



Digitalization@PG

# Solving business challenge with innovative AWS architecture and third-party software

Berlin | 18.05.2017 | AWS Summit 2017

# Power and Gas – Powerhouse in power generation

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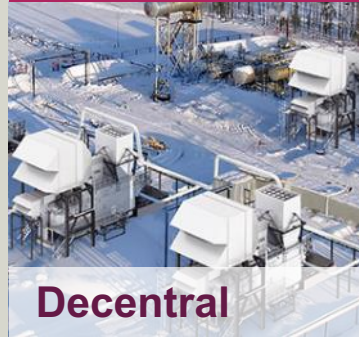
## Power and Gas Division

### Oil & Gas



- Portfolio expansion through Dresser-Rand's acquisition
- Entry into growing LNG market

### Power Generation



Decentral



Central

- Products and turnkey solutions
- Small decentral to largest utility applications

## Power Generation Services Division

### Service



- Game-changing service technologies
- Data-driven services
- Large installed fleet (7,800 gas turbines, 72,000 steam turbines, 44,100 compressors, 3,200 automation systems)

# Power and Gas – Global trends are creating our market's challenges

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## Global trends lead to increased energy demand

### Demographic change

**9.6 BN**

increase in the earth's population in 2050 from 7.3 billion people today. Average life expectancy will then be 82 years.

### Urbanization

**70%**

of the world's population will live in cities by 2050 (2009: 50%).

### Climate change

**2013**

Scientists measured the highest CO<sub>2</sub> concentration in the atmosphere in the last 800,000 years.

### Digitalization

**44 ZB**

will be reached by the digital universe by 2020 – a 10-fold increase from 2013.

### Globalization

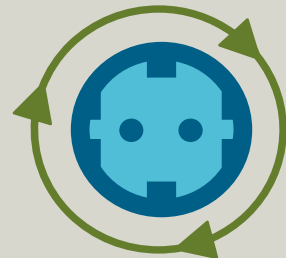
**2x**

Since 2000, the volume of world trade has nearly doubled.

## Lead to our market's challenges



Acceptance



Reliable power supply



Economic efficiency



Resource efficiency



Climate protection



# Egypt Megaproject – 14.4 GW H-Class power further national grid

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Customer  
**Egyptian government**  
Location  
**Beni Suef, Burullus, New Capital**  
Date  
**2017**

**> 60%  
net efficiency**



## Challenges

- Outages and electricity cuts hamper industrial production and affect private households
- Energy demand is rising
- More electrification of urban and rural areas needed



## Solution

- Three natural gas-fired combined cycle power plants including 24 H-Class gas turbines and 12 steam turbines
- Adds 14.4 GW to Egypt's national grid
- Provide training to future power plant workers and service personnel



## Customer benefits

- Increased power generation capacity and reliability of power supply
- Reduced CO<sub>2</sub> emissions and diversification of the energy mix
- Supports economic growth
- Increases the number of jobs and benefits for education and training



**24 H-Class gas  
turbines**

**14.4 GW  
total combined  
capacity**



Change is  
a Process  
not an Event!

Customers need solutions – not technical description and tools



PG is an engineering company – the staff needs an easy way to access and evaluate data

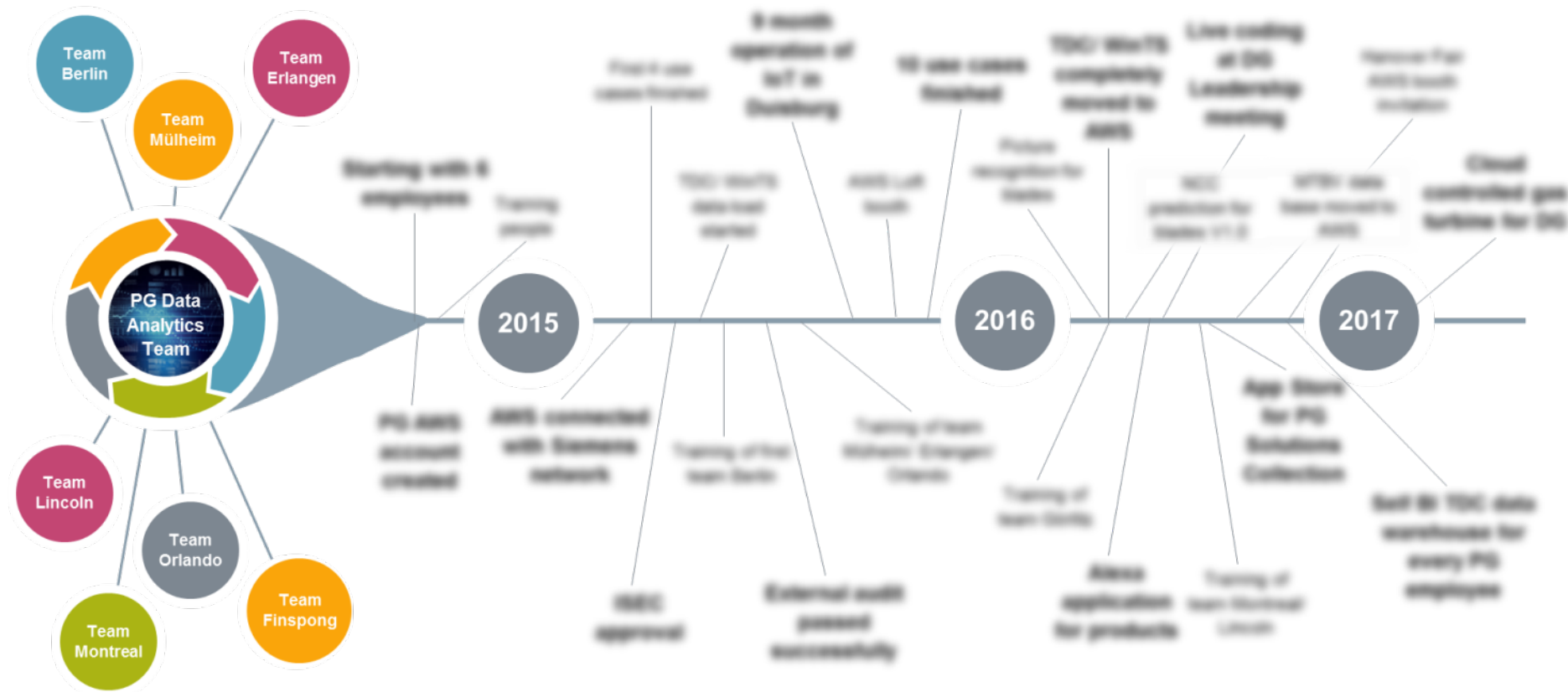


Our people should build the solution – they have the domain know how

# Digitalization@PG – Data Analytics and Cloud Solutions

## What we are doing

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Business value goes first

Serverless goes first

Build your solution, learn and extend

Stay cloud native





And in some cases we will fail ....

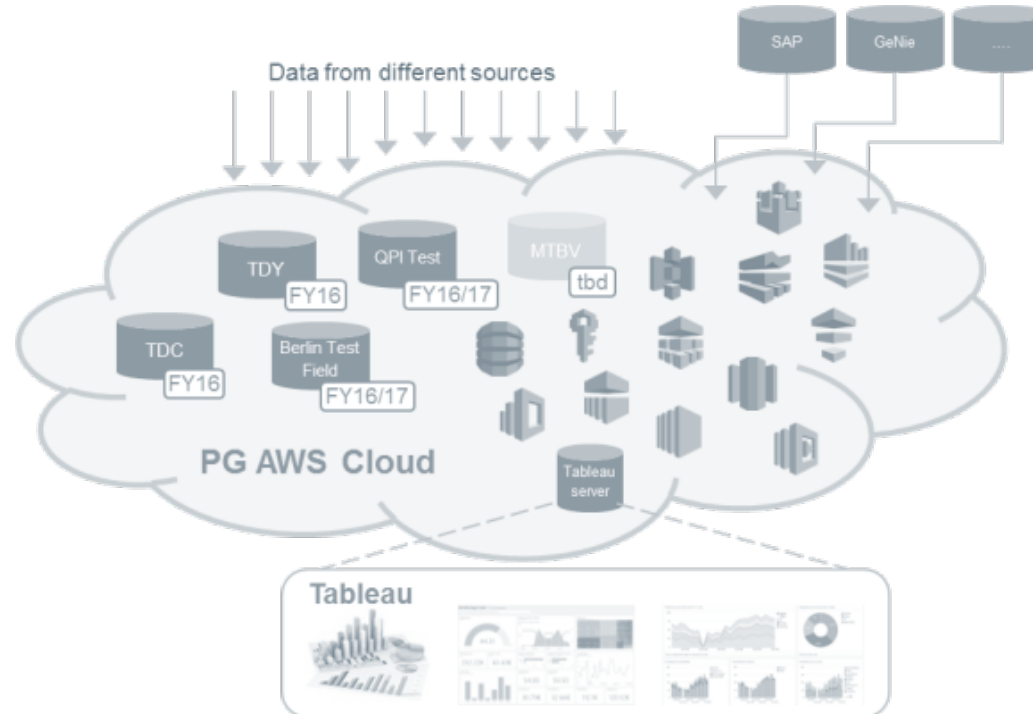
### Cloud based infrastructure: starting fast by using what is out there – but what about ETL?



Standard AWS account



Tableau Server located in AWS cloud







aws marketplace

AMI & SaaS

View Categories

Hello, kevin.brechtel2@siem...

Sell in AWS Marketplace Amazon Web Services Home Help

**Matillion ETL for Amazon Redshift**

Sold by: Matillion | See product video | Product Support Connection

**14 Day Free Trial Available** - Matillion ETL for Amazon Redshift makes loading and transforming data on Redshift fast, easy, and affordable. Prices start at \$1.37/hour with no commitments or upfront costs. Need to cut your ETL development time in half and shave months off your projects? No problem. The AMI takes less than five minutes to set up and delivers results much faster than traditional ETL technologies. With just a few clicks, you can load data into Redshift from from dozens of sources, including S3 and RDS; multiple databases and APIs; common systems like Google Analytics, Salesforce, Netsuite, and SAP; and... [Read more](#)

Customer Rating	★★★★★ (25 Customer Reviews)
Latest Version	1.27.4. (Other available versions)
Operating System	Linux/Unix, Amazon Linux 2015-03
Delivery Method	64-bit Amazon Machine Image (AMI) <a href="#">(Read more)</a>
Support	<a href="#">AWS Marketplace Product Support Connection</a> <a href="#">See details below</a>
AWS Services Required	AmazonEC2, AmazonEBS, Redshift

**Highlights**

- Push-down ELT Architecture - simplified infrastructure, fast performance, scalable, increases development productivity
- Intuitive User Experience - easy onboarding, powerful

**Continue** You will have an opportunity to review your order before launching or being charged.

**Pricing Information**

Use the Region dropdown selector to see software and infrastructure pricing information for the chosen AWS region.

**For Region**

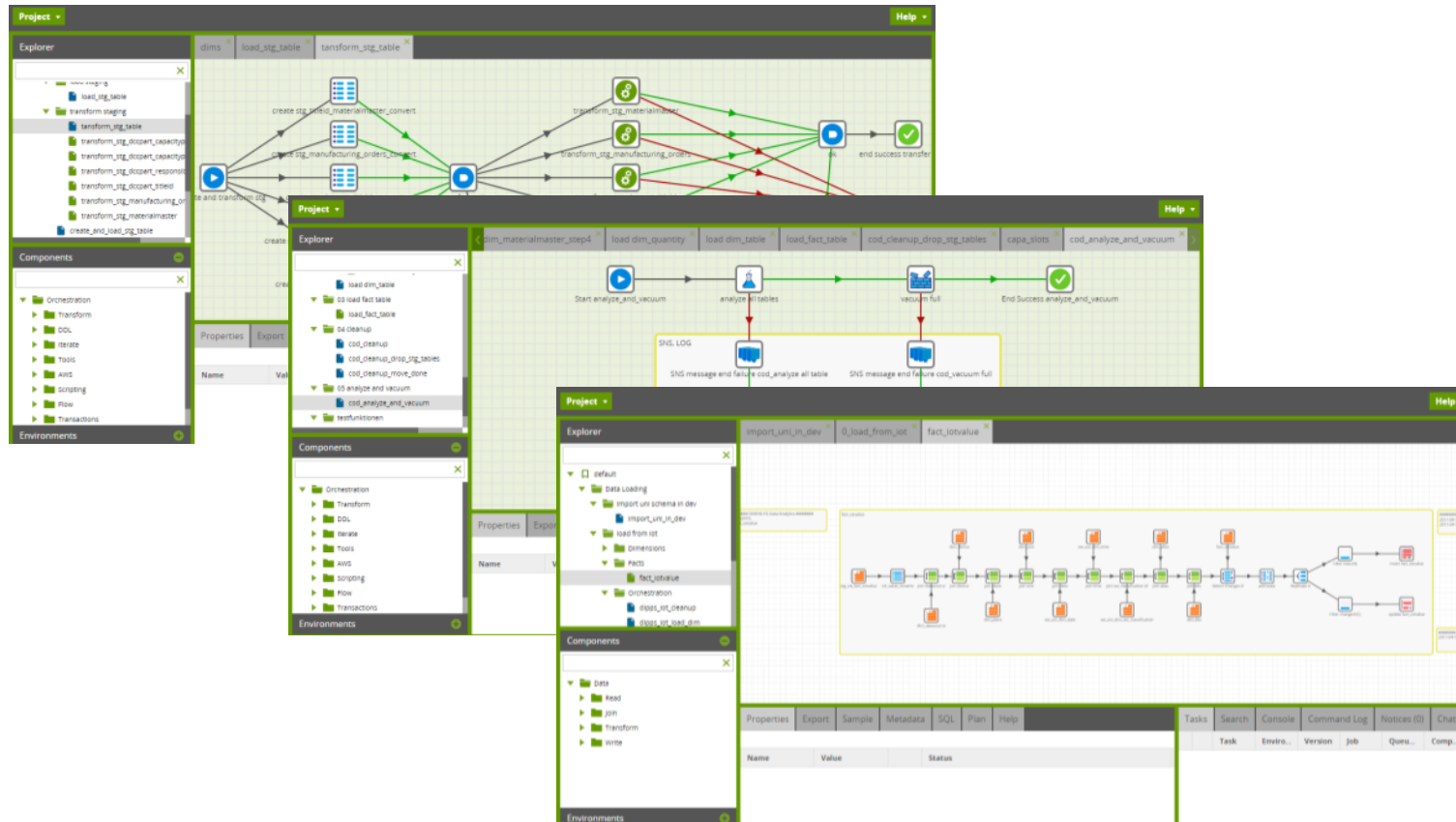
US East (N. Virginia)

**Free Trial** Try one instance of this product for 14 days. There will be no hourly software... [Read More](#)

**Additional Taxes May Apply**

Easy to find but....





What happens to  
our existing jobs  
with other tools?

....can we manage to implement it?

## From a todays point

- Changing the tool was possible – and it was easy too
- Fully integrated into cloud environment makes working easy and flexible
- Training of team members is essential
- Matillion is now the first choice for our work
- Fully scalable with every new team without requiring massive changes, licenses or extra effort
- Excellent support for every issue and topic

**Matillion offers great support making our work much more easy**

“

**To invent you have to experiment, and if you know in advance that it's going to work, it's not an experiment.**

Jeff Bezos

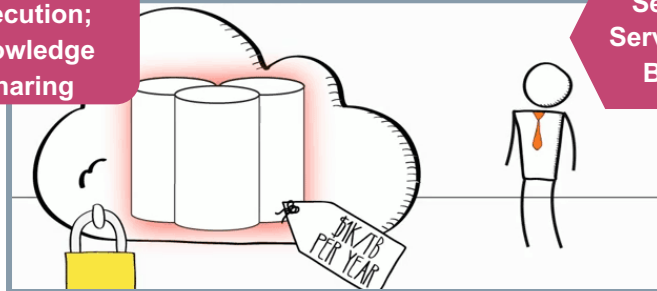


# Digitalization@PG

## Data Analytics and Cloud Solutions – Some Examples

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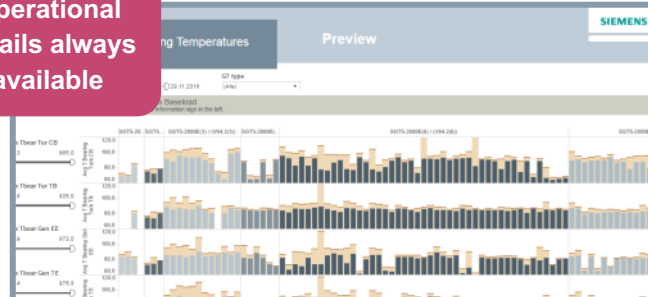
Speed up of execution;  
knowledge sharing



Easy access to operational data at a central data warehouse for every PG/ PS member

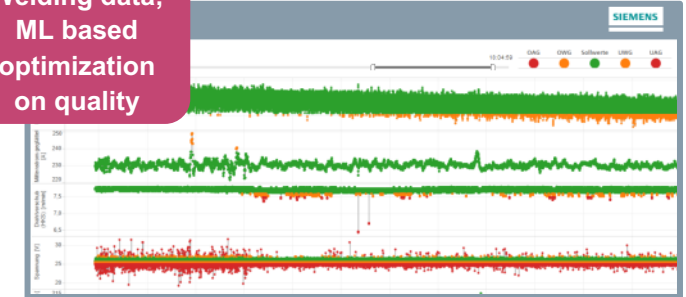
Self Service BI

Operational details always available



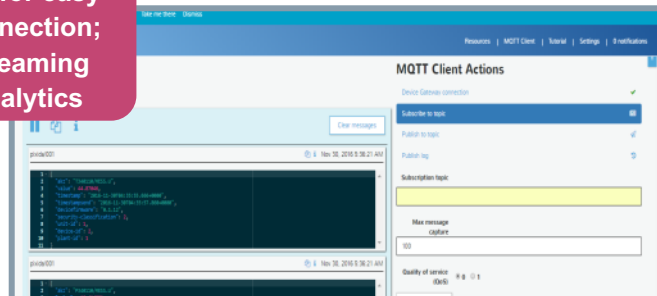
Operational data evaluation (>40 different views via Tableau dashboards)

Welding data;  
ML based optimization on quality



Data evaluation during welding to avoid failures and reduce quality testing

IoT for easy connection;  
streaming analytics



Internet of Things connectivity to gather data from manufacturing and field

Web based information search



Evaluation of supplier and sales information

New cloud based customer offering



Digital twin of e.g. boiler to evaluate operational performance on the fly







Alle sagten:

**DAS GEHT NICHT!**

Dann kam einer,  
der das nicht wusste,

**UND HAT'S  
EINFACH GEMACHT.**

All told: It is not possible...but then someone came not knowing this and simply did it



