



Detect Safety Zone Violation in Manufacturing with SAS Event Stream Processing and ONNX models

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Problem Statement

- *At a customer's facilities, there are areas deemed "prohibited space", i.e., "do not enter". Existing Security cameras were used to provide the video feed for analysis (a camera shows one or more of these spaces). Use Computer Vision to alert when someone enters the prohibitive space. Total: 12 cameras.*



Key Focus Areas



Detect people in prohibited fenced spaces using ONNX Model



Deploy the solution in production for multiple cameras



Integrate with customer's downstream system, using their existing processes to notify them of violations



Monitor and save system health data

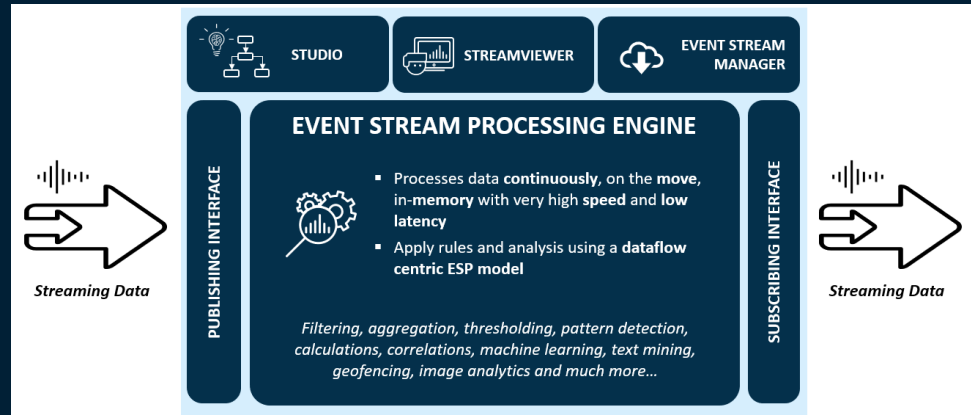


Notify customer of any system problems

SAS Event Stream Processing (ESP)

Engineered for Agility

- Small footprint OS native application
- Supports lightweight embedded technology to cloud distributed architecture
- Fulfill Edge-to-Enterprise IoT architecture needs
- Growing IoT partner Ecosystem



SAS ESP is a Complex Event Processor (CEP) that can analyze and understand millions of events per second, detecting patterns of interest as they occur – the results show the correct actions to take, what alerts to issue, which data to store and which events to ignore

SAS Event Stream Processing

Supports entire streaming analytic lifecycle



Developer:
Design & Test

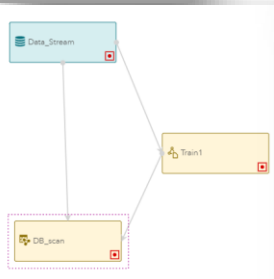
- Design, Test, Validate
- Integrate Analytics
- Visual Modeling
- XML Editor
- Notebook development



IT:
Deploy & Monitor

- Automate Deployment
- User defined, scriptable plans
- Reusable templates
- Discover & Monitor

SAS ESP Studio



SAS ESPpy: Jupyter

```
1 project = esp.create_project(name="Query_1")
2 project.add_source()

3 Create the project windows and define the workflow connections
4 Create a source window (Sales_Sales.sql) to convert the project to the source data adding it to the ESP
project

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SAS Event Stream Manager

SAS Event Stream Manager - Engines

Engine Name	Admin Port	Refresh Port	Version	Analytic Licenses	CPU Use (%)	Memory Use (%)	Host
ESP Server 2	3002	3002	4.3	True	0	0	rkson10001.usa.sas.com
ESP Server 1	3002	3002	4.3	True	0	0	rkson10001.usa.sas.com

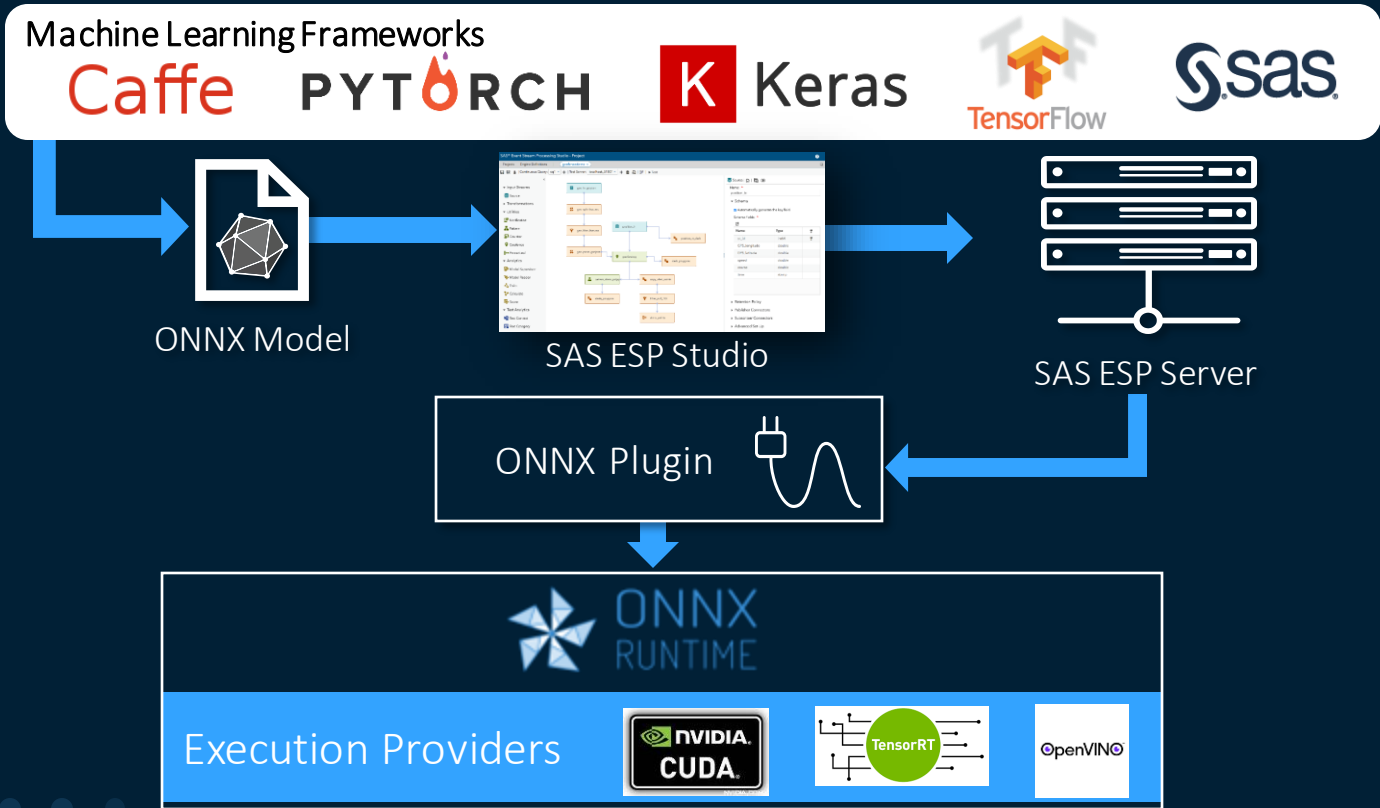
Running Projects

Status	Running Project	Project	Engine
Running	MC001	Flowbuilder	ESP Server 1



ONNX Integration

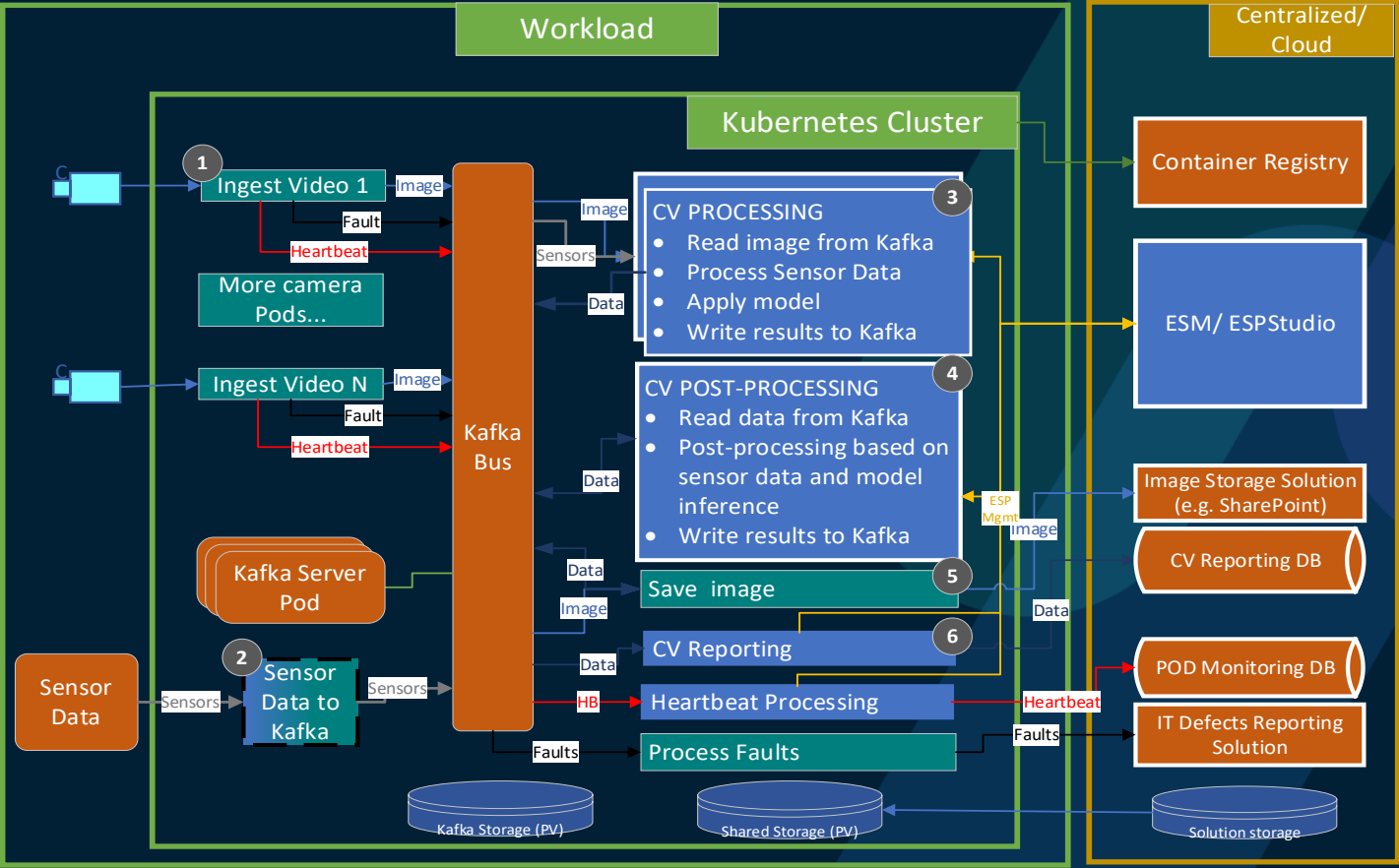
How it works



Proposed “Modular” CV pipeline



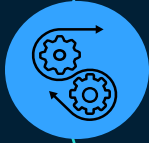
Deployed Architecture



SAS ESP POD
PYTHON POD (from SAS)
3rd Party
Workload Infrastructure
Centralized Infrastructure



Solution Highlights



Time to value:

Take advantage of ONNX pretrained models and Customer Assets



Resiliency:

No data lost due to Kubernetes, Kafka integration



Performance and Scale:

Containerized lightweight deployment with GPU acceleration



Flexibility and Extensibility:

Support for multiple Cameras/GPU and ad-hoc post processing

Q&A

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