

HANA in O&G

HANA Council - Moscow

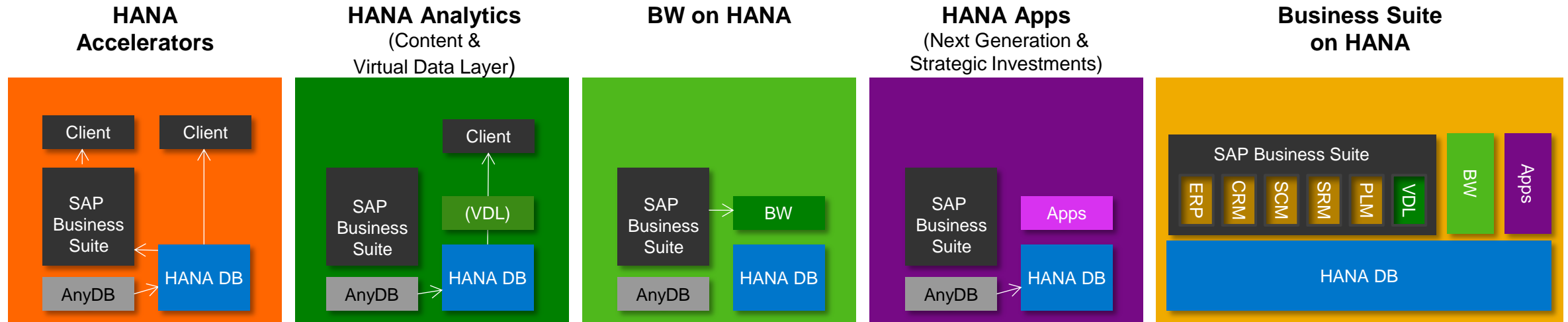
Dr. Phillip Sievers, IBU O&G SAP
October 2014



Agenda

- **HANA in Oil & Gas – Customer Examples**
- **More HANA Use Cases**
- **Suite on HANA for O&G**

HANA Innovation Overview



Side-by-side scenarios

In seconds:
Accelerating existing transactions of the Business Suite

More Insight: Exploring data loaded from Business Suite on any level of detail

Supercharged BW :
Fasten up your BW without disruption

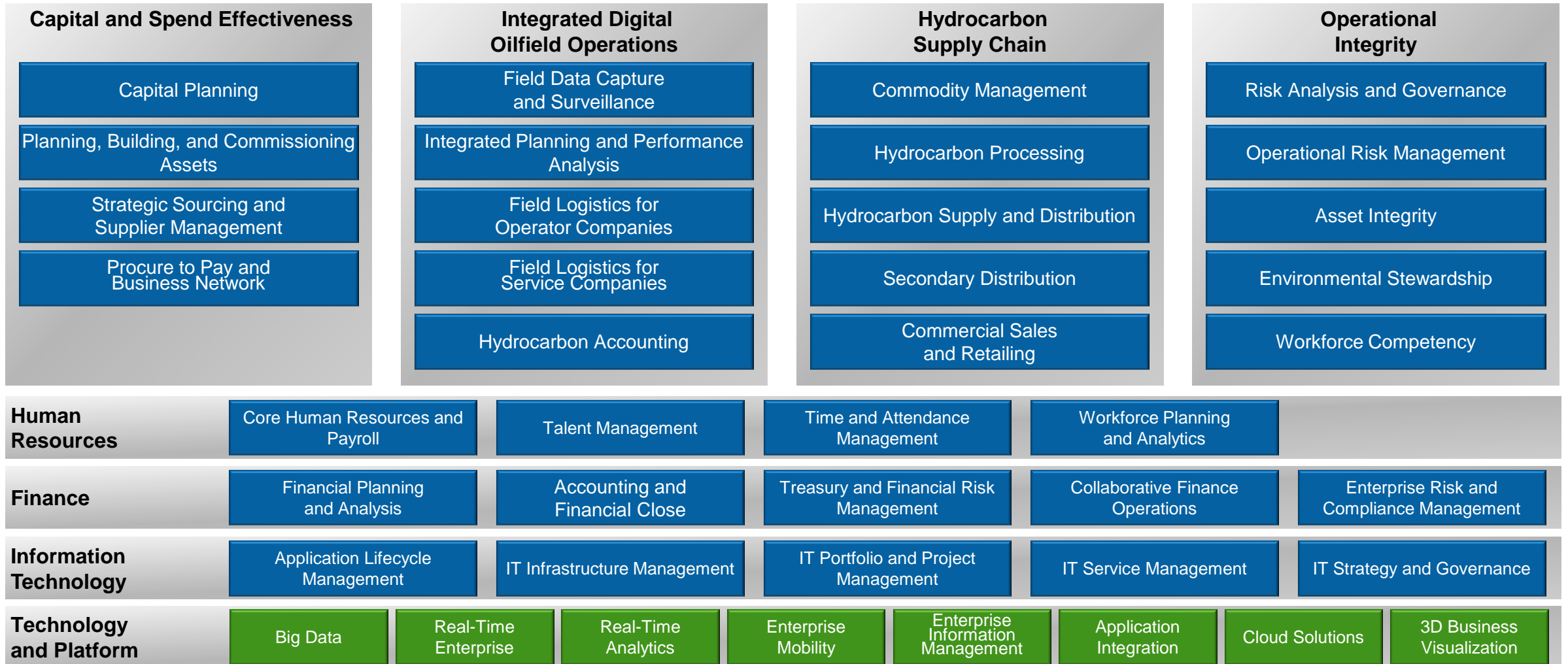
Innovation:
Functional applications natively built on HANA, with and without Business Suite integration

Integrated scenario

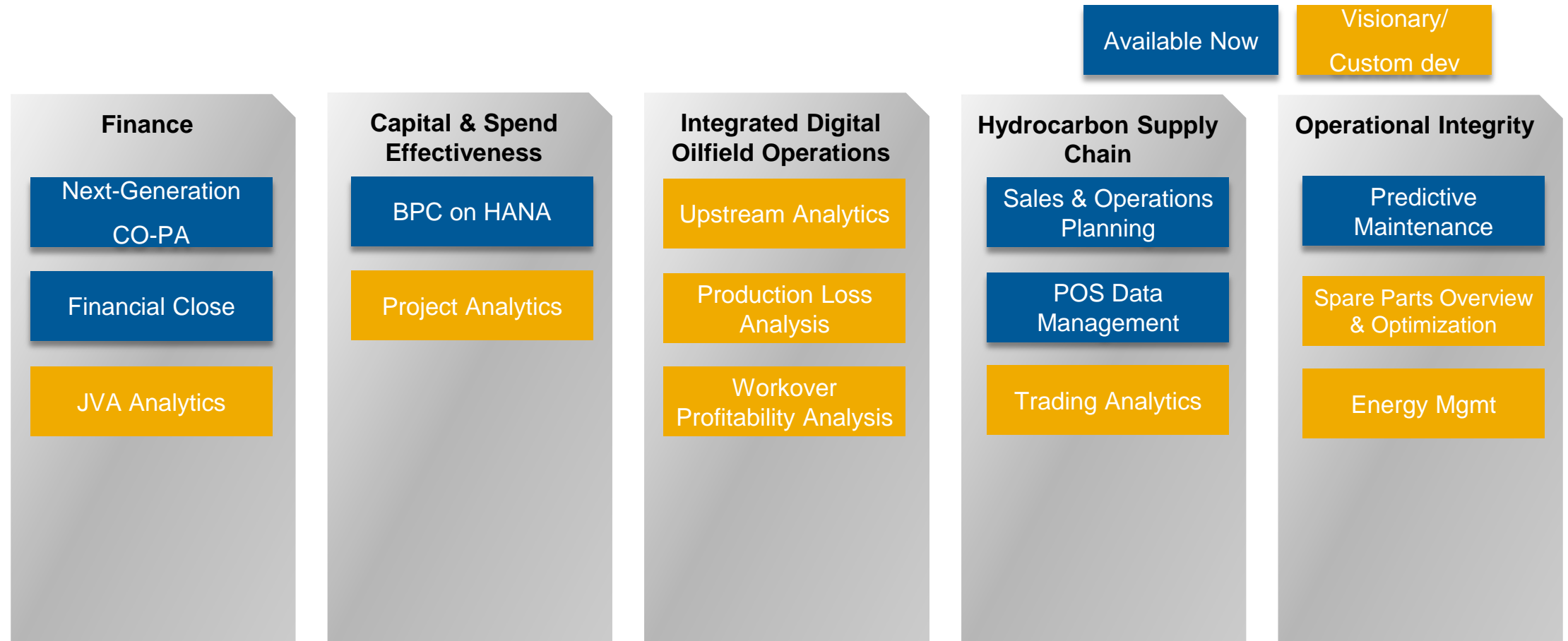
All in One – Ultimate:
Business Suite solution fully integrated with and optimized for HANA as database

Industry Value Map for Oil & Gas

The Prudent Energy Supplier



Oil and Gas Value Map and HANA Use Cases



HANA in O&G – Customer Examples

HANA O&G customers

SURGUTNEFTEGAS
OPEN JOINT STOCK COMPANY

ESSAR 


Marathon Oil
Corporation™

Hunt 
OIL COMPANY



Pacific Drilling 


ENGEN


PETROBRAS



Engen Petroleum: Improving Reporting with SAP HANA® Profitability Analysis

Company

Engen Petroleum Ltd.

Headquarters

Cape Town, South Africa

Industry

Oil and gas

Products and Services

Crude oil and refined petroleum products

Employees

3,500

Web Site

www.engenoil.com

The company's top objectives

- Speed up reporting and allocation of SAP® CO-PA Accelerator software to accommodate growing data volume
- Store more data in the production system to build more accurate reports
- Enable real-time data analysis and additional profitability analysis functionality, including net margin analysis

The resolution

- Used SAP Landscape Transformation software to load CO-PA tables from the SAP ERP application to the SAP HANA® platform
- Leveraged the SAP HANA Profitability Analysis rapid-deployment solution
- Established a plan to power the SAP NetWeaver® Business Warehouse and the SAP Point-of-Sale applications with SAP HANA

The key benefits

- Better analytics, thanks to detailed and flexible ad hoc reporting
- SAP ERP transactions can read data directly from SAP HANA, speeding up processes and report runtimes
- Data compression for large-volume storage without slowing performance

94%

Faster average queries

87%

Data compression

2 weeks

To implement SAP HANA using a rapid-deployment solution

“SAP HANA actually delivered on what it promised. And working with the rapid-deployment solution and SAP HANA experts from SAP was a great experience. We are really proud to have achieved the first live SAP HANA deployment in Africa.”

Andries van der Vyver, Manager of Integrated Solutions Consulting Services, Engen Petroleum Ltd.



Business Challenges

- Company spin-off of downstream operations
- Needed Financial reporting that was Upstream focused
- Agility to respond to dynamic Upstream business model

Technical Challenges

- Batch loads run too long impact international operations
- BW Queries ran in minutes not seconds
- Report changes took months
- Difficult to reconcile reports

Benefits

- Simplistic data model: a simplistic data model is easier to maintain, faster to load, less data to store
- Report rationalization: Single source of truth = Better user adoption; fewer objects to maintain = Higher ROI
- Dramatic performance improvements: faster report = better user adoption
- Data load performance: faster data load = frequent loads, latest data
- Data compression & state of the art BI platform

Lessons

- User experience critical to project success
- Fast query response leads to more valuable questions
- Load times were more critical than expected

Hunt Oil Company– BPC on HANA

Business Challenges

- Increasing complexity of planning and forecasting
- No corporate planning process – silo-ed approach
- Time consuming data capturing process

Goal

- Improve planning visibility across the organization with a centralized planning solution and process

Benefits

- Top-down corporate planning process
- Vastly improved self-service reporting tools
- Dramatically faster query runtimes: faster report = better user adoption

Surgutneftegas - Material Stock Overview

Company Information

- Surgutneftegas (SNG), Russia
- Oil and Gas
- Employees: > 100.000

Project Details

- 512 GB HANA (HP)
- Co-innovation set-up: significant customer involvement, SNG employees trained in HANA technology

Technical Result & Improvement (INTERNAL KPIs)

- Stock analysis of 140,000 materials and million data records reduced from 12 hours to ~10 min
- Ad-hoc queries for a single material can be done with a response time in the order of seconds.

Future Plans

- SAP BW on HANA, SAP Smart Meter Analytics

High Level Description

Stock analysis and stock forecasting for entire range of materials (spare parts – no oil/gas material). Determination of stock value at given point in time.

Customer Objectives / Issues

- Traditional BW solution with long processing time: the overall reporting time was around 12 hours consisting of 10 hours loading time and 2 hours calculation on-top.

Value Proposition

- Significant reduction of reporting time
- More optimized inventory of spare parts

Envisioned Business Result

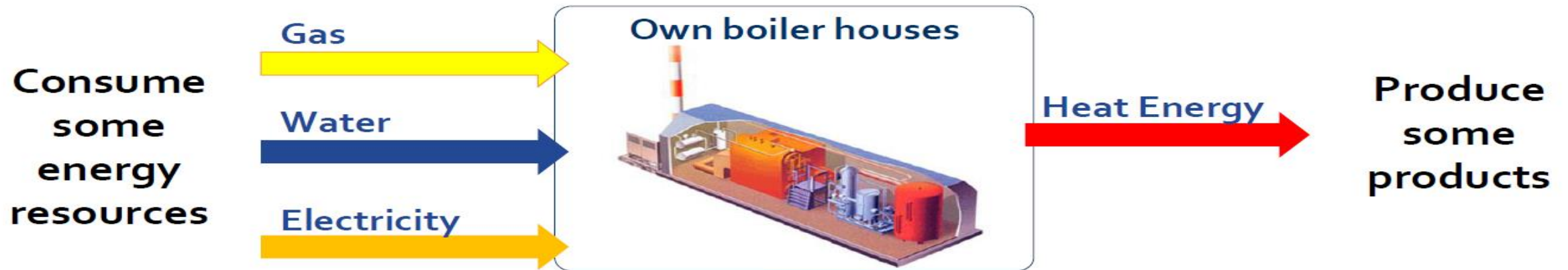
- The HANA based solution ensures in-time delivery of the needed material and reduces out-of-stock situations.

“ With SAP in-memory computing technology we can manage the provisioning and delivery of material and technical resources. I am convinced that this technology has a great future.”

Rinat Gimranov, CIO; Surgutneftegas

Surgutneftegas – Energy Efficiency

Nature of Energy Efficiency

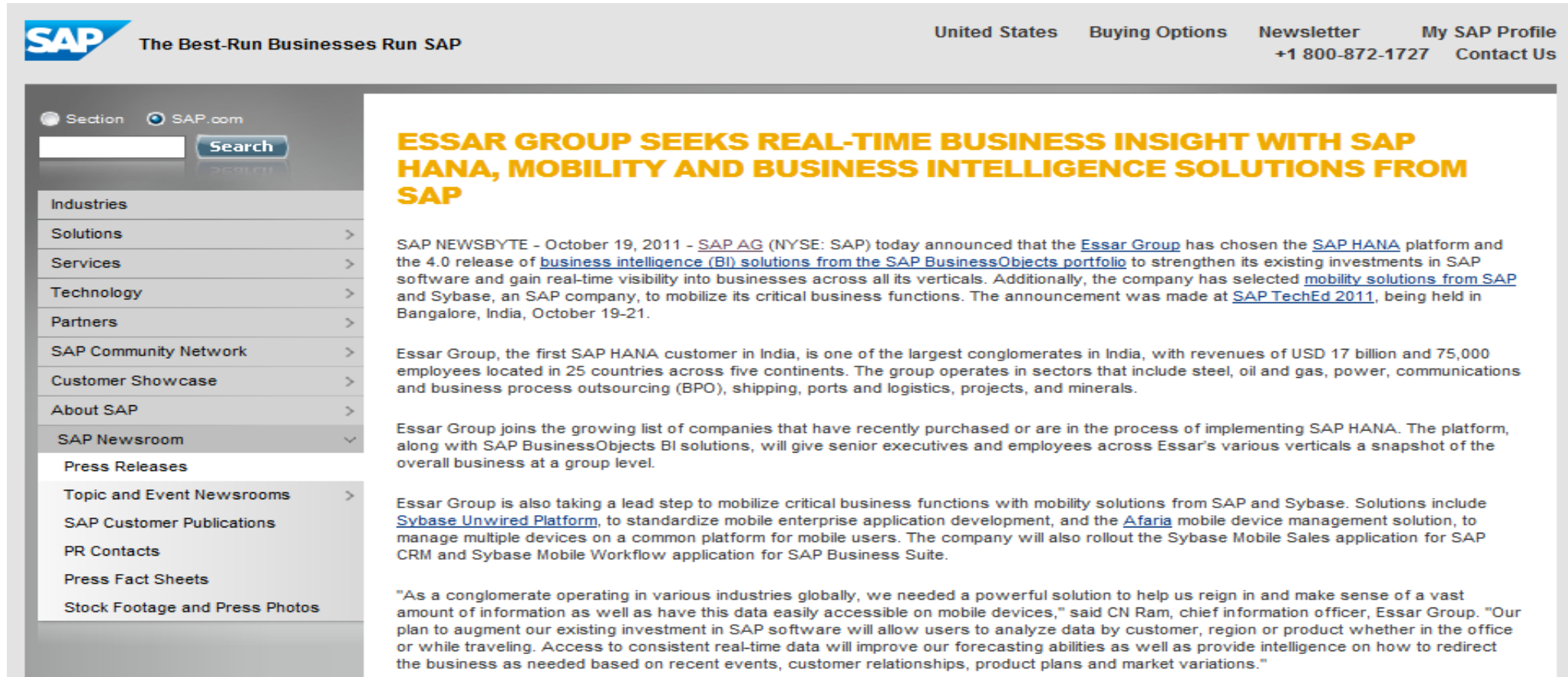


Clarify energy efficiency

- specific consumption of fuel gas for heat energy $m^3/Gcal$;
- specific consumption of liquid fuels (oil, diesel fuel, fuel oil) for heat energy, $kg / Gcal$;
- specific consumption of fuel for thermal power $kg.u.t. / Gcal$;
- specific energy consumption for heat energy, $kWh / Gcal$;
- specific consumption of water for heat energy $m^3/Gcal$;
- actual heat load of the facility;
- recommended heating medium flow.

Essar Group seeks real-time business insight...

HANA data mart

A screenshot of the SAP website's press release page. The top navigation bar includes the SAP logo with the tagline "The Best-Run Businesses Run SAP", and links for "United States", "Buying Options", "Newsletter", and "My SAP Profile" with a phone number "+1 800-872-1727" and a "Contact Us" link. A left sidebar contains a search bar and a menu with categories like "Industries", "Solutions", "Services", "Technology", "Partners", "SAP Community Network", "Customer Showcase", "About SAP", "SAP Newsroom", "Press Releases", "Topic and Event Newsrooms", "SAP Customer Publications", "PR Contacts", "Press Fact Sheets", and "Stock Footage and Press Photos". The main content area features a press release titled "ESSAR GROUP SEEKS REAL-TIME BUSINESS INSIGHT WITH SAP HANA, MOBILITY AND BUSINESS INTELLIGENCE SOLUTIONS FROM SAP". The text of the release is as follows:

ESSAR GROUP SEEKS REAL-TIME BUSINESS INSIGHT WITH SAP HANA, MOBILITY AND BUSINESS INTELLIGENCE SOLUTIONS FROM SAP

SAP NEWSBYTE - October 19, 2011 - [SAP AG](#) (NYSE: SAP) today announced that the [Essar Group](#) has chosen the [SAP HANA](#) platform and the 4.0 release of [business intelligence \(BI\) solutions from the SAP BusinessObjects portfolio](#) to strengthen its existing investments in SAP software and gain real-time visibility into businesses across all its verticals. Additionally, the company has selected [mobility solutions from SAP](#) and Sybase, an SAP company, to mobilize its critical business functions. The announcement was made at [SAP TechEd 2011](#), being held in Bangalore, India, October 19-21.

Essar Group, the first SAP HANA customer in India, is one of the largest conglomerates in India, with revenues of USD 17 billion and 75,000 employees located in 25 countries across five continents. The group operates in sectors that include steel, oil and gas, power, communications and business process outsourcing (BPO), shipping, ports and logistics, projects, and minerals.

Essar Group joins the growing list of companies that have recently purchased or are in the process of implementing SAP HANA. The platform, along with SAP BusinessObjects BI solutions, will give senior executives and employees across Essar's various verticals a snapshot of the overall business at a group level.

Essar Group is also taking a lead step to mobilize critical business functions with mobility solutions from SAP and Sybase. Solutions include [Sybase Unwired Platform](#), to standardize mobile enterprise application development, and the [Afaris](#) mobile device management solution, to manage multiple devices on a common platform for mobile users. The company will also rollout the Sybase Mobile Sales application for SAP CRM and Sybase Mobile Workflow application for SAP Business Suite.

"As a conglomerate operating in various industries globally, we needed a powerful solution to help us reign in and make sense of a vast amount of information as well as have this data easily accessible on mobile devices," said CN Ram, chief information officer, Essar Group. "Our plan to augment our existing investment in SAP software will allow users to analyze data by customer, region or product whether in the office or while traveling. Access to consistent real-time data will improve our forecasting abilities as well as provide intelligence on how to redirect the business as needed based on recent events, customer relationships, product plans and market variations."

[Link to www.sap.com/press_releases](http://www.sap.com/press_releases)

Petróleo Brasileiro S.A. – Oil & Gas

Brazil's Largest Company – Oil&Gas Industry
22° World's Biggest Company – Forbes 2000 list



Real-time

Data available for analysis



Significant Improvement

in calculation and audit process



5 minutes

the time to generate PIS / COFINS File



Product: Optimization of the PIS / COFINS (federal taxes) calculating and reporting processes with the SAP HANA platform

Business Challenges/ Objectives

- Increase the accuracy of preparing tax files (~\$7.12 B involved)
- Ensure delivery of federal tax files by March 03, 2012 according to Brazilian tax laws

■ Technical Challenges

- Process big data volumes to help calculate the tax liability
- Reduce time required to generate fiscal reports for the government
- Develop the capability to work with different data sources and technologies
- Introduce and deploy this unprecedented, innovative technology in Brazil

■ Benefits

- Increase the accuracy and timeliness of corporate tax calculations
- Generate Taxes Payable report in real-time, as a snapshot
- Significant decrease in time spent on identifying and fixing issues with calculation processes
- Reduction in administrative operating costs related to tax management

Pacific Drilling: Doubling revenue and driving innovation with SAP ERP powered by SAP HANA

Company

Pacific Drilling S.A.

Headquarters

Houston, Texas

Industry

Oil and gas

Products and Services

Ultra-deep water drilling

Employees

1,200

Revenue

US\$638 million

Web Site

pacificdrilling.com

Partner

SAP Services organization
Hewlett-Packard Company
Deloitte
Capgemini S.A.

Objectives

- Managing IT across regions, including remote offshore drilling sites
- Moving from a reactive to proactive management style, with a focus on performance management
- Looking at doubling company size and revenue within the next five years

Technical Implementation

- Migrated the SAP ERP application to the SAP HANA platform in just 60 days
- Significantly reduced database size and data footprint
- Deployed SAP HANA Live for SAP ERP to enable real-time operational reporting

Key Benefits

- Real-time performance management and faster key processes for material requirements planning (MRP) and payroll
- New enterprise dashboard created for the CEO
- Innovation platform, accelerating time-to-value cycles and offering new possibilities like predictive maintenance
- Lower total cost of ownership with a single platform for transactions and analysis

“SAP has been critical to our success thus far, and SAP Business Suite applications powered by SAP HANA will be even more important to our success going forward as we move from a transactional-based business to a real-time, performance-driven business.”

Coy Wright, Vice President of IT, Pacific Drilling S.A.

2 months

To go live with SAP Business Suite powered by SAP HANA after the proof of concept

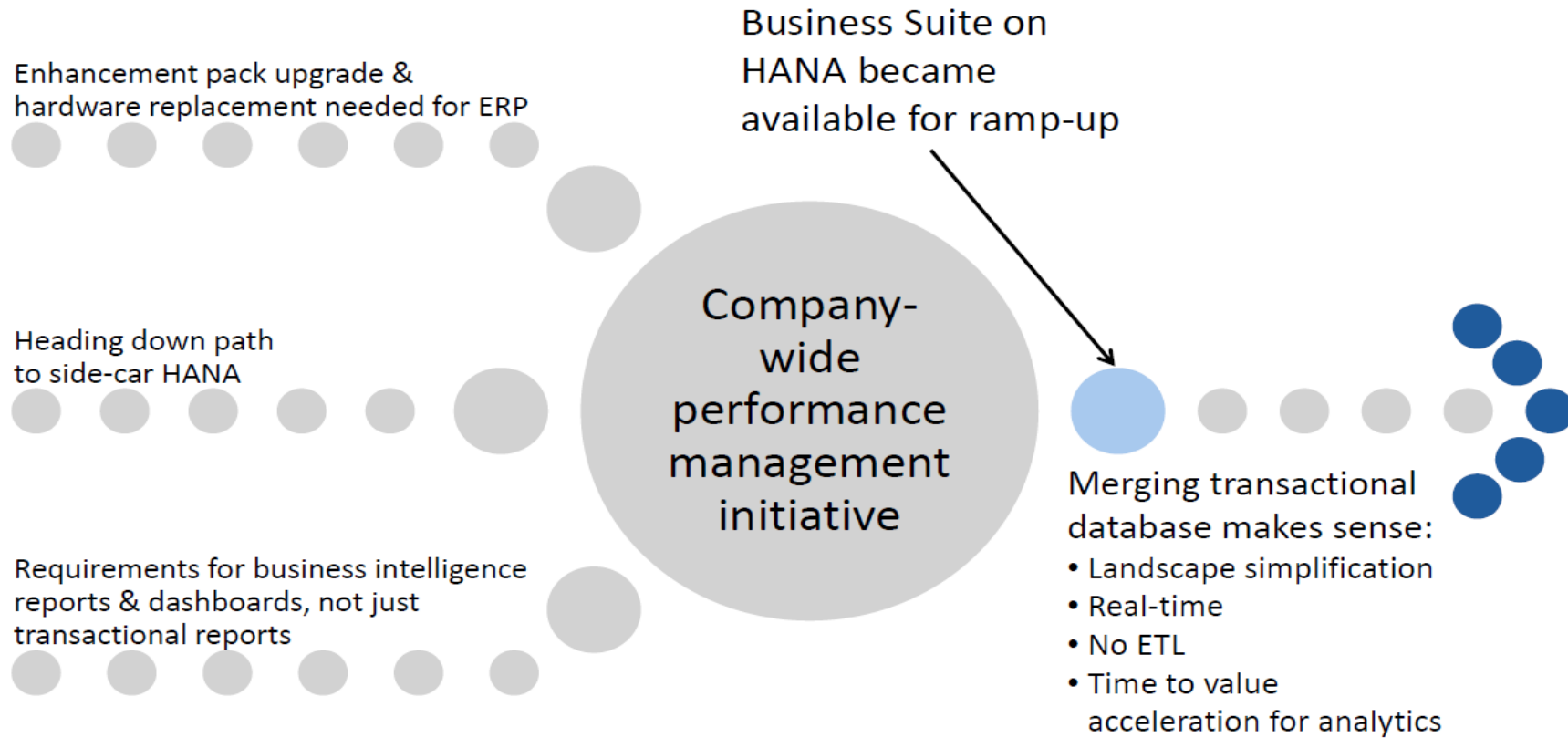
2x

Increase in fleet size over next 3 years

3 projects in 1

Upgrade of the SAP ERP application plus hardware replacement, and laying the foundation for business intelligence

Business Case for Business Suite on HANA





Royal Dutch Shell plc is finishing a trial of next-generation database technology and plans this year to begin deployment of the software throughout its business, a sign that advanced computing is moving ever-deeper into the corporate mainstream.

Shell is currently in the midst of a trial of SAP AG's HANA database technology, and there will be "first deployments later this year," Johan Krebbers, Shell group IT architect, told CIO Journal.

HANA is an "in-memory" database, which means that it stores information in a computer's main memory, instead of on a disk. That reduces response times when users make a query, because the database can execute the task with fewer commands and doesn't need to move back and forth between different forms of memory. Also, information in main memory typically is accessed on a random basis, while information on remote drives is often accessed in a specific order, which can be slower.

HANA will be used in the two main parts of Shell's business, including the exploration and drilling side, known as upstream, and the manufacturing and customer-facing side, known as downstream, according to Krebbers.

Multiple HANA projects at Shell

- BW on HANA
- HANA side-by-side
- etc.

<http://mobile.blogs.wsj.com/cio/2013/03/20/shell-getting-more-clarity-from-analytics/>



<http://www.oilandgastechology.net/upstream-news/shell-sap-develop-next-generation-digital-wrfm-solution>

HANA in O&G – Use Cases

Petroleum Retail Marketing

Objective:

- Understand customer buying behavior at service stations
- Optimize pricing (gasoline & retail product) to increase sales

Solution:

- Integrate data from different sources: traffic, credit card, buying habits
- Fast analytics on integrated data using HANA
- Derive pricing recommendation

HANA for Trading – Proof of Concept

- Data loads and reporting times of the Oil Data Warehouse (ODW) no longer meet the needs of the Trading business.
- Viewing of 2 days of trading data is **not possible today** in Domestic Crude On Lease business unit P&L report.
- Data load could not be performed over night in many cases

Results with HANA POC

- ✓ Data load was reduced from >7 hours to near real-time
- ✓ POC successfully displayed >82 days in less than 2 seconds
- ✓ HANA exceeded the 20 day aggregation by aggregating 82 days without performance degradation
- ✓ All report examples performed their drilldown/drill-through capabilities in the average of 5 seconds or less.
- ✓ Dramatically reduced ODW complexity and reduced TCO

- **Data in PoC Scope:**
 - **82** days of P&L tables
 - **20** tables
 - **820** million records
 - 0.5 TB data
 - **HANA**
 - (4x10 Core CPU, Linux, 1TB memory, at SAP Palo Alto site)

Shale/Fracking HANA - Proof of Concept

Objective:

- Understand the characteristics of a successful fracking activity → operators to re-use information about drilling, pressures, depths and set-up at similar sites
- Large DW using HANA populated from multiple sources → correlate SCADA data against other sources to find root cause

Solution:



Approx **373 Million** Records Loaded

- Live and historical data
- Combined Production Volume Reporting and SCADA data

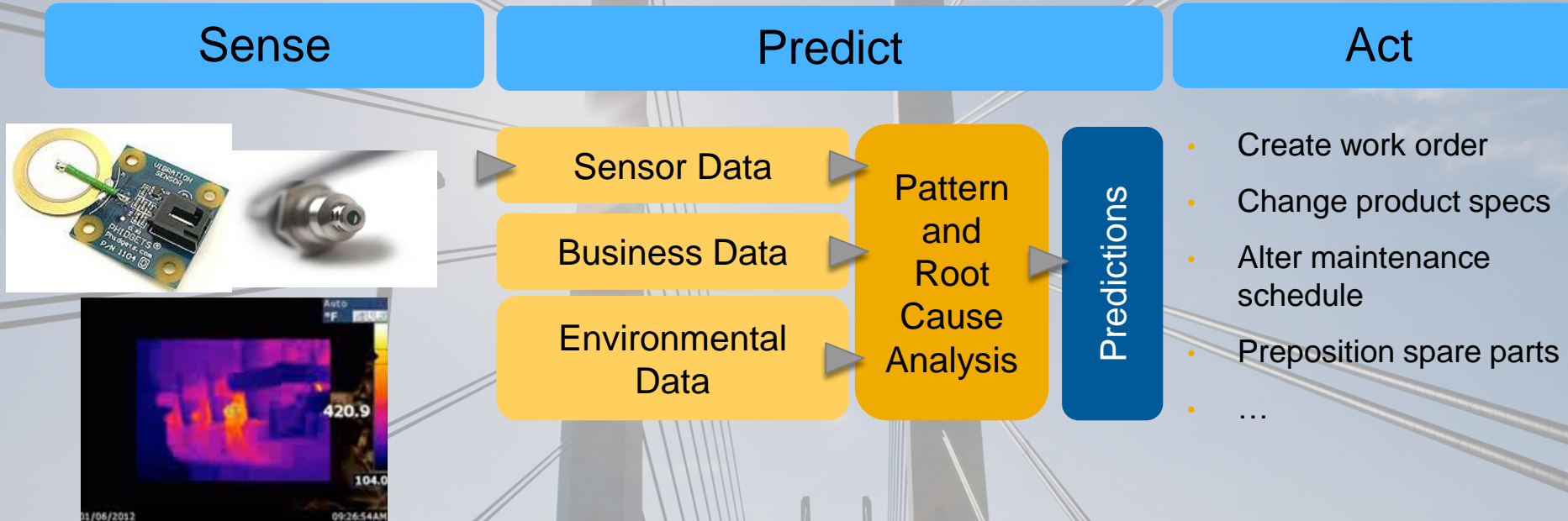


Near Real Time Updates From **PhD (SCADA Data)**

- Updating HANA Every **1 Minutes**
- **Lowest Level** of Detail

Predictive Maintenance

A key building block for improved asset performance



50 billion
devices connected by
2020*

1/5
price of sensors, microprocessors
& wireless technologies today vs.
4 years ago**

40-50%
CAGR for M2M market until
2020*

*Source: Gartner – “Top 10 Tech Trends for 2013” – 2012

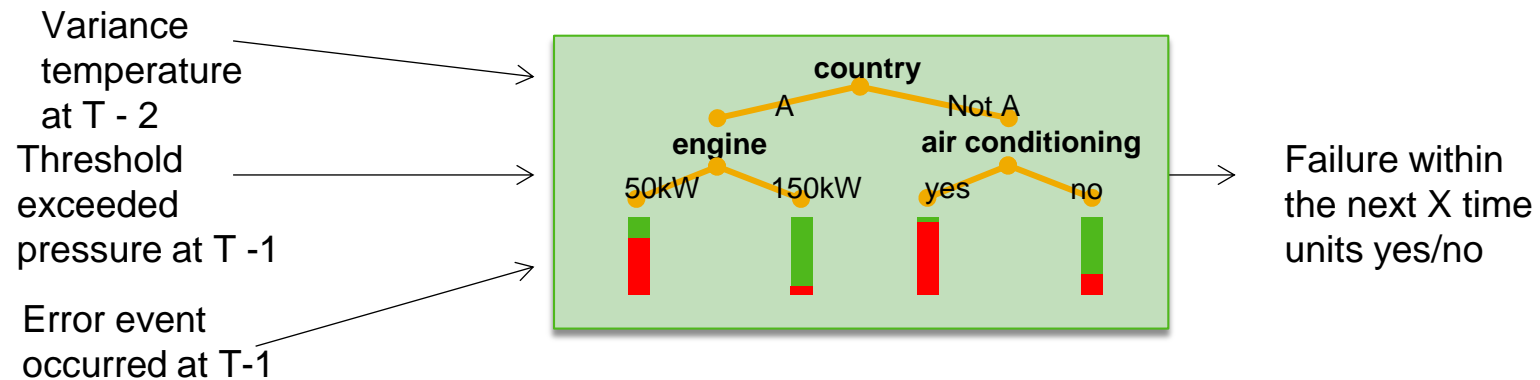
**Source: Economist Intelligence Unit – “The Rise of the Machines” – 2012

Machine Health Prediction Using Sensor Data

- Predict machine/part failure/warranty claims to lower service costs and increase machine up-time
- Potentially interesting attributes :
 - Sensor data like temperatures, pressures, machine conditions
 - Failure codes
 - Machine master data

- Usage:

- Increase machine up-time
- Optimize service
- Increase customer satisfaction
- Use warranty predictions for establishing provisions



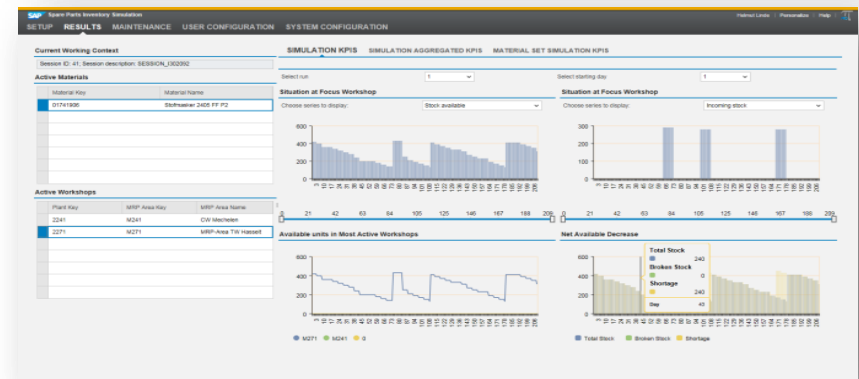
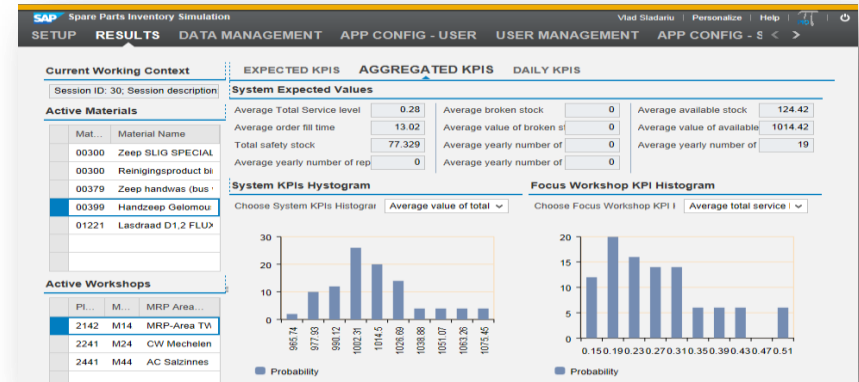
▶ Algorithms automatically reveal possible defect patterns which are interpretable by the end user

Predictive Maintenance - Co-innovation projects in 2013/2014

Industry:	Country:	Scope:
Automotive	Germany	Product improvement in R&D based on vehicle test data.
Automotive	Germany, US	Vehicle health prediction to improve manufacturing quality, service planning and customer satisfaction based on business and telemetry data. Very big data: Hana / Hadoop
Farm Equipment	US	Early identification of emerging issues for product improvement and failure prediction to reduce downtime based on business and telemetry data.
Farm Equipment	Germany	Identification and prioritization of machine failure pattern for product improvement based on business and machine data.
Compressors	Germany	Machine health prediction to lower service costs and increase machine up-time. Enable service, sales and R&D to transform the company to an industrial service provider.
Separator	Germany	Identification of health finger print based on vibration analysis. Integration of and monitoring of machine health using failure pattern for product improvement based on business and machine data.
Airplanes	US	Systems trending and alert management framework which allows customer support to propose alternative maintenance schedules which may avoid unplanned downtime, increase aircraft availability and as well as service and maintenance revenues.
Automotive	Germany	Manufacturing Quality Assurance by automatic failure identification and anticipation based on machine data.
Airplanes	US	Improve operational efficiency and identify statistically significant demand signals for spare parts. Provide information needed to make fix or fly decision and drive down turn time.
Airplane Service	Swiss	Feasibility of accurate health predictions for aircraft components and its desirability for the people responsible for component management and line maintenance planning and dispatching based on historical flight recordings, aircraft configuration and maintenance data.
Railway	Italy	Health predictions for train components and its desirability for the people responsible for maintenance service management
Mining	US	Drillable Map view of phosphate and potash minefield to view operational statuses of cluster, wells, pipes and rigs.
Chemicals	Germany	IT/OT integration unifying 6.2 billion sensor readings from one chemical plant with 29,000 service notifications from ERP in SAP HANA, in order to identify failure patterns and predict failures.

Inventory Simulation & Optimization allows you to

- **Visualize consolidated information** for each material part across the whole supply chain
- **Predict** the behavior of the supply chain in the future, based on a data snapshot from SAP ERP
- **Simulate** the effect of changed inventory policies, lead times, distribution paths, etc.
- **Calculate KPIs** like service level or average inventory based on the simulations
- **Optimize inventory policies** to achieve best possible trade-offs between service level and inventory holding cost



▶ SAP Data Science is developing a simulation and optimization solution for finding ideal MRP parameters to manage a spare parts supply chain

Operational Insights with Rolta OneView™

This SAP partner solution allows to process huge amounts of data from multiple operational systems through SAP HANA to deliver near real-time insights to the customer's operational staff enabling corrective actions to be taken.

- Prebuilt data model supports industry standards
- Analyze operational data to gain insight into process improvement, increase asset availability, improve safety, reduce down time, improve product quality
- Enable predictive analytics and modeling based on operational data
- Provide in-depth analysis of cost and profitability information
- Decrease maintenance and operational costs



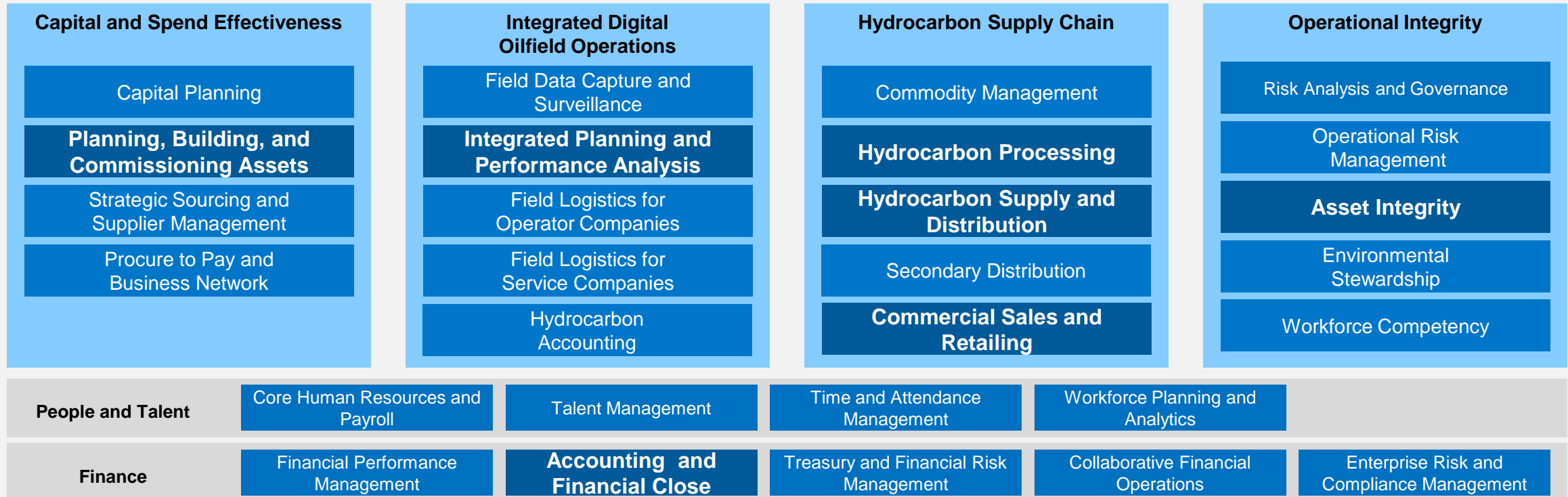
Suite on HANA for O&G

Industry Value Map for Oil & gas

The Prudent Energy Supplier

Business Suite on
HANA Advantage

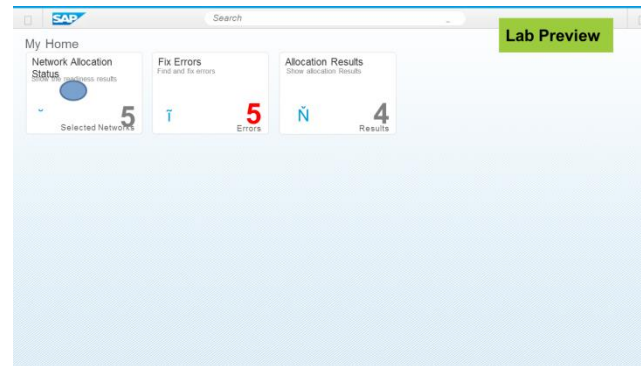
www.sap.com/solutionexplorer



Oil Solutions available on HANA!

Upstream Operations Management with Suite on HANA

GAS	Last Day	Daily	By Percentage	Production Network Name	Production Date	Actual / C	By Quantity	Explained	Unexplained
				US_texas_PN1	13/01/2014	1000/ 250 mcf		4%	16%
				US_texas_PN2	13/01/2014	720/ 80 mcf		2%	8%
				US_texas_PN3	13/01/2014	800/ 200 mcf		10%	10%



US_PN1_S1
Production Network: US_PN1_N1
Frequency: Daily

Quantity Type: Alloc | Measurement Category 1 | Measurement Date: January 13, 2014

Gas
Gas Volume: X.XXX SM3 / Day
Pressure: X.XXX KPa
Temperature: X.XXX C

Oil
Oil Volume: X.XXX SM3 / Day
API Gravity: X.XXX Deg/ API
BSS W: X.XXX %

Water
Water: X.XXX SM3 / Day

Save Cancel

- HANA Optimized Hydrocarbon Allocation engine
- Overall new FIORI–based User Interfaces to improve efficiency and user experience across Field Data Capture, Allocation, and Deferment Management
- New user productivity enhancements related to alerts, data access and selection, and status management

JVA Optimization Results - Summary

Comparison of time taken between traditional DB and HANA DB

Scenarios	Before Optimization		After Optimization	
	Traditional DB	SoH	HANA Side-Car	SoH
GJCB - Cutback	5 hrs + not completed	35 mins	30 mins	22 mins
GJ95 - Overhead calculation	2 hrs + Not completed	34 mins	25 mins	23 mins
GJ96 - Payroll Burden	6 hrs + Not completed	13 mins	24 mins	12 mins

HANA Optimization for Oil & Gas Downstream

Customer Engagement Initiative (project charter as of Oct 2013)

In 2013 SAP has delivered the SAP Business Suite on HANA enabled for Oil & Gas. To fully exploit the possibilities of SAP HANA, SAP plans to **optimize key business scenarios** relevant for the oil and gas industry in terms of

- ❑ Performance
- ❑ Integrated real-time analytics
- ❑ Usability

This project is to jointly identify and define the relevant business scenarios together with our SAP customers and to **deliver the identified scenarios along a jointly defined roadmap**.

The project focuses on key scenarios in the areas of Supply chain Scheduling, Supply Chain Execution, and Real Time Inventory Management and specifically takes into consideration optimization potential in SAP IS-Oil Downstream, SAP Trader's and Scheduler's Workbench and in the underlying core ERP functions.

SAP invites our customers to jointly identify and prioritize the relevant scenarios as well as to specify the requirements from a performance and usability perspective. Therefore customers will be participating in joint calls, business expert interviews and **on-site end user interviews** to help understand and validate the requirements for the planned improvements.



Thank you

Contact information:

Dr. Phillip Sievers
Solution Management
Industry Business Solutions Oil & Gas

SAP SE

Dietmar-Hopp-Allee 16
69190 Walldorf
Germany

E phillip.sievers@sap.com