



Rapid Digital Oil Field transformation Based on Edge Computing

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ARABIAN GULF OIL COMPANY

Introduction



One of National Oil Company in Libya



Production Capacity ~ 400K BOPD
50 years in operation



Sustainable Production Enhancement
Performance Driven by Technology



IT & Production Department Shared Vision

Enable Data Driven Decision Making

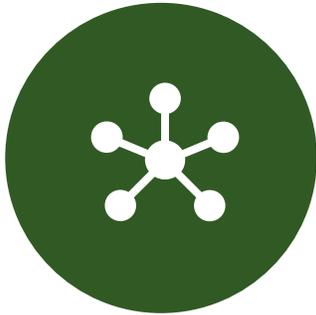
Leverage Digital Technologies To Maximize Team Efficiency

Develop Rapid and Scalable Digital Oil Field

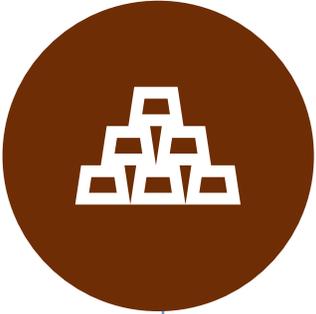
Schlumberger

Edge
Computing
Solutions

Project Background



Remote Greenfield

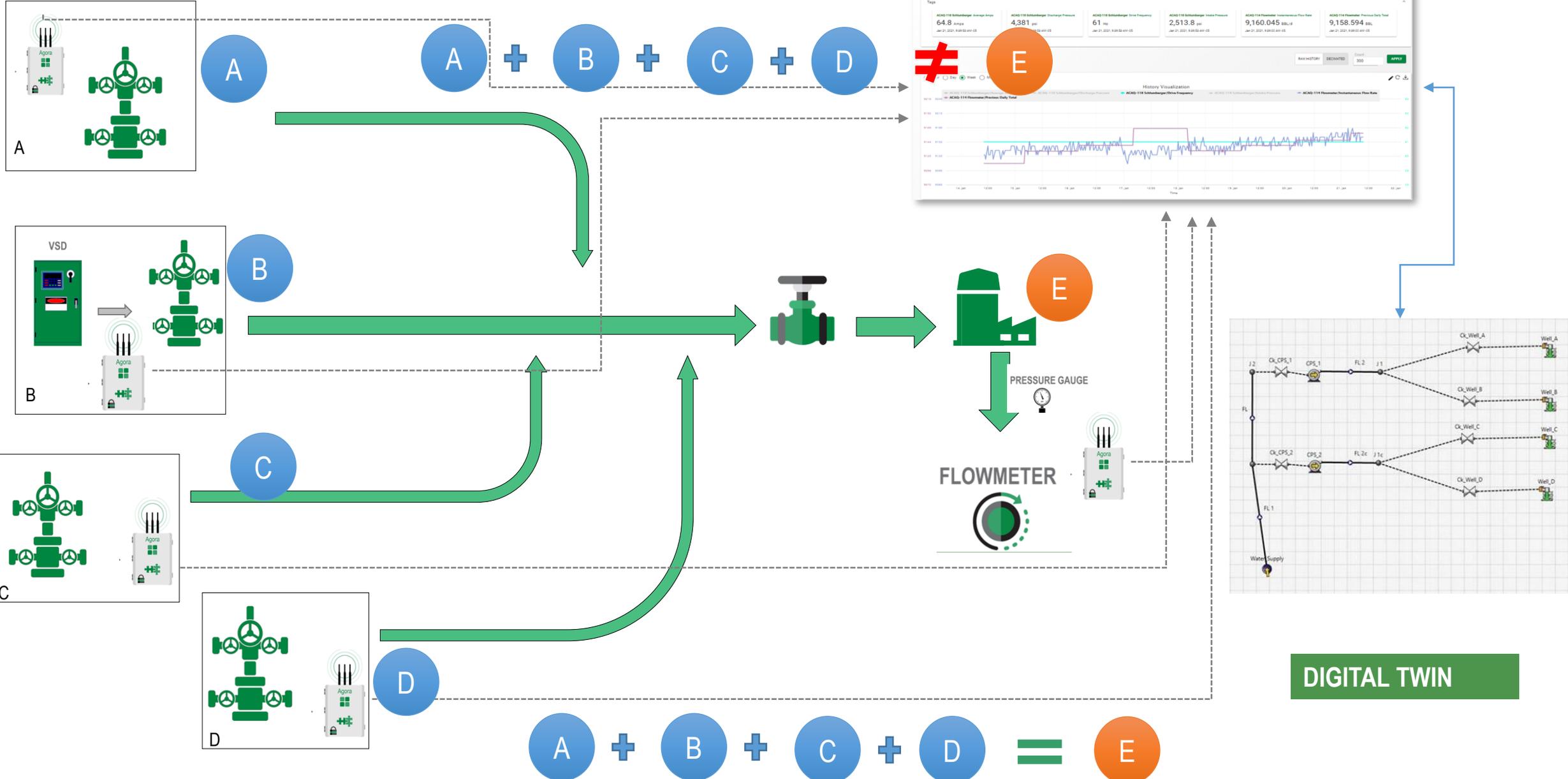


Peak Performance

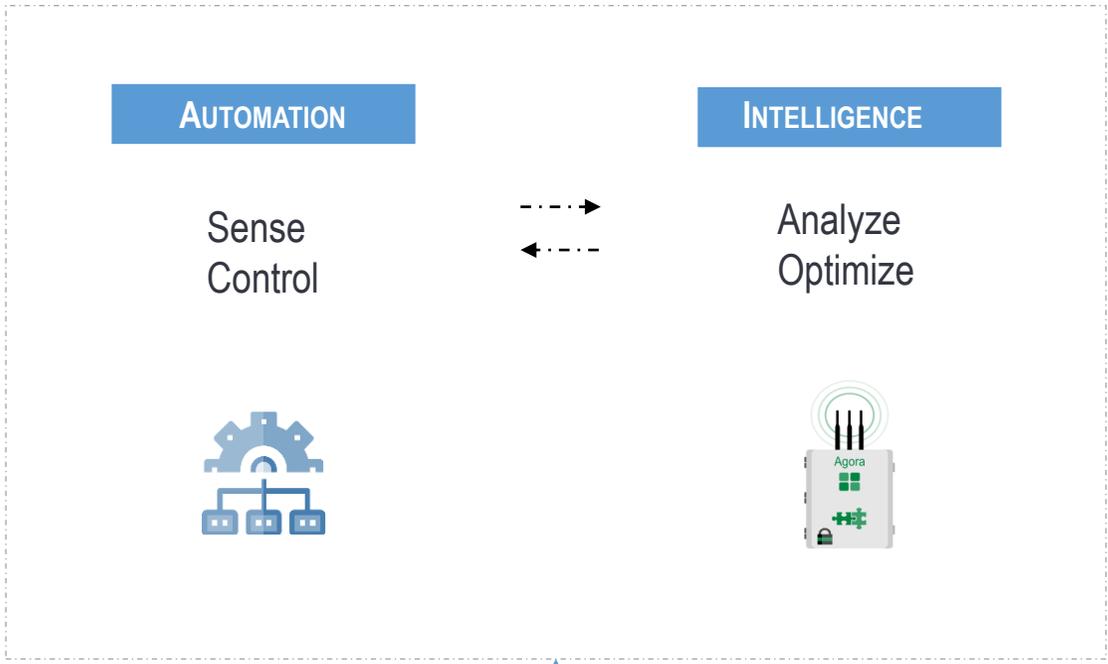
- 30K BOPD Target
- Limited Infrastructure
- Site & Asset Security

- Digital Enablement – Day “0”
- Maximize Well & Network efficiency
- Safety

Challenges and Goal



Solution Architecture



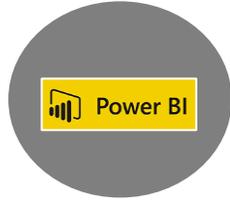
AGORA Ops PORTAL

NETWORK LEVEL



WELL LEVEL

Flexible Analytics



Key Features of the Solution

Virtual Flow Metering

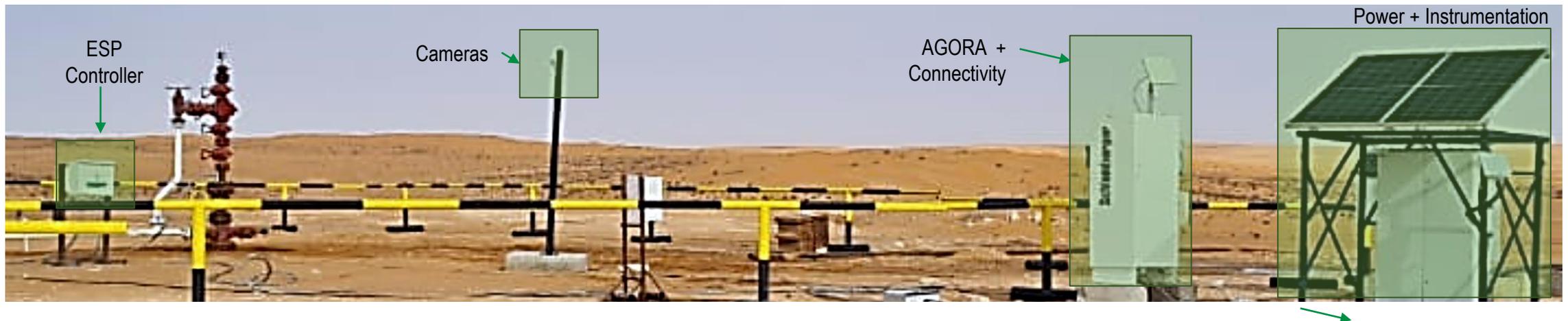
- Naturally Flowing Well - Choke VFM
- Wells with ESP – PIPESIM on Edge

Site Security

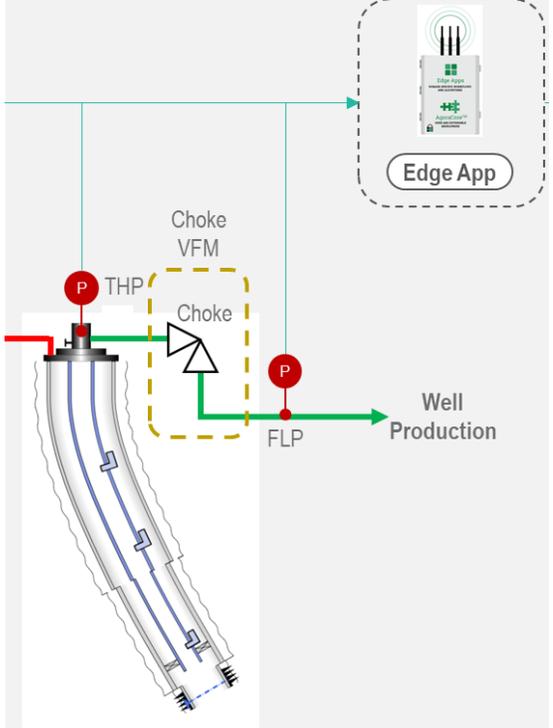
- Motion Detection Video Analytics
- Alarm System

Packaged Solution

- SENSIA
- Production System – ESP / Metering & Valves
- Power & Connectivity



Virtual Flow Metering : Natural Flow Well



TRENDING THP AND FLP



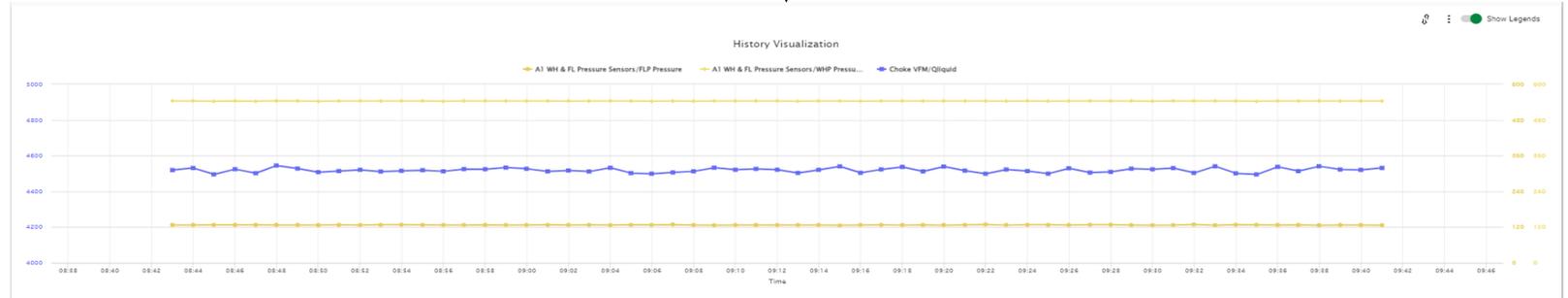
WELL TEST DATA

DATE	TIME	THP	FLP	CHOKING	STATUS	OPERATOR	REMARKS
09/01	08:00	127547	547963	...	...	...	...
09/01	08:05	127547	547963	...	...	...	...
09/01	08:10	127547	547963	...	...	...	...
09/01	08:15	127547	547963	...	...	...	...
09/01	08:20	127547	547963	...	...	...	...
09/01	08:25	127547	547963	...	...	...	...
09/01	08:30	127547	547963	...	...	...	...
09/01	08:35	127547	547963	...	...	...	...
09/01	08:40	127547	547963	...	...	...	...
09/01	08:45	127547	547963	...	...	...	...
09/01	08:50	127547	547963	...	...	...	...
09/01	08:55	127547	547963	...	...	...	...
09/01	09:00	127547	547963	...	...	...	...
09/01	09:05	127547	547963	...	...	...	...
09/01	09:10	127547	547963	...	...	...	...
09/01	09:15	127547	547963	...	...	...	...
09/01	09:20	127547	547963	...	...	...	...
09/01	09:25	127547	547963	...	...	...	...
09/01	09:30	127547	547963	...	...	...	...
09/01	09:35	127547	547963	...	...	...	...
09/01	09:40	127547	547963	...	...	...	...
09/01	09:45	127547	547963	...	...	...	...
09/01	09:50	127547	547963	...	...	...	...
09/01	09:55	127547	547963	...	...	...	...
09/01	10:00	127547	547963	...	...	...	...

INITIAL CALIBRATION

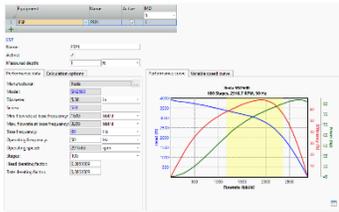


OUTPUT: RT LIQUID FLOW RATE



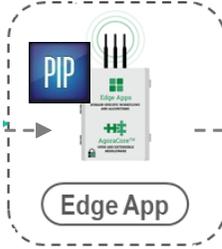
Virtual Flow Metering : ESP Lifted Well

PIPESIM ESP MODEL



INITIAL WELL MODEL CALIBRATED TO WELL TEST DATA

PIPESIM Running At EDGE

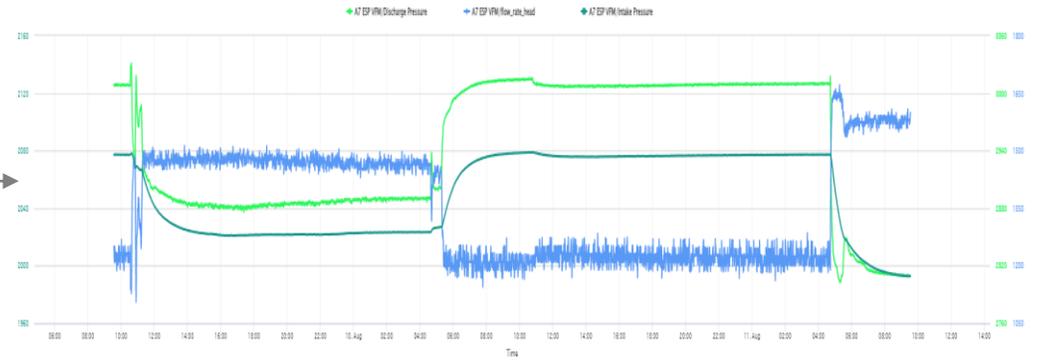


EDGE CALIBRATION WITH NEW WT DATA

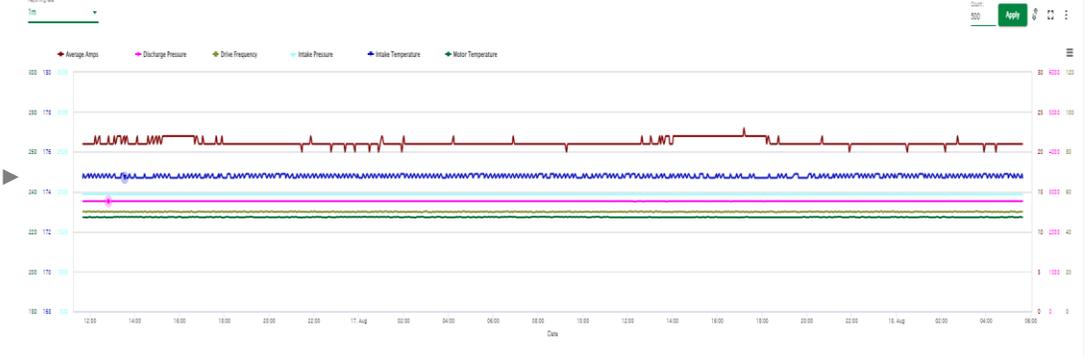
WELL TEST DATA: MODEL CALIBRATION

DATE	LIQUID_RATE	WCUT	GOR	API
2/22/2022	1080	0	1522	42
3/1/2022	1221	0	1305	42
3/6/2022	1219	0	1143	42
3/10/2022	1229	0	1053	42

OUTPUT: RT LIQUID FLOW RATE



ESP PERFORMANCE SURVEILLANCE

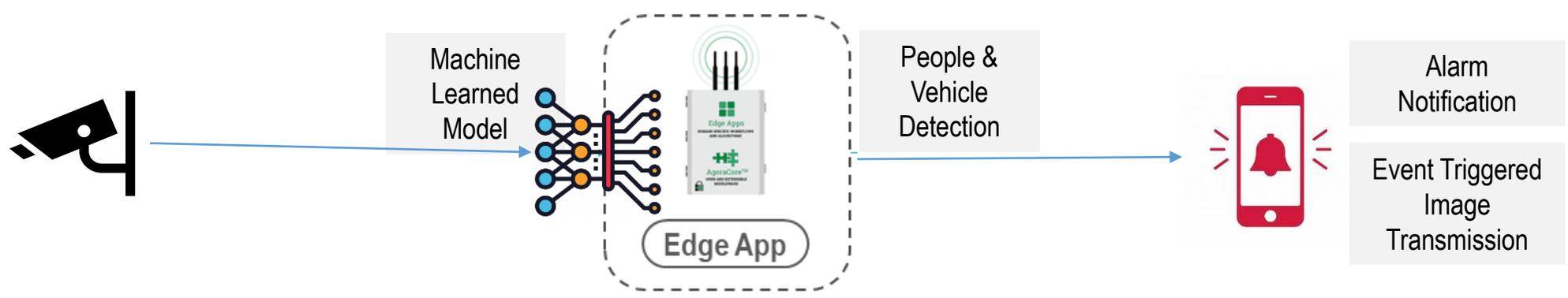


Site Security : Machine Learned Analytics

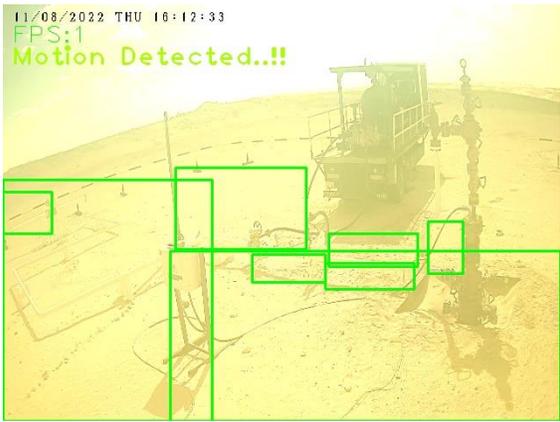
Security of AL equipment , Fuel Tanks and Instrumentation

Edge Computing

Cost of Satellite Data Makes Normal Video Surveillance Economically Unviable in Remote Fields

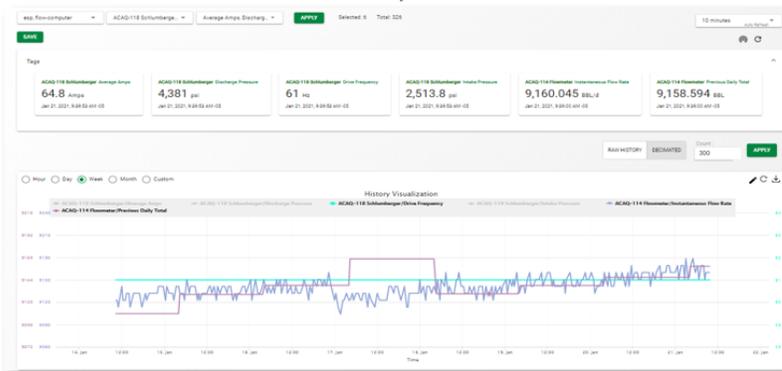
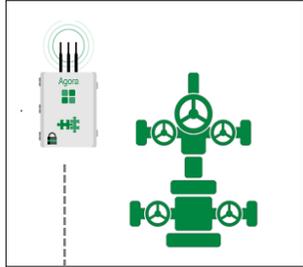


Real Time Video Analytics at EDGE



- Minimal Data Transmission
- Economic Viability Achieved

Well Network Integration Model

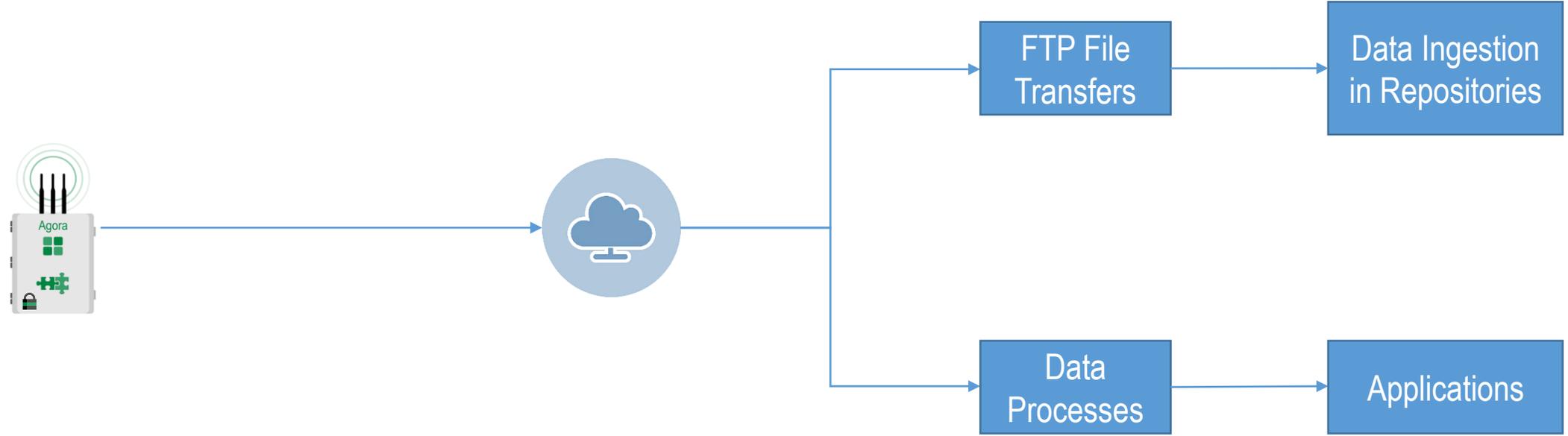


PIPESIM INTEGRATION:

- **Agora** data is consumed in **PIP** Network model.
- Production optimization.
- New Well Design
- Production bottleneck identification.

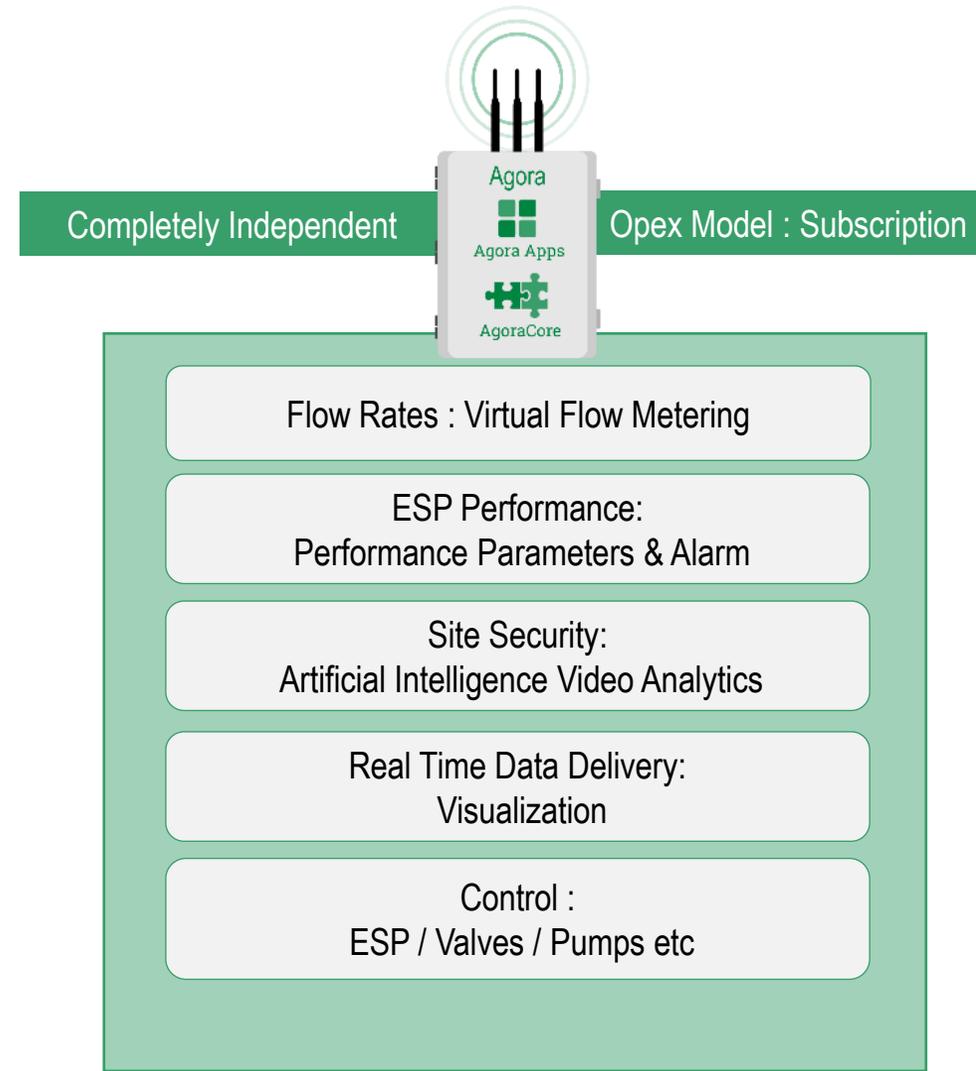
Data Integration

Data Ingestion from AGORA cloud to Our Databases and Application



Value Realization

- Digital Oil field in Green fields
- Package : Sensors, Power, Connectivity and Edge AI Intelligence
- 1st Ever : Edge deployment for Asset Security, Edge Flow rate
- Wells and Network performance : KPI Tracking
- Asset Security : HSE related trips reduced by 90%
- CO2 emission reduction : 16T / deployment / Year
- Planned scale Up : Gas Lift Optimization, Choke Control



Thank You!!

Q & A