



Transforming Parts for Optimal PLM Effectiveness

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Agenda

1. About  Wellbore Technologies
2. Product Data Quality
 - Challenges
 - Solution and Roadmap
 - Maturity Journey of NOV
3. Solution partner CDS

We are a **global family**
We believe in
purposeful innovation
and service above all

We are the backbone of the oil and gas industry with a singular focus to deliver the finest products and services, on time and on budget, to push our customers' business forward.



NOV Structure





What we do...

Our people deliver technologies that drive new levels of safety, efficiency and productivity

Drilling and
Intervention

Dynamic
Drilling
Solutions

WellSite
Services

IntelliServ

Grant
Prideco

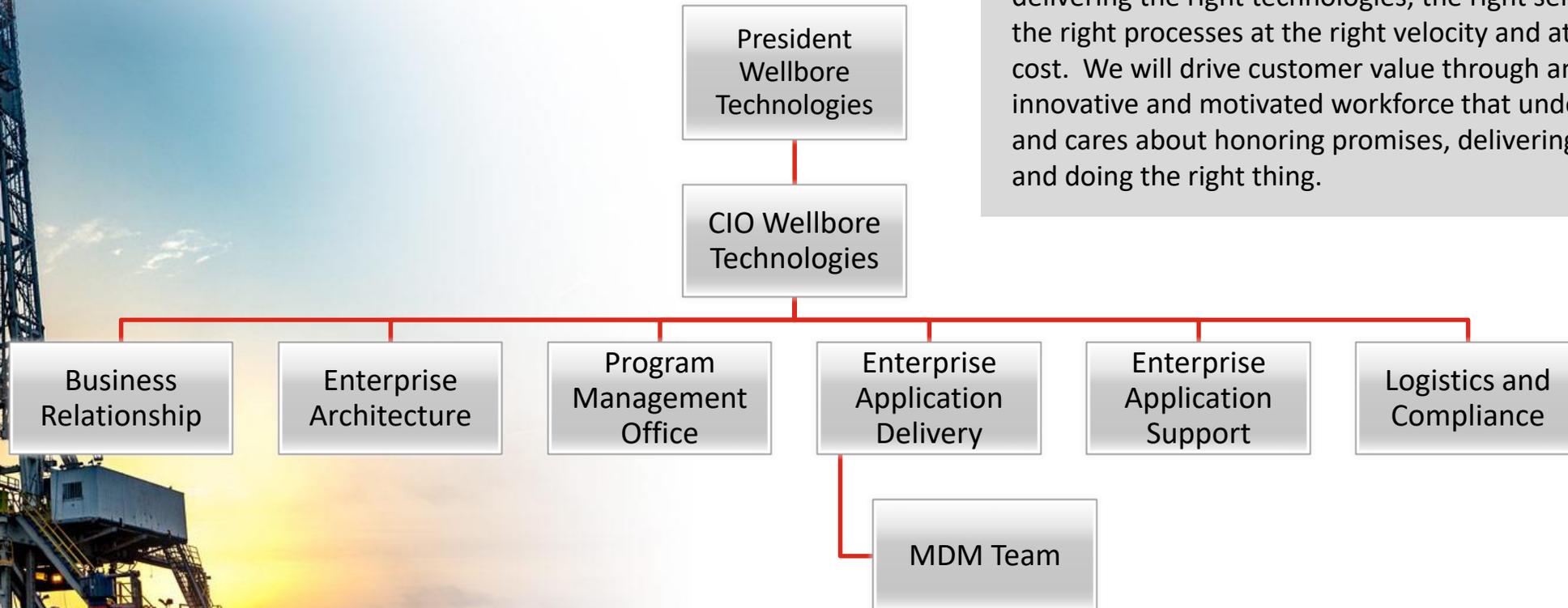
Tuboscope

Design and deliver necessary equipment for optimal performance

Solve operational challenges to optimize productivity

Information Systems

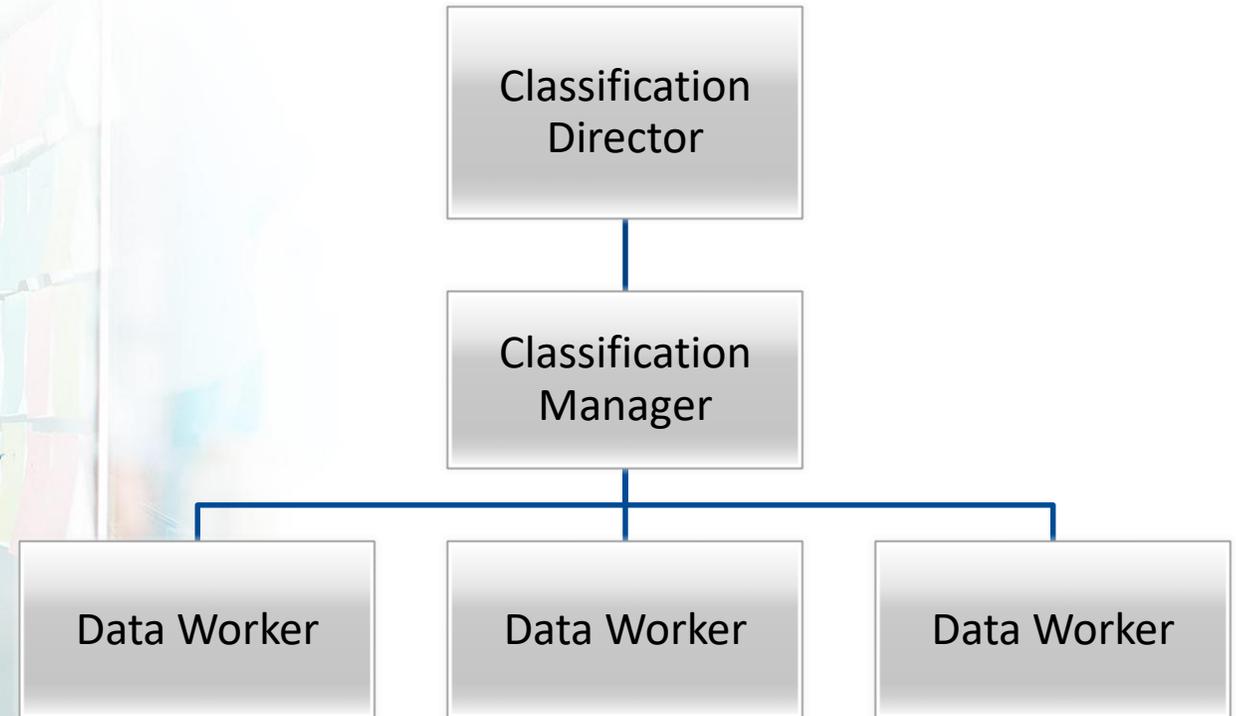
..... The Right ThingsThe Right TimeThe Right Way



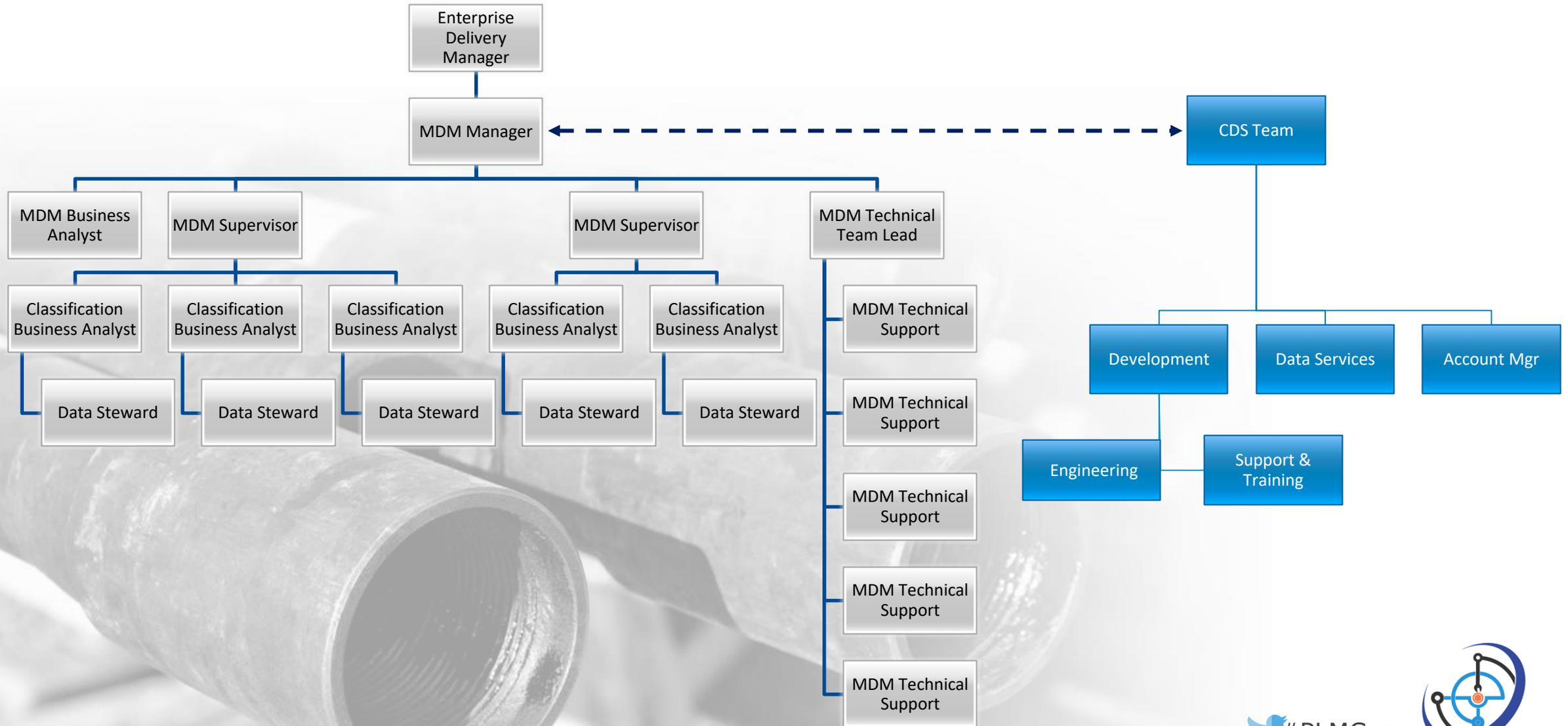
Vision

Wellbore Information Systems is dedicated to delivering the right technologies, the right services and the right processes at the right velocity and at the right cost. We will drive customer value through an innovative and motivated workforce that understands and cares about honoring promises, delivering results and doing the right thing.

Initial Structure – Project Black Diamond



Current Structure – Wellbore IS MDM Team



NOV - Product Data Quality Challenges

Data Quality Strategy

Data Strategy was incomplete for BU's consolidating to JDE.

- **Fragmented Data** manually replicated without common definition of framework
- **Data Quality** is managed independently with no consistency
- **Highly Manual** data quality processes with limited governance

Mergers and Acquisitions

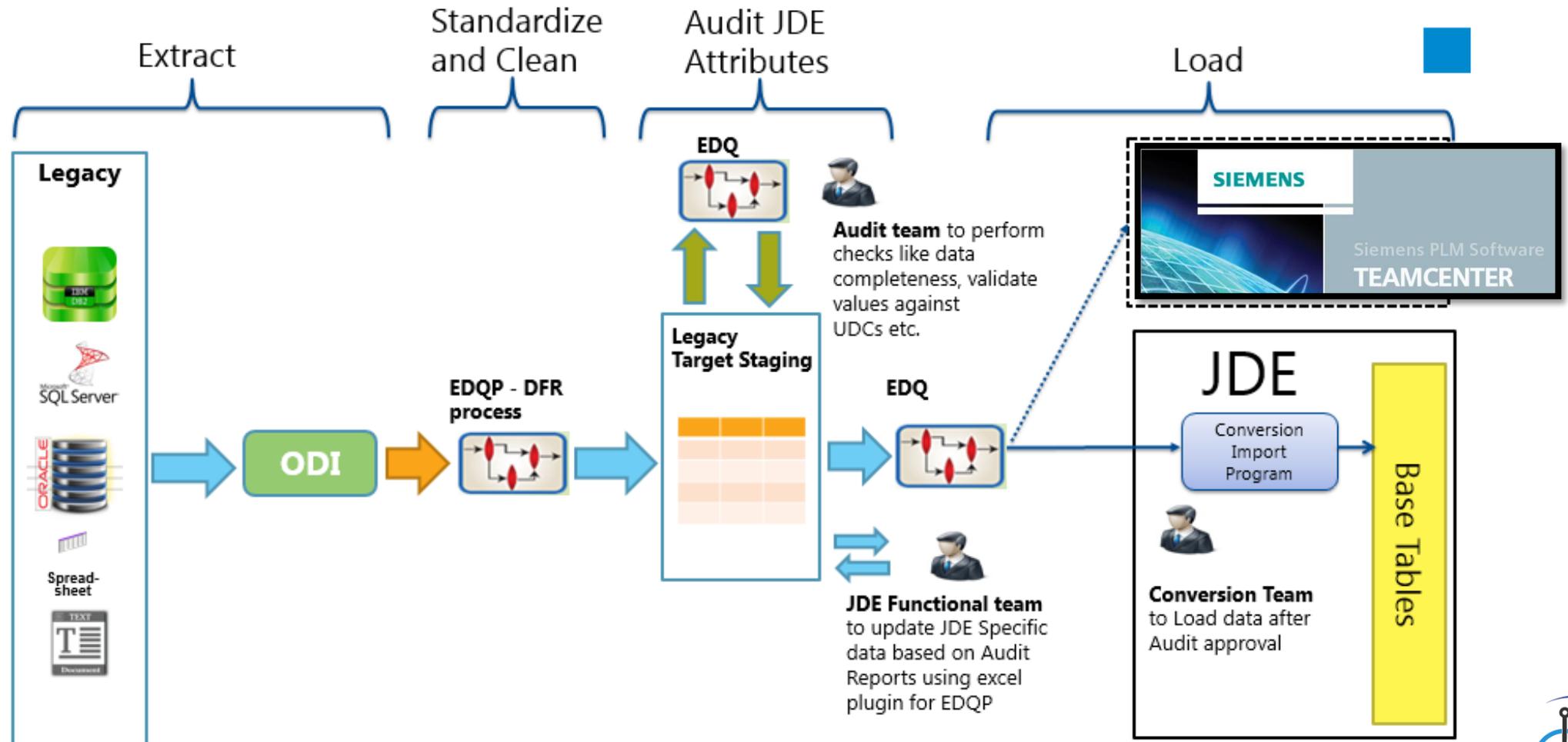
JDE Consolidation Strategy

- **New Acquisitions** come with their own systems and data standards
- The data need to be **normalized, classified, cleansed and de-duplicated** for integration of data into JDE and NOV applications.
- Some tools in place to **automate, manage and govern the process** but still highly dependent on manual efforts and reviews.
- Takes 3-6 months for one **consolidation** project implementation

Maintain Product Data Classification and Attribution

- **Product Hierarchies** changes frequently due to Business restructuring.
- **Manual, difficult and expensive** methods for product classification and attribution

Case Study: NOV - Living process



Before – Data

Duplicates

- Acquisition like businesses
- Uncontrolled data entry

Search Limited

- Descriptions
- Inconsistent abbreviations

Inconsistent Reporting Data

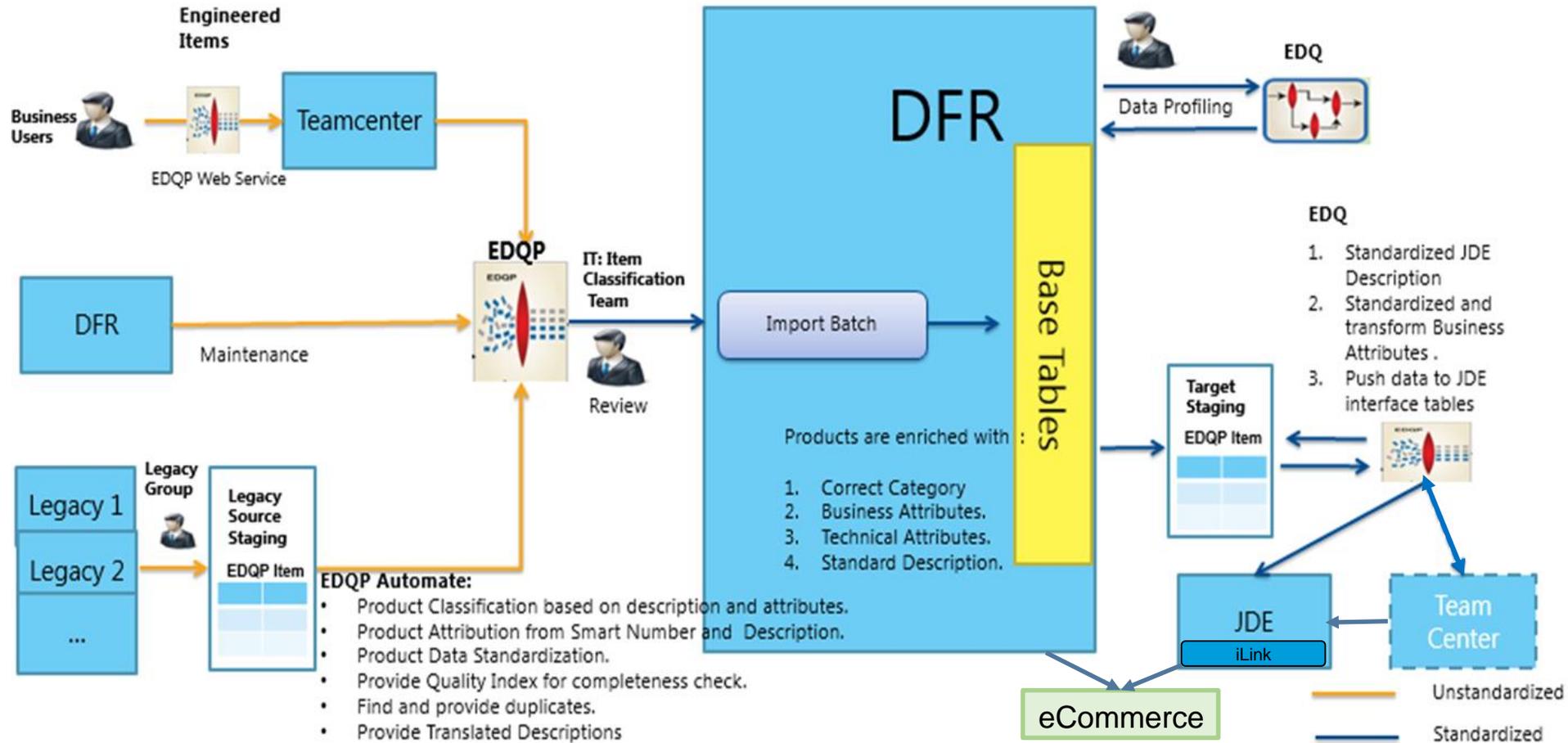
- Unable to define structure to a what it is level
- Lack of Focus on categorization

No Data Governance

NOV Classification process:

	OLD	NEW
Addition of data to project	Excel files comparison	Systematic comparison
Working data by priority	multiple sources – loss of control	Single point entry
Approving data for multiple system use	Inability to set and keep track of multiple rules	Ability to set policies to assist with governance

NOV Highlights - Integration



NOV Highlight – Classification - DFR

The image displays the Design For Retrieval - [Classification Manager] software interface. The main window shows a classification tree on the left with categories like 'Completion and Production Solutions iLink', 'Non-Parts', 'Rig Systems iLink', 'Wellbore Technologies', 'ANSI Pipe and Fittings', 'API Tube and Fittings', 'Artificial Lift', 'Charges', 'Commodities', 'Controls', 'DH Downhole', 'Documentation', 'Drilling and Intervention', 'Borehole Enlargement', 'Coring', 'Customer Training', 'Drilling Agitator', 'Drilling Motors', 'Fishing Tools', 'ICT', 'Mfg Components', and 'Motor Technologies'. The right pane shows the 'Category' details for 'Root', including 'Name Root' and 'Description Root'. Below this is a table with columns for 'Attributes', 'Properties', 'Responsible Users', 'User Resources', 'Attachments', 'Category Processing', and 'Display Order'. The 'Responsible Users' and 'User Resources' sections are expanded to show a list of developers and approvers.

Attributes	Properties	Responsible Users	User Resources	Attachments	Category Processing	Display Order
Developers:		Approvers:				
drokebg		drokebg				
everett.macdonald		everett.macdonald				
haughtmg		haughtmg				
jean-paul.angelle		jean-paul.angelle				
jonathan.narciso		jonathan.narciso				
kristine.white		kristine.white				
tiffany.nguyen		tiffany.nguyen				
tyler.collins		tyler.collins				
websterr		websterr				

The bottom window shows the 'Description Generator' configuration. It includes a 'Templates' list with columns for 'Name' and 'Description'. The 'JDE_Long_Description' template is selected. The 'Configure' dialog shows the template name 'JDE_Long_Description' and a preview of the generated XML code, which includes various conditional statements for item classification.

NOV Highlight – Classification - Teamcenter

The screenshot displays the Teamcenter Classification interface. On the left is a hierarchical tree view of product categories. On the right is a list of attributes with their corresponding values. Annotations include:

- Data Model**: Points to the tree view.
- Attributes**: Points to the list of attributes.
- Attribute Values**: Points to the dropdown menu for the 'Stop Type' attribute, which is currently set to 'LONG CATCH STOP'.
- Categories**: Points to the 'Series 150' category in the tree view.

Tree View Structure:

- Wellbore Technologies
 - ANSI Pipe and Fittings
 - API Tube and Fittings
 - Artificial Lift
 - Charges [4]
 - Commodities
 - Controls
 - Documentation [48]
 - Drilling and Intervention
 - Fishing Tools
 - Accessories
 - Fishing Tools
 - Overshot
 - Series 10 and 20
 - Series 150
 - Basket Grapple [0]
 - Basket Grapple Control [0]
 - Basket Mill Control Packer [0]
 - Basket Plain Control Packer [0]
 - Spiral Grapple [0]
 - Spiral Grapple Control [0]
 - Series 70
 - Wide Catch
 - Manifold Fittings
 - Manufacturing Components
 - Nameplates
 - Pipe Handling

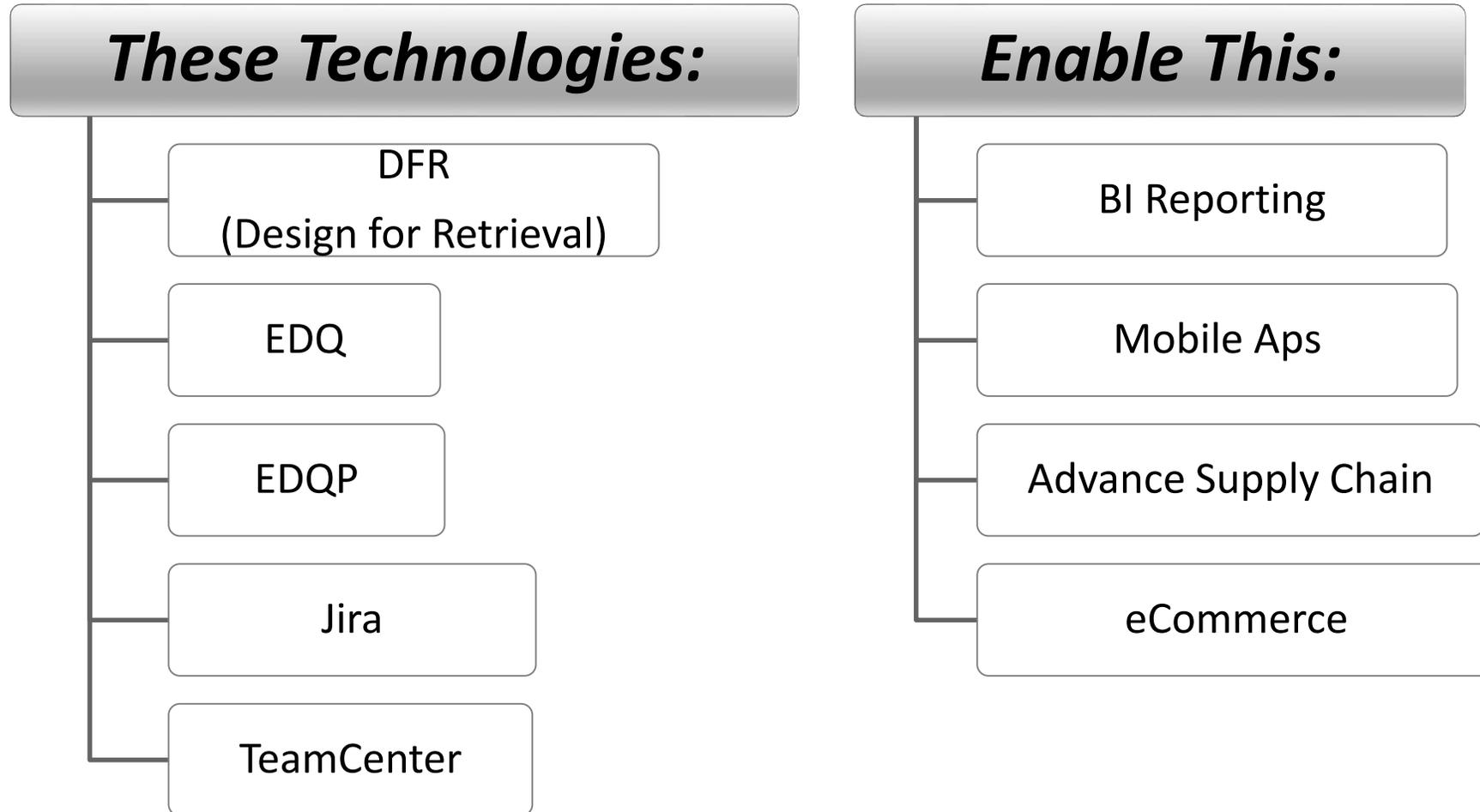
Attribute List:

- Catch Size Numeric
- Catch Size 2
- Catch Size Numeric 2
- Material
- Stop Type (Value: LONG CATCH STOP)
- Wicker Style
- Grapple Number
- Helix Orientation
- Tool Orientation
- Component Of
- Assembly Number
- Other Features
- Version
- Overshot Series
- NOV Material Specification
- Spec Information-Unverified

NOV Process

- **Importing structure** and parts from Teamcenter
- DFR to Teamcenter **UOM mapping**
- **Teamcenter Id generation** for exporting new structure
- **Exporting PLM XML** formats for both structure and parts
- **Policy Manager** rules to help control structure and part data to not violate Teamcenter rules

NOV Classification Technologies:



4 Classification Enabled Technology

1

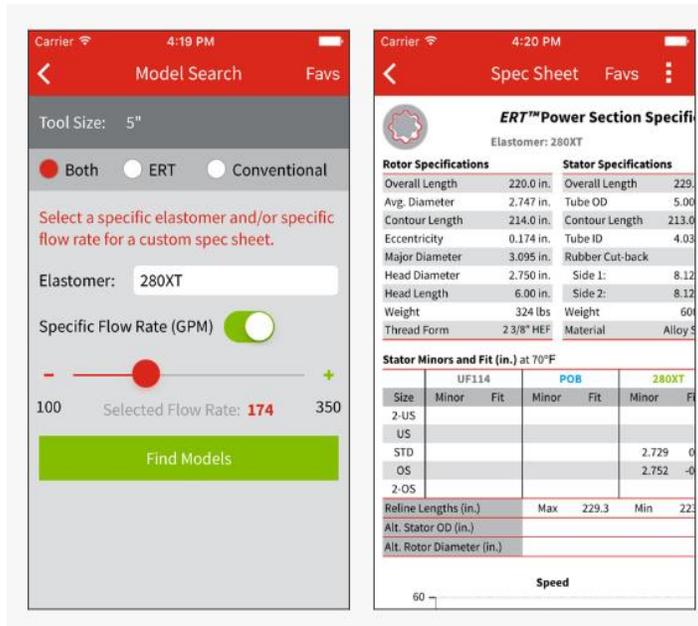
B. I. Reporting



2



Mobile App –
NOV Power Sections



3

Advanced Supply
Chain Planning



Online Sales Portal – 24 hr sales!

<https://wbt.nov.com/Default.aspx>

Wellbore Technologies

Bowen™ Fishing Tools Motor Technologies Service Equipment Help

Home > Bowen™ Fishing Tools > 1000 - External Catch Fishing Tools > 1010 - Sucker Rod Overshot > Basket Grapple

1-1/16
1-1/2
1-1/4
1-1/8
1-11/16
1-13/16
1-15/16
1-15/32
1-19/32
1-3/16
1-3/4
1-3/8
1-5/16
1-5/8
1-7/16
1-7/8
1-9/16
1.315
1.600

Search

Search By Filter By

Catch Size Equals

Add Filter Clear Filter

Items Per Page 20 Sort by Item Number A to Z

Table Expanded List

Compare Add to List

4

DFR Categories & Attributes

Category and attribute properties in DFR drive online sales portal navigation – searching, comparing products.

Fishing Tools

- Die Collar
- Overshot
 - Series 10 and 20
 - Series 150
 - Assembly
 - Basket Grapple
 - Basket Grapple Control
 - Basket Mill Control Pack
 - Basket Plain Control Pac
 - Bowl
 - Break-Out Clamp
 - Collar Stop
 - Extension Sub
 - Guide
 - High Pressure Packoff
 - Inner Seal
 - Lock Ring
 - Mill Extension
 - Mill Insert
 - Packer
 - Spiral Grapple
 - Spiral Grapple Control
 - Thread Protector
 - Top Sub
- Series 70
- Wide Catch Spear

- Packer
- Spears
- Taper Tap
- Wide Catch Spear

Category: Root\Wellbore Technologies\Drilling and Intervention\Fishing Tools

Name Basket Grapple

Description Wellbore Technologies\Drilling and Intervention

Property	Value
UNSPSC	20121717
Release Date Alias	<Empty>
eCommerce	True
Catalog Name	Bowen™ Fishing Tools
Business Segment	WBT
Terminating Node	Yes
	<Empty>
	Basket Grapple

DFR Data Model

Assisting NOV



Our Mission

Help our customers extract more value out of their enterprise systems with improved part data.

15 Years Experience

- Providing services to
- Aerospace/Defense
 - Electronics
 - Automotive/Industrial
 - Consumer/White Goods
 - Oil/ Gas

Cleanse & Normalize

Data from disparate sources (Purchased parts, MRO, design parts, etc.)

Prepare

Data for migrations: ERP, PLM, MDM, PIM

Support

Parts re-use initiatives, mitigate parts proliferation

Provide

Analytics supporting cost reductions & classification search



1

Load Parts Here



2

Build Data Model



From documents & websites

- Short Descriptions
- String Data
- Numeric Data with UOMs
- Cleansed Supplier Names

3

Data Harvesting

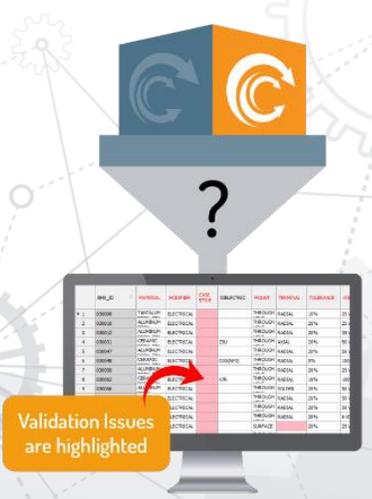


Data is normalized to a single standard

- Allowed Values List
- List of Values

4

Data Normalization



Validation Issues are highlighted

5

Data Validation

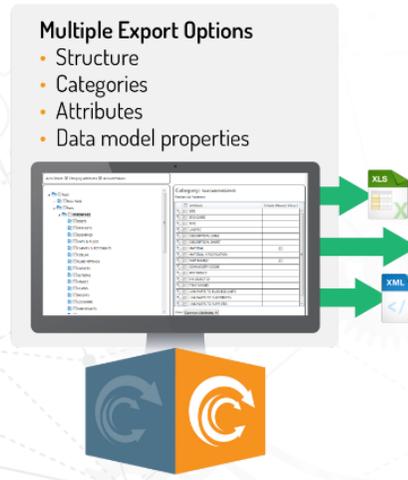


Export Manager

Identify potential export issues and fixes them on the spot

6

Policy Manager

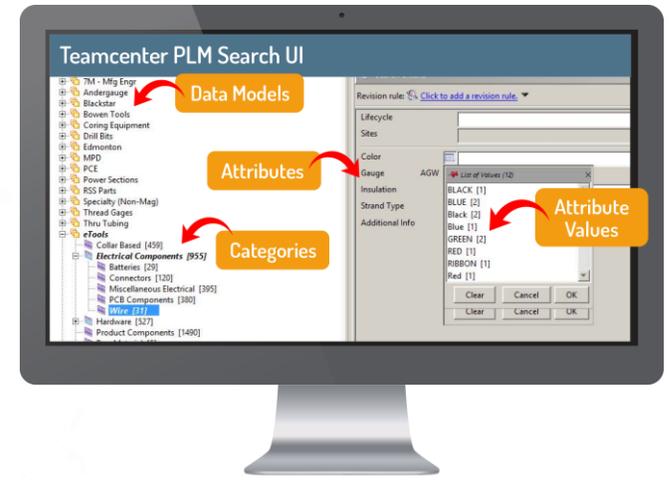


Multiple Export Options

- Structure
- Categories
- Attributes
- Data model properties

7

Export Manager



Teamcenter PLM Search UI

- Data Models
- Attributes
- Categories
- Attribute Values

8

Enhanced TeamCenter Search



Clean Up Your Legacy Data

Easily jump start your classification project with CDS Data Services

-  Find hidden parts
-  Identify duplicate parts
-  Add attribute data for PLM classification
-  Enter consistent descriptions
-  Categorize your parts correctly



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