



Open Subsurface Data Universe

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To be discussed

- » Current realities in Subsurface
- » Data at the center
- » OSDU:
 - What is it?
 - Coverage
 - Data Platform
 - Applications
- » The Open Group and OSDU:
 - Members: An overview
 - Done so far and plans for the near future
- » Lessons learned

Subsurface Current realities

- » Data is linked to Applications → **Often proprietary file formats & types**
- » Data is stored in silos → **Lineage is not there**
- » Metadata is not stored with the data → **Lack of contents information**
- » Limited / No search capabilities → **Many hurdles to find the data you need**
- » Data set up not suitable for **Data Driven Applications** (AI)

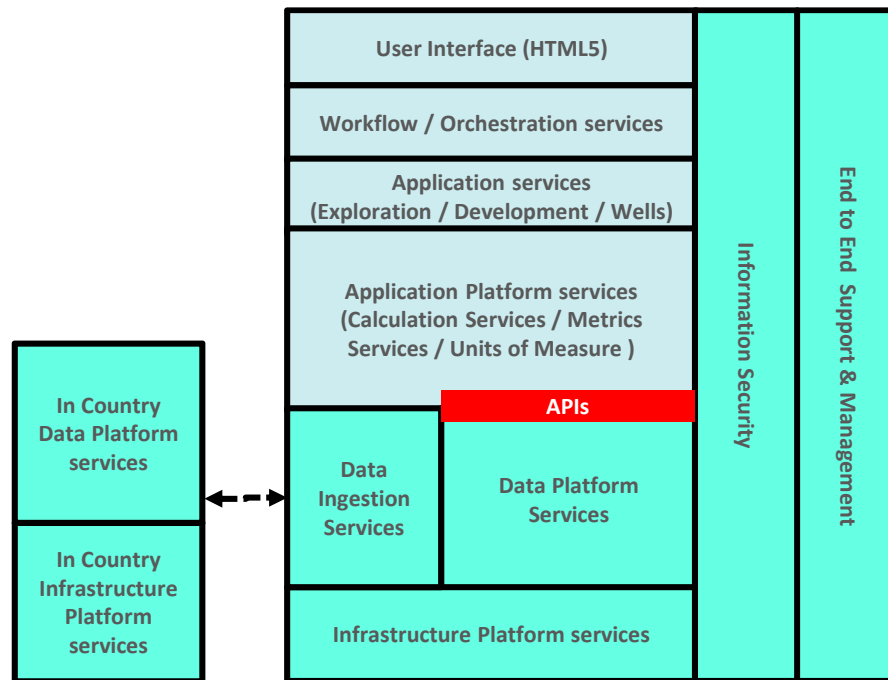
- » → **Far too much time is spent on trying to find the data**
- » → **Workflows could be much broader then they are today.**

A change is needed → Data at the center

- » Separate data from applications → **Any application can access all data**
- » Put **ALL** data (Structured & Unstructured) into an single Data Platform
- » Initial supporting scope: **Exploration – Development – Wells**
- » Support for Meta + Master data
- » Support for Realtime data access: **Increasingly important.**

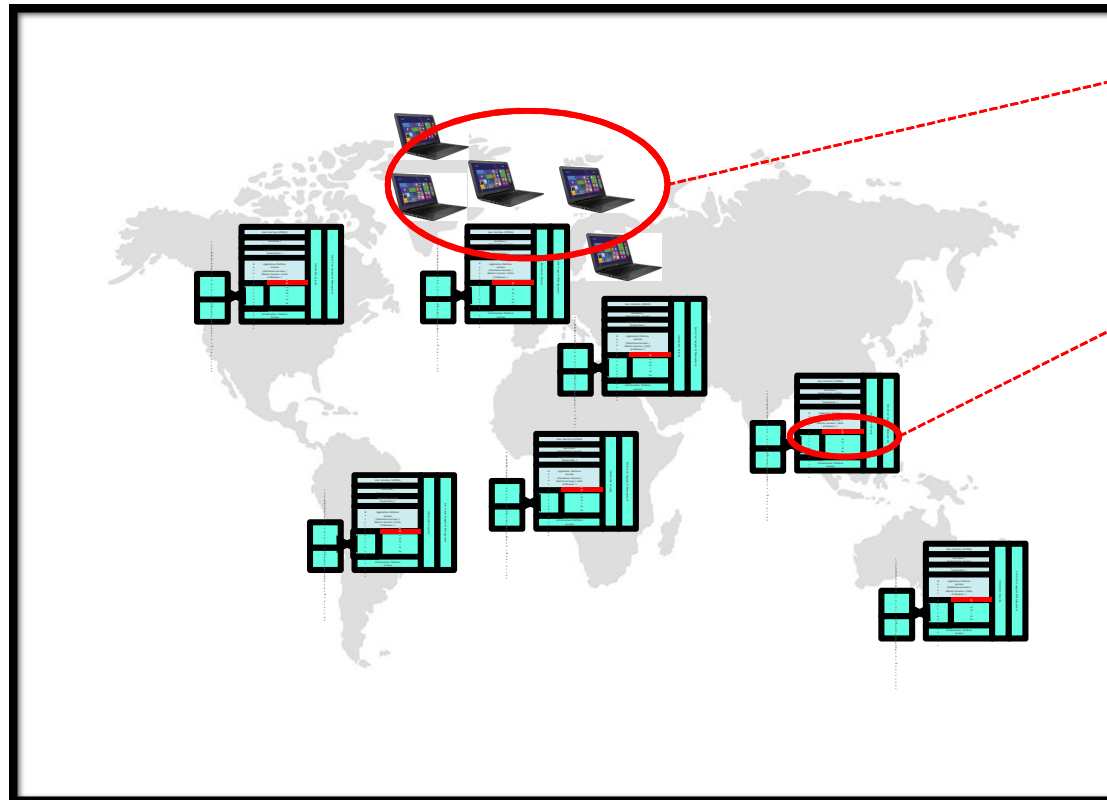
Open Subsurface Data Universe™ (OSDU) Forum Scope

Non competing
Competing



- » All Public Cloud based
- » All data for the Data Platform Services loaded via the Data Ingestion Services → Extract metadata / data quality / etc
- » Well defined (RestFUL) APIs defining the access to the Data Platform Services
- » Applications: (Micro) Services based
- » Information Security: Covering all elements with focus at Data Security
- » In Country solution: For those countries where we are unable to move data out of the country and there are no cloud services
- » As well support for legacy applications based on MS Windows or Linux Desktops

OSDU – Sample implementation



- ❑ OSDU location driven by max distance between users and Applications (often 3D) / Data.
- ❑ Meta data is replicated globally → Global access.
- ❑ RestFUL APIs to separate Apps and Data Platform.
- ❑ Actual data in region where it is created such as: All USA remains in the USA; etc. → For global teams this data can be replicated to another region.
- ❑ Includes complete set of CI/CD; Operational; Management; etc. services.
- ❑ Initially offered by both AWS and MS (Google most likely to follow)

OSDU Target

New generation of applications being developed / acquired:

- » Flexible orchestration of workflows
- » (Micro) Services driven
- » Kubernetes support
- » User Interface: HTML5 driven (including 3D support) & therefore support for any device
- » Getting enabled for VR (Collaboration) support
- » Both Physics & Data Driven applications
- » Artificial Intelligence: Exploiting Machine Learning wherever possible
- » **Support for current (legacy) apps based on MS Windows and Linux desktops**

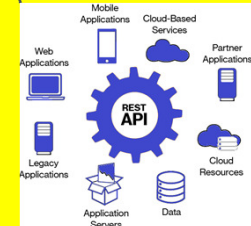


OSDU Business Impact

- » All Subsurface & Wells data in one Data Platform → **Silos have gone**
- » Data is separated from applications → **All data accessible to all applications**
- » Global oversight on what data is available → **Access to all meta data**

- » **Start ups / Third parties / In house / Academia / etc.** can develop software useable (once licensed) to all Operators running OSDU:

- **We have created a much larger market out there**
- **We compete where we should compete and we use Open Source (standards) where we should cooperate**



OSDU and The Open Group

Objective: Making OSDU an Industry Solution

- » Managed by **The Open Group** (<http://www.opengroup.org/>) making sure that all parties have equal access
- » **Open Subsurface Data Universe™** (OSDU) Forum has been created (Q3 – 2018)
- » All Standards, APIs, Reference Implementations to be made available to everybody (members and non-members)
- » Members, of course, have the right to join the Subcommittees and drive changes

OPERATORS MEMBERS



SUPPLIERS MEMBERS



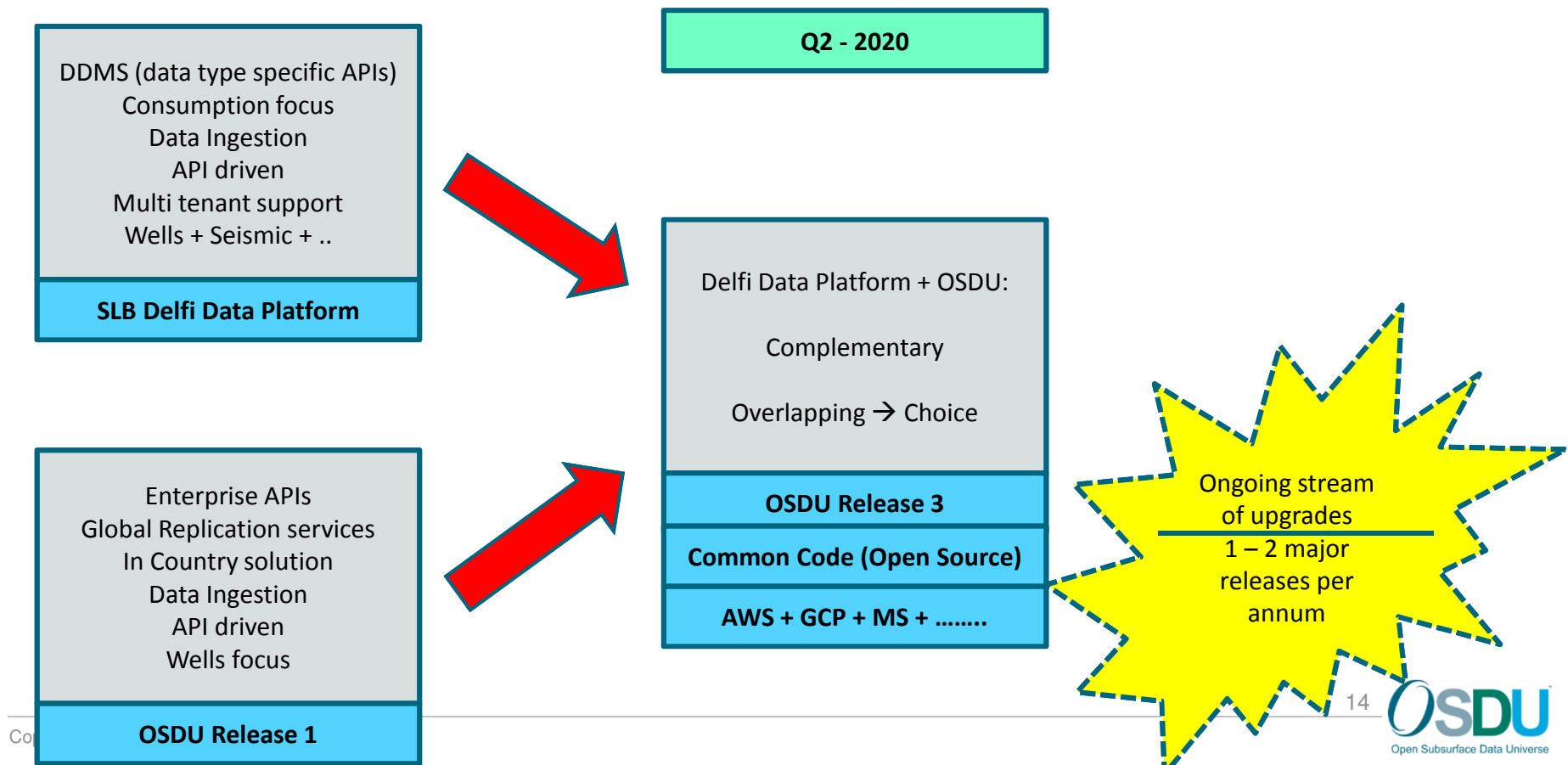
SUPPLIERS MEMBERS



Making OSDU an **Open Source** solution

- » OSDU Governance has been updated to fully support that OSDU Platform to be managed as an Open Source community:
 - All under the Open Group umbrella → **Have stepped up to make this possible.**
 - Mirrored the way **Linux Software Foundation (LSF)** is managed.
 - **Apache License 2.0 as the base.**
 - Schlumberger Delfi (Data Platform) is being merged into OSDU and indeed fully Open Source based → **No single company is in control.**
 - Speeds up development and creates more agility.
 - **Common code** → Multiple hosting providers.

SLB Delfi Data Platform merged into OSDU



SLB Delfi Data Platform into OSDU

- » OSDU Forum OMC (OSDU Management Committee (11 members)) to drive, on a daily basis, OSDU developments → Making sure that we can move fast enough:
 - We go to all members for large decisions such as changing scope of OSDU.
 - In this way we avoid that we are unable to continue to move fast.
- »
- » PMC (Project Management Committee) to drive the Open Source projects.

OSDU Forum achievements so far

- » Four subcommittees have been created (**all driven by the members**):
 - **Enterprise Architecture:**
 - Driving the development and evergreening of all architecture / design subjects
 - **Data Definition:**
 - Driving, for example, the common data definitions.
 - Work in progress with PPDM to see how we can more closely connect PPDM and OSDU.
 - **Information Security:**
 - Driving all items related to Security such as API security; Governance; etc
 - User Authentication; User Authorisation; Entitlements; etc.
 - **Business Model:**
 - What will be the sustainable model for the future

- » Creation of an **TIGER team** driving the development and implementation of the OSDU DEMO Release and all subsequent releases.

OSDU Forum plans for the coming months

» **Release of OSDU DEMO release → RELEASED:**

- Shared release including an demo applications (and data)
- Focus at Wells
- Released on AWS and MS platforms
- Accessible for all members to get an better idea what OSDU is all about

» **Release of OSDU release 1 → Early November 2019:**

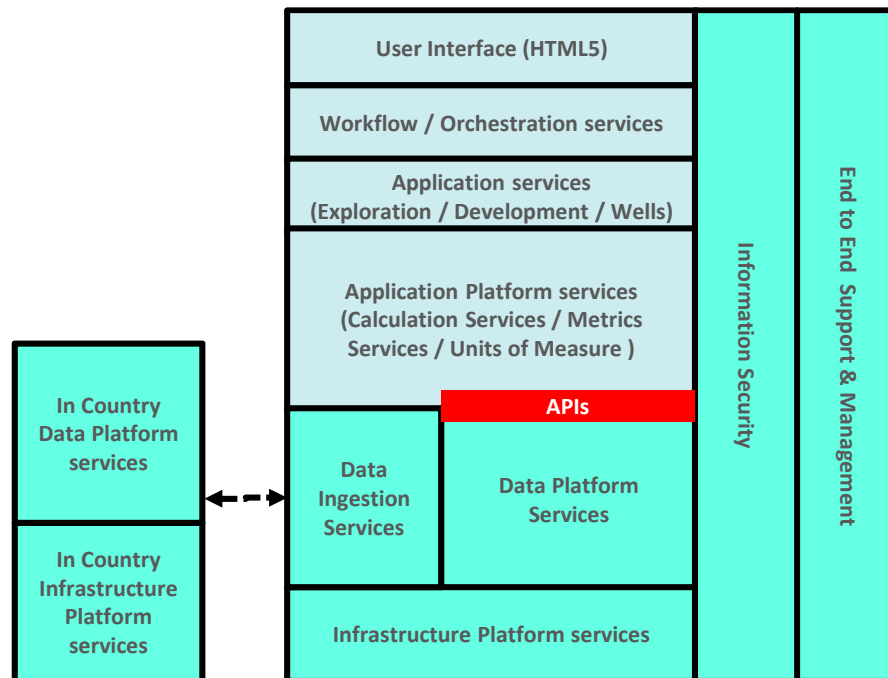
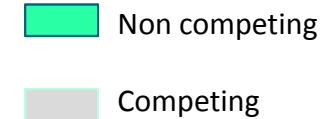
- Will be implemented on company (eg Operator), on request, by MS / AWS / GCP.
- Focus at Wells and later Seismic.

OSDU Forum plans for the coming months

- » **Release of OSDU release 2 → (Approx) Late 2019 / Early 2020:**
 - Will be implemented, on request, by MS / AWS / GCP
 - Focus at Seismic.
 - Support for OpenVDS format.

- » **Release of OSDU release 3 → (Approx) Q2 2020:**
 - First release whereby Schlumberger Delfi Data Platform is fully integrated into OSDU.
 - Both Wells and Seismic support.
 - Common code for all hosting providers: Managed as Open Source:
 - Therefore we move to many small releases and 1 – 2 major releases per annum.
 - Fully managed by PMC and OMC.

OSDU and external data sources



» OSDU project under way to determine how best connect various external data sources to OSDU:

- Data remains in the external data source.
- Standard APIs to be defined: Of course it is possible that we use other means then RestFUL APIs to connect incase we need high throughput.
- Aim to deliver as part of OSDU Release 3.

Other observations

- » There is a lot of pressure to deliver fast:
 - Operators are in a hurry.
- » Focus at NOCs and small(er) operators.
- » Focus at other data holders → Speed up to get access to external data.
- » After OSDU Release 3 you can expect other service models to be added.

Lessons



- » This will be a **Game Changer** for this industry → It is desperately needed
- » Platform approach (Public APIs) introduces **competition** into this market:
 - Open the market for small companies / academia / new players / etc
- » Data must be positioned **at the center** → To support AI based applications
- » Data is not left to **one company** → That has never worked
- » **We made a start but a lot of work still has to be done**

Help us driving this forward



» <https://www.opengroup.org/membership/forums/open-subsurface-data-universe>

Thank you for your attention