PipeRunner™

Edge AI Media Platform

RKAI

Convert Video Into an Event-Driven Dataset

Trigger

- Real-time pattern detection
- Take action at the edge
- Automate IoT workflows

Search

- AI detects and tracks context
- Metadata injects into stream
- Search it like Google Images™

Hardware & Clusterware for the AI Processing of Media
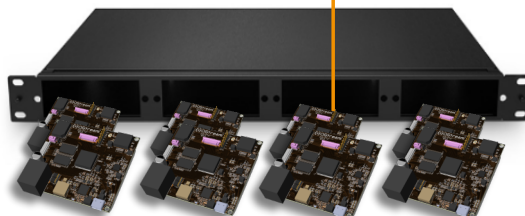
PipeRunner is an edge AI media platform that accelerates media decoding and AI execution while embedding the results into the streaming Object MP4 format.

It's clusterable design is used by leading AI integrators as the most scalable and cost effective edge AI hardware platform.
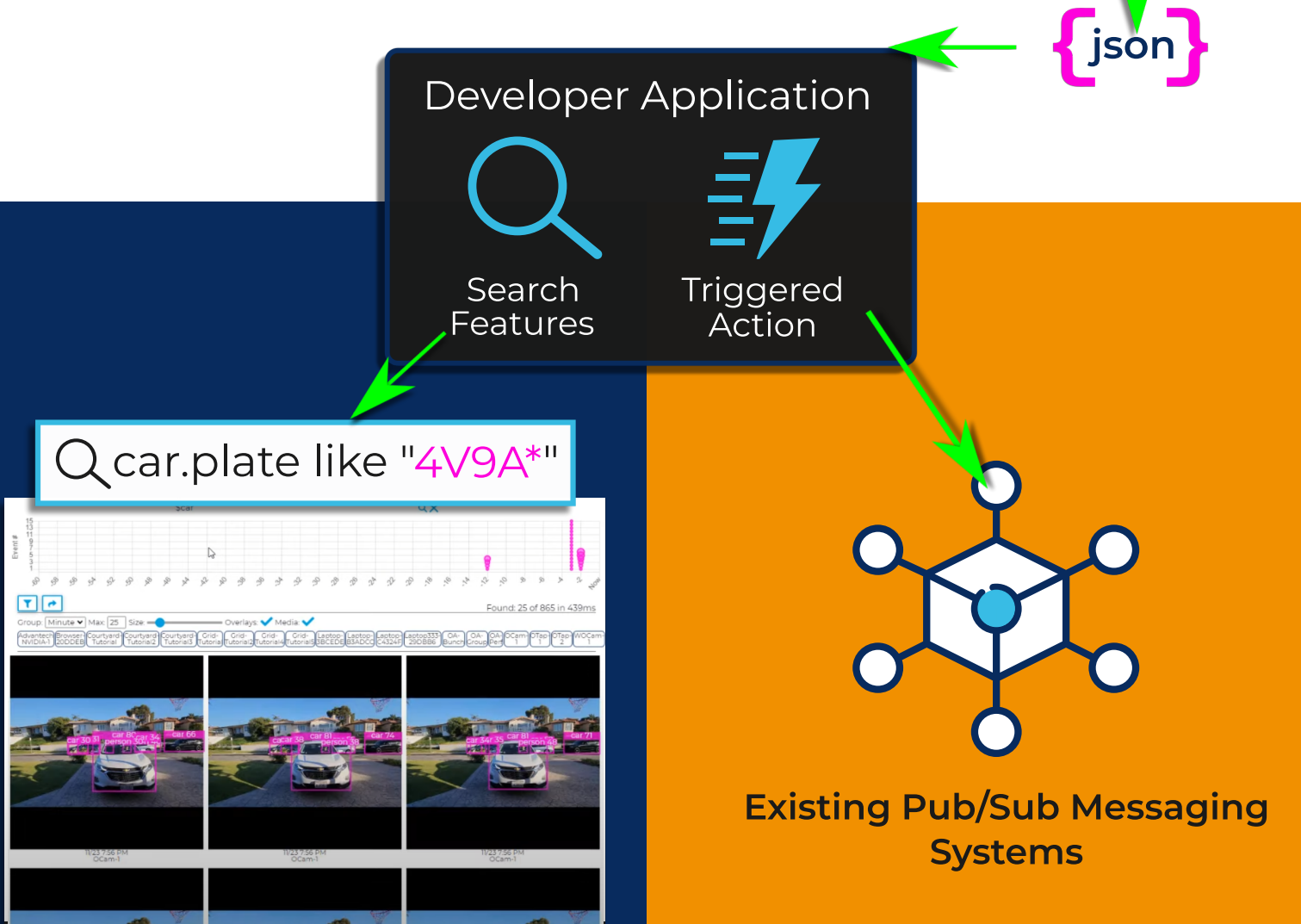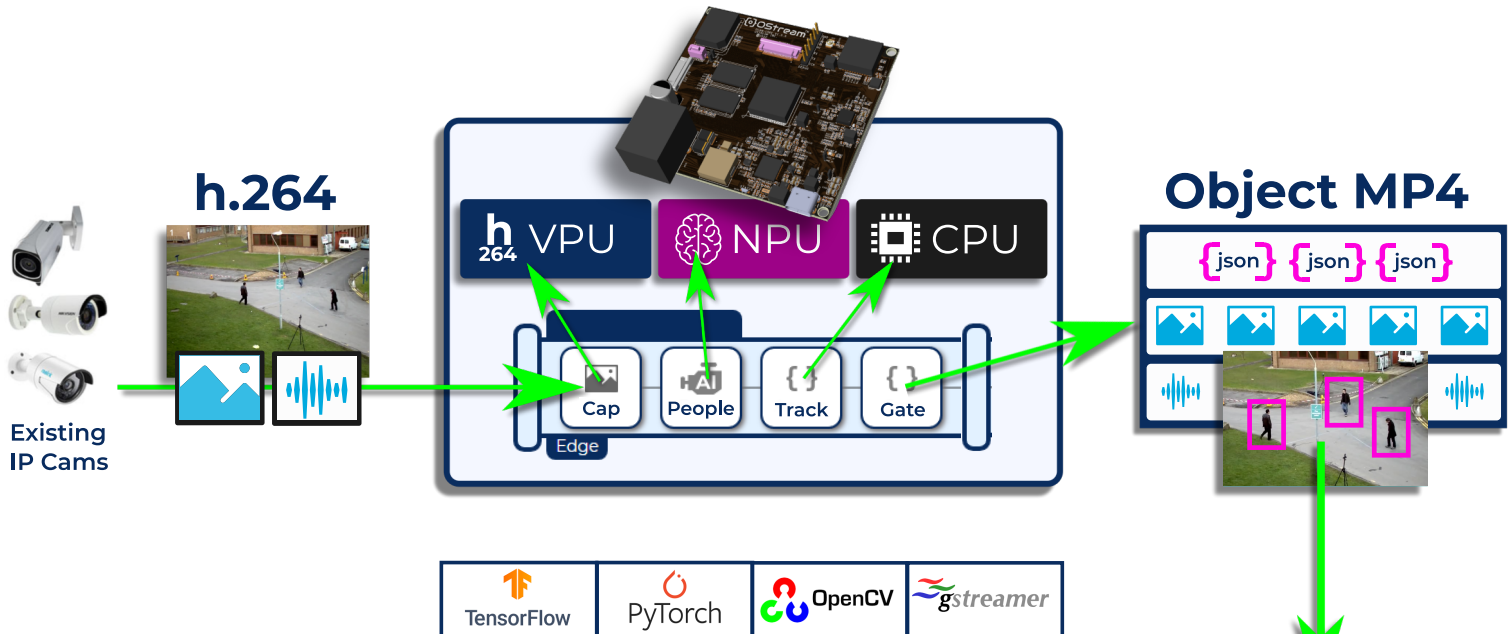
3 to 800 TOPS
Starting at $100

Object MP4 Out

h.264 Video In

Street Cam   1/26 11:25:00a

TensorFlow   PyTorch   OpenCV   gstreamer

OStream™

The Foundation for Physical World AI

ostream.com

PipeRunner™
RKAI

RKAI Hardware + Physico Software
GStreamer Pipeline Elements Automatically Run on Hardware Accelerators

h.264

Existing
IP Cams

h.264 VPU | NPU | CPU

Cap | People | Track | Gate

Edge

Object MP4

{json} {json} {json}

TensorFlow | PyTorch | OpenCV | gstreamer

{json}

Developer Application

Search
Features

Triggered
Action

car.plate like "4V9A*"

Group: Minute | Max 25 | Size | Overlays ✓ Media ✓   Found: 25 of 865 in 439ms

Existing Pub/Sub Messaging Systems

1. Introduction

1.1. PipeRunner RKAI, is an edge AI media processing board that can run as a standalone or part of a cluster. RKAI is the entry point board in the PipeRunner family featuring 3 TOPS at a very reasonable price point. Physico software comes onboard as does GStreamer, OpenCV and a pre-integrated set of AI computer vision stacks. RKAIs integrate to a free Physico Server instance that allows for configuration, AI pipeline execution and routing of the resulting ObjectMP4 to 3rd party systems and applications. All PipeRunner boards using Physico software automatically leverage hardware acceleration without any need to wrestle with hardware.

2. Features

2.1. Microprocessor

- Dual-core 64 Bit ARMv8-A Cortex-A35 CPU
- ARM Neon Advanced SIMD (single instruction, multiple data) support for accelerated media and signal processing computation
- Include VFP v4 hardware to support single and double-precision operations
- 128KB unified system L2 cache
- Integrated 32KB L1 instruction cache, 32KB L1 data cache with 4-way set associative
- One isolated voltage domain include
- Separate power domains for CPU core system to support internal power switch
  - PD_CPU0: 1st Cortex-A35 + Neon + FPU + L1 I/D Cache
  - PD_CPU1: 2nd Cortex-A35 + Neon + FPU + L1 I/D Cache
- One isolated voltage domain includes Dual Core CPU, L2 cache and other logics to support DVFS

2.2. Neural Process Unit

- 3 Trillion TOPS
- Support max1920 Int8 MAC operations per cycle
- Support max 64 FP16 MAC operations per cycle
- Support max192 Int16 MAC operations per cycle
- 512KB internal buffer
- One isolated voltage domain to support DVFS

2.3. On Chip Memory

- Internal BootRom
- Used for storing boot code and support system boot from the following interface:
- SFC interface

2.4. External Memory / Storage

- On board eMMC 8GB

3. Interfaces & Peripherals

3.1. Components

- WiFi 802.11 B/G/N
  - 2.4Ghz Antenna on board
- Bluetooth 4.0 with BLE
- 1x 10/100M Ethernet port w/ PoE. 48V
- 1x 4 Lane MIPI camera interface
- 1x USBC
- 1x USB 2.0 via external header
- 12x user GPIO supporting various interface options:
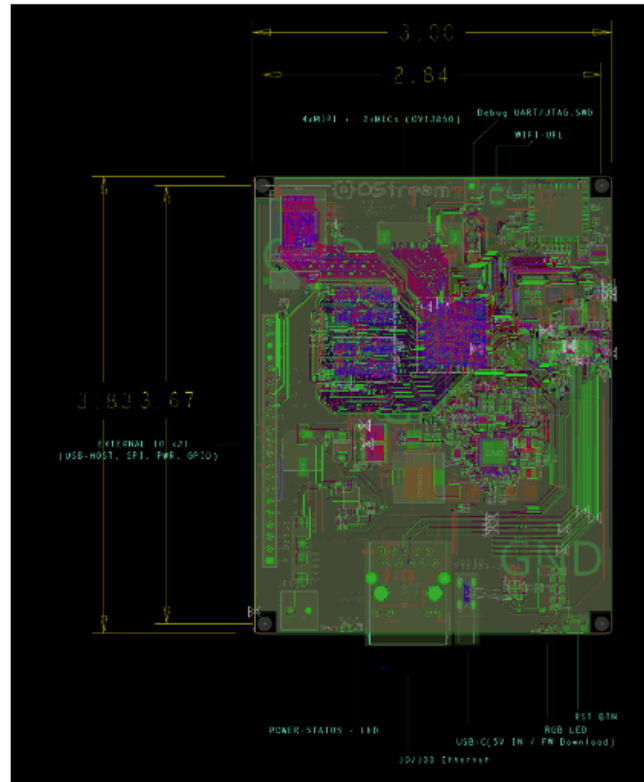 - 1x SPI
  - 1x USB 2.0
  - 10x Mappable

3.2. Connectivity
- WiFi
- 10/100M Ethernet
- USB
- SPI Interface

4. Software
- ARMv8 Instruction Set
- Mature Debian 10 LTS operating system
- Actively developed and maintained
  - Recent Linux kernel support
  - Stable and well supported userland
  -

5. Mechanical Specification

6. Electrical Specification

6.1. Stresses above these requirements may cause permanent damage to the device. This is a stress rating only; functional operation of the device under these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

6.2. Power Requirements
- Units require a good quality USB-C power supply capable of delivering 5V at 3A.

7. Temperature Range and Thermals

7.1. The recommended range of operating temperature is 0 to 85 degrees Celsius.

7.2. No other external cooling is required.

8. Availability

8.1. Guaranteed availability of units through at least Jan 2026.

9. Support

9.1. For support please see go to the website ostream.com or email support@ostream.com