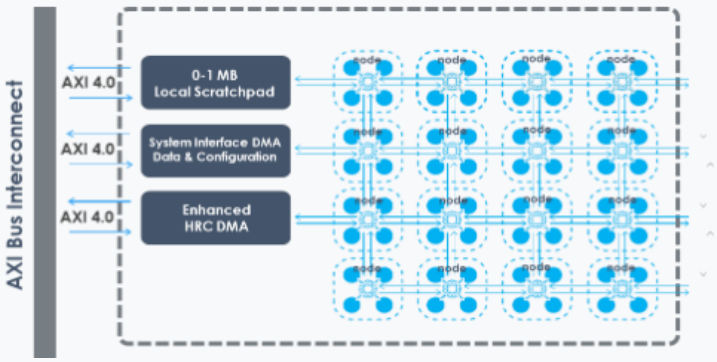



**Self-contained neural processor**

- Scalable fabric of 1-128 nodes
- Each neural node supports 128MACs
- Configurable 50-130K embedded local SRAM
- DMA for all memory and model operations
- Multi-layer execution without host CPU
- Integrate with ARM, RISC-V with AXI bus interface

**Efficient algorithmic mesh**

- Convolutional Neural Processor (CNP) and Fully-connected Neural Processor (FNP).




**Akida 1 Block Diagram**

# Akida 1 IP Platform
## Specifications

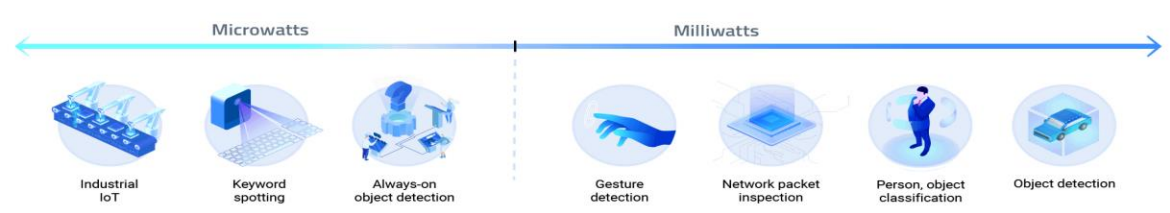
**Akida efficiently accelerates…**
- Image and audio classification
- Object detection
- Scene segmentation
- Gesture and face recognition
- State-of-the-art algorithms in sequence prediction
  - Video object detection
  - Human action recognition
  - Raw-audio classification
  - Vital signs prediction

**Notable features:**
- Supports 4-,2-, and1-bit weights and activations
- Supports multiple layers simultaneously

**Software development and deployment:**
- **Akida** leverages standard frameworks and development platforms such as TensorFlow/Keras, and Edge Impulse
- **Akida** is model-, network-, and OS-agnostic
- **BrainChip MetaTF ™** supports model development and optimization for Akida hardware
- **Akida model zoo** offers a set of pre-built Akida-compatible models, pre-trained weights and training scripts

metaTF

## Applications




## Specifications

| Scalability (up to 128 Neural Network Nodes) | 2 | 4 | 8 | 32 | 64 |
|---|---|---|---|---|---|
| **TOPS @ 0.5Ghz** | **.25** | **0.5** | **1** | **4** | **8** |
| **In-Memory** MB | .39-1 | .78- 2 | 1.56- 4 | 6.24-16 | 12.48- 32 |
| **MAC Engine** (4x4 MACs) | 256 | 512 | 1024 | 4096 | 8192 |
| **CPU Support** **ARM** | M-Series | M/A-Series | M/A-Series | A-Series | A-Series Quad |
| **RISC-V** | 32b | 32b | 32b/64b | 32/64b | 64b |
| **External Memory** | DRAM SRAM Flash | DRAM SRAM Flash | DRAM, SRAM, Flash | DRAM SRAM Flash | DRAM, SRAM, Flash |

## IP Delivery

- Fully synthesizable RTL.
- IP deliverables package with standard EDA tools.
- Complete test bench with simulation results.
- RTL synthesis scripts and timing constraints. Customized IP packaged targeted for your application.
- Run time software C++ library.
- Processor and OS agnostic.