"THING" CONNECTIVITY IN OIL & GAS OPERATIONS

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6/9/2016

AGENDA

- ❑ Kepware Overview
- ❑ Oil & Gas Industry overview
- ❑ “Things” in the Field and the Types of Data They Have
- ❑ Applications that Require Field Data
- ❑ Types of Networks to Reach the Field
- ❑ Inherent Challenges of Data Collection
- ❑ How a Connectivity Platform Like KEPServerEX Can Help
- ❑ Customer Case Study Examples

KEPWARE PROSPECTUS

Established in **1995**

Located in **Portland, Maine**

20+ YEARS of developing communications software

Connecting the **Industrial Automation** industry

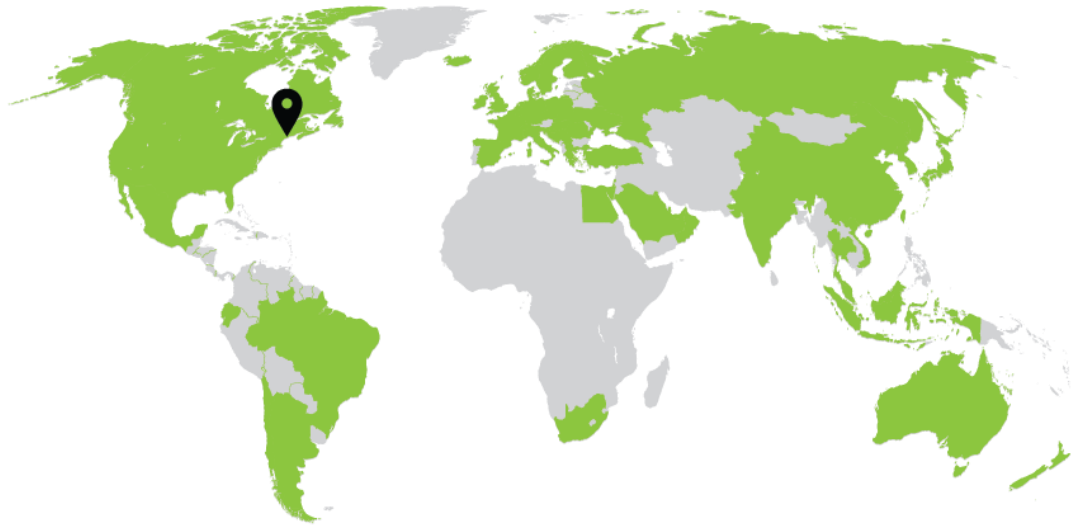
Early player in the **Industrial Internet of Things (IIoT)** market

110+ Employees

STRONG HISTORY OF GROWTH AND EXPANSION

INDUSTRIES SERVED

- Manufacturing
- Oil & Gas
- Building Automation
- Power
- IT & Infrastructure



Control Engineering 2016 Engineers' Choice Awards Winner

2015 10 Years Best Places to Work in ME

First Team Leadership in Automation 2015 Presented By Automation World

Processing's Breakthrough Products 2015

2016 Bronze Stevie Winner for Sales & Customer Service

2015 IoT Evolution Product of The Year

2016 Readers' Choice Awards Control

CONNECTING WITH KEPWARE

THE HEART OF YOUR INDUSTRIAL CONTROL SYSTEM

- Moves critical information from Point A to Point B
- Communication bridge between hardware and software applications
- Enables informed decision-making from the shop floor to top floor
- Provides consistent, reliable data

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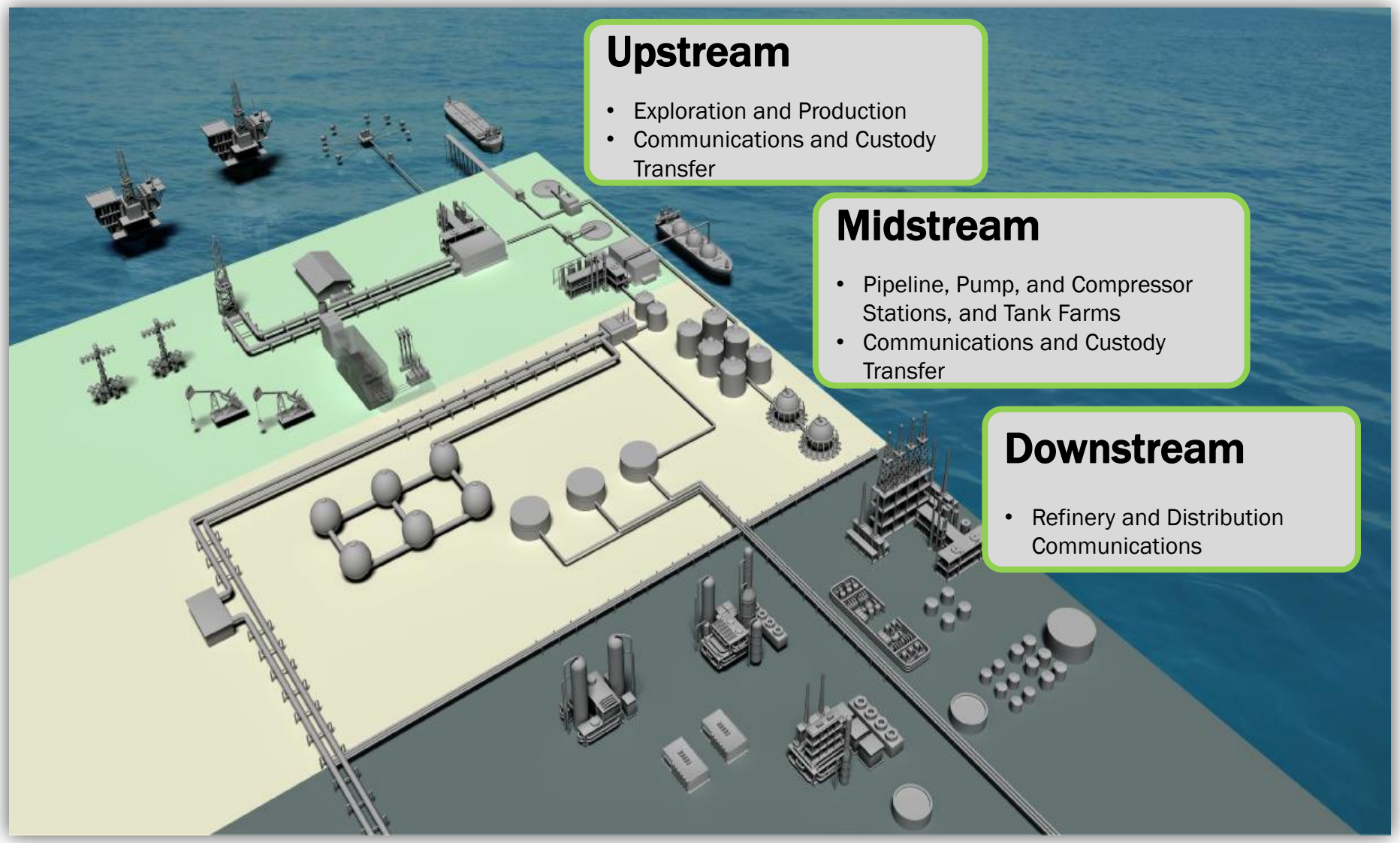
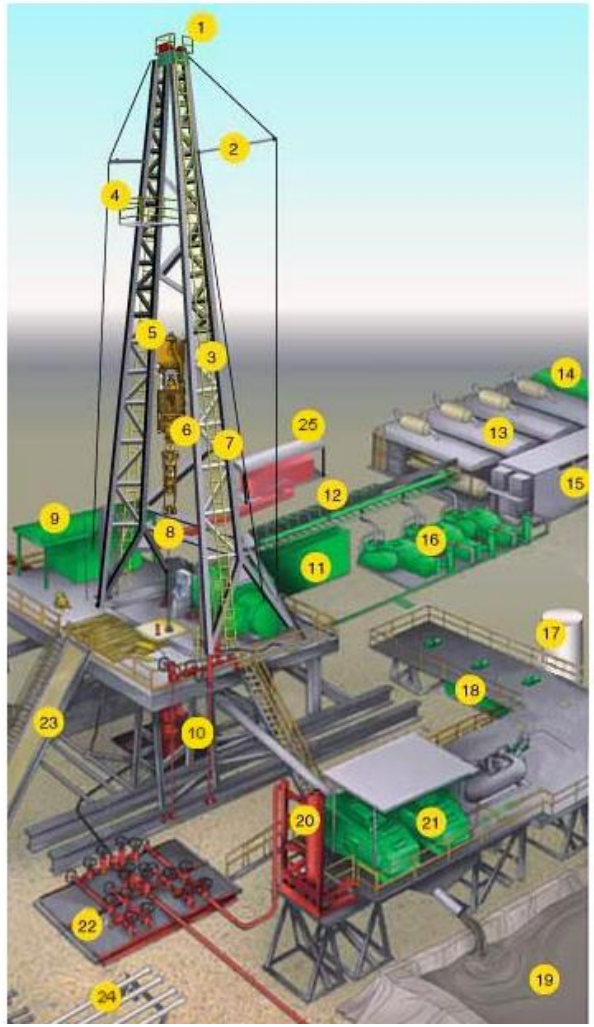
OIL & GAS INDUSTRY HIGH-LEVEL OVERVIEW



TYPICAL DRILLING RIG “PLANT”



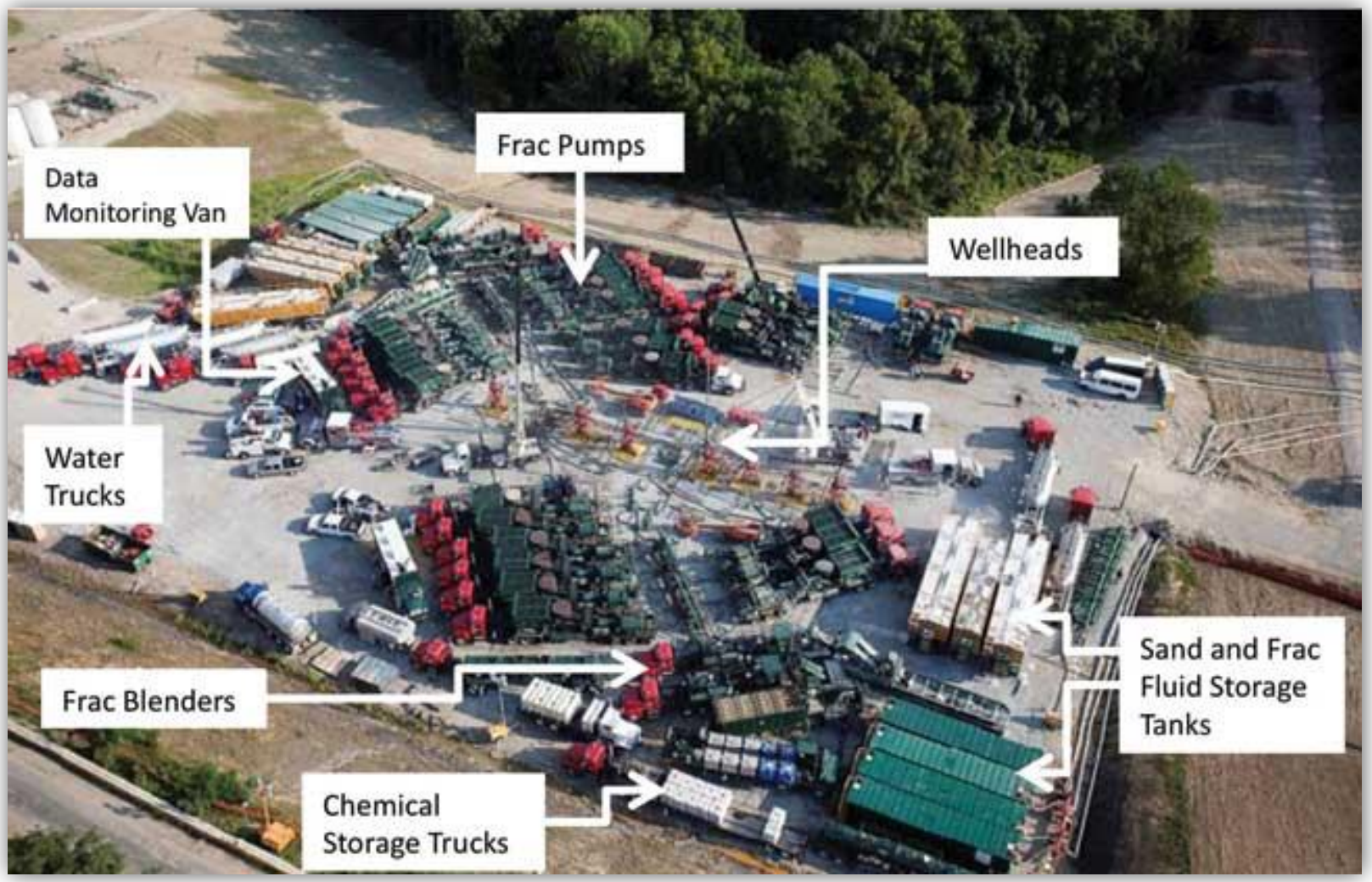
1. Crown Block and Water Table
2. Catline Boom and Hoist Line
3. Drilling Line
4. Monkeyboard
5. Traveling Block
6. Top Drive
7. Mast
8. Drill Pipe
9. Doghouse
10. Blowout Preventer
11. Water Tank
12. Electric Cable Tray
13. Engine Generator Sets
14. Fuel Tanks
15. Electric Control House
16. Mud Pump
17. Bulk Mud Components Storage
18. Mud Pits
19. Reserve Pits
20. Mud Gas Separator
21. Shale Shaker
22. Choke Manifold
23. Pipe Ramp
24. Pipe Racks
25. Accumulator

Source: https://www.osha.gov/SLTC/etools/oilandgas/illustrated_glossary.html

EVEN MORE EQUIPMENT & SYSTEMS WHEN YOU GO OFFSHORE

- Dynamic Positioning
- Vessel Management
- Power Distribution
- Drillfloor Operations
- Subsea
- Metering/Measurement

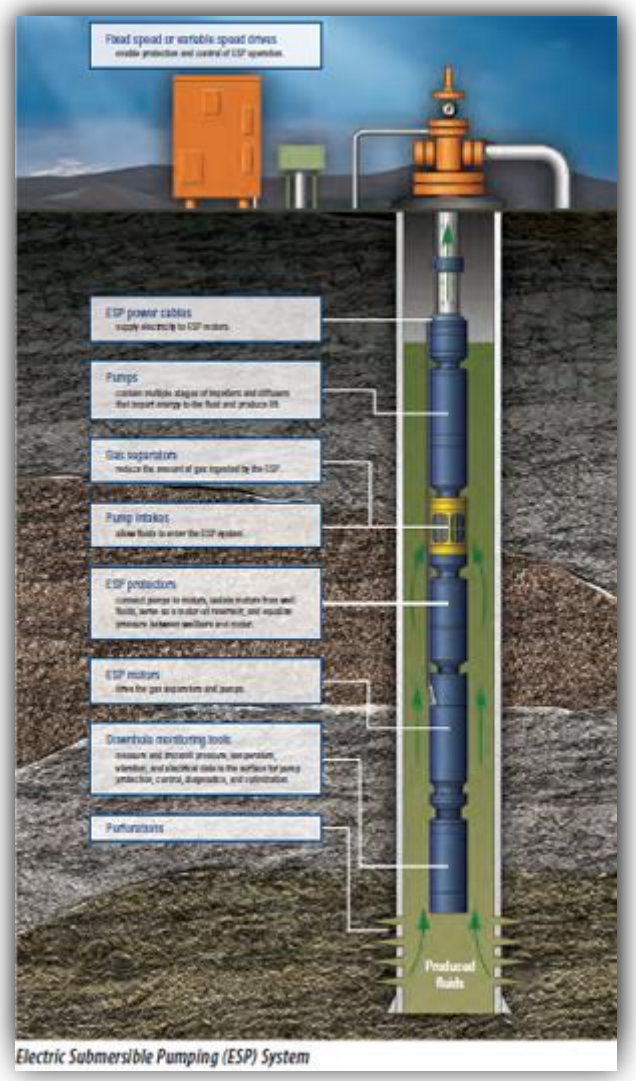
FRACKING/STIMULATION



A Frac Spread; Image Credit: Kansas Geological Survey or http://info.drillinginfo.com/well-completion-well-stimulation/

ARTIFICIAL LIFT (PRODUCTION)

- Pump Jacks/Rod Pumps
- Electric Submersible Pumps
- Progressive Cavity Pumps
- Injection Well Controllers
- Vendors: GE/Lufkin, Weatherford, Schlumberger, Halliburton, National Oilwell Varco (NOV), Jenson, Drake



Electric Submersible Pumping (ESP) System

https://www.geoilandgas.com/oilfield/artificial-lift-well-performance-services/lufkin-well-manager-rod-pump

http://www.chemtech-online.com/O&G/Priyanka_april_may12.html

FLOW COMPUTERS AT WELLSITES, GATHERING/PROCESSING FACILITIES, AND PIPELINES

http://new.abb.com/products/measurement-products/upstream-oil-and-gas

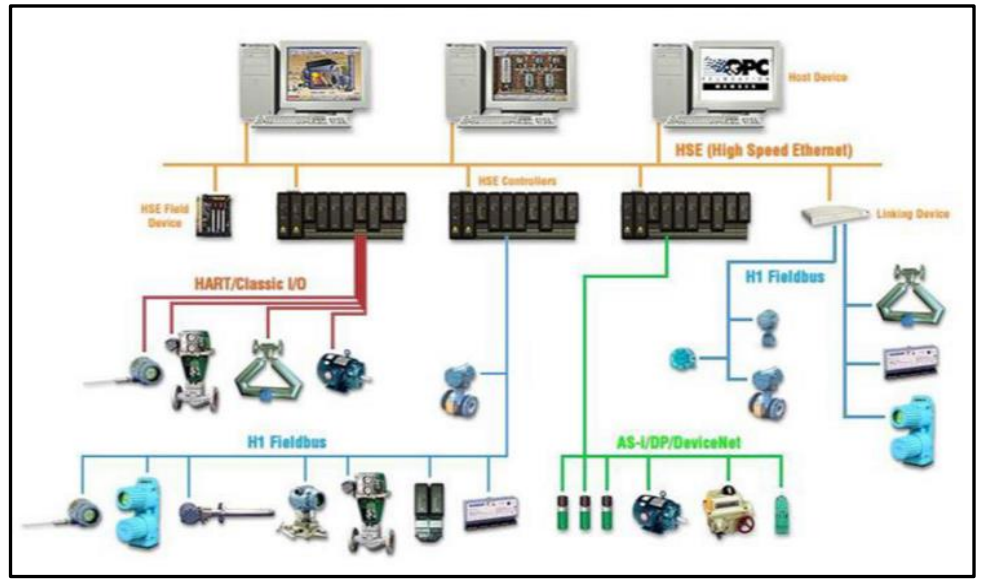
EFM (ELECTRONIC FLOW MEASUREMENT)

- Custody Transfer
  - Junction point in Gas Pipeline, often changing ownership
- Amount of Energy (BTUs) through a pipe == $$$
  - Called “The Cash Register of the Industry”
- Electronic Flow Measurement (EFM)
- Vendors: ABB Totalflow, Emerson/Fisher ROC800/FloBoss, Thermo Fisher Scientific AutoPILOT, Cameron NuFlo Scanner, Eagle Research XARTU, Schneider Control MicroSystem SCADAPack, OMNI Flow Computer

DISTRIBUTED CONTROL SYSTEM (DCS) IN REFINERIES

- Typically used in Process Manufacturing environments (such as refineries and chemical processing)
- Often “closed” system

http://corporate.exxonmobil.com/en/company/worldwide-operations/locations/united-states/baytown



http://www2.emersonprocess.com/en-us/brands/deltav/Pages/index.aspx

PROGRAMMABLE LOGIC CONTROLLERS (PLC)

- Are everywhere
  - Drilling rig equipment
  - LACT units
  - Wellsite tank levels
  - Gathering facility pumps/values
  - Pipeline facility compressors

http://ab.rockwellautomation.com/Programmable-Controllers

http://w3.siemens.com/mcms/programmable-logic-controller

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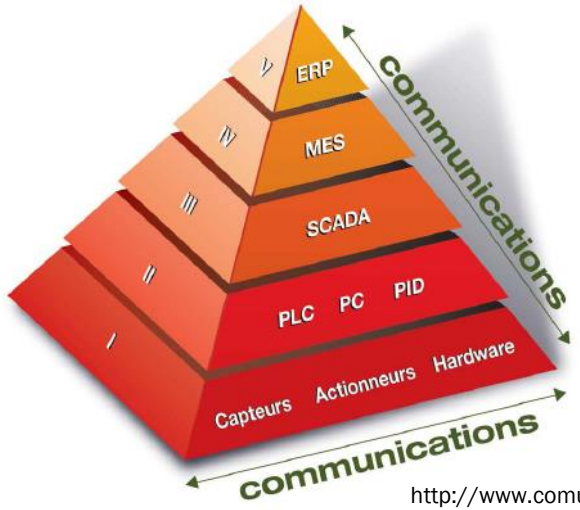
APPLICATIONS THAT REQUIRE FIELD DATA

- HMI – Human Machine Interface
- SCADA – Supervisory Control and Data Acquisition
- Historian – Storage and analytics of time series data
- MES – Manufacturing Execution System
- ERP – Enterprise Resource Planning
- EAM – Equipment Asset Management
- Big Data/IoT/IIoT/Analytics applications

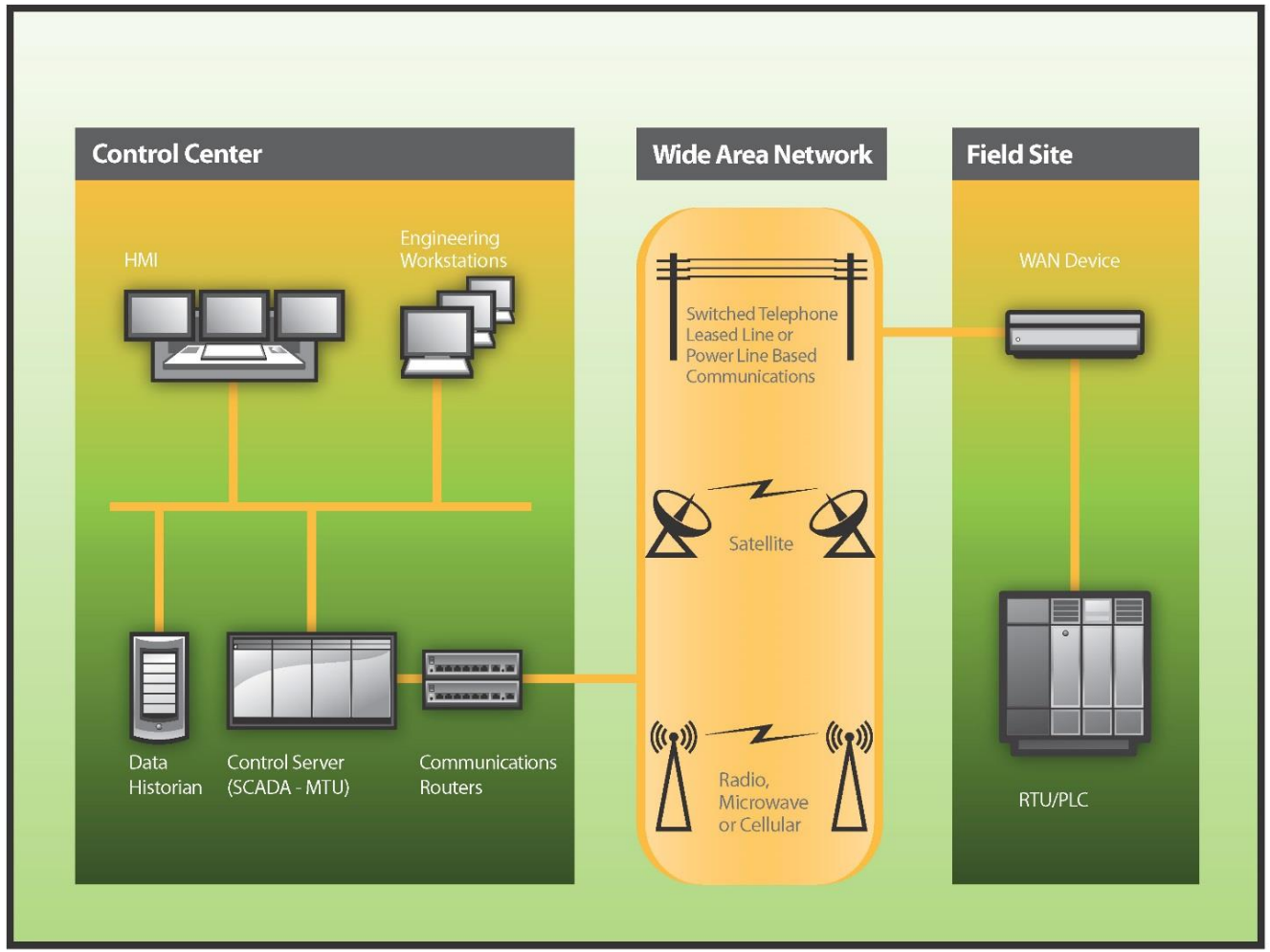


http://www.comunidadesalecop.com/automatismesindustriels/

http://origin-ra-ma-uatqa.rockwellautomation.com/global/news/the-journal/exclusive/2010/august2.page?
http://www.resmarin.ru/

REMOTE DATA COLLECTION CHALLENGES – LIMITED NETWORKS

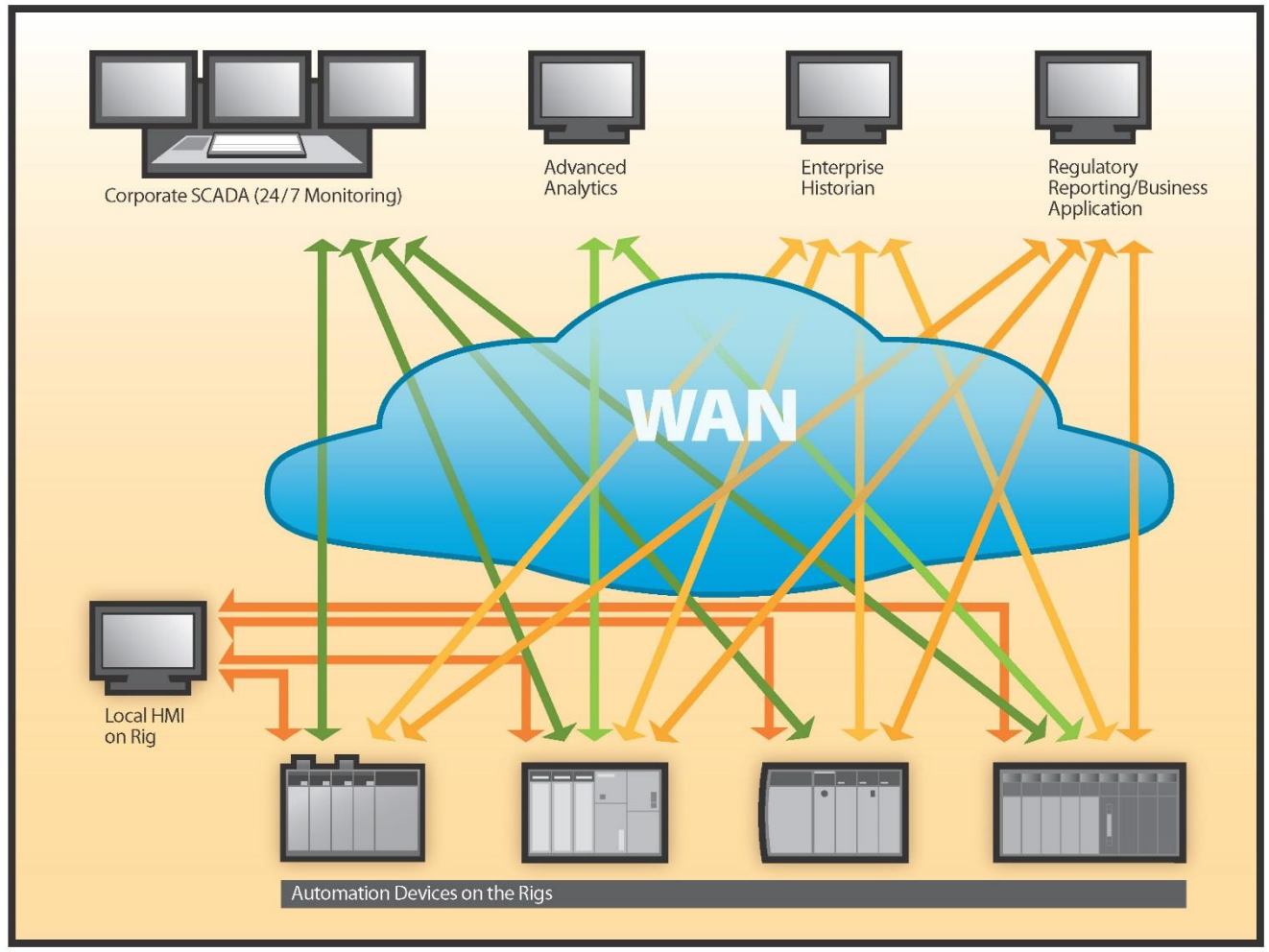
- Remote locations require various telemetry solutions for data to be transported back to the Central Office
  - Low bandwidth, high latency
  - Expensive if paying $$/byte
  - Outages from environment, obstructions, weather



A typical remote communications network and its components.

NON-CENTRALIZED DATA COLLECTION

- When each application tries to communicate with each device
  - Application developers are not communication experts
  - Inefficient use of limited network bandwidth
  - Overburden devices with redundant data requests
  - Native protocols designed before security was a concern



Redundant communications directly between enterprise applications and devices can overburden the devices and network.

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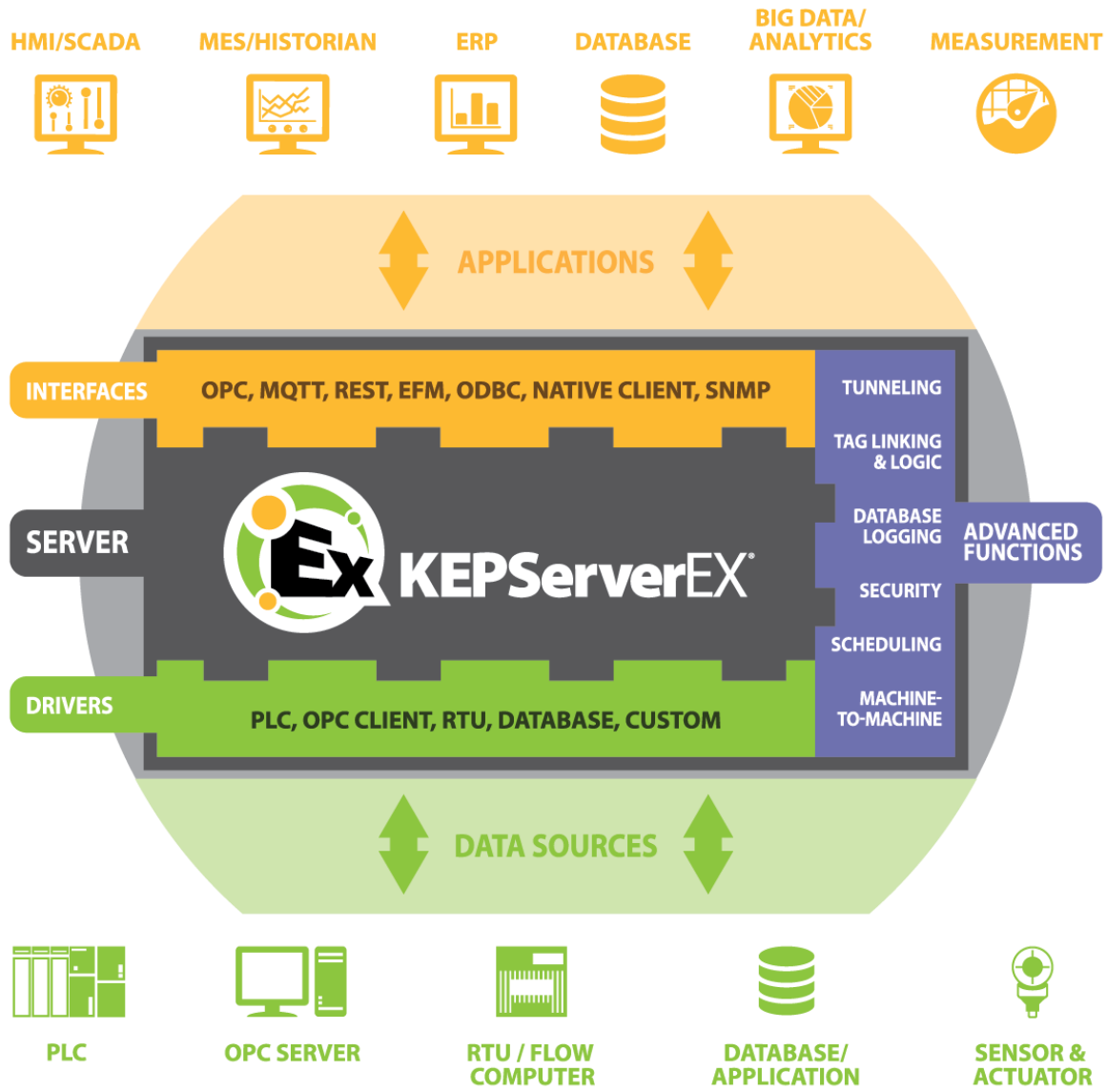
KEPServerEX® - CONNECTIVITY PLATFORM

Proven Interoperability, Reliability, and Efficiency

- Consolidates data and information from many sources into one connectivity platform
- Connectivity to hundreds of types of automation controllers with 150 different drivers.
  - Oil & Gas Specific: ABBTotalflow, Fisher ROC, Weatherford, Lufkin, OMNI, Enron Modbus
- Provides consistent and reliable data throughout the enterprise through 16 north bound interfaces capable of supporting hundreds of applications
- Reduces network traffic and decreases device and system resource usage

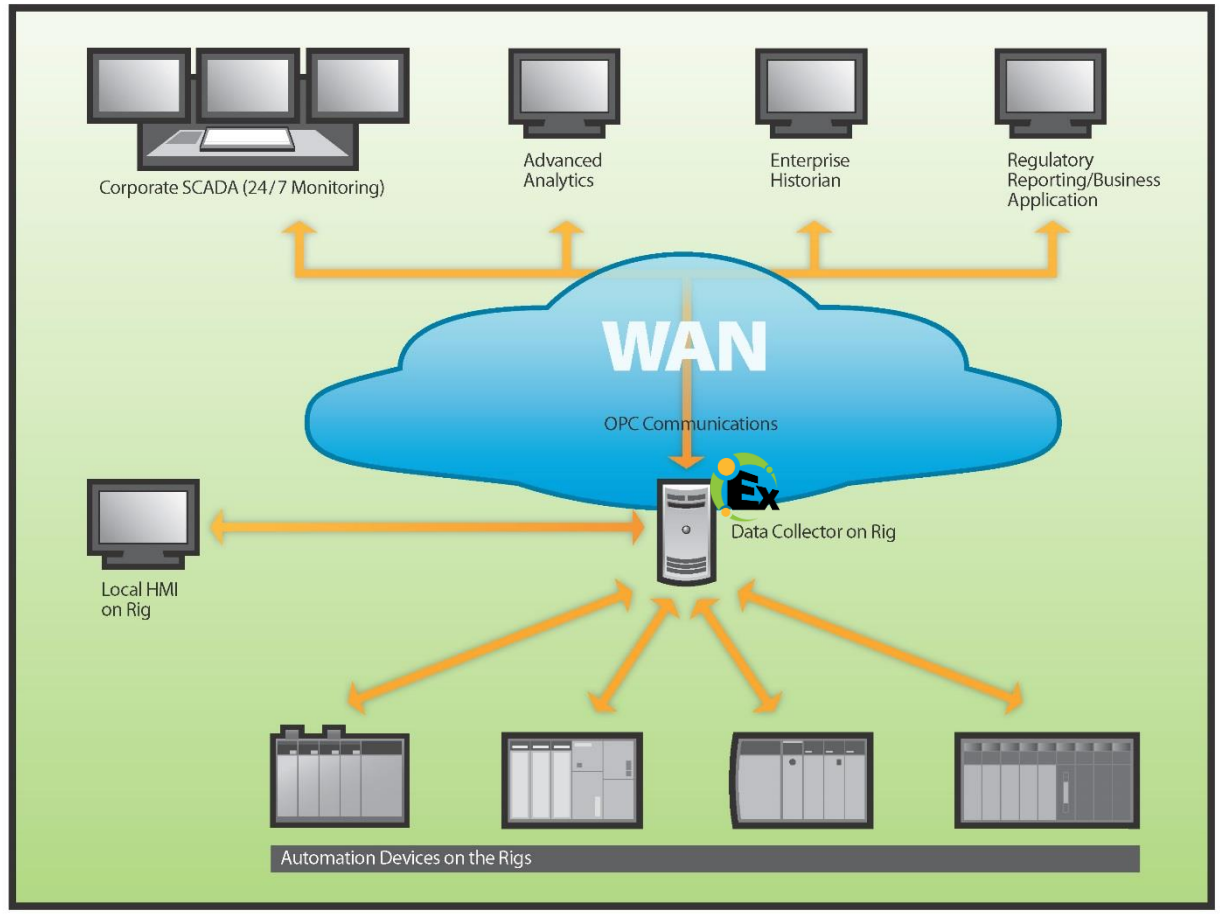
Easy to Use Tools

- Device Discovery, Automatic Tag Generation (ATG)
- Advanced tag options for linking and computations
- Enhanced Scheduling
- Security policy tools
- Inbound and outbound diagnostics
- Data reduction techniques through dead banding



IMPROVED COMMUNICATIONS WITH A SINGLE KEPServerEX

- On-site KEPServerEX Data Collector
  - Directly connected to all various devices
  - Secure data transfer to enterprise applications
  - Reduction in network traffic, data loss



A communications server on each rig improves data collection across the enterprise.

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CUSTOMER CASE STUDY: LARGE UPSTREAM PRODUCER

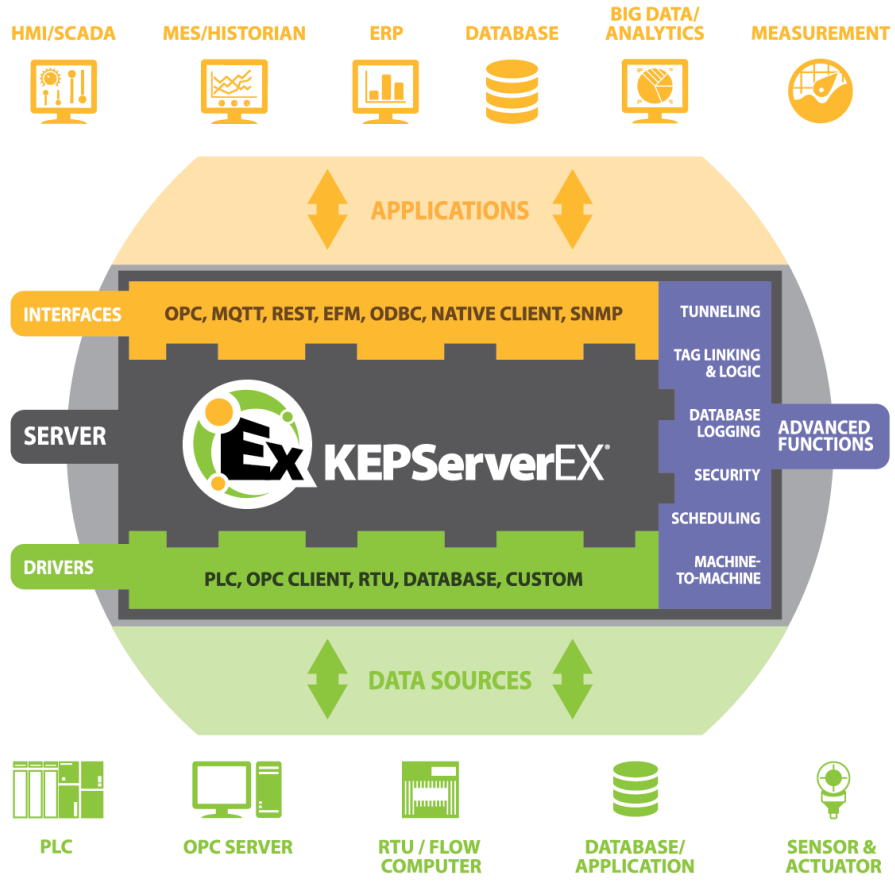
- New SCADA technology project initiated in Q3 of 2013
- The existing systems had the following problems:
  - 7 different SCADA systems
  - No standards across assets for SCADA HMI data presentation
  - No standards across assets for SCADA data acquisition (hardware and software)
  - Some systems were proprietary and required developers to make changes
  - No security
- Project Goals
  - Enterprise solution flexible enough to solve issues across several different operations, like drilling, completions, production, mining, water, and electrical services
  - Centralized infrastructure housed in data center
  - High-speed redundant network
  - Web-based
  - Access for every person
- Telemetry Description
  - 80% serial communications networks, not professionally designed
  - Some assets are 40 years old
  - Thousands of devices not connected
  - Multiple SCADA hosts on the same radio networks
  - Limited capabilities equate to alarming only
- Device Make-Up
  - 20,000+ devices
    - 6,000+ EFMs
    - 9,000+ PLCs
    - 7,800+ POCs

PANTERA CUSTOMER CASE STUDY

- Small, family owned company
  - Aggressive acquisition program
  - 1300+ wells, using enhanced production technique
- 2015: Cutting-edge SCADA system to automate, mobile accessibility, prevent downtime
  - Previously relied on human “pumpers” for the daily monitoring and management of wellsites covering much of Texas and Oklahoma
- Challenges
  - Wide range of PLCs/RTUs manufacturers
  - Various networking and architecture
  - Flexible and scalable
  - Employee morale – dealing with change
- Successes
  - Communicate to variety of equipment, including legacy
  - Boosted productivity
  - Quality of life (i.e. remote login, monitoring, shut-down capabilities)

OIL & GAS CONNECTIVITY SUMMARY

- Many devices in the field from many vendors
  - Different protocols
- Many applications that need device data
- Limited network bandwidth between devices and applications
- A Connectivity Platform like KEPServerEX can help
  - 150 different device drivers
  - 16 application interfaces
  - Traffic cop for data requests going across network
- Customer Case Studies
- Q&A

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