





# E&P Data management in the cloud using ArcGIS and PPDM

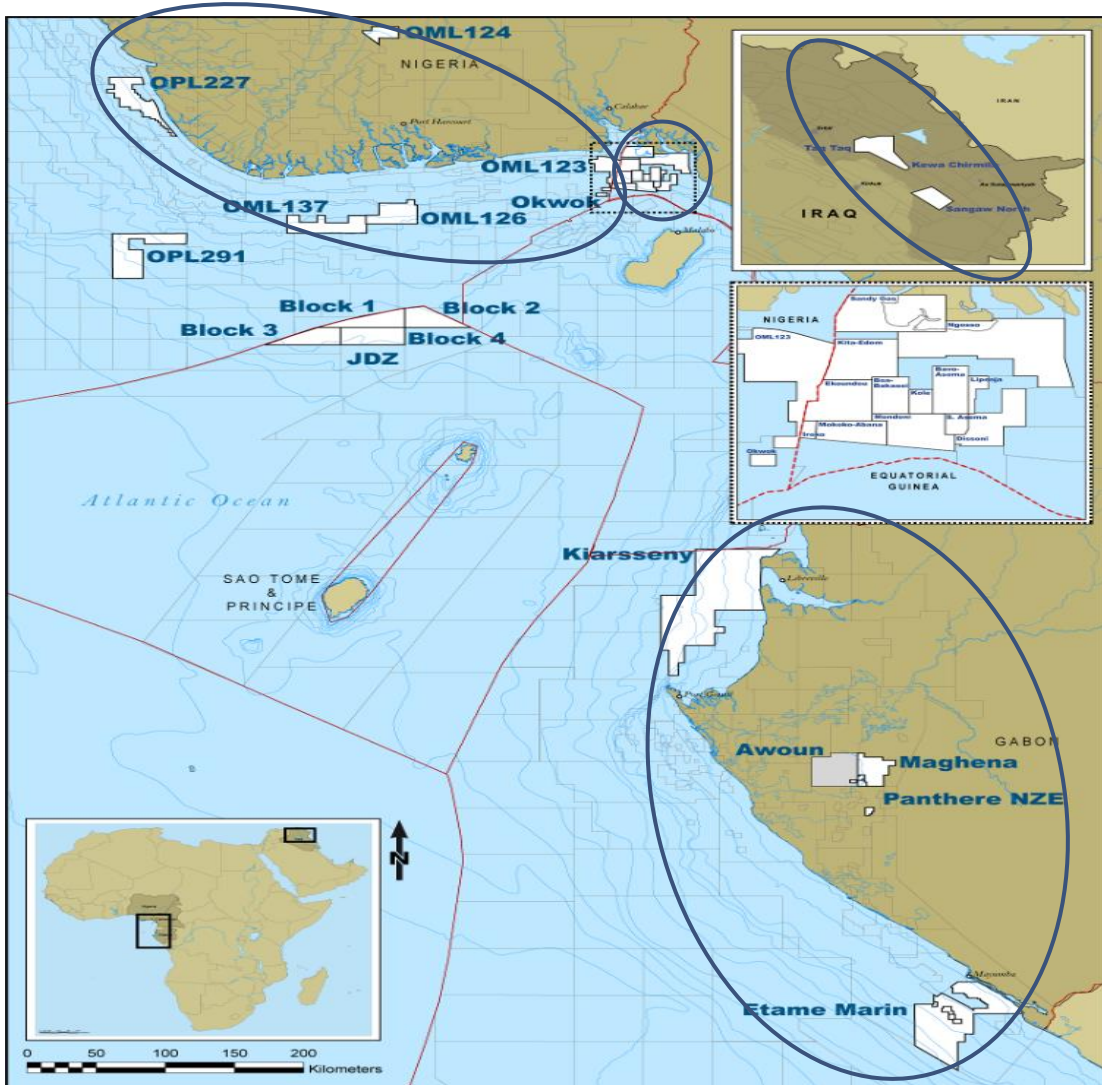
**Tom Royston**  
IT management consultant for  
Addax Petroleum Group

**October 30<sup>th</sup> , 2018**

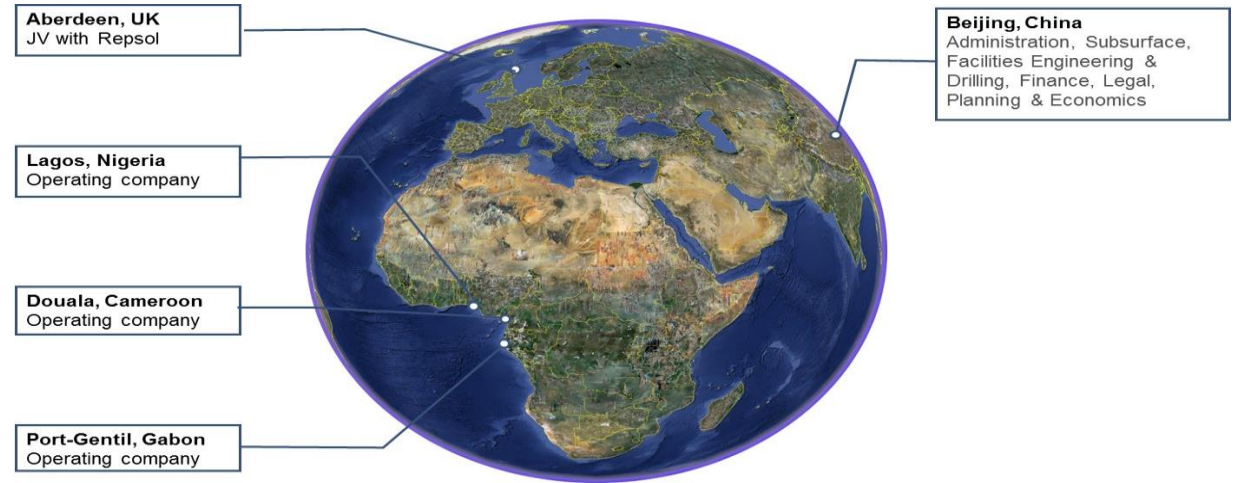


	Addax context
	GIS at Addax
	Cloud at Addax
	GIS in the cloud

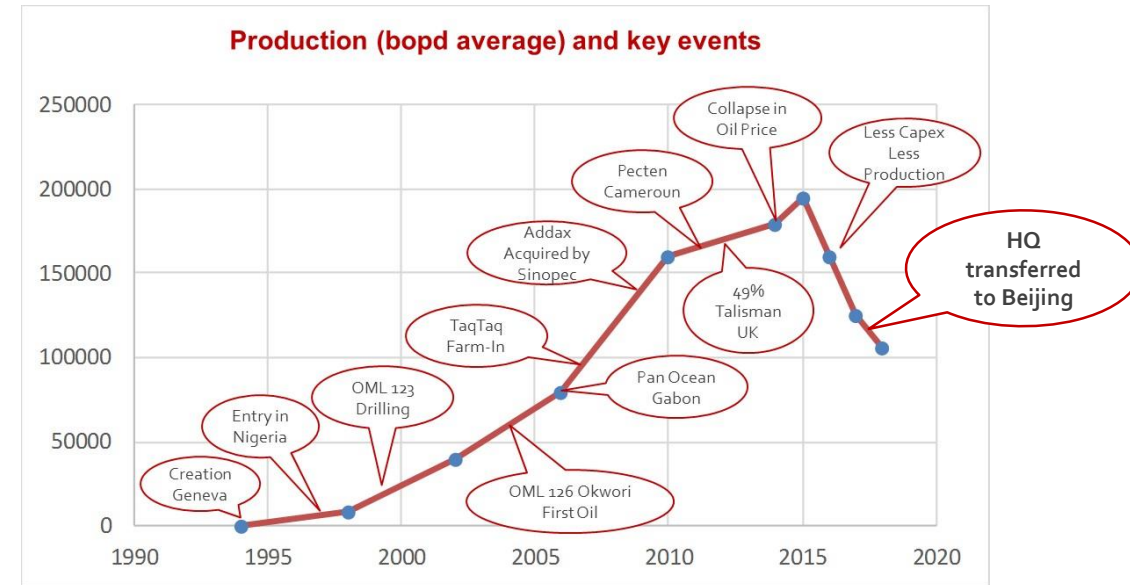
## Assets in West Africa, North Sea and Kurdistan



## Offices in 5 countries



## Production (bopd average) and key events

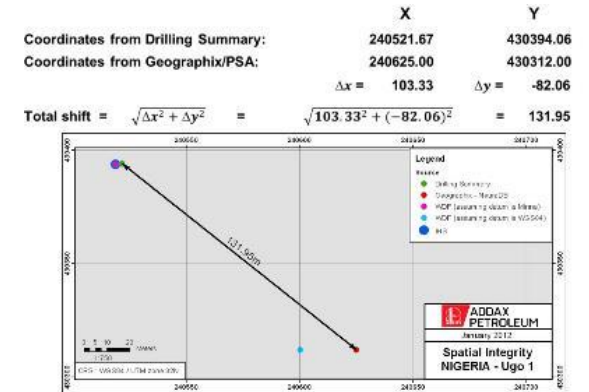
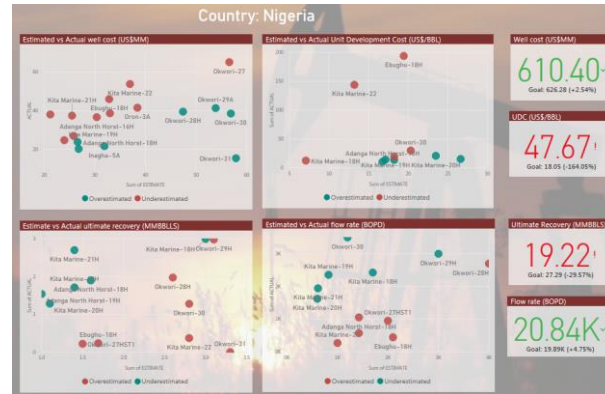
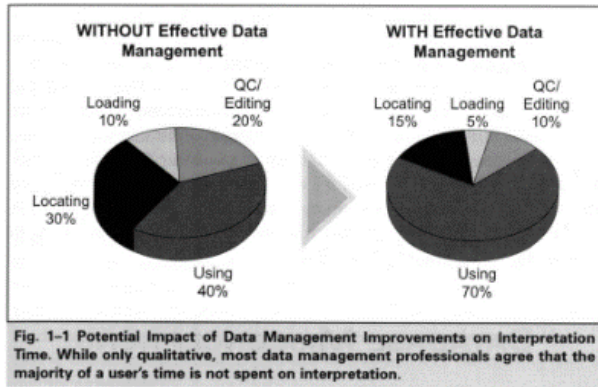


## Subsurface: G&G data discovery

## Development: cost/prod analysis

## Compliance: document retention

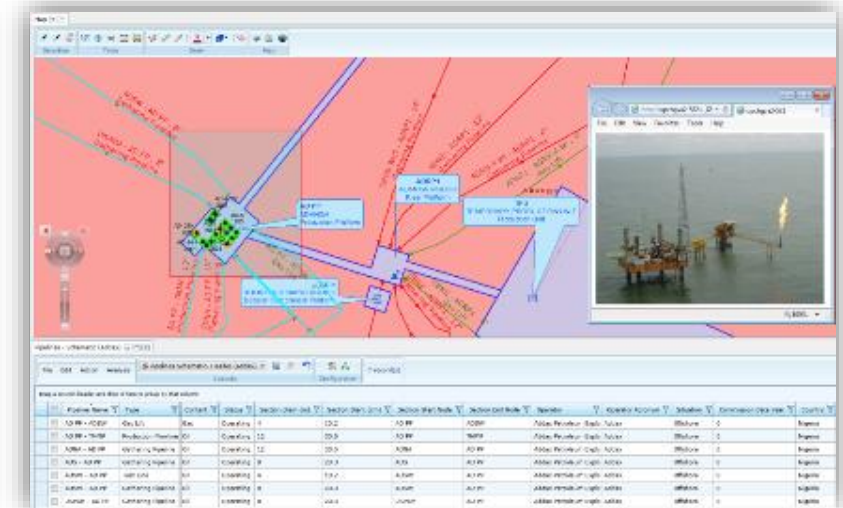
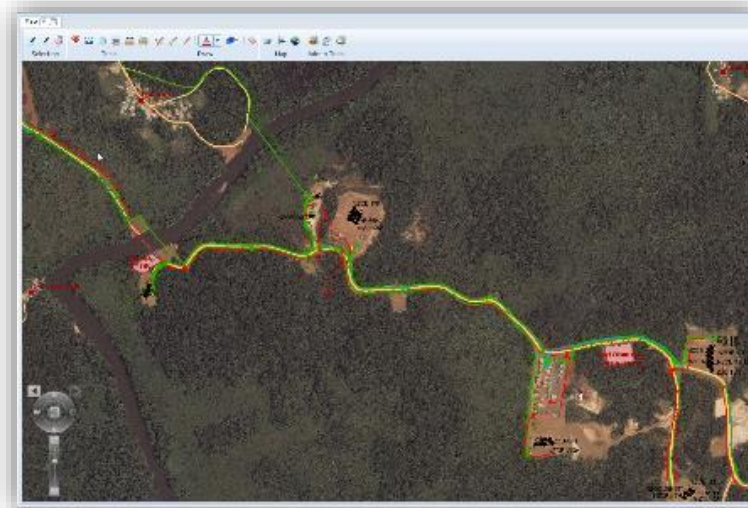
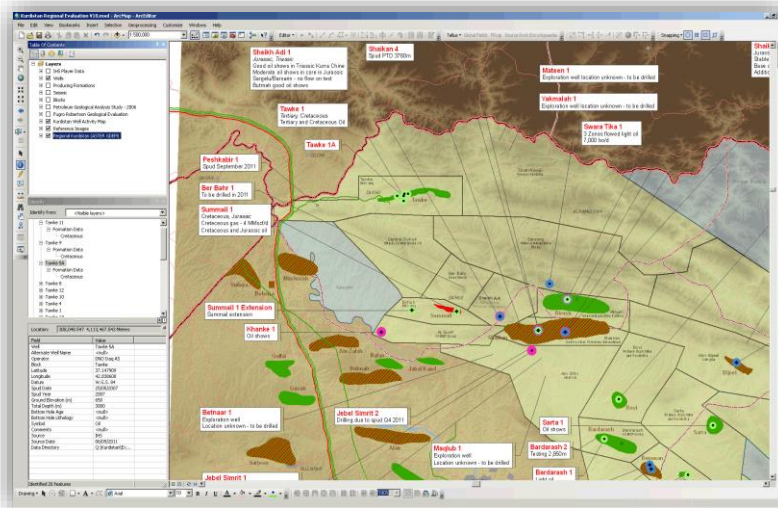
## Drilling: spatial integrity

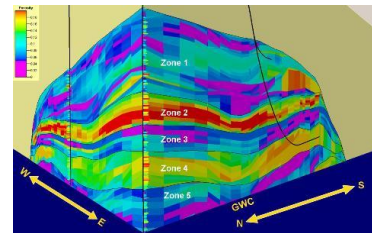
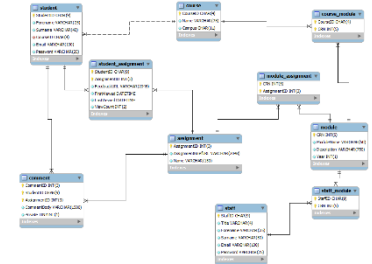
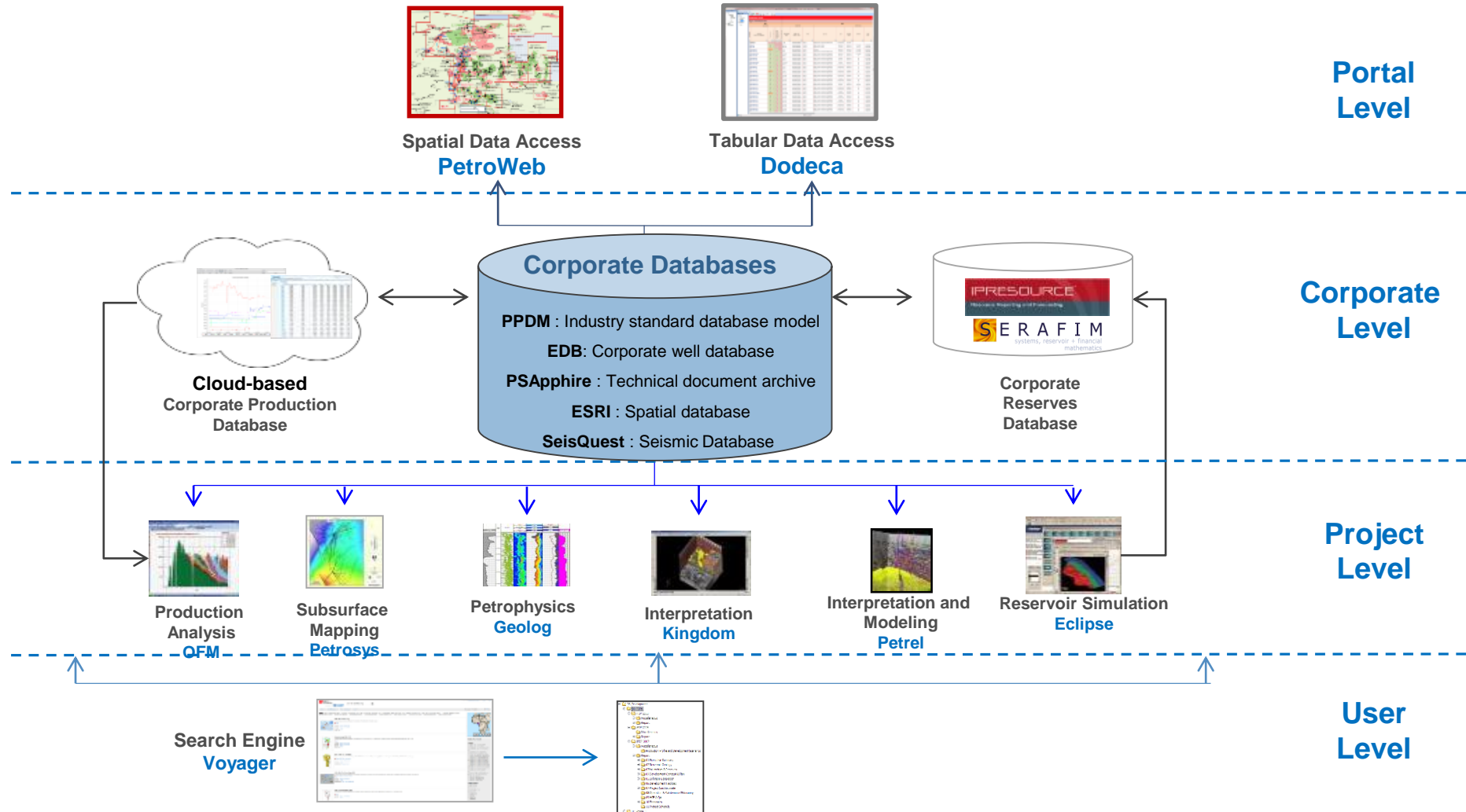


## M&A: opportunity qualification

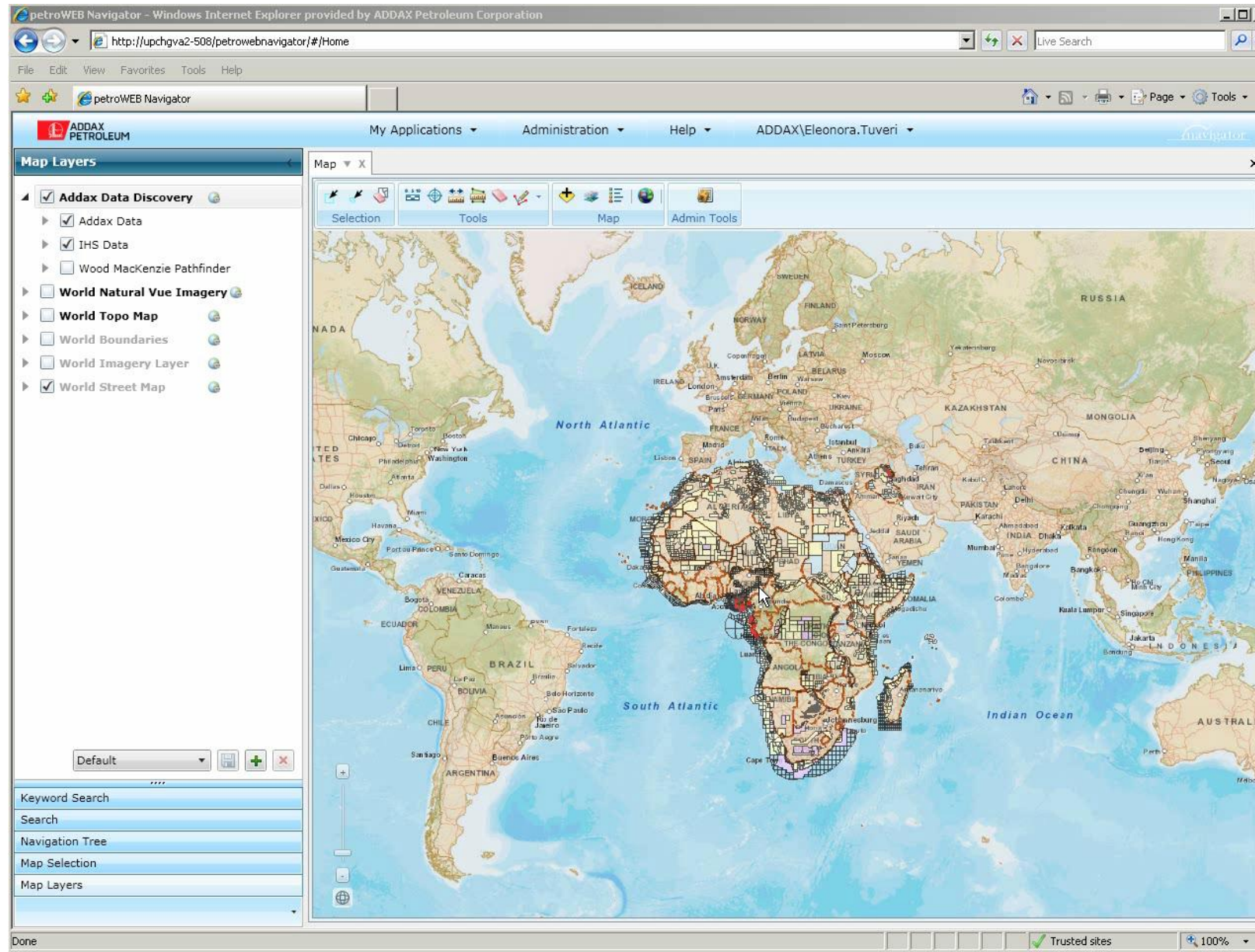
## HSSE: environmental impact assessment

## Operations: asset integrity/inventory

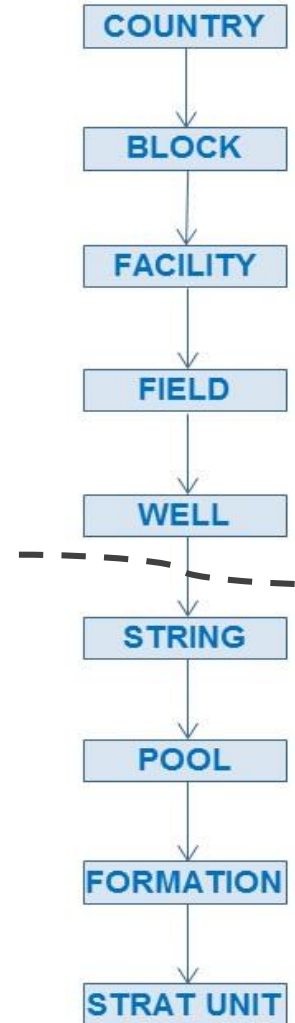




## Value chain & Disciplines



## Model



☐ **Cloud is a multi-year IT strategy**

2012 First “Software as a Service” applications

2014 Identity management and SSO

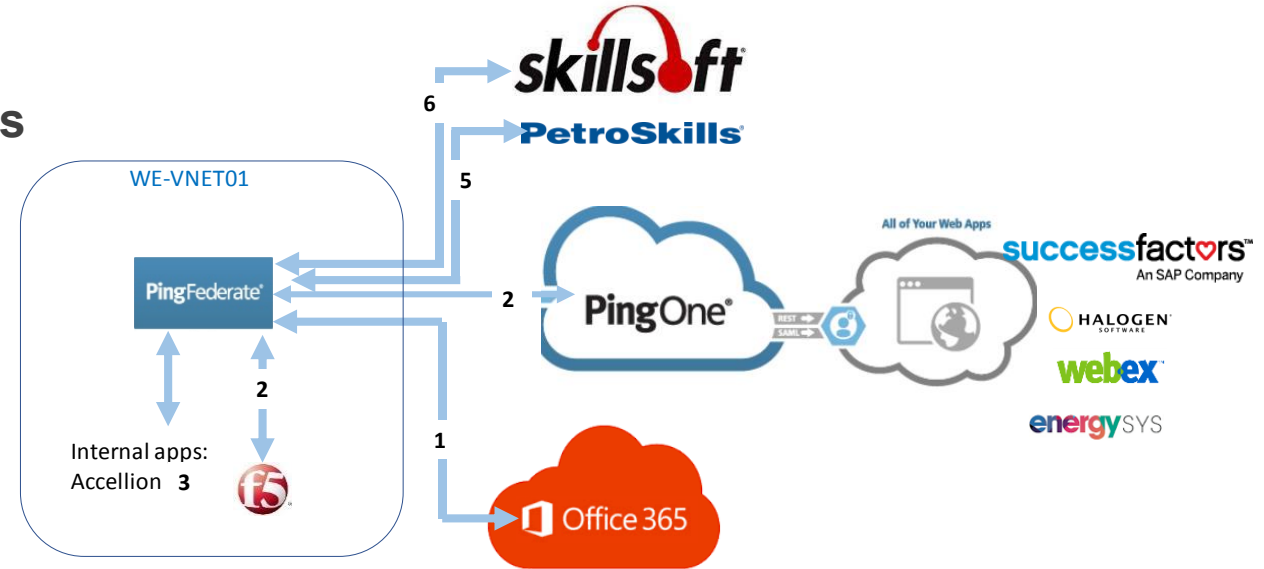
2015 Local Internet break-out

2016 Office 365

2017 POC on Azure: Corporate Web Site

and

2018 **Full Azure migration triggered by GVA HQ shutdown !!!**





Cloud Feature	Alibaba Cloud	Huawei	Microsoft Azure	Amazon Web Svcs
URL	<a href="https://intl.aliyun.com/">https://intl.aliyun.com/</a>	<a href="http://www.huaweicloud.com/">http://www.huaweicloud.com/</a>	<a href="http://azure.microsoft.com">http://azure.microsoft.com</a>	<a href="http://aws.amazon.com/">http://aws.amazon.com/</a>
Web Sites (as of 10/17)	1,364	> 100,000	606,471	39,157,956
Geographic Leadership Coverage	China	China	Rest of world except China	Rest of world
SE Asia Price	\$139.33 /mo	\$89 /mo	\$200.88 /mo	\$232.82 /mo
N Europe Price	\$139.33 /mo	⊘	\$156.24 /mo	\$ 215.76 /mo
Elastic Compute Service	✓	✓	✓	✓
Relational Database Service	✓	✓	✓	✓
Direct Network Connectivity	✓	✓	✓	✓
MS-SQL PaaS	⊘	⊘	✓	⊘
Citrix PaaS	⊘	⊘	✓	✓
MS-AD PaaS	⊘	⊘	✓	⊘
O-365 SSO	⊘	⊘	✓	✓
Federate with On-Prem AD	✓	✓	✓	✓
Riverbed Tech Integration	⊘	⊘	✓	✓
Native Terraform Support	✓	⊘	✓	✓
Marketplace Feature	✓	✓	✓	✓
F5 Load Balancer Instances	⊘	⊘	✓	✓
Credential/Secret Vault Support	✓	⊘	✓	✓
Support Connectivity to BT MPLS	?	?	✓	✓
Support for Automated Compute Scaling	✓	✓	✓	✓
Fully Functional ReST API	✓	✓	✓	✓

## Choose the right criteria to select the best cloud partner

### OF365 already in-place

- Azure AD connected
- SSO in place

### Microsoft contracts already in-place

- Sinopec EA
- Addax EA

### Data Centre location

- Amsterdam for African users
- Hong Kong for Beijing users

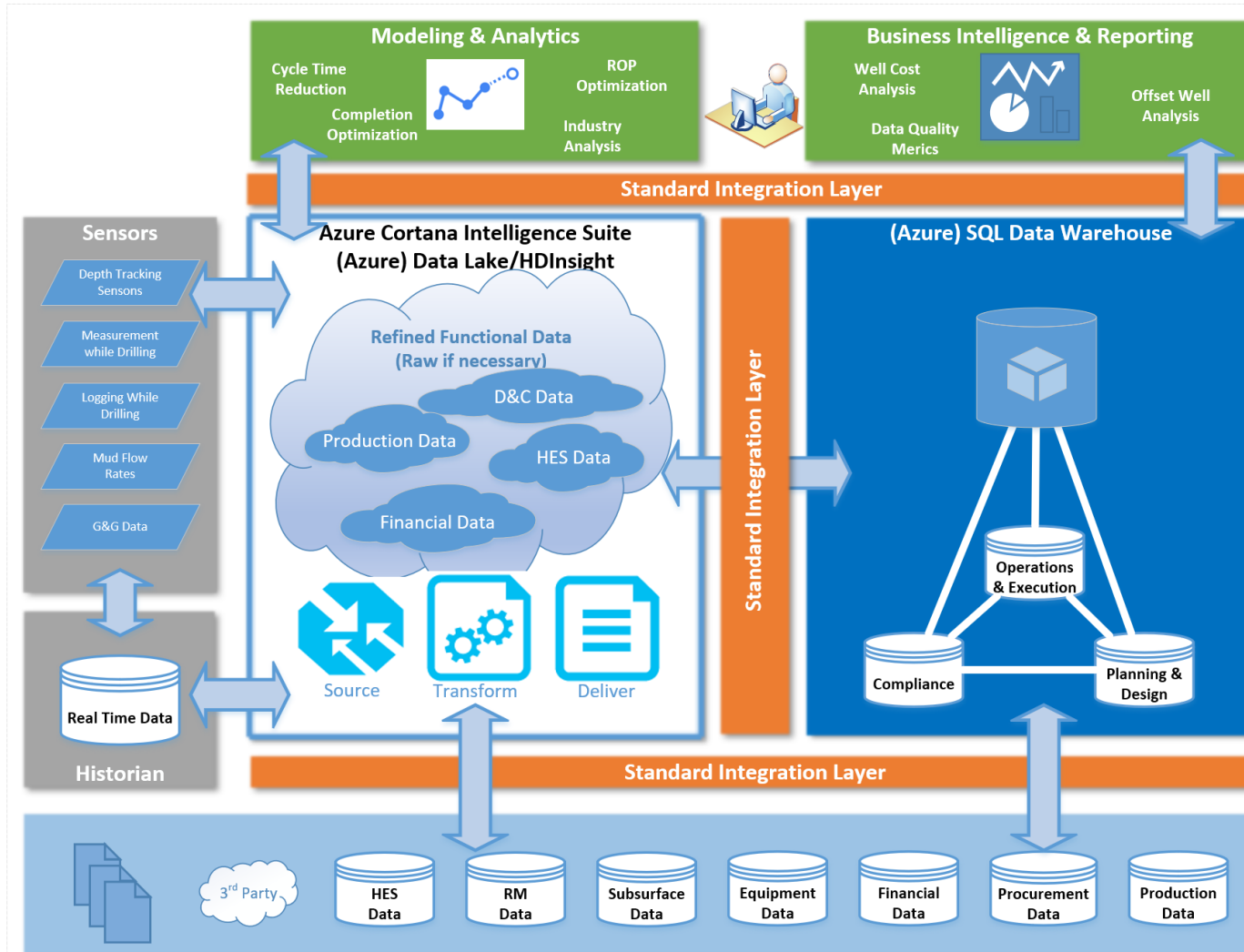
### PaaS offerings available

- Azure SQL for databases
- Azure AD services

### The E/P data platform



- A cloud platform combining modern (real-time, big data, machine learning) and traditional technology (BI, SQL DWH)

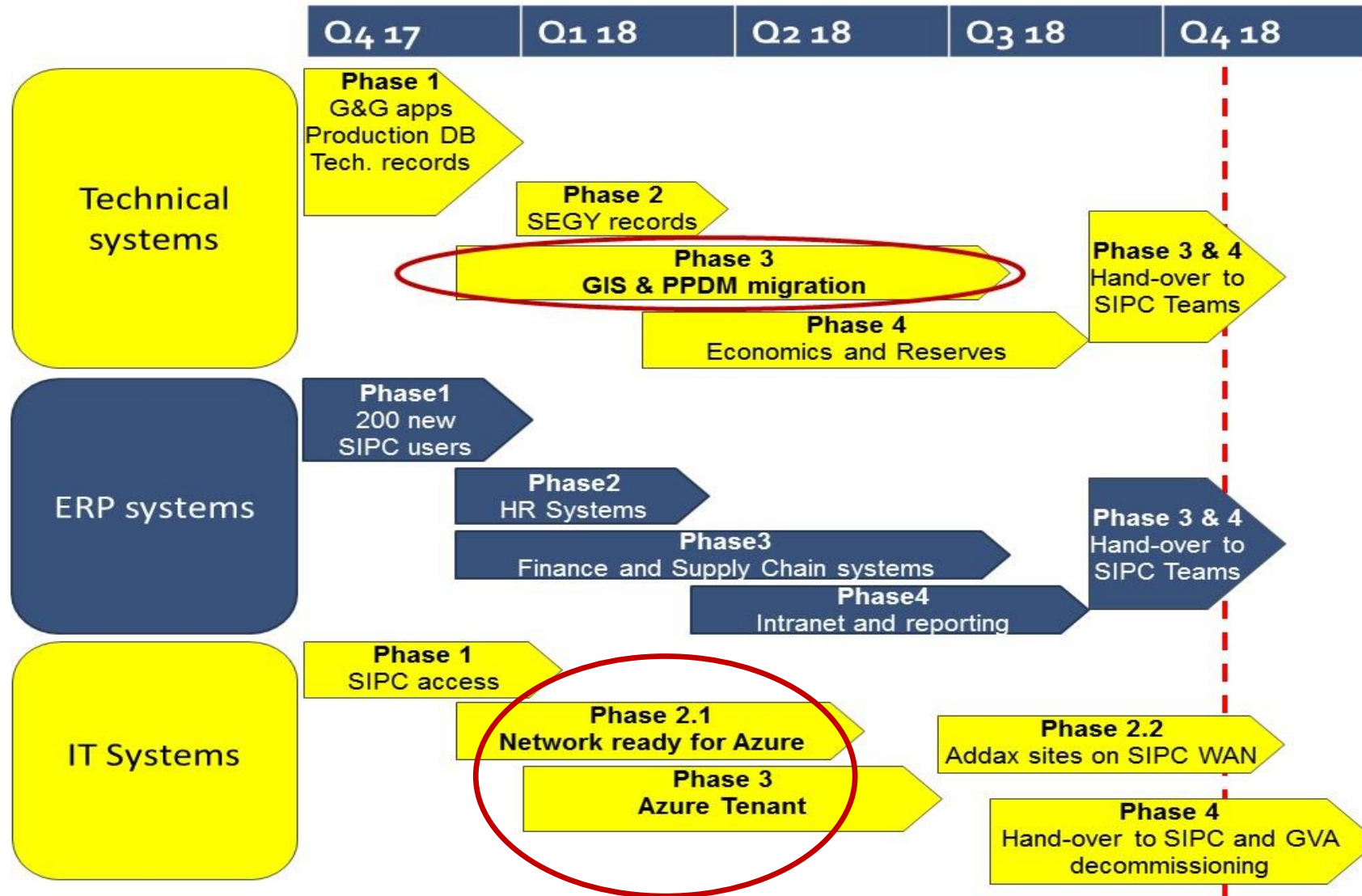


## Opening possibilities around:

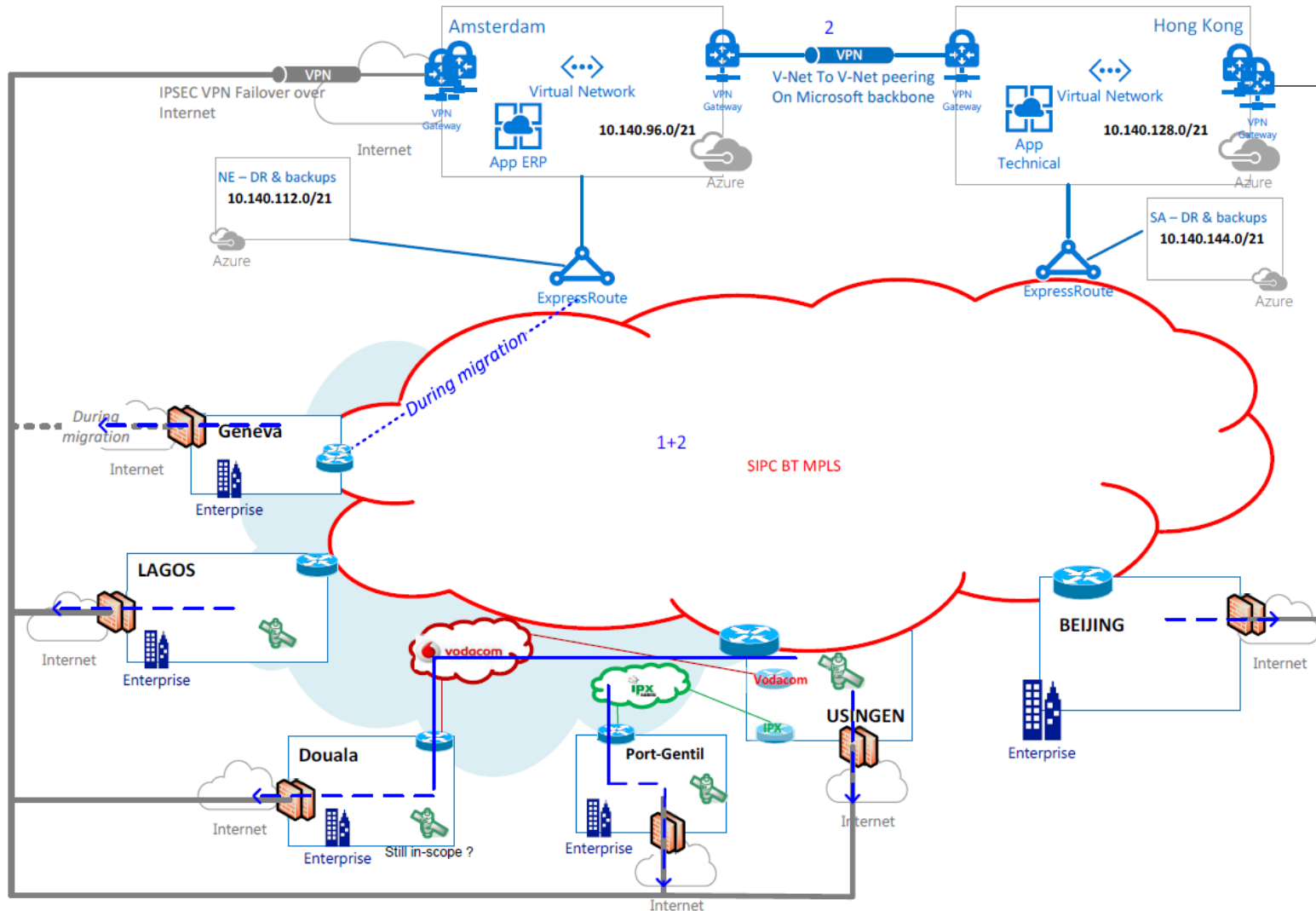
- Predictive maintenance feeding off facilities/well sensor data
- Understanding of legacy facilities using cognitive search on millions of unstructured documents, emails and schematics
- Predicting reservoir performance using machine learning on high volumes of well logs



- GIS and PPDM cloud migration was just one part of a much wider program



☐ The network needs to adapted to public cloud hosting



**Azure is seen as another SIPC data centre**

- Internal IP addresses
- connected to corporate WAN

**Dual connection & automated fail-over**

- BT Express Route (primary)
- VPN (fail-over)

**Local internet break-out**

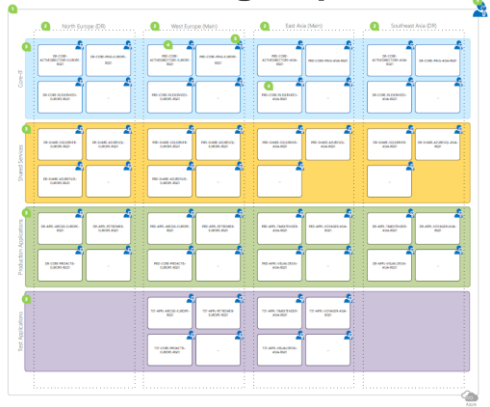
- Local Internet providers
- Local Palo-alto firewalls and Riverbed Steelheads

**Central management**

- central management console in Azure for the Palo's and the Steelheads

☐ The Azure “virtual data centre” needs to be designed, implemented and operated

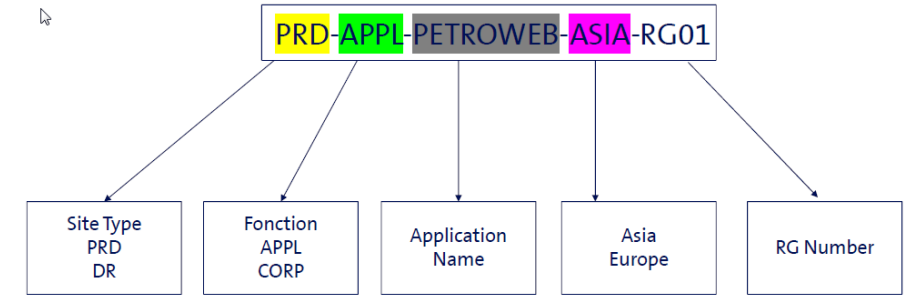
## Resource groups



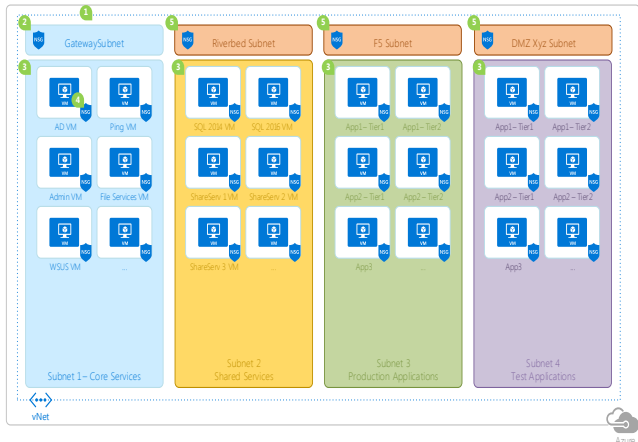
## Role based access controls

Scope	Role			
	Reader	Resource-specific or custom role	Contributor	Owner
Subscription	Observers	Users managing resources		Admins
Resource group		Users managing resources		
Resource	Automated processes			

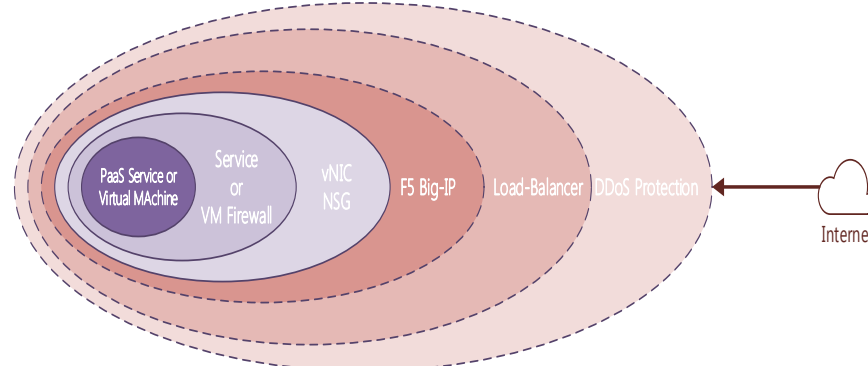
## Naming conventions



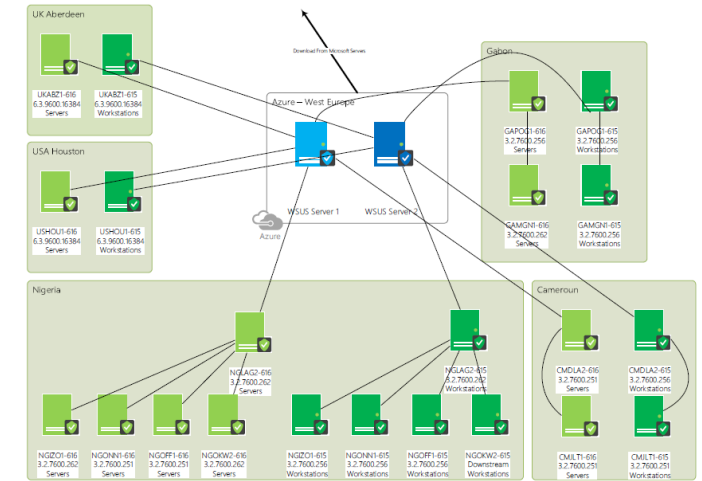
## Vnets and Sub-Nets



## Network security groups



## Automation



❑ **Balancing complexity of migration with operational cost reduction**

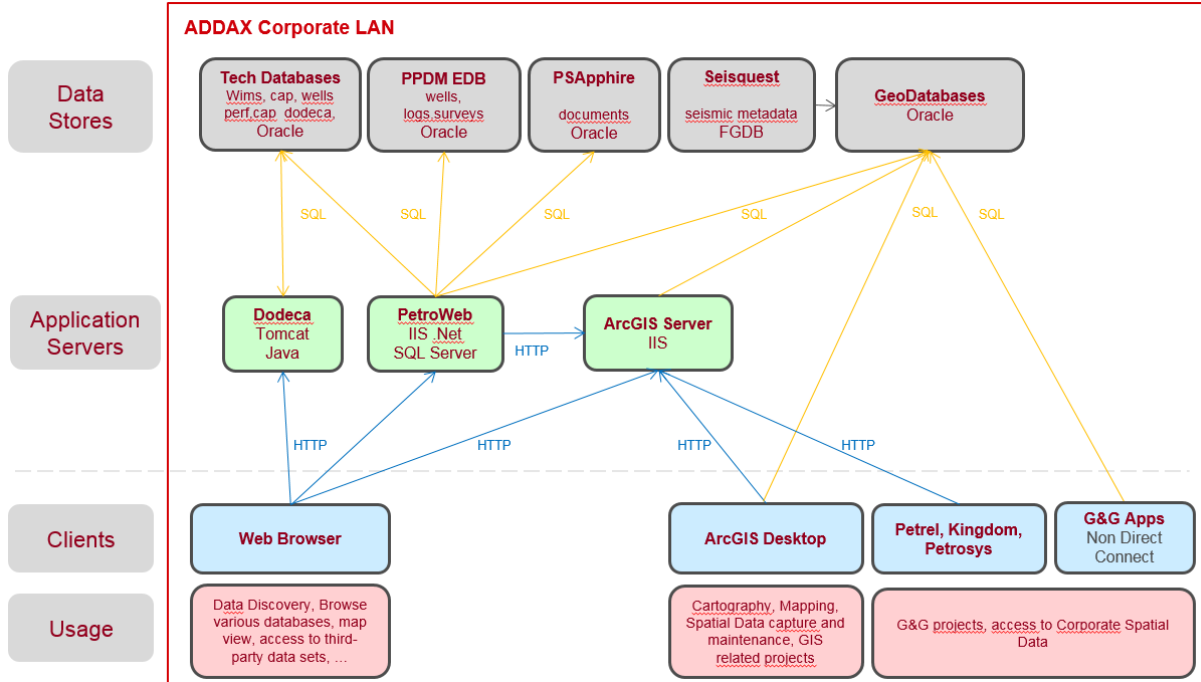
## Lift & Shift (IaaS only)

- Fast, easy and relatively cheap
- Limited operating cost reduction
- Less scalable and less resilient
- Supported by application vendors

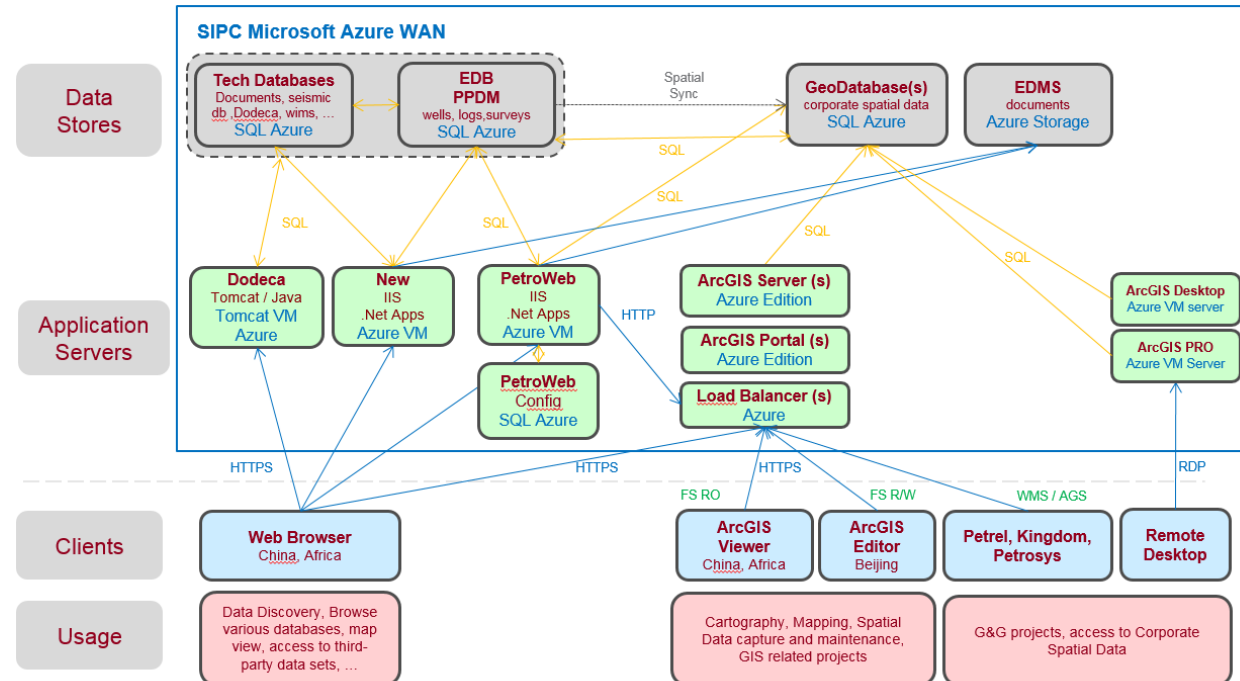
## Re-Platform (SaaS, PaaS or IaaS)

- Slow, complex and more expensive
- Reduces operating costs
- Scalable and more resilient
- Not always supported by application vendors





## Database re-platformed (PaaS)



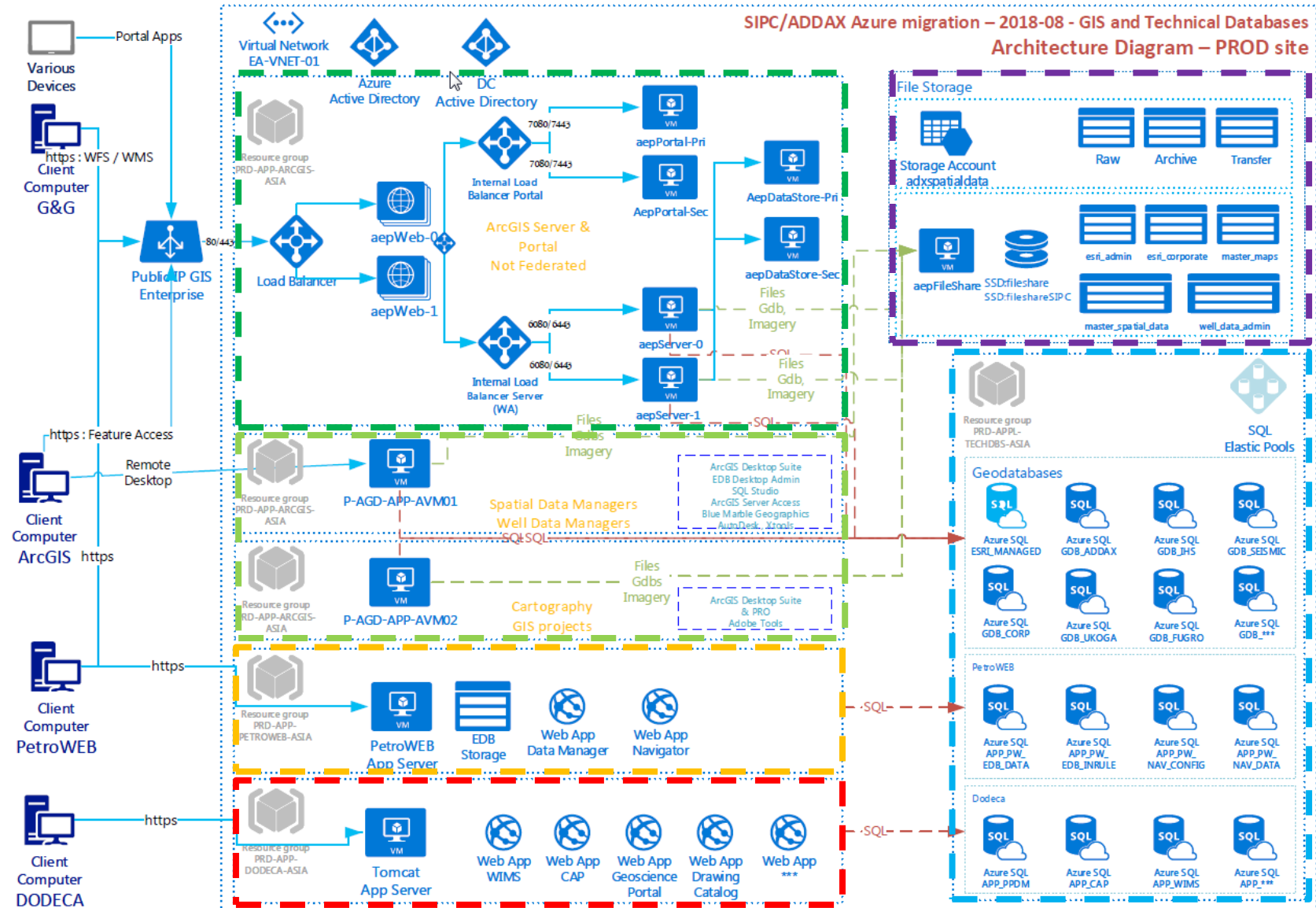
## Applications re-installed (IaaS)

- ArcGIS server using ESRI Cloud Builder (IaaS)
- ArcGIS desktop on Azure VMs (5 users each)



## The full framework is in Azure


- ArcGIS Enterprise
  - SQL Azure
    - Geodatabases
    - PPDM Well Database
    - Dodeca Technical Databases
- File Storage
  - Azure Storage Account
  - SSD File Share
- ArcGIS Desktop
- PetroWEB
- Dodeca framework





# ArcGIS Enterprise re-plateforming in Azure



 中国石化国际石油勘探开发有限公司  
SINOPEC INTERNATIONAL PETROLEUM EXPLORATION AND PRODUCTION CORPORATION

## 2018



## Define your cloud strategy

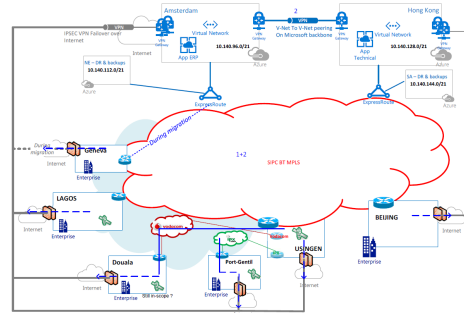
- Objectives
- Roadmap

## Technical enablers are key

- Network: Dual Connectivity
- Topology: Break-out
- Central optimization/security
- Identity mngmt: SAML & SSO

## Business case and follow-up

- Baseline & track
- Cloud provider and price plans
- Adapted sizing (IO, CPU, GPU)
- Environments (Test, Prod)



## Balance benefits, cost and risk

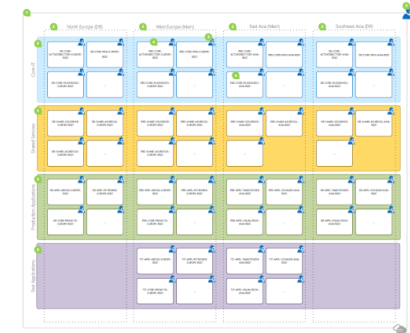
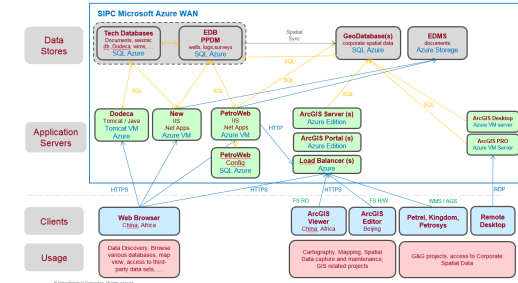
- SaaS & PaaS vs IaaS
- Lift and Shift vs re-platforming
- Editor support & 3rd party compatibility

## Cloud is not out of the box

- Design: security and scalability
- Implementation: standardize
- Operations: automation/dashboards

## Track application performance

- Using automation/tools
- Baseline & track
- Integrate in user support/service desk



Analyze: Applications

Performance by Applications

Application	Users	Usage per User	Usage Time	Wait Percent	Hang Percent
Microsoft Excel	50	1.0 hours	10.3 hours	4.3%	0.0%
PDF Web Live - BPP	39	32.3 minutes	28.8 hours	3.9%	0.0%
SQL Web Live	38	22.3 minutes	28.8 hours	3.9%	0.0%
ArcGIS Reader	35	4.0 minutes	24.9 hours	2.9%	0.0%
ARC 2024	29	30.3 minutes	24.9 hours	2.9%	0.0%
TimeWork Dash...	3	14.0 minutes	2.7 hours	0.7%	0.0%
AEE	13	12.2 minutes	2.0 hours	0.2%	0.0%
Internet Genesis	16	5.3 minutes	1.4 hours	0.5%	0.0%
Microsoft Word	1	7.4 minutes	22.8 minutes	1.8%	0.0%
Slope for Business	4	5.1 minutes	20.3 minutes	1.0%	0.0%
SuccessFactors	1	13.4 minutes	13.4 minutes	0.7%	0.0%
Claris Session	2	4.8 minutes	9.9 minutes	0.0%	0.0%
Microsoft Outlook	3	1.8 minutes	5.4 minutes	0.2%	0.7%
Internet Explorer	56	0 seconds	0 seconds	0.0%	0.0%
Patientr OK Live	1	0 seconds	0 seconds	0.0%	0.0%

**Thank you, any questions ?**

**Tom Royston**  
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