

Deployment of WITSML for real-time operations

October 8, 2013

PetroDAQ



Universal Data Acquisition

Instrumentation

Data Acquisition

Transmission

Monitoring

PetroDAQ Inc

PetroDAQ Inc is a technology provider of hardware and software to the Oil & Gas industry.

We develop and manufacture leading-edge technology products for faster and informed decisions leading to a more efficient drilling operation.



Summary

PetroDAQ provides the technology and expertise for a successful real-time Service Provision

Added values to final customers beyond traditional data transmission

Integration with customer's modeling applications

Enable support center and 24 x 7 monitoring

WITSML

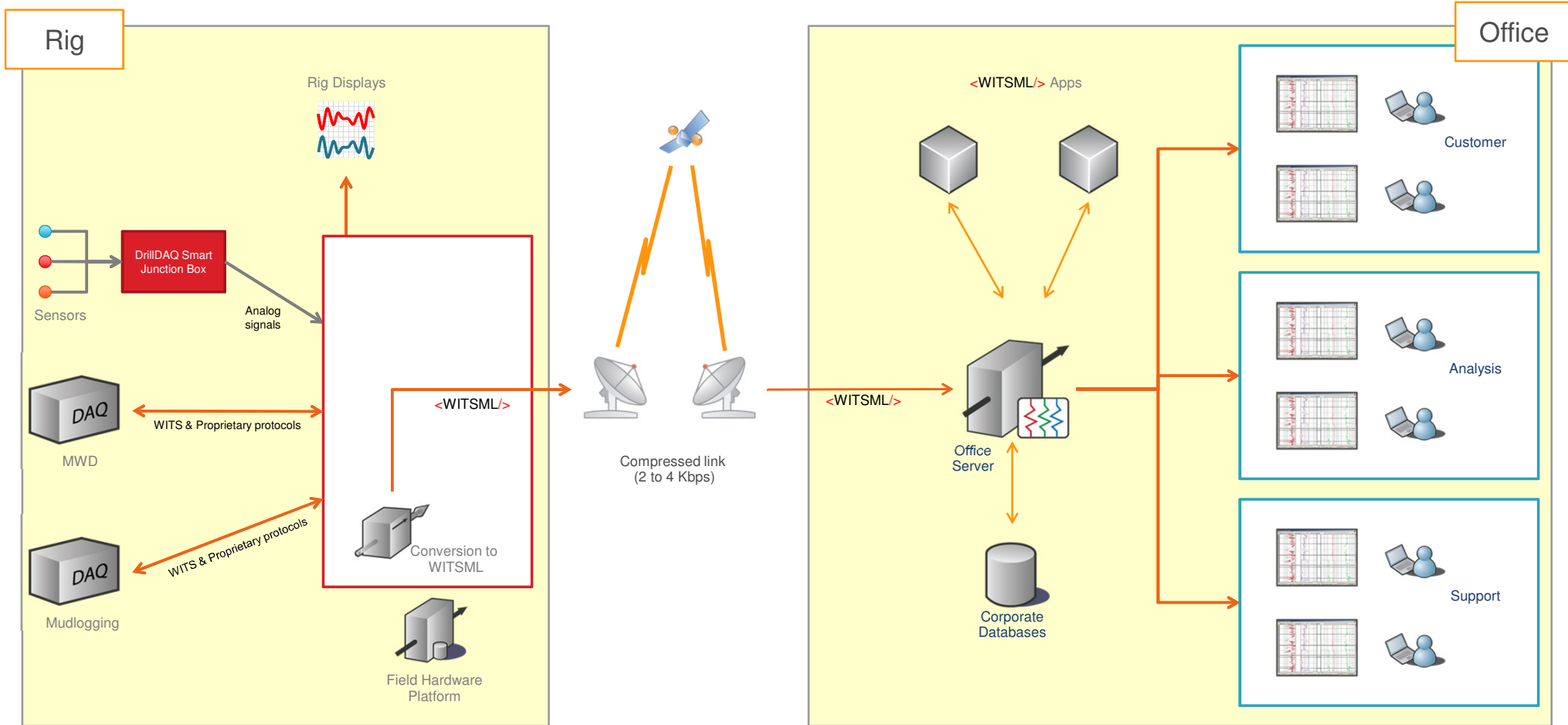
Characteristics

- Interoperability between applications from different vendors
- Wide adoption in drilling and G&G apps
- Mature standard

Benefits

- Leverage existing infrastructure
- Integrated modeling for drilling optimization
- Large coverage in vendor applications

Dataflow – WITSML at the Office only



WITSML at the office only

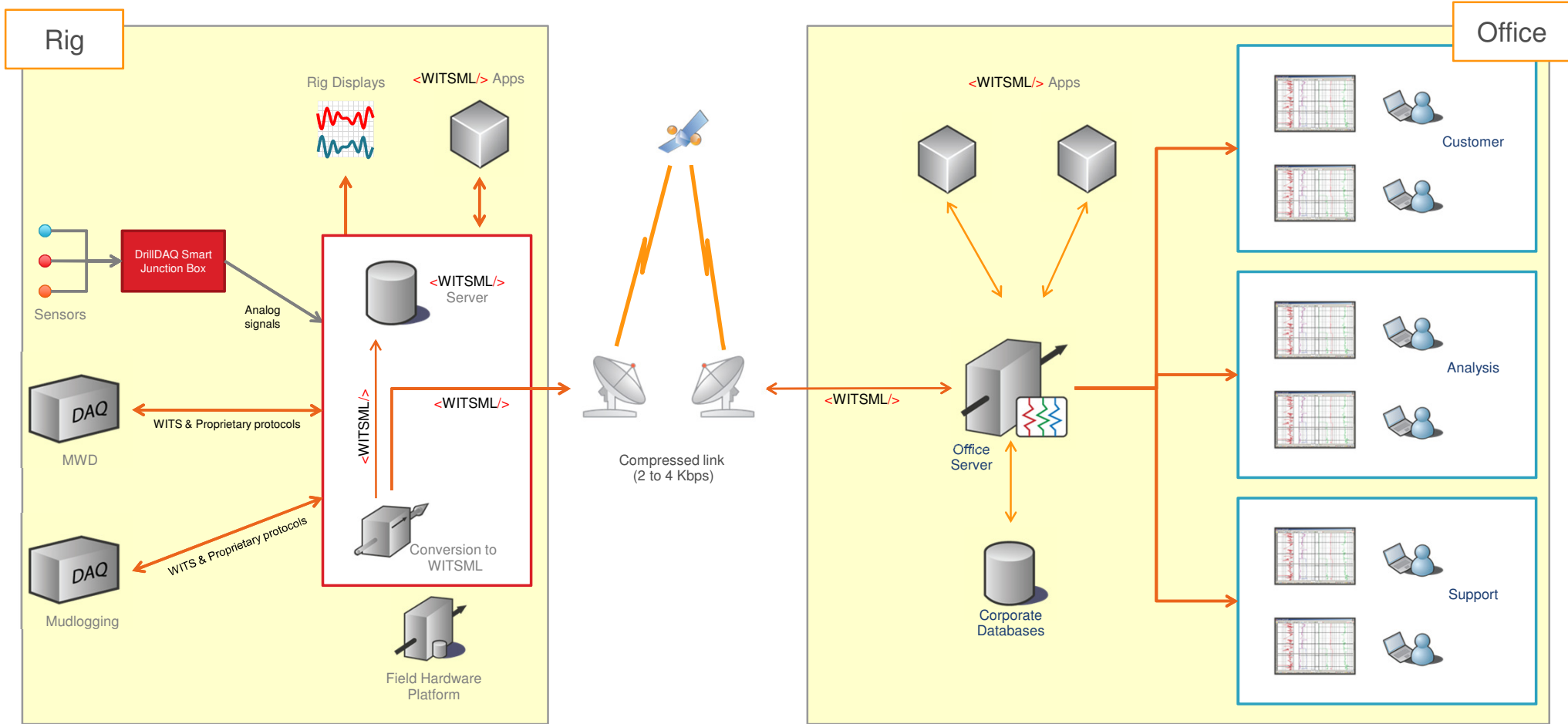
Pros

- Lowest cost of implementation
- Administration of the infrastructure at a single point
- For operations where modeling is done at the office, i.e.: centralized real-time operations centers

Cons

- Modeling data available at the office only

Dataflow – Field WITSML with one-way synchronization



Field WITSML with one-way synchronization

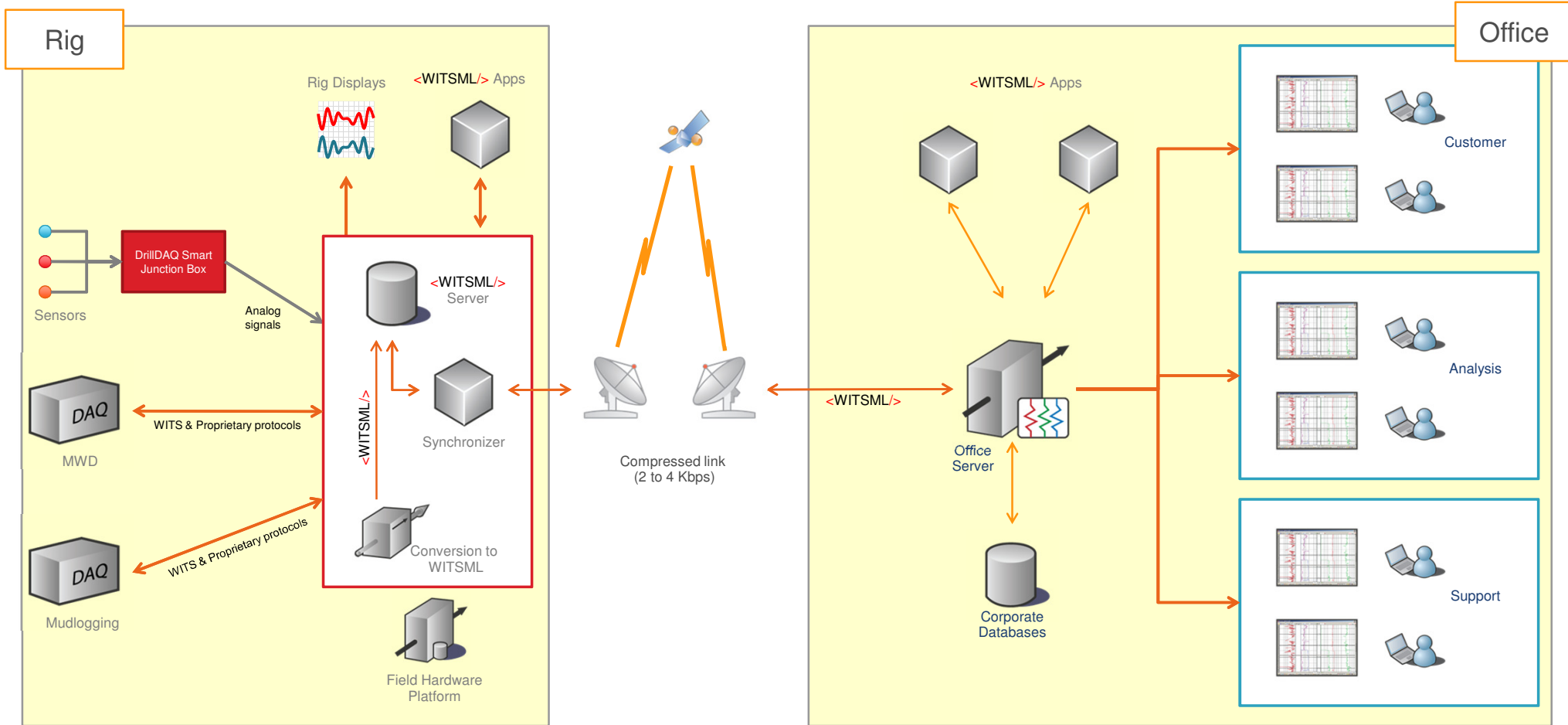
Pros

- Enable WITSML applications at the rig
- One-way synchronization to the office
- Adequate for limited modeling at the rig, i.e.: pore-pressure analysis

Cons

- Modeling data available at the office only
- Higher level of field administration

Dataflow – Bidirectional Field to Office synchronization



Bidirectional Field to Office synchronization

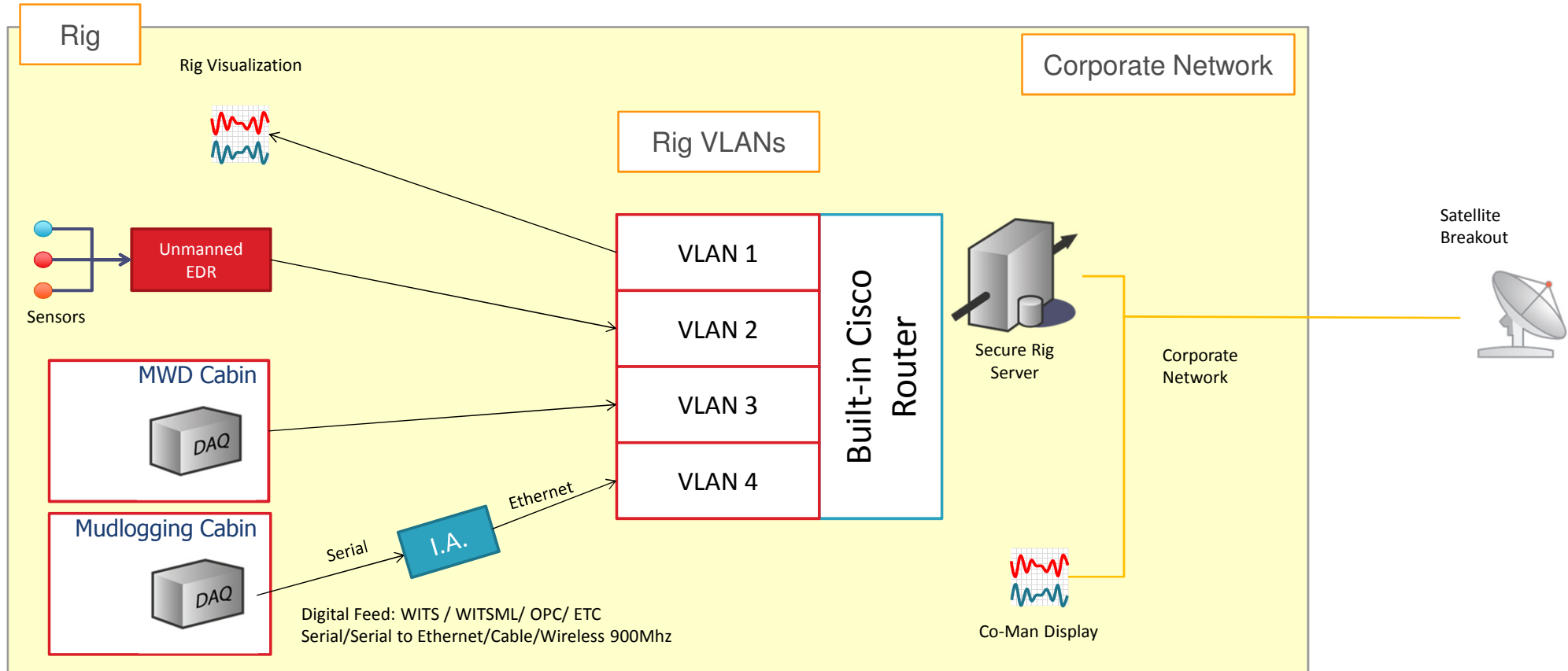
Pros

- Data mirror between the rig and the office
- All modeling data at the office is available at the rig
- Enable WITSML applications at the rig
- Bidirectional synchronization between the rig and the office

Cons

- Highest implementation cost
- Highest level of field administration

Secure Field Network Topology



Service Requirements

- Rig Hardware and Software
- Field support specialists

- Office / Cloud Hardware and Software
- Office support specialists

- Support Center

PetroDAQ support to customers

- On-site support and training
- Hardware installation
- System maintenance
- Cloud Services

Hardware Platforms

Versatile hardware solutions for data acquisition and aggregation

Intelligent Appliance

- Single purpose device
- Specialized format conversion
- Contractor specific protocols
- Drop-in upgrade for legacy systems
- Remotely configurable



Rig Aggregator

- Wired & Wireless Digital Data
- Extensive I/O Ports
- Field grade construction
- Data Aggregation & Visualization



Secure Rig Server

- All the functionality of the Rig Aggregator
- High-performance
- Extensive I/O Ports
- Built-in Cisco Router for VLANs
- Rack-Mountable
- Data Center in a box – transportable in Helicopters



Slim Secure Rig Server

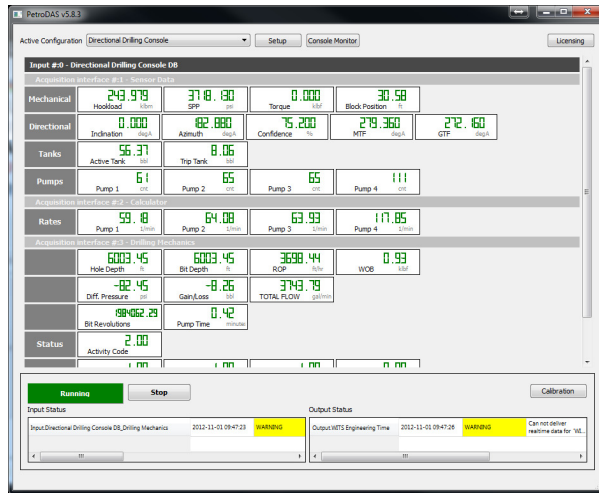
- Performance of Secure Rig Server
- Rack-mounted
- Space saving 1U height



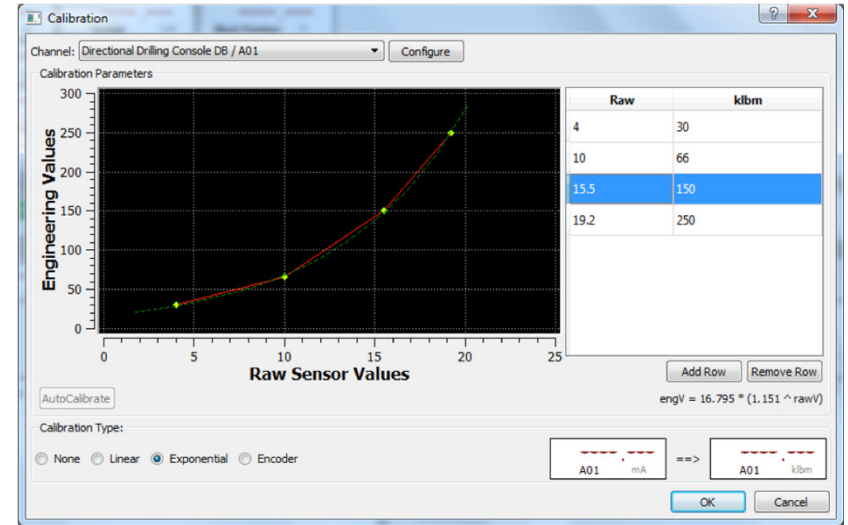
Software solutions

Field and Office tools for real-time operations

PetroDAQ Acquisition Software



Channel View
Standard and Proprietary Inputs & Outputs
Buffered & Real Time Mode

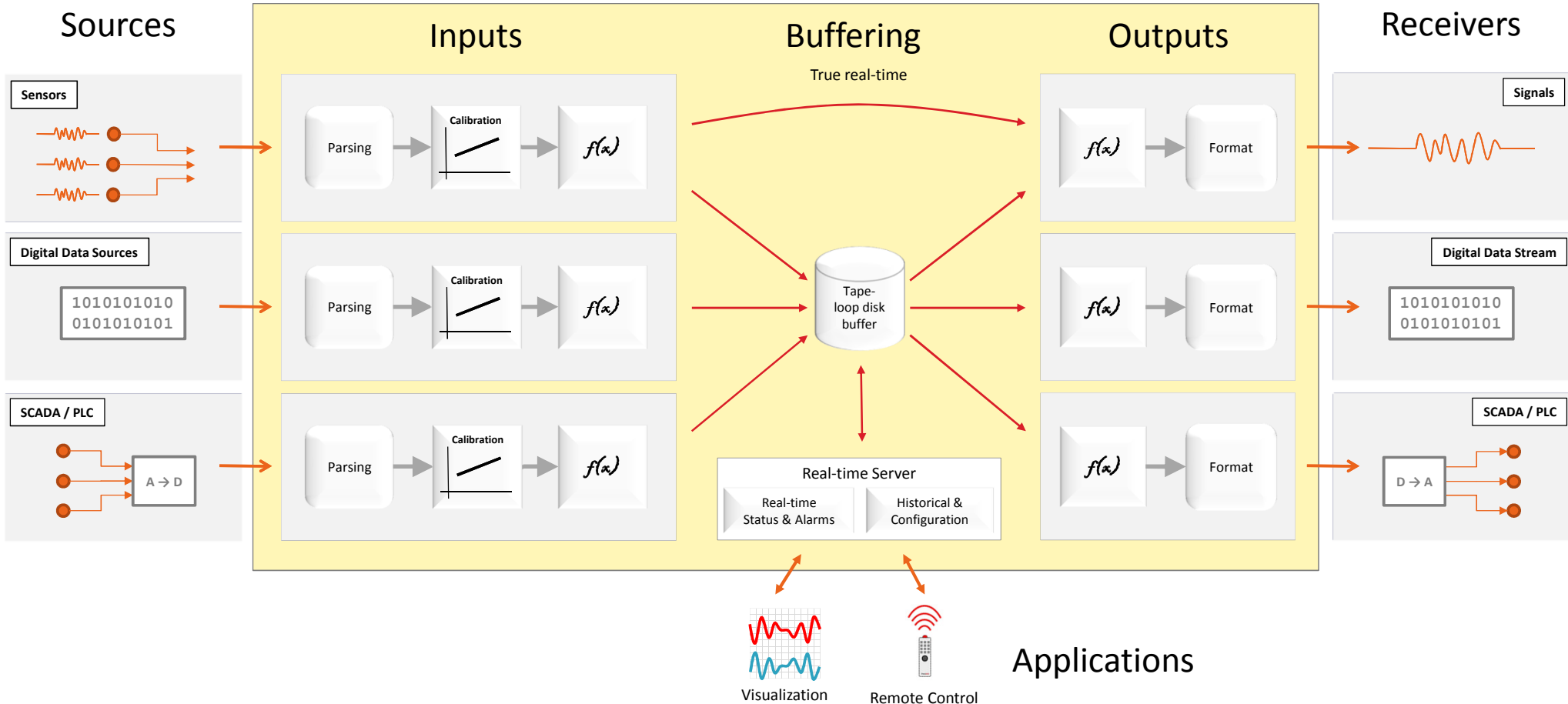


Sensor Calibration

```
def on_delivery(context, datablock): #getting parameters params try: print_on_console("python a\n"); WOB_CH = context.getParam(WOB_CH); RPM_CH = context.getParam(RPM_CH); TRQ_CH = context.getParam(TRQ_CH); ROP_CH = context.getParam(ROP_CH); D = context.getParam("D"); except EParameterMissing: # Oops - calculation try to use curve that is not available in this datablock print_on_console("Calculation failed parameter is missing :")+ (e)+'\n'; return ;
```

Scriptable Computational Engine (Python)

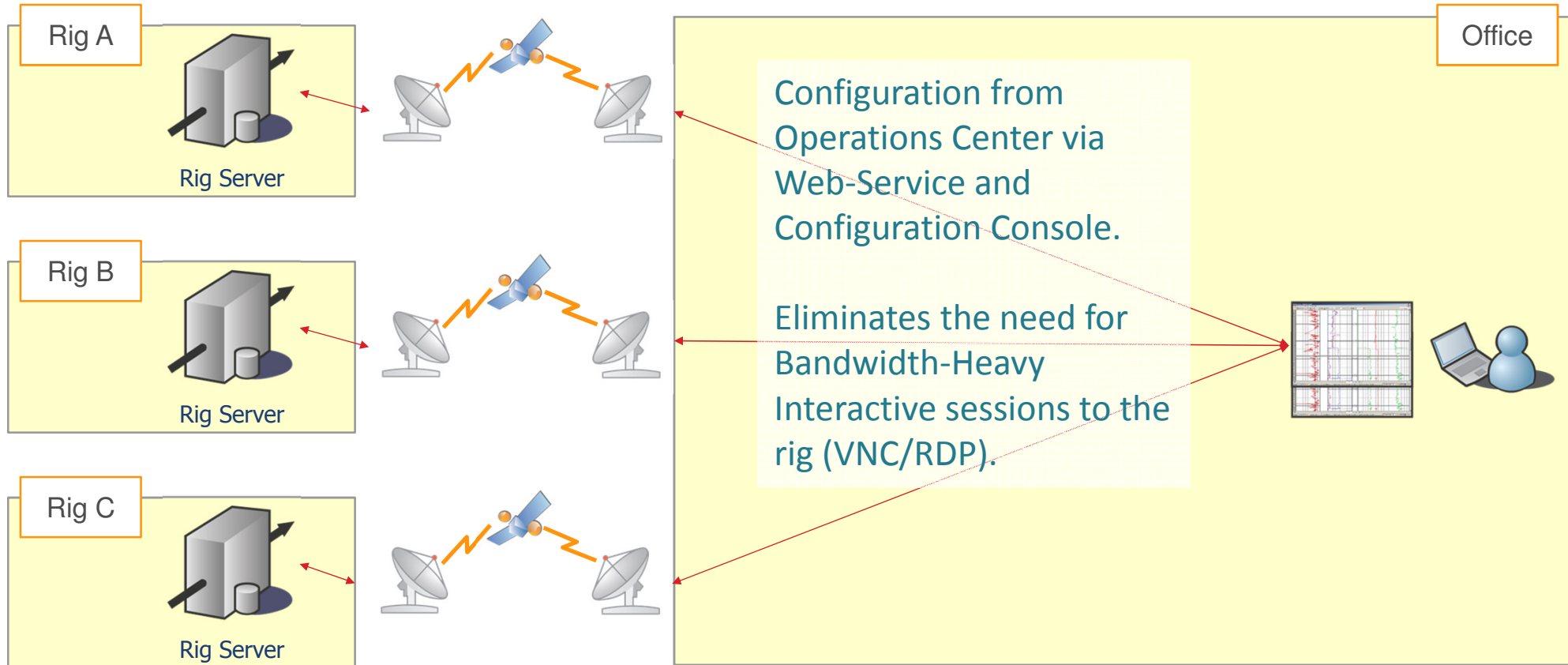
PetroDAS - Data Acquisition & Aggregation



PetroDAS - Supported Transports and Protocols

Transport	Input	Output	Protocol	Input	Output
Serial RS-232	•	•	WITS Level 0 Standard and Contractor Specific	•	•
Serial RS-485	•	•	WITSML standard and “Flavors”	•	•
Serial RS-422	•	•	OPC-DA and HDA	•	•
TCP/IP Client	•	•	Modbus RTU, TCP/IP, and Serial over IP	•	•
TCP/IP Server	•	•	National Instruments	•	•
Disk File	•	•	Fracpro	•	•
Wireless	•	•	MWD Teledrill Pulse Decoding	•	
			Azonix ADU Directional Console		•
			Wise		•
			L3-COM HVR with optimized PetroDAQ Storage	•	•
			ICPCON	•	

PetroDAS - Remote Configuration



PetroDAS Remote & Diagnostics

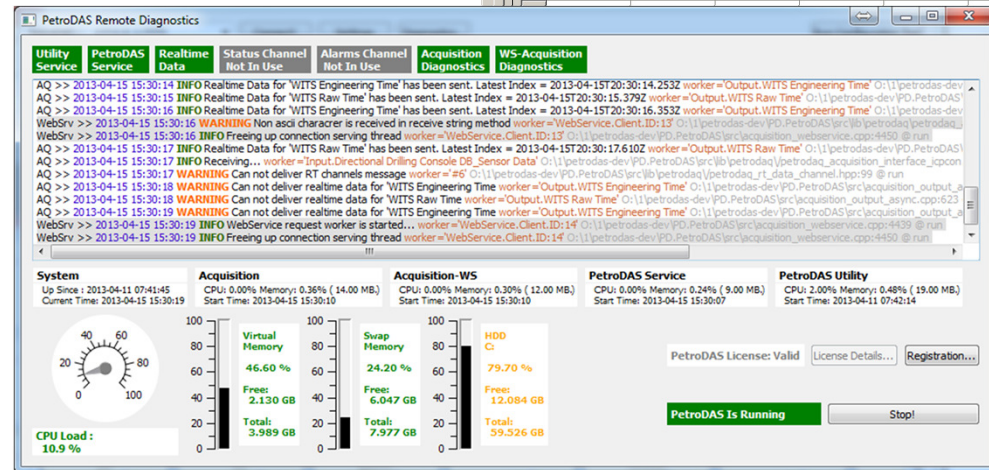
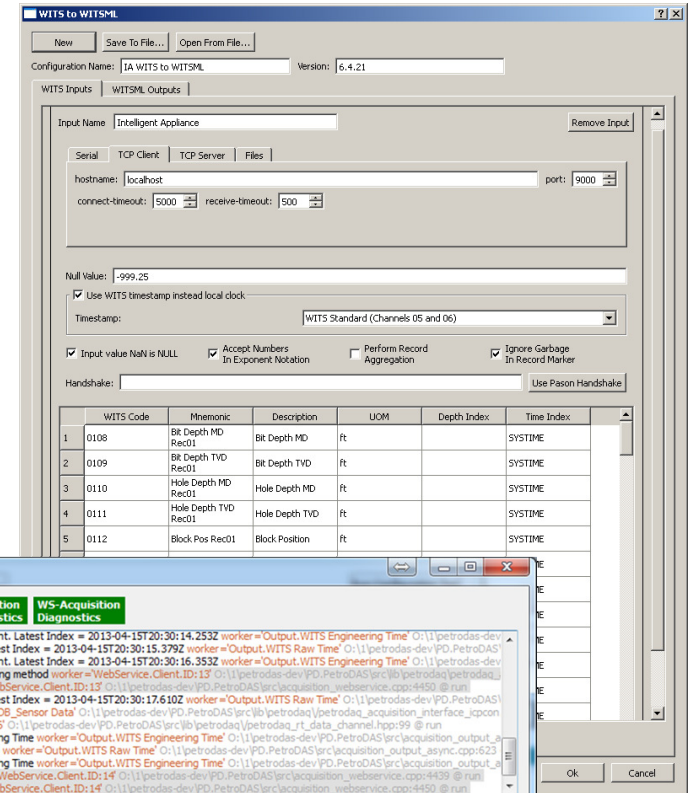
Centralized configuration of multiple operations

Bandwidth efficient

No need for interactive sessions over satellite links

Protocol specific configuration

System Diagnostics

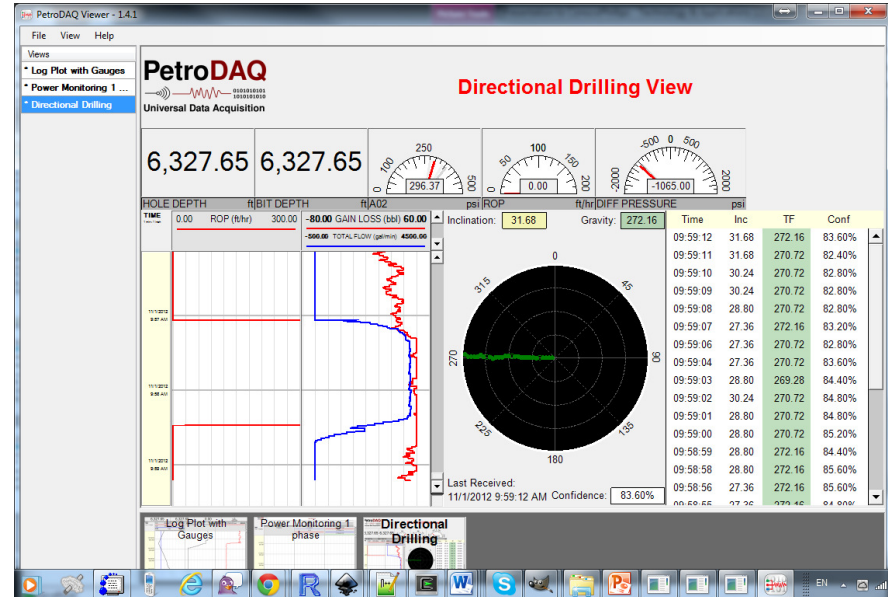


PetroDAQ Rig Viewer

Customizable Views

Controls for Geology, MWD,
PVT, and Equipment Monitoring

Supports fast data rates



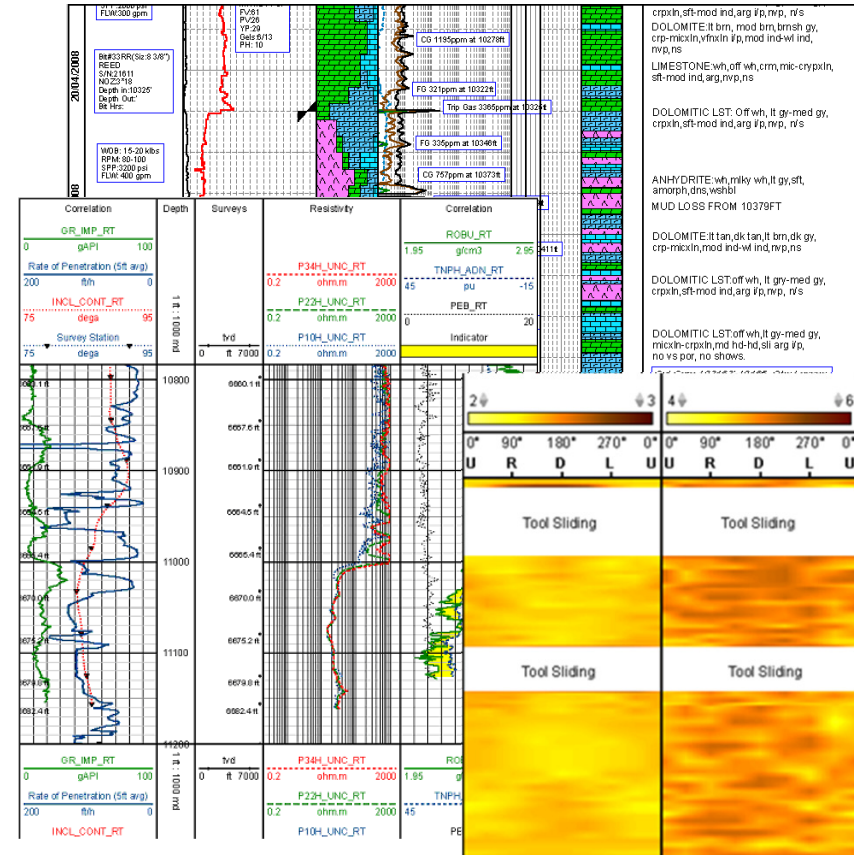
PetroDAQ Office / Cloud Viewer

RTOC Monitoring of multiple operations

Web based-no license installation

Drilling, Geosteering, Mudlogging specialized tools

Customizable plots



RTOC Toolkit

Monitoring and alarms of the
real-time transmission status

Patching tool

Server	Well	Wellbore	Log	LastIndex	LastUpdated	Status
secure.petrodaq.com	PetroDAQ	PetroDAQ 003	RigDAQ 003	2013-07-03 10...	0 00:02:36	Alarm
secure.petrodaq.com	PetroDAQ	Battery Test	RigDAQ 009 Battery Test	2013-07-03 10...	0 00:00:00	Ok
secure.petrodaq.com	PetroDAQ	Drilling Simulation	time log 1	2013-07-01 17...	0 00:00:00	Ok
secure.petrodaq.com	PetroDAQ	Drilling Simulation	time log 1	2013-07-01 17...	0 00:00:00	Ok

WITSML Store

High Performance

Cross Platform

Client C# Library

1.3.1.1 stable version

1.4.1.1 development version

<http://witsml.petrodaq.com>

<http://code.google.com/p/cswitsml/>

PetroDAQ
Universal Data Acquisition

PetroDAQ WITSML Store

Welcome to the **PetroDAQ WITSML Store**

PetroDAQ WITSML Store - 1.0.1 - Linux Version supports all objects in 1.3.1.1 version. It is accessible at <http://witsml.petrodaq.com:8080/witsml/wmls.asmx>

PetroDAQ WITSML Store - 2.0.4 - Windows Version supports all objects in 1.2.0 and 1.3.1.1 versions. It is accessible at <https://secure.petrodaq.com/petrodaq/witsml/wmls.asmx>

To request credentials for access to the store, please send us an email at support@petrodaq.com with your request.

PetroDAQ Data Acquisition Units are **<WITSML/>™ Ready**

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