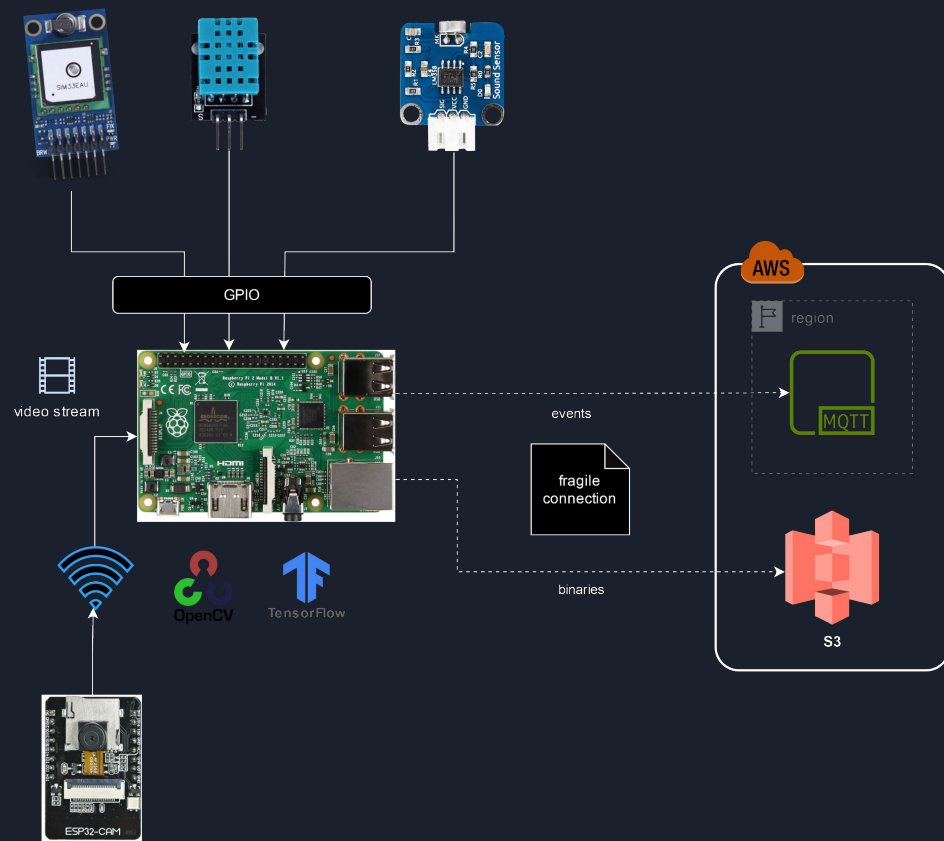


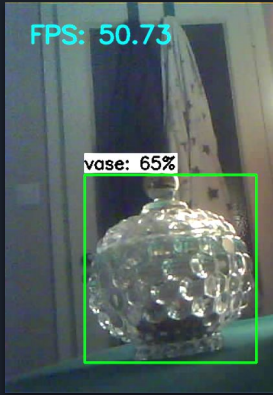
A decorative graphic in the top-left corner consisting of two overlapping parallelograms. The front one is blue and the back one is a light greenish-blue. Both are oriented diagonally, with their longer sides running from the top-left towards the bottom-right.

Efficient time series processing for edge computing and IoT

Why edge computing?

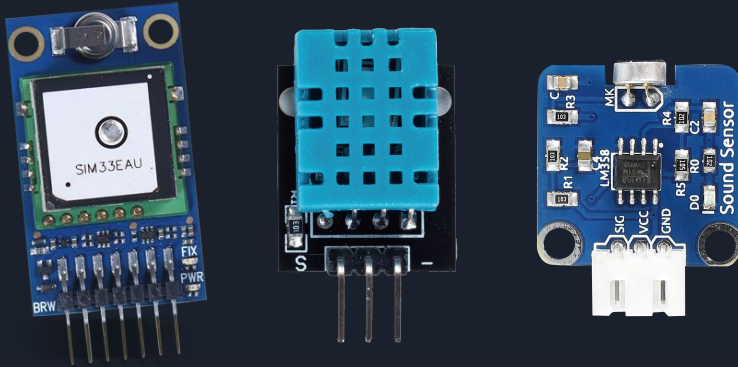






VS

```
{  
  "timestamp": 1725888108,  
  "probability": 0.59,  
  "box": [642, 1011, 320, 480],  
  "label": "robot"  
}
```



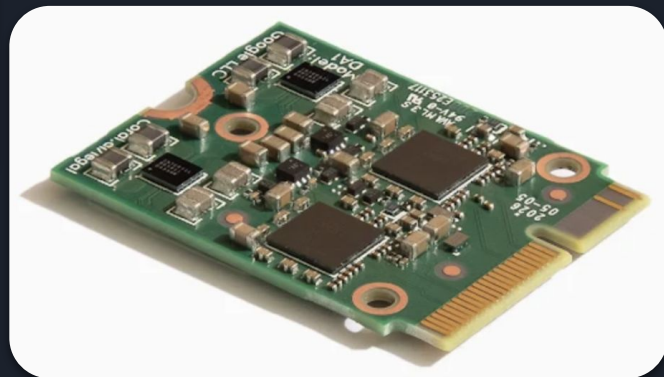
50-100Hz



Hailo AI Kit



Coral Edge TPU

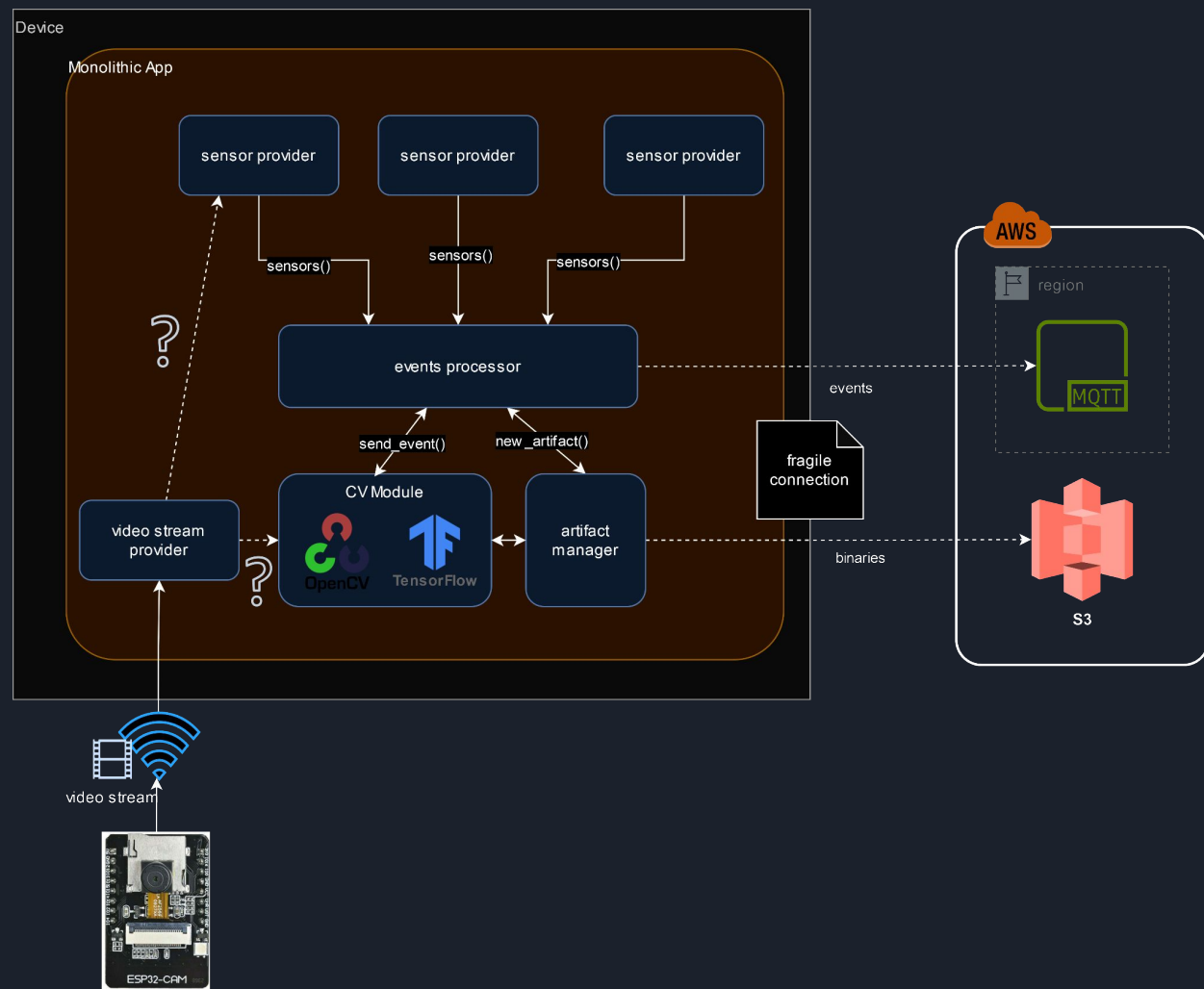


Coral Dual Edge TPU

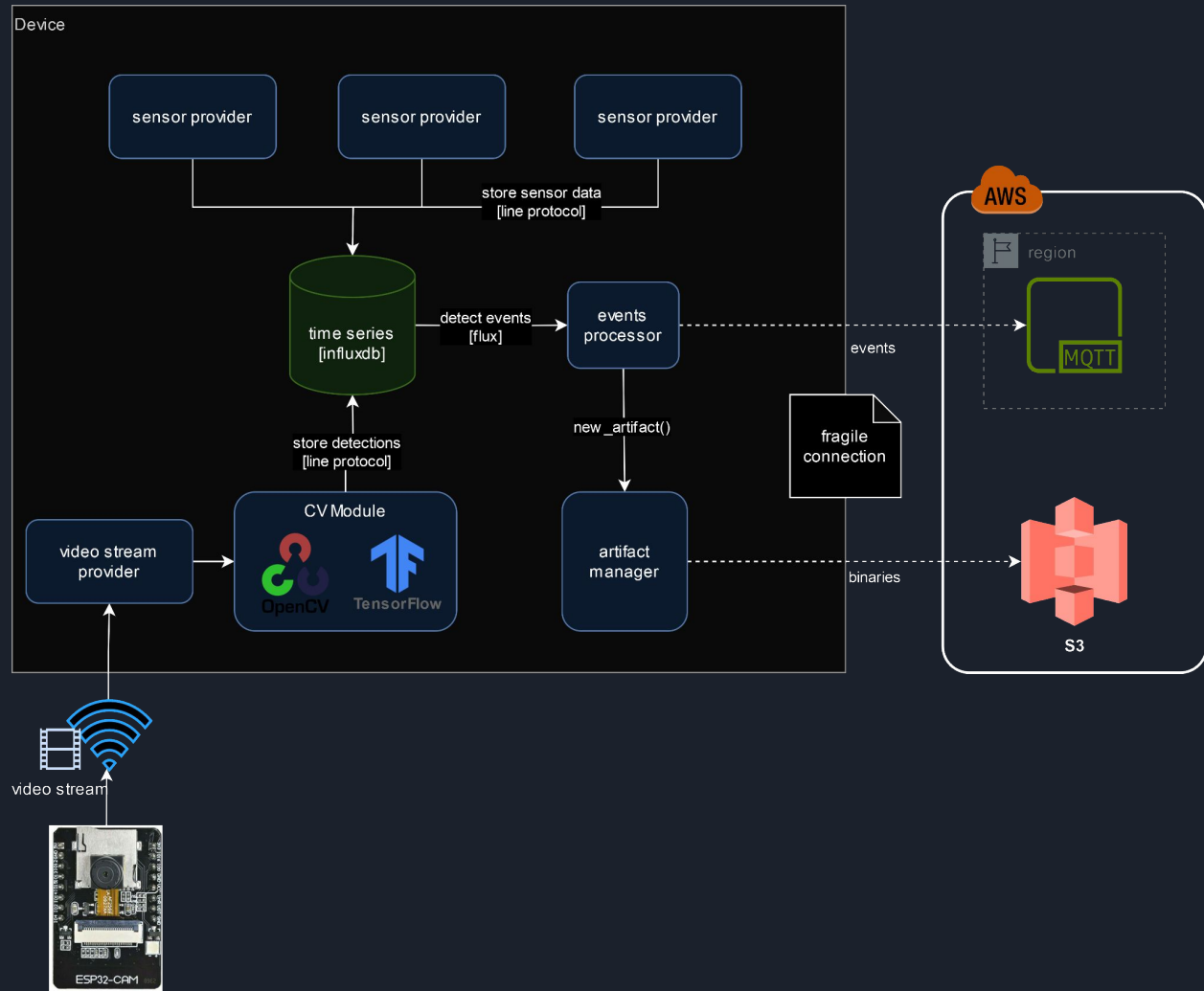
AI Chipsets

Internal Communication





Internal Communication

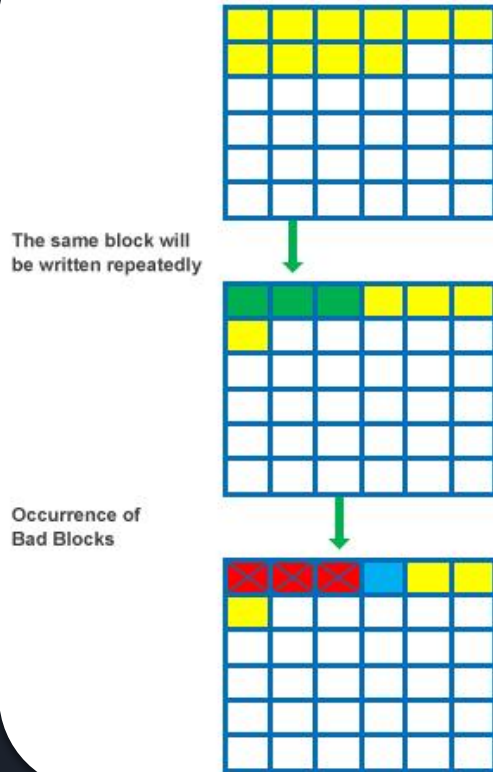


Time Series - Distributed

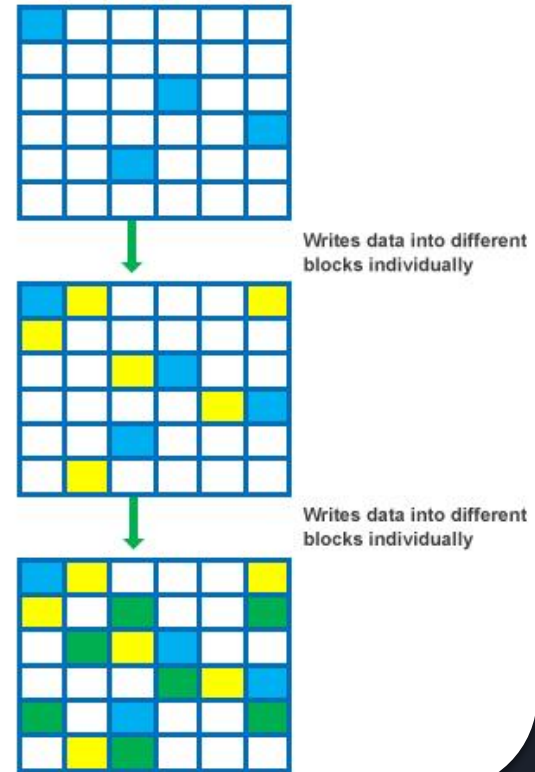
What are our
constraints?

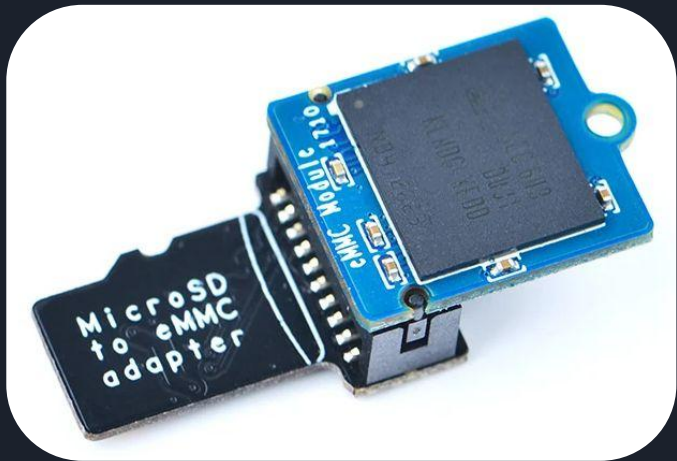


Without Wear Leveling Technology:



When using Wear Leveling Technology:





eMMC adapter



Wear Leveling - Hardware



SQLite3 vs InfluxDB

```
mock_sensors_to_sqlite3.py
sensors_storage.sqlite
sensors_storage.sqlite-shm
sensors_storage.sqlite-wal
```

```
.../wal/
└─ 000xX00xxXx000x0/ (bucket ID)
   └─ autogen/
      └─ 0123/ (shard ID)
         └─ _01234.wal (WAL file)
```



Target Hardware

Hardware	Chipset	Instruction Set	SQLite3	InfluxDB
Pi 2 Model B v1.1	ARMv7	32 Bit	+	×
Pi 2 Model B v1.2	ARMv8	64 Bit	+	+
... Pi 5 Model B				



Features We Want

- ✓ Derived data - combinations
- ✓ Resampling, downsampling
- ✓ Aggregation
- ✓ Background processing
- ✓ Retention policies



Quality Attributes

Conceptual Integrity

- reads & writes logically separated
- query & command encapsulation
- decoupling “sensing” from “recording”
- single responsibility principle



Quality Attributes

*Maintainability, Reusability, Portability,
Testability*

- installation
- schema checks
- lock-step deployments
- library support
- mock data format & injection
- feature coverage
- Integration options



Quality Attributes

Performance

- latency (soft real-time)
- throughput (datapoints/sec)
- memory footprint
- CPU usage
- IOPS



Quality Attributes

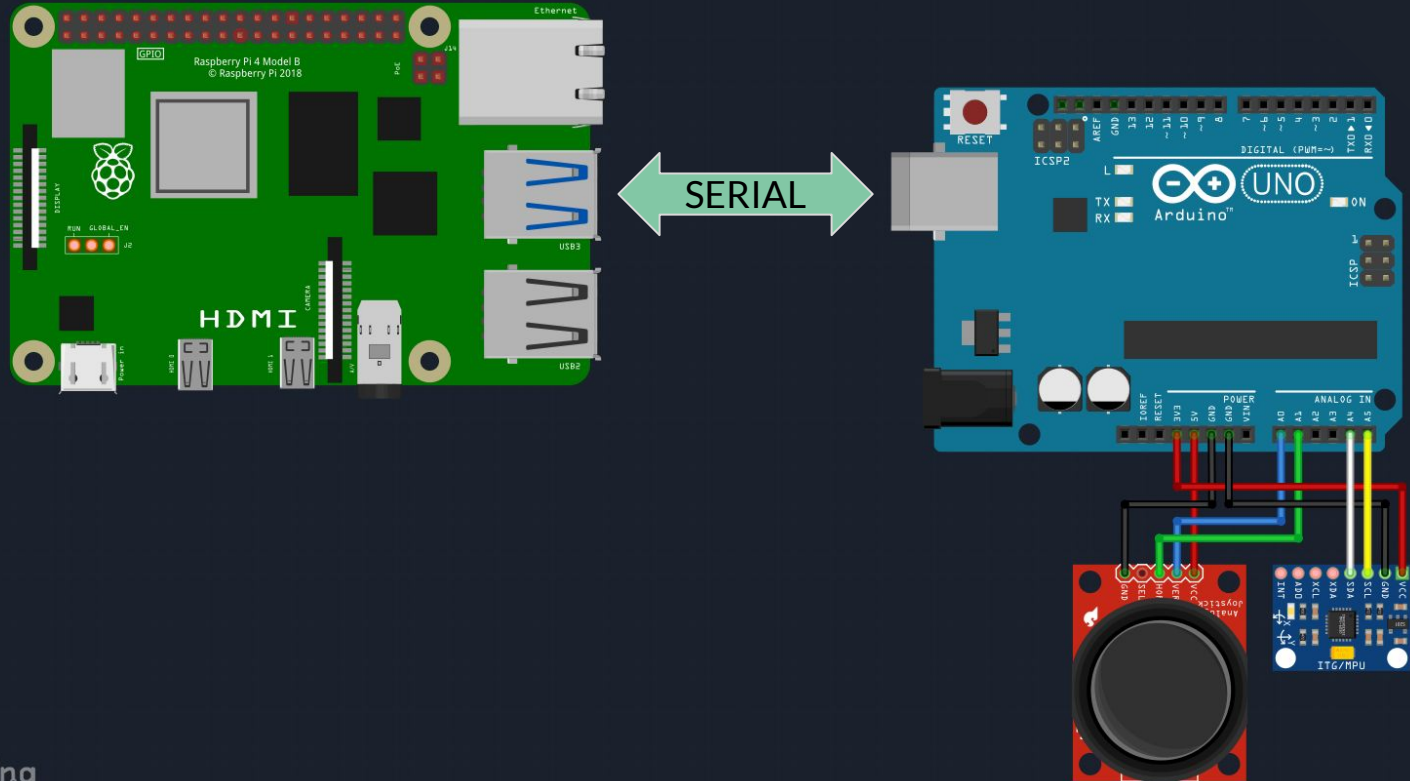
Security

- remote/local port exposed
- read/write permissions separated
- data available for certain Unix users
- data protected with strong password

Drunk Crane Operator



Wiring



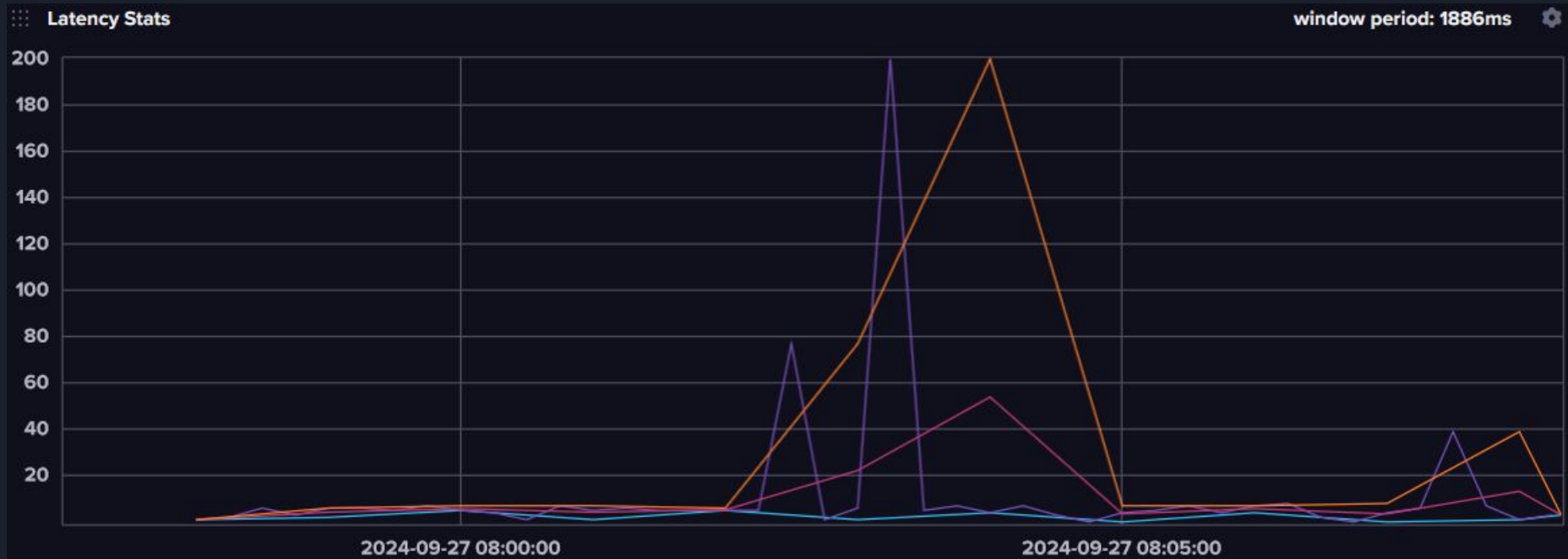
Core Features



Performance



Latency



Throughput - SYNC



Throughput - ASYNC



Throughput - Batch

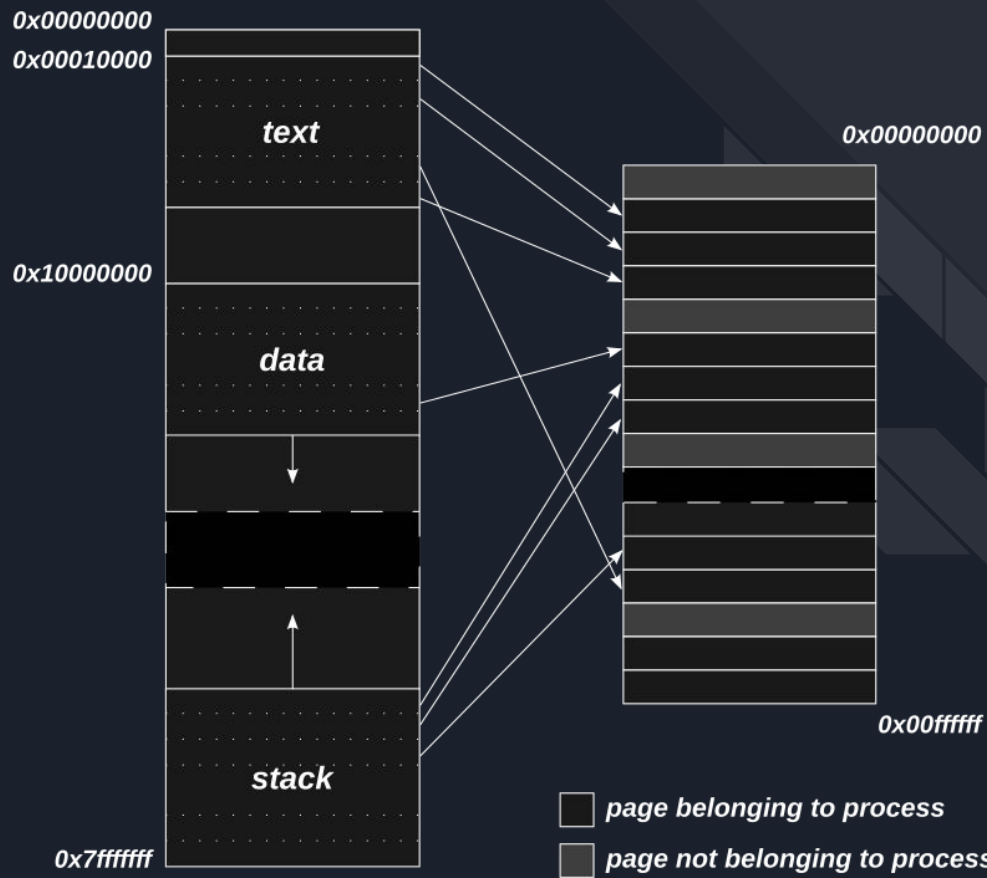


Memory Consumption



Virtual address space

Physical address space



Binary Size

>go · github.com/influxdata/influxdb/v2/ — (26M / 43%) — Click to zoom out

static.

21M / 33%

tsdb/

1.1M / 1.8%

influxql/

570k / 0.92%

pkgerr/

570k / 0.91%

http/

500k / 0.80%

storage/

380k / 0.61%

cmd/influxd/

340k / 0.54%

v1/

290k / 0.47%

tenant/

260k / 0.42%

notification/

220k / 0.35%

kv/

190k / 0.31%

query/

140k / 0.22%

replications/

100k / 0.16%

authorizer.

92k / 0.15%

kit/

80k /

pkg/

130k / 0.21%

annotation

76k /

label.

67k /

dashboa

64k /

authoriz

64k /

task/

110k / 0.17%

models.

76k /

session.

64k /

sech

64k /

inn

64k /

self

110k / 0.17%

dbro.

76k /

telegraf/

64k /

notepad

64k /

remotes/

64k /

size count

Binary Size - Reduced

>go · github.com/influxdata/influxdb/v2 — (5.9M / 14%) — Click to zoom out



size count

Questions?





Thanks!



Oresztész Margaritisz

<epam>



@gitaroktato



gitaroktato



<https://www.linkedin.com/in/oresztesz>