



Digital Foundation to Empower Industry 4.0 for Oil & Gas

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85	2125905	445735	
86	2321244	120086	
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88	5663890	6520878	5278455
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90	2525405	5055254	5200861
91	6521923	6352300	527007
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97	78550	6450754	655767
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01	23144		



2X

by 2045

5X

Growth in Renewables

110

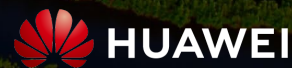
MBPD Peak Oil Demand by 2030

30%

Growth in Gas Demand

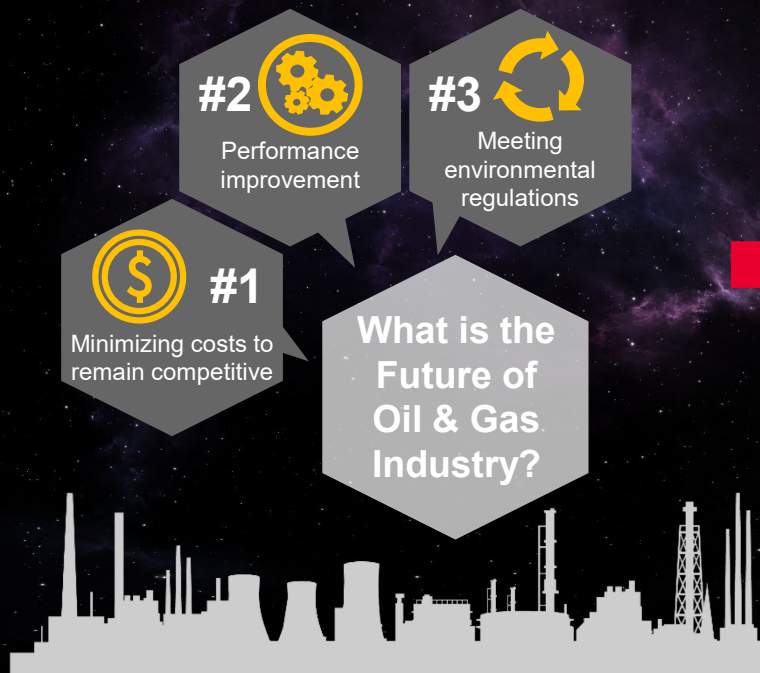
194

States signed
Paris Agreement

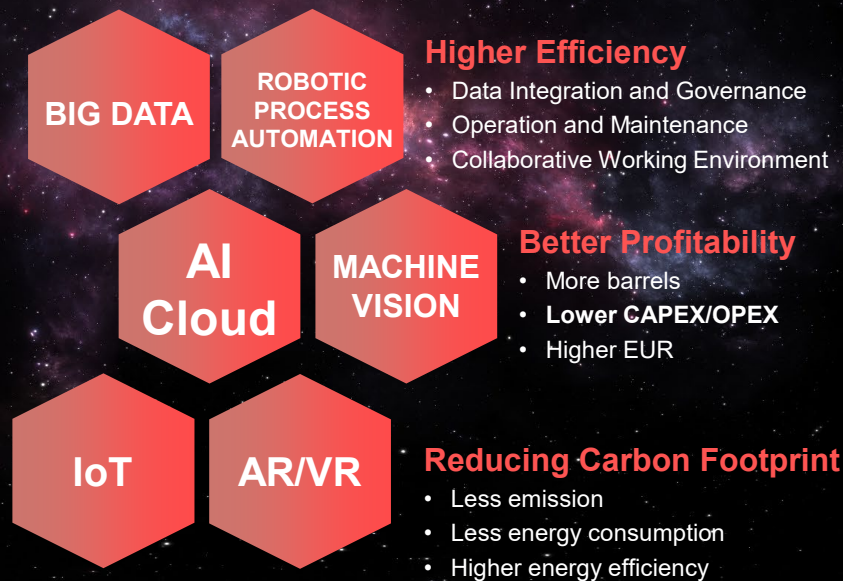


The Key to Next-Chapter of Oil and Gas

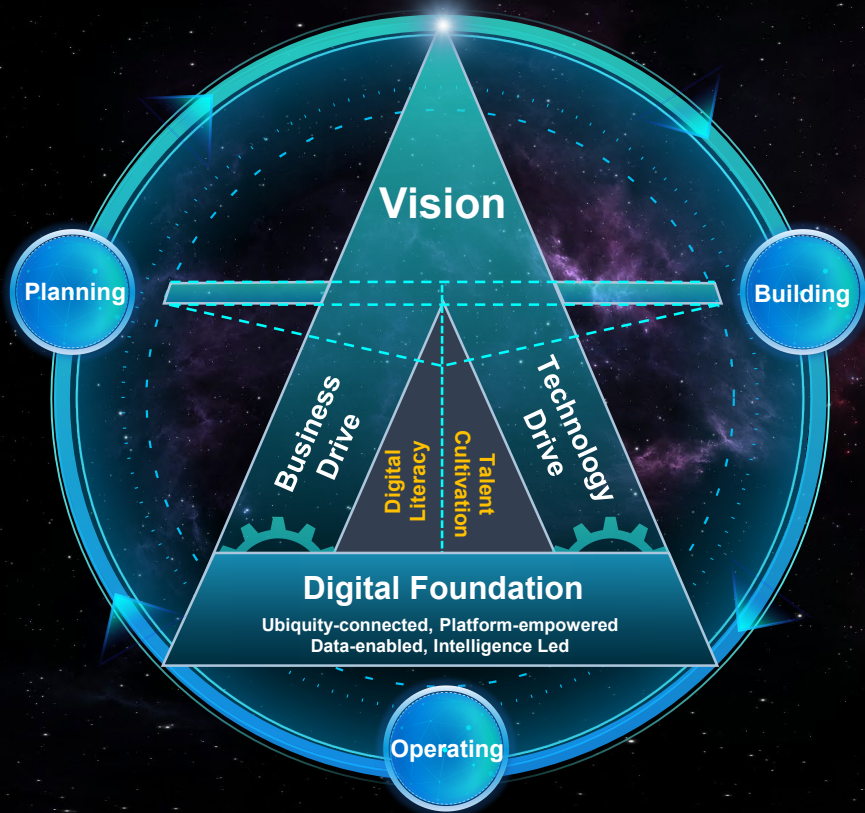
Top Challenges Influencing the Growth of Oil and Gas Companies



Digital Transformation for a Sustainable and Greener Business



Leading the Energy Industrial Transformation



1 Vision

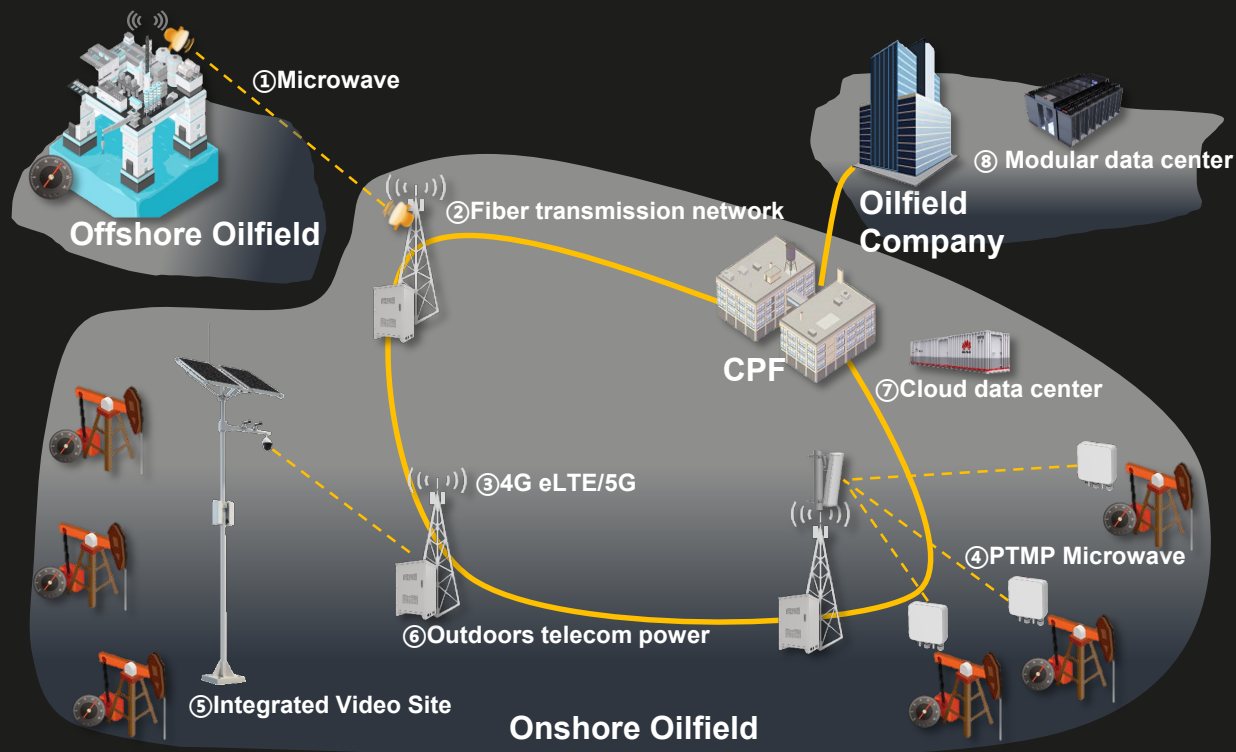
2 Drivers

3 Processes

2 Guarantees

One Foundation

Ubiquity-connectivity: Core Enablement of Mobility and Agility



Highlights

- 1. All-Scenario Connectivity:**
visualized production, mobile operation and emergency response, etc.
- 2. Intelligent Security:**
improved HSE by terminal-edge-cloud intelligent analysis; cost effective, simple O&M and anti-theft power supply for remote sites.
- 3. Modular Cloud DC:**
shorten construction period, improve resource utilization and agile response to business.

Ubiquity-connectivity: World's 1st eLTE Network for Offshore Field

Offshore Oilfield in Norway



This is a milestone for us involving one of the most innovative providers in the telecommunication industry into our business. The cooperation with a market leader such as Huawei is very exciting and we are intrigued by their professional attitude and ability to support us on the deployment of their technology into such extreme conditions.

Per-Helge Svensson
CEO of Tampnet

Customer Challenges

1. Brown field with oil wells and tankers without network communication.
2. Low speed network cannot support business operation or staffs' life demands
3. Compatible with existing submarine cable
4. High expense for satellite transmission

Solutions

1. LTE broadband for access and trunking, **10ms** latency
2. Wide network coverage: **37km** wide coverage
3. Edge bandwidth: **2Mbits/s** downlink, **1Mbits/s** uplink

Value Gain

1. Realize communication of wells and tankers, support multiple business
2. Realize remote and real-time technical support, reduce O&M cost
3. Improve communication and operation efficiency by 20%
4. Improve staff safety and enrich people's life



Ubiquity-connectivity: 5G Smart Campus

Robotic Inspection

- The inspection process for gas leaks is crucial to the continuity and safety of the Shell Pernis operation.
- With intelligent cameras and sensors on a mobile inspection robot connected to 5G, this inspection can now be fully automated and robotized.



Connected Sensors

- Production asset monitoring is transformed from an ad hoc and paper process, to a remote procedure where real-time data is promptly and digitally available for each asset.
- This increases plant safety and ensures that monitoring data is of high quality and always up to date.



Connected Worker (5G + AR)

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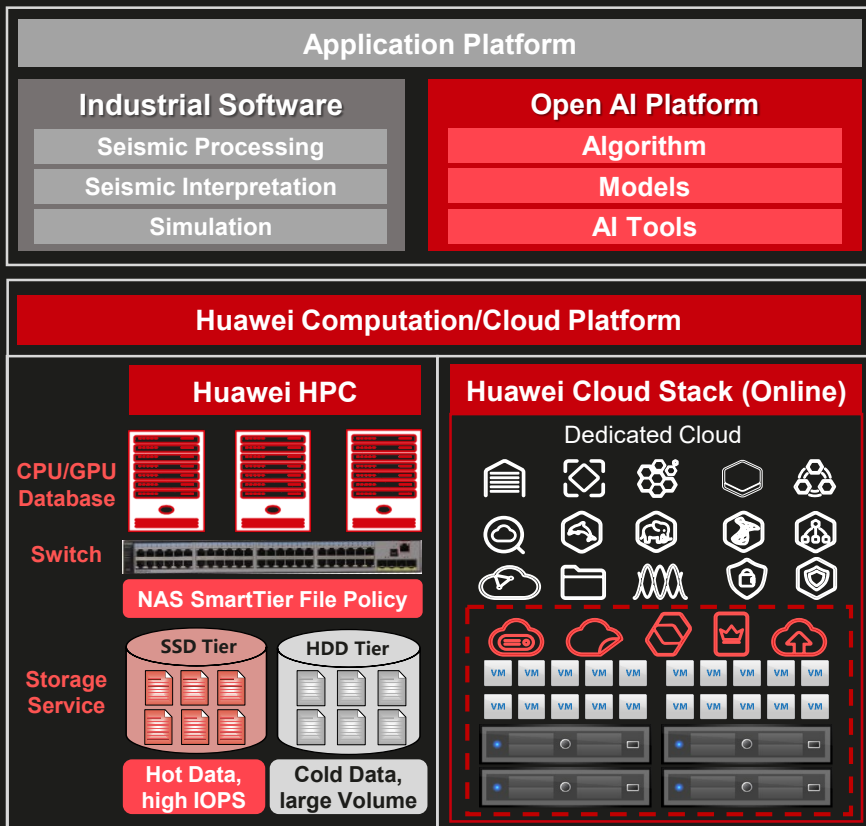


Predictive maintenance (5G + ML)

- Enhance the inspection of ~160,000 km pipe racks at Shell Pernis by high-resolution images delivered by UHD camera on and ML tools.
- This makes it possible to prevent cracks and fractures by detecting corrosion and other defects with high precision in advance.



Platform-empowered: Drive Data to Barrel through HPC and Cloud



Solution Highlights

High Performance

- Performance increases with node expansion to meet high bandwidth requirements for seismic data processing
- All NVMe SSD supports high IOPS, CPU intelligent algorithm, RDMA acceleration, and the time delay reaches millisecond level, which is 20% shorter than traditional storage

High Scalability

- Meet the space requirements in rapid growth of seismic processing intermediate data ,interpretation and reservoir data
- Fully distributed storage architecture, flexible and elastic scaling. Up to 144GBps/5U, 1500K IOPS/5U. Self-developed EC (22+2) storage utilization rate increased to 90%+

Optimized TCO

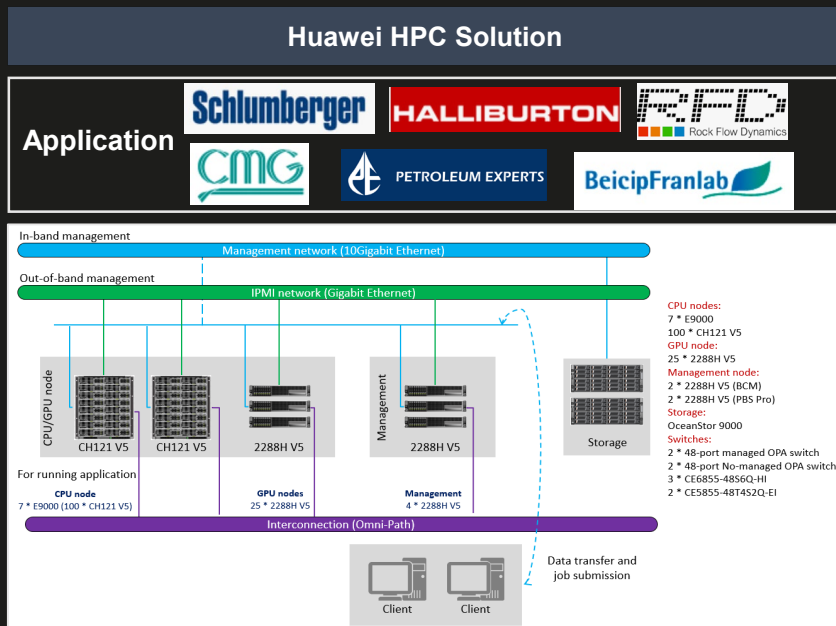
- CAPEX to OPEX
- Unified O&M on E&P services
- Rapid online

Cloud Computing

- Elastic computation resources for seismic processing and reservoir simulation
- Intelligent analysis on Cloud

Platform-empowered: Support NOC's Business Sustainability

Supported one of the major NOCs in Middle East Area to modernize legacy cluster to accelerate reservoir simulation for development planning in 5 years.



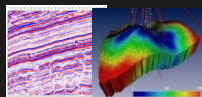
Customer Challenges

- Demand HPC solution to simulate high-fidelity reservoirs
- Low efficiency in reservoir simulation and limited computation capability for adopting innovative algorithm
- Evolutionary platform for future simulation and scale up

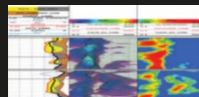
Value Gain

- Improve **45%** performance in reservoir simulation
- Support **5 years** computing evolution
- Professional support in fine tuning POC
- Holistic design and engineering save space in simple management

Intelligent Led: Enable Technology Driven Growth



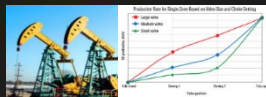
Reservoir
Simulation



Logging
Interpretation



Drilling
Optimization



Production
Optimization



Predictive
Maintenance



Pipeline
Surveillance



Gas Station HSE
Management

Highlights of Huawei Full-stack AI Solutions

Knowledge
Graph



ModelArts

AI Development
Platform



Application enablement: Full-pipeline services, hierarchical APIs, and pre-integrated solutions



Mindspore

AI Training
Framework



MindSpore: Unified training and inference framework for device, edge, and cloud (both standalone and cooperative)

CANN
(Compute Architecture for Neural Networks)

AI Algorithm
Factory



CANN: Chip operators library and highly automated operators development toolkit



AI Chips
Servers



Ascend: AI IP and chip series based on unified scalable architecture



Cloud

Full-Stack
AI Services on
Cloud



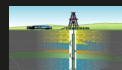
Seismic Data



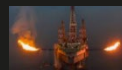
LWD



Mud Logging



Wire Logging



Testing Data



Prod. Data



Downhole
Data

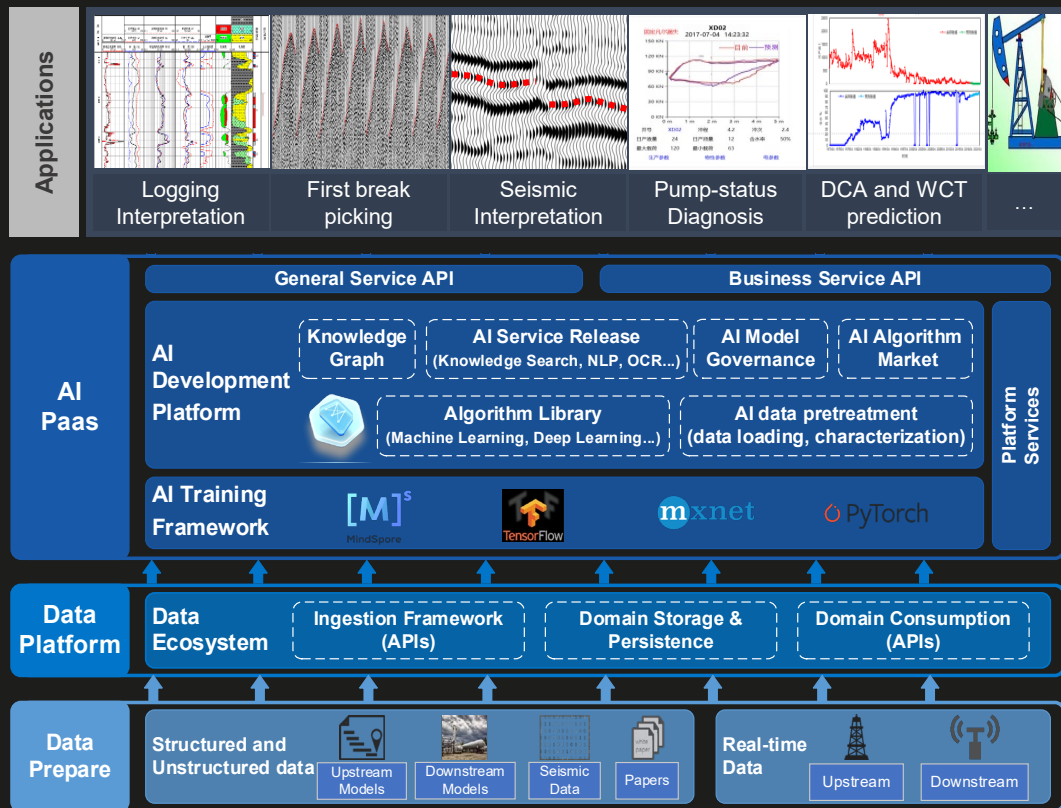


Video



3rd Party

Intelligent Led: Enable Technology-Driven Growth



Customer Challenges

1. Exploration Research: Limited GPU resources, high learning cost for open-source stack, isolated data sources, etc.
2. Production: High OPEX in manpower, operation, maintenance, etc.; limited efficiency due to low collaboration between disciplines; high HSE risks

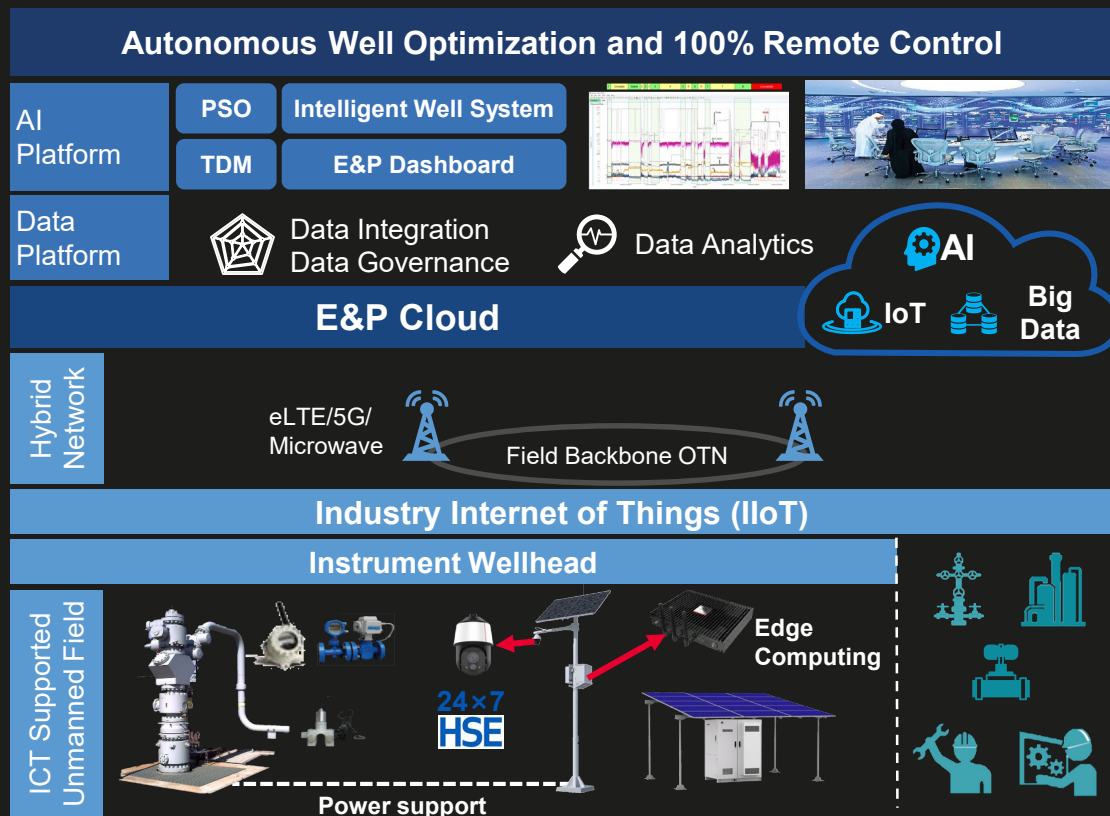
Solutions

1. AI Platform: uniformed AI development environment and tools (Knowledge graph, ML/DL, NLP, etc.)
2. AI Applications: uniformed AI deployment and implementation environment

Value Gain

1. Cognitive Computing Platform enables AI innovation and deployment in E&P activities
2. Knowledge graph enables data-driven analytics, and retains valuable expert knowledge and experience.
3. AI application significantly reduces manual effort, promotes both efficiency and effectiveness by each application developed so far.

Intelligent Led: Enable 24×7 Autonomous Well Optimization



Solution Enablement

Smart Upstream

- Real-time Data Analytics
- Autonomous Optimization, 24×7
- Collaborative Working

Value Added

- 3-5% production
- Unmanned operations
- ~25% energy consumption

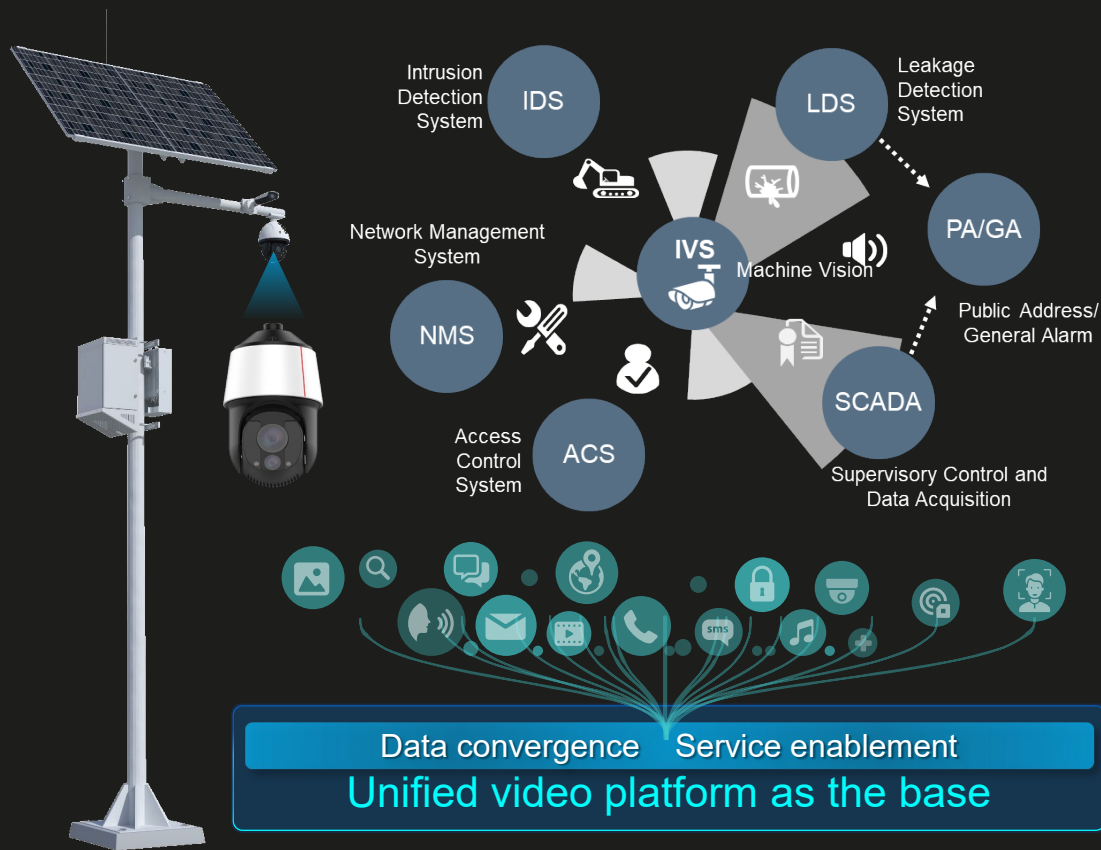
Smart Field

- 100% Real-time Reading
- Remote Control

Value Added

- 1-2% production
- Minimize field trips
- Improved HSE

Intelligent Led: Enable Technology-Driven 100% HSE



Highlights



Inspection and Security Monitoring powered by computer vision (With Partner)

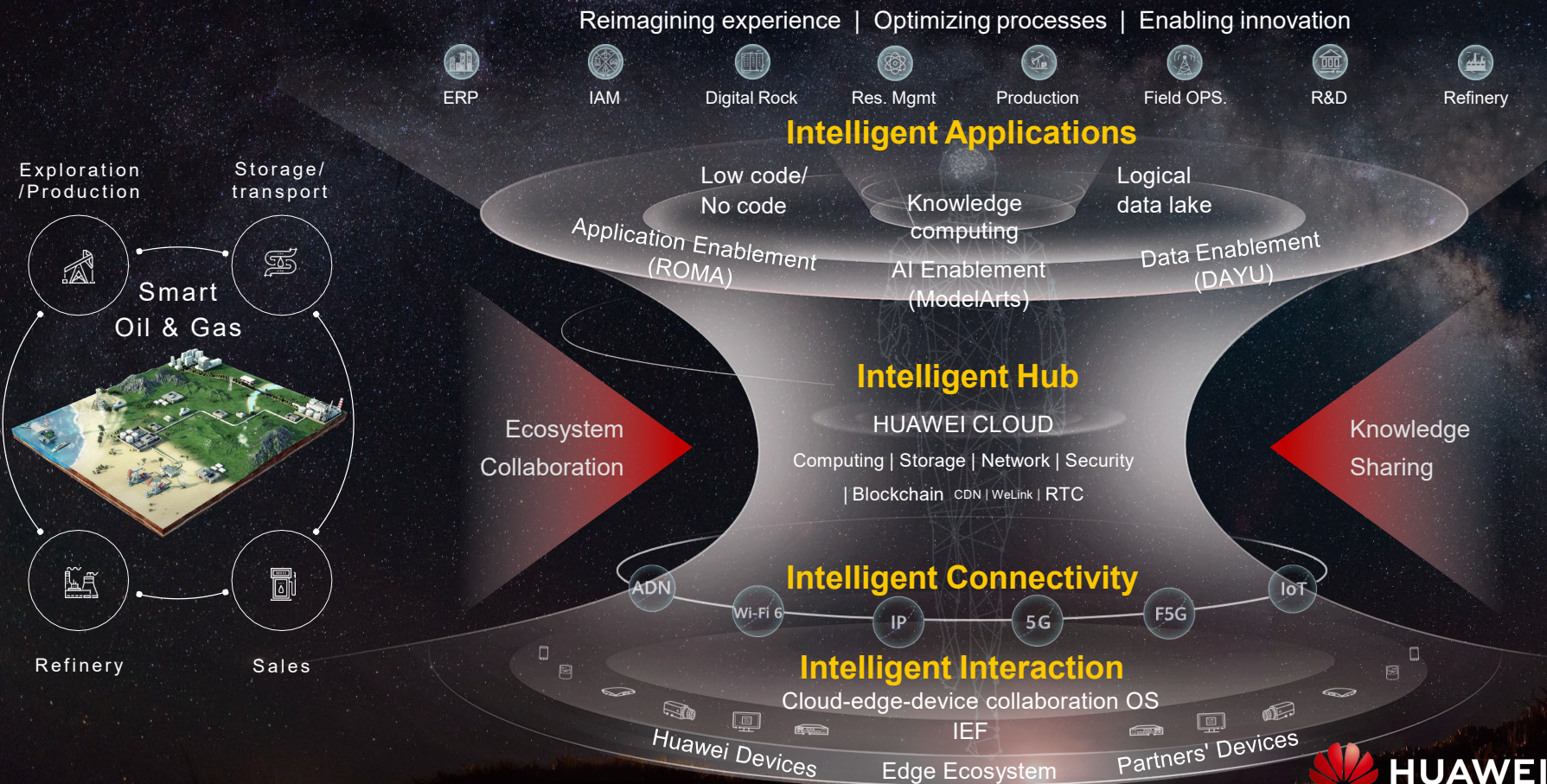


Intrusion Detection System Improve the HCA (High Consequence Area) Security



Alert Validation and Data Correlation by SCADA/IDS/LDS/SENSOR linkage with IVS

Oil and Gas Intelligent Twins: Fueling the Industry Future



Thank you.

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每个组织，构建万物互联的智能世界。

Bring digital to every person, home and
organization for a fully connected,
intelligent world.

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