In-situ (LED Component) - WP1

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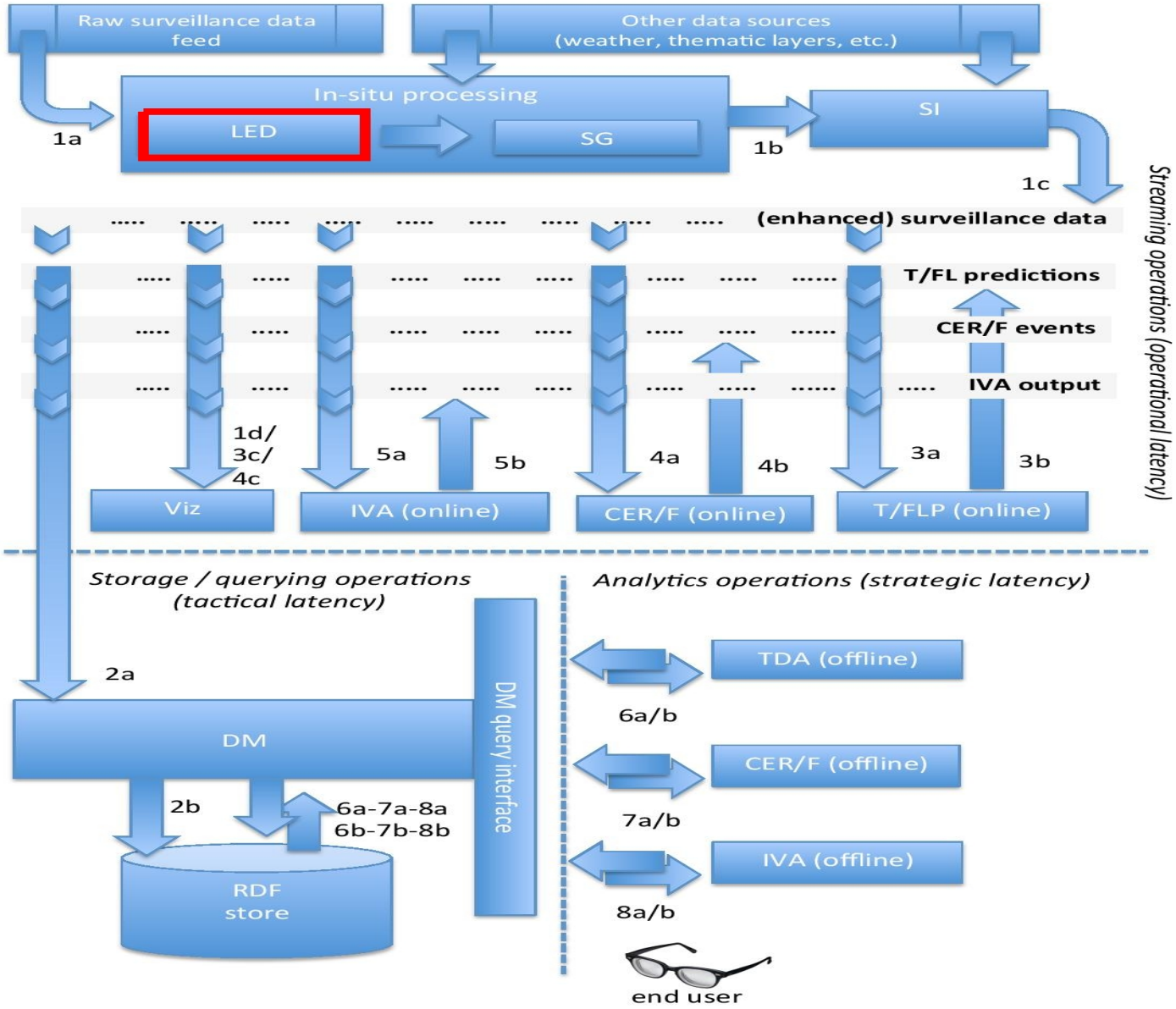
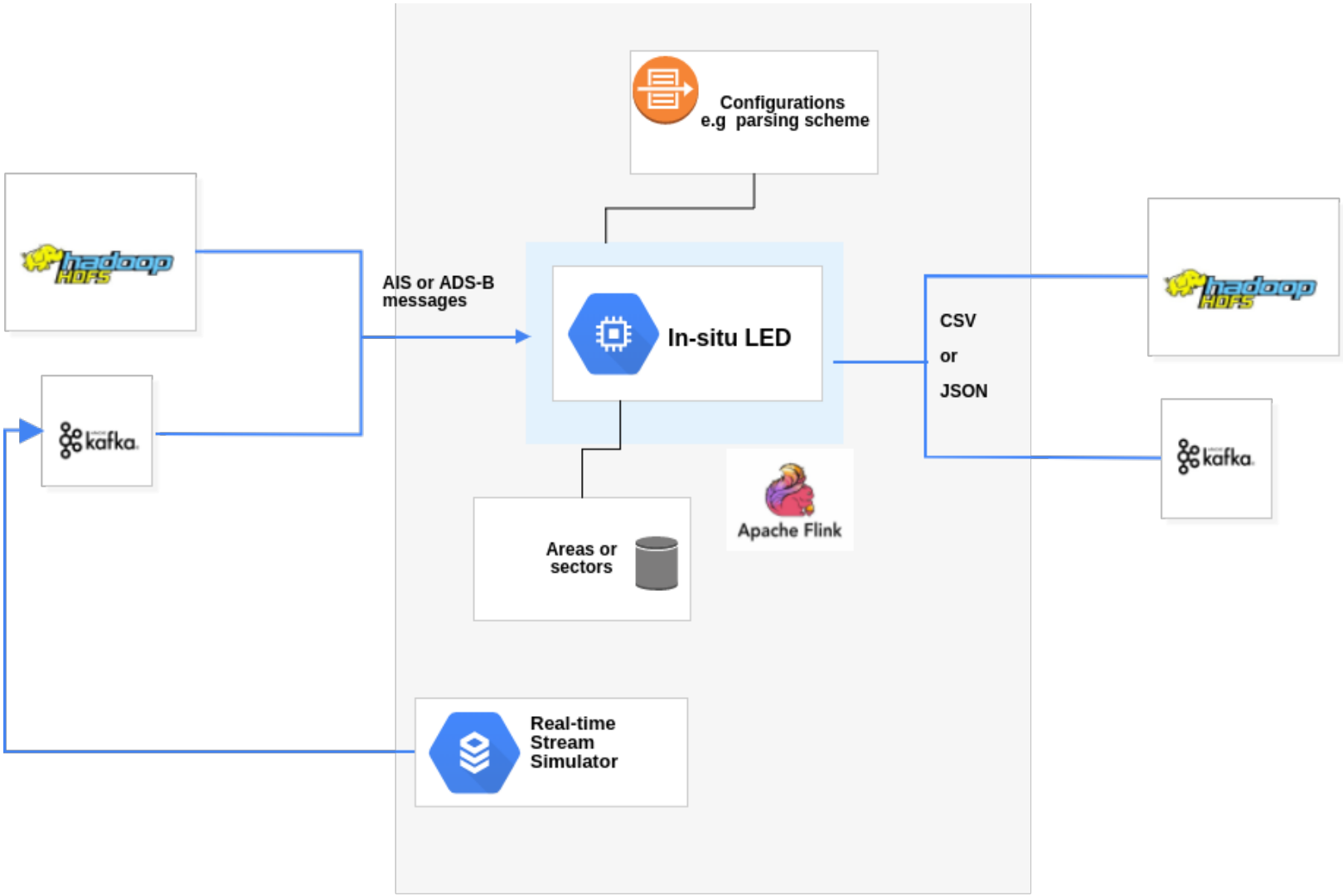
Outline

datAcron Architecture



In-situ (LED Component) [1]

Overview



[1] github.com/ehabqadah/in-situ-processing-datAcron

In-situ LED

Functionalities

- Trajectory enrichment: computing trajectory statistics such as min/max/mean/var speed.
- Monitoring of AIS messages against areas information (detected areas)
- Derivation of low-level events for area entering and leaving

Real-time stream simulator

- Read raw AIS File to generate a reply stream
- Reconstruct the trajectories and use the actual time difference between the points to replay origin stream
- *delayScale* parameter to scale up/down the out stream rate

Output CSV scheme (29 fields)

```
timestamp,id,longitude,latitude,speed,
heading,msgErrorFlag,turn,course,status,
NumberOfPoints,AverageDiffTime,LastDiffTime,
MinDiffTime,MaxDiffTime,MaxSpeed,MinSpeed,
AverageSpeed,VarianceSpeed,MinLong,
MaxLong,MinLat,MaxLat,MinTurn,MaxTurn,
MinHeading,MaxHeading,isChangeInArea,
detectedAreas
```

Deployment

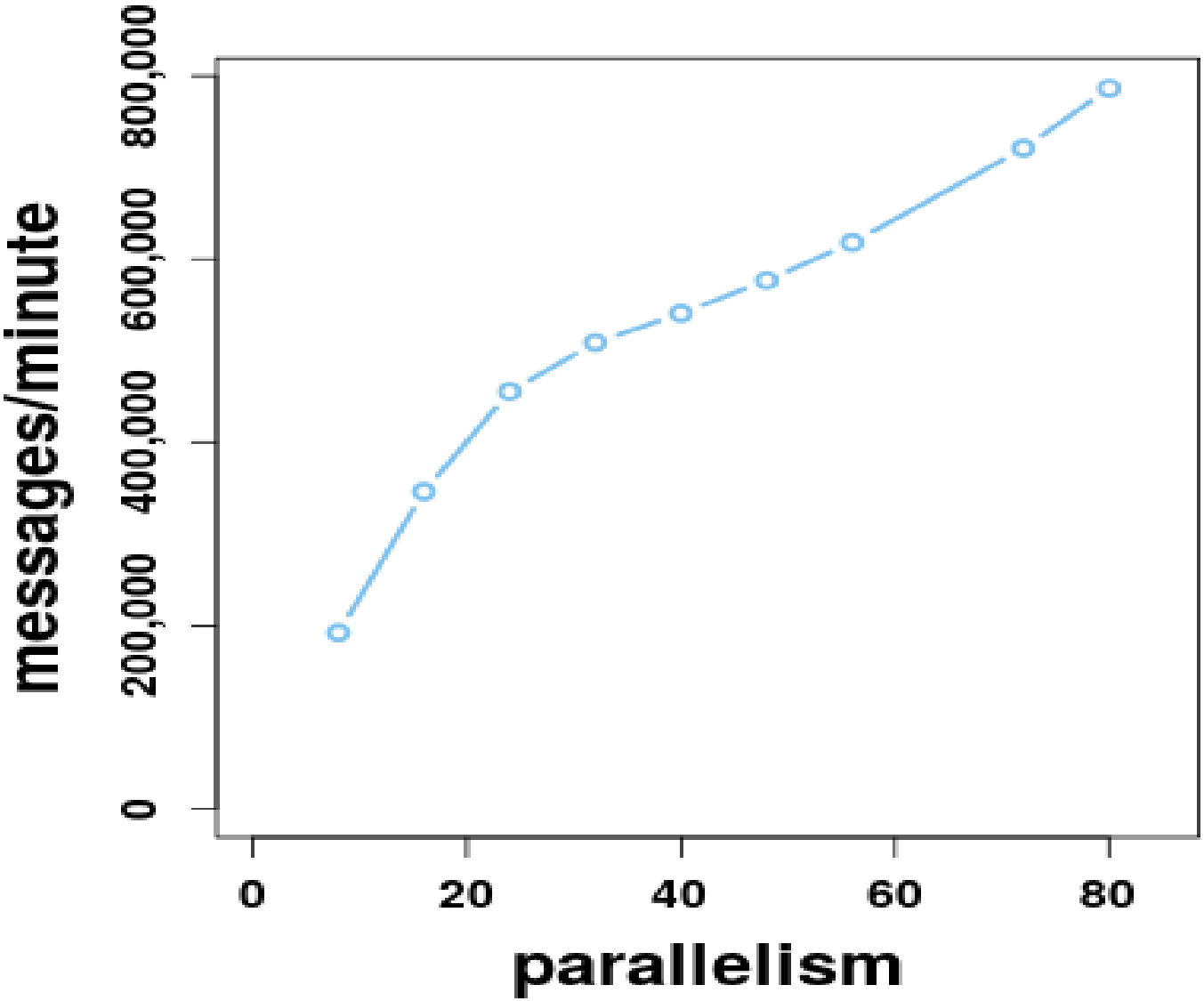
- From deployment on a single VM machine
- To deployment on the YARN datAcron cluster (10 *nodes X* 8 *cores*)

In-situ deployment on datAcron YARN cluster

```
#!/bin/bash

# YARN Cluster configs
numberOfTaskManagers=10
memoryPerTaskManager=15360
processingSlotsPerTaskManager=8

# Pull new code changes
git pull

# Build the project
mvn clean package

projectWorkDir=$(pwd)
.
.
.
.
.
jarFile=$(find $projectWorkDir/target/in-situ-processing*.jar)

jobName="in-situ-p:$parallelism-tm:$numberOfTaskManagers"

# Submit a Flink program to the YARN cluster

./bin/flink run -m yarn-cluster -yn $numberOfTaskManagers -ytm $memoryPerTaskManager -ys $processingSlotsPerTaskManager  -ynm  $jobName $jarFile  > deployOnYarn.log &
```

In-situ Performance

Throughput on datAcron YARN cluster



Conclusion

LED in-situ processing resources/CPU consumption and delay can be neglected