



Building a Digital Plant

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Digital Plant – A Wonderful Journey of Discovery !

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Egyptian Hieroglyphic's



Stephenson's Rocket



Wright Brothers Flyer



Sinclair C5



Paper based Engineering



Where would you rather be ?



Apple Hieroglyphic's



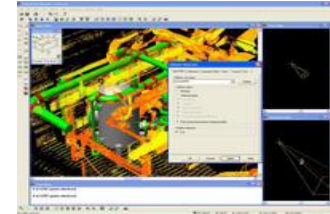
Bullet Train



Airbus A380

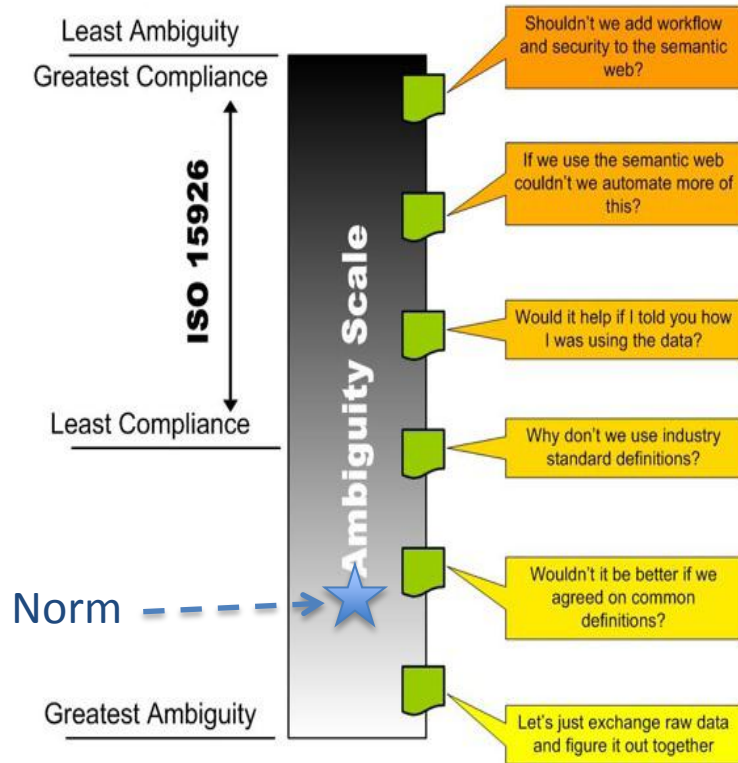


Smart Car



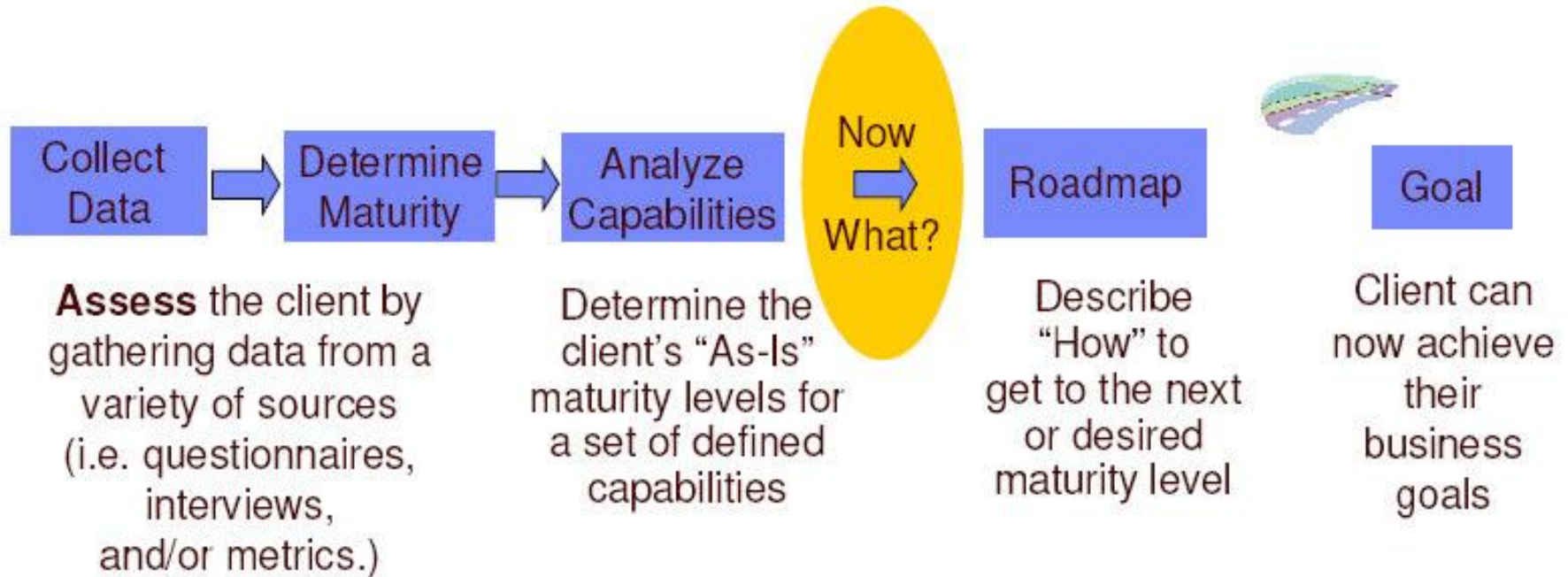
Digital Plant

Overview – ISO compliance



1. The majority of industries today are currently at Maturity levels 1- 2 (initial). EDM processes are not defined, and the environment is not stable.
2. The processes reflect the competence of individuals within the organization, rather than the use of proven processes.
3. While the organisation produces outputs that work, they potentially deliver uncontrolled information increasing the operational and maintenance risks.
4. Information interoperability is poor.

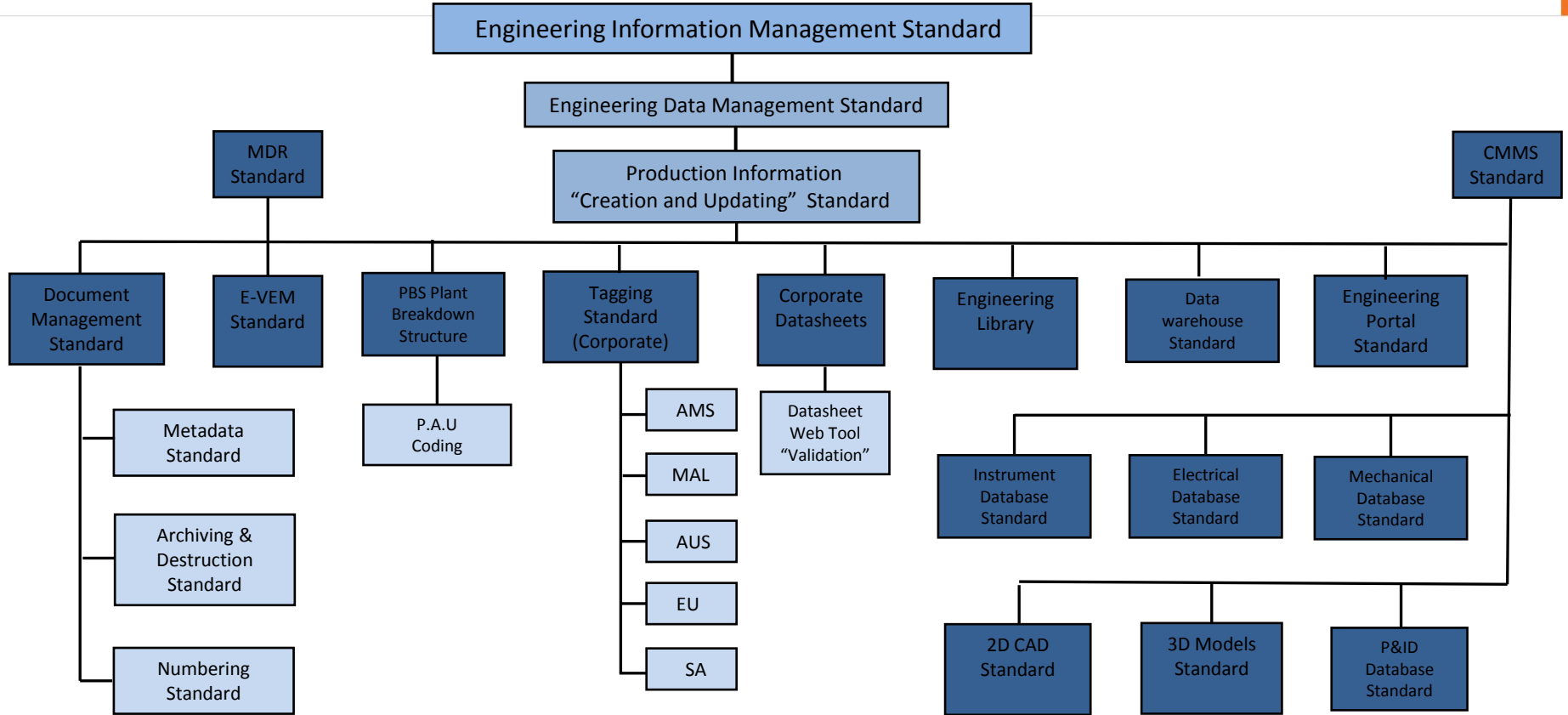
ODESI Approach to Assessing Maturity



Key Focus Areas for an EDM Project

- 1. Standards** - Companies have many standards (often conflicting) draft standards or no standards.
- 2. Processes** - Usually many processes which may be by divisional, area or group, resulting in misaligned deliverables and rework.
- 3. People** - Engagement & participation often becomes a missed opportunity, up front engagement ensures a successful uptake of new technology (Consult your experts).
- 4. Tools** - Tools are often the primary focus rather than the result of a consultation process with stake holder and the development of a suite of standards & processes.

Engineering Data – Standards



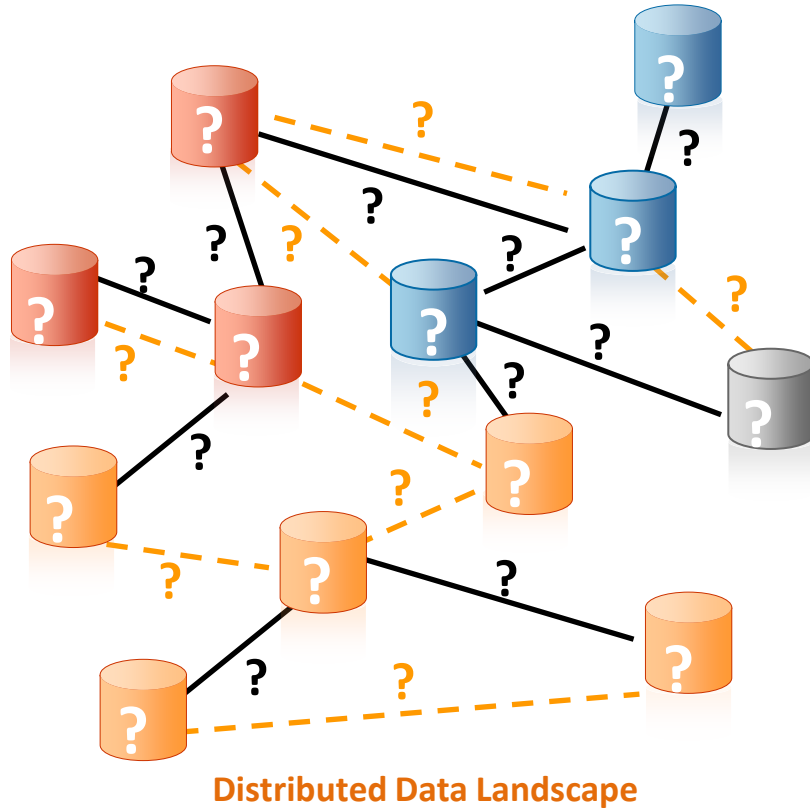
ODESI Sample questions

- Is a clear Business Strategy defined for documents and data collection?
- Are the designated user communities clearly identified (Eng, Ops, Maint)?
- How well are EDM processes documented and understood?
- Do I need to & how well aligned am I comply with statutory regulations?
- How well do you ensure integrity of documents and data (MOC)?
- Is the metadata for description of a digital object adequate ?
- Is the IT infrastructure adequate and scalable (one plant to many plants)?
- How well do the IT systems support engineering data management?
- What are my risks of not having integrated EDM processes and systems?
- Should I outsource EDM activities ?

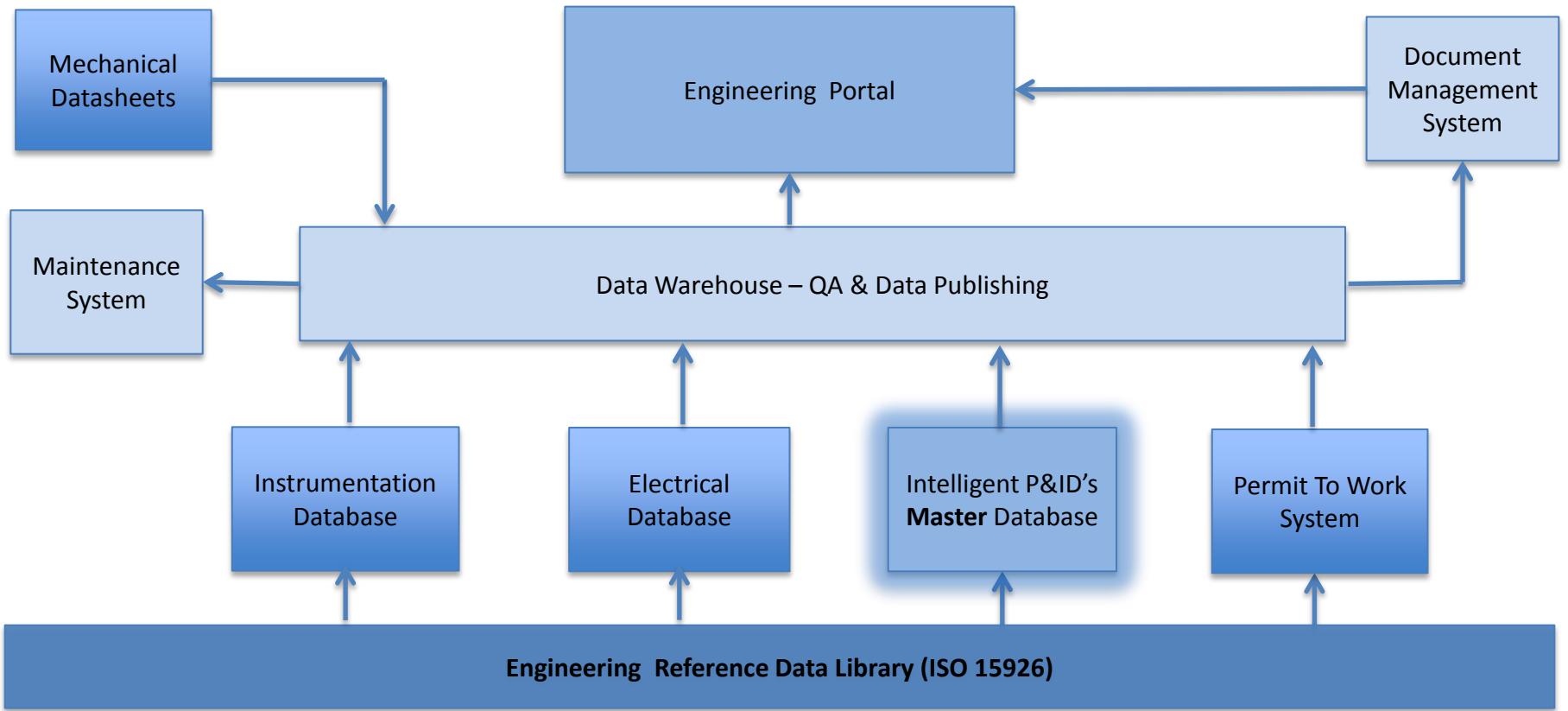
What are your EDM Objectives

1. **Review existing software and systems** rationalise and create integrated tool suite.
2. **Performance and ease of use** – Ensure quick and easy access to EDM data by approved users in a usable and business relevant form.
3. **Reusability** – Software structures will ensure, where appropriate, that multiple applications are able to use the data.
4. **Integrity** – The EDM data will always have a valid meaning and value, and will always reflect the valid state of the business.
5. **Security** – True and accurate data will always be immediately available to authorised users.
6. **Maintainability** – All EDM work will be at a cost that delivers value by ensuring that the cost of creation, storage, maintenance and use do not exceed its asset lifecycle value.

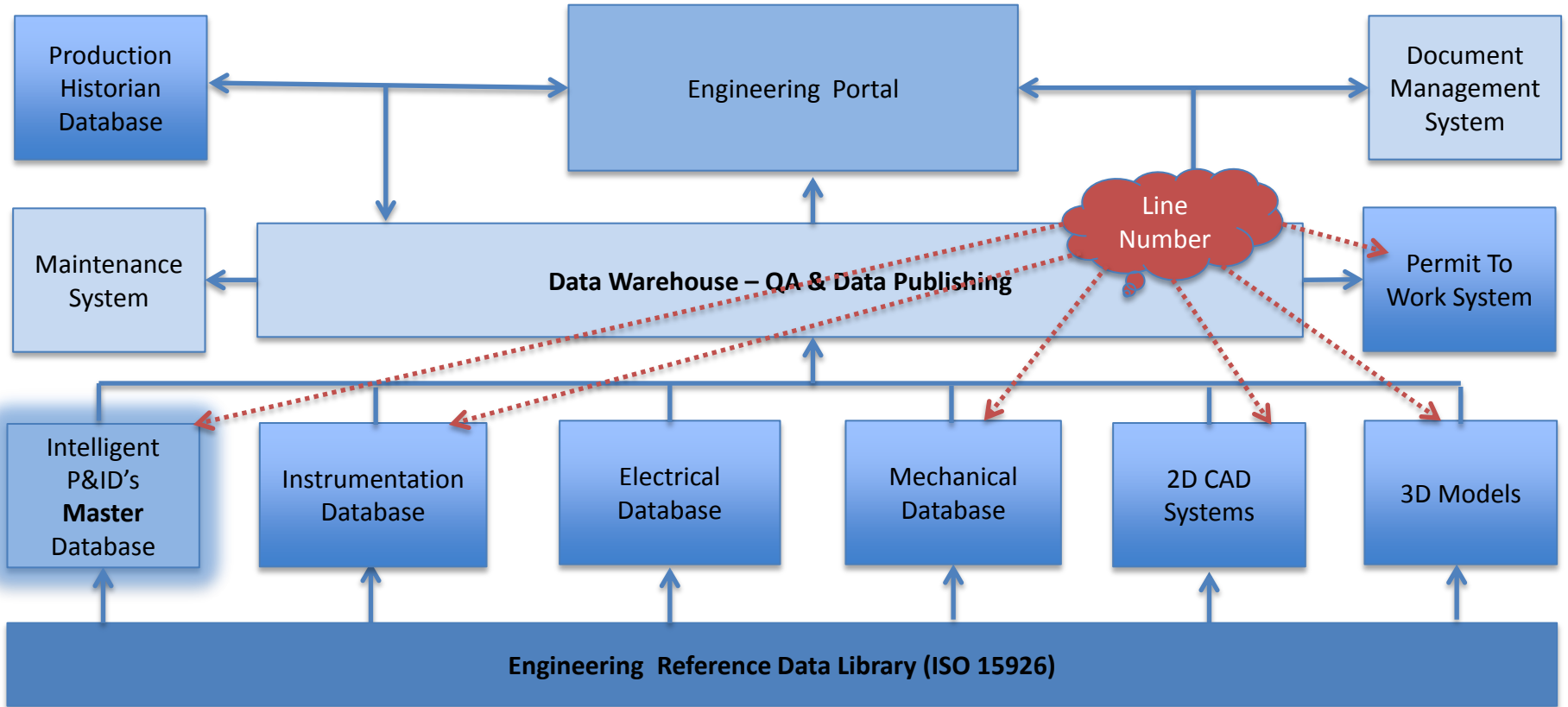
What is my current structure



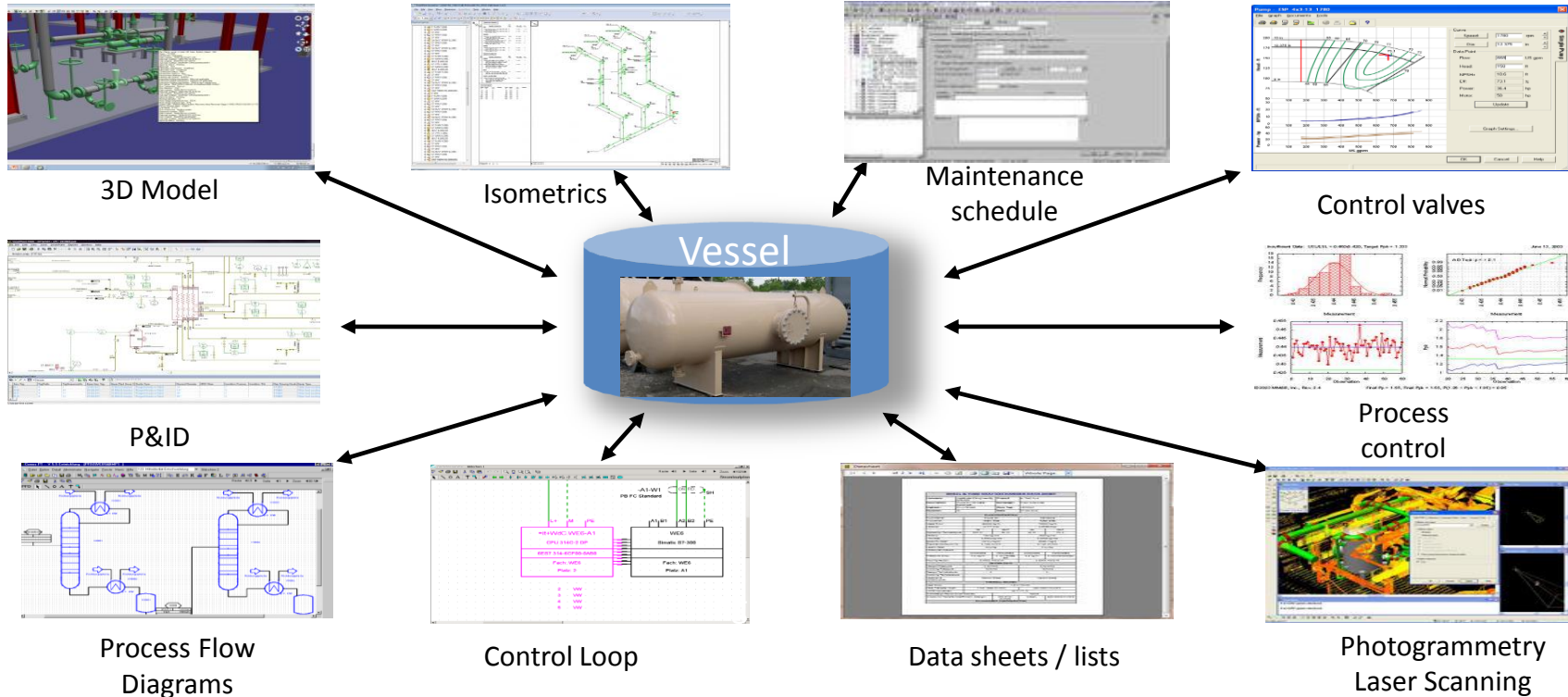
- Data is distributed over multiple applications, databases and platforms
 - Where are those databases located?
- Complex, poorly documented data relationships
 - Which data is controlled, and which can be shared?
 - Whole and partial data elements can be found in hundreds of tables and fields
- Data relationships not understood because:
 - Corporate memory is poor
 - Documentation is poor or non centralised
 - Logical relationships (enforced through metadata or business rules) are hidden
 - Lessons learnt are not adopted



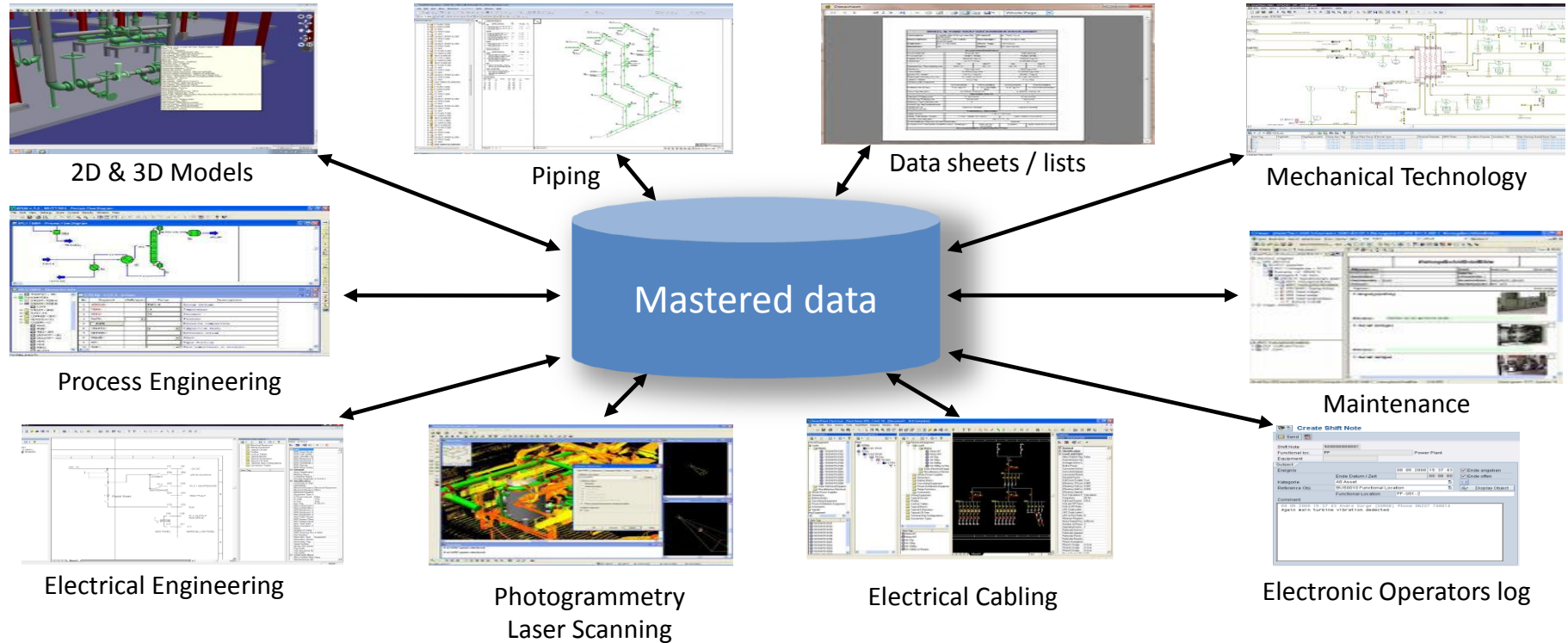
How many places does your data reside in ?



Data Relationships



Centralised Data Interfaces



Computerised Maintenance Management System 1

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- CMMS Functionality Clearly defined (Maintenance vs. Engineering)
- Hyperlinking format and functionality tested (all interface systems)
- CMMS PAU structure aligned to industry standard (ISO 15926 / 14224)
- Engineering Characteristics migrated to Data warehouse & batch loaded into CMMS for operational & maintenance purposes (ISO 15926 RDS)
- Object Classes aligned to industry standards (Alignment to Templates, Failure Codes, Maintenance Strategies, Datasheets)
- Tagging standard created (Core libraries - Equipment , Cables & Pipes)

Computerised Maintenance Management System 2

One of the major advantages of a EDM project and transition to a digital plant is the ability to use the CMMS for its core design function rather than a “1” stop shop to dump all information into (See definition of repository-wikki & @&%^\$).

The CMMS supports a Plant Area & Unit structure, operational data that should be replicated rather than mastered in the CMMS, Materials & transactional data.

It is a commonly held view that CMMS systems hold all maintainable equipment (physical devices) many are never extended to cover manual valves, cables & pipes ?

As we move into 3D deliverables and use of new technology with core data warehousing capability the opportunity to improve data quality and visibility exists, it also significantly reduces implementation and ongoing costs of large CMMS systems.



Introducing Simple Rules – Generates Quick Wins 1

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Document, Drawing & Equipment Titling

- **What it is** SLD,
- **Where it is** Sub station 12, Frac 1
- **What it does** Small Power & lighting distribution Panel 6

Title Drawing & Document SLD, Substation 12, Small Power & Lighting Distribution Panel 6

Title Equipment Switch Board , SS 12, Small Power Lighting Distribution Panel 6

Photo & Media Gallery Software

We take thousands of photograph's a year on capital projects and during normal operations and maintenance activities – Where do they go?

Software is currently being developed to support the full asset lifecycle of equipment. The design is straight forward with an album type layout.

What drives the software ?

Metadata key attributes from drop down lists which include:

Tag Number, Activity, Short Text Description, Date (Short Cuts).

Benefits: Shows as found and as left conditions, scaffolding & special arrangements, Disassembly & Assembly steps.

Introducing Standard Deliverables - Quick Wins 3

Many companies do not have a standard list of engineering deliverable by asset type, despite completing many construction projects and expansions. The standard should contain:

- Record type
- Metadata / Sub Types
- Criticality
- Short text description
- Discipline
- Delivery time & Approvals Matrix
- Asset Owner

Legacy data

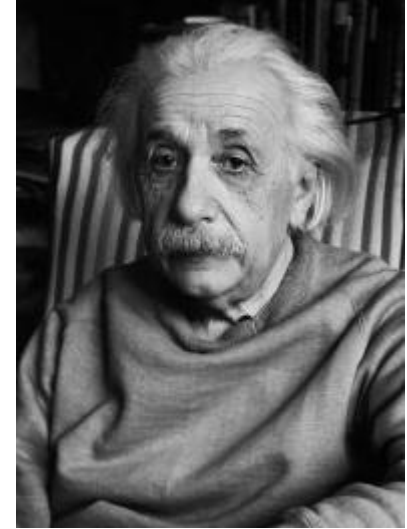
Managing legacy data conversions is often seen as a major stumbling block to an EDM project rather than the true opportunity it provides !

Legacy data becomes more valuable as time goes by – Why ? Original data becomes hard to source, obsolesces of material, refurbishment projects, expansion projects all need installed information !

We now have a wide variety of methods and service providers who specialise in converting legacy data whether it be microfilm, paper copy, PDF , CAD or 3D data.

What if I only have limited data and the quality and accuracy is unreliable ? (No this is not a home shopping channel advert) 3D & 2D restoration solutions do exist for most problems (see Odesi Solution team & Offset presentation).

Some lighter Final Thoughts



Pop Quiz - EDM Fact or Fiction !

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- Many Owner Operators would like to improve capital project handovers and reduce costs ✓
- People are enthusiastic about making a change ✓
- Current technology platforms (IPAD's, Cell Phones, Laptops) are expected tools by our new graduates, operations & maintenance technicians ✓
- The technology to support a digital plant already exists today for Production & Capital projects ✓
- Engineering staff really like to spend several hours looking for key engineering data ✗
- People like unstructured data because it makes every retrieval an adventure ✗

Does Size Really Matter !

Owner Operator View - One Plant or many Plants :

- Aligned accurate data saves you money !
- Lower cost to maintain, greater access when required !
- One size does fit all (Standards, Processes, tools)
- Greater Accuracy & Currency
- Easy of Access
- Re use of Information (Carbon Copy through to Ex Certificates)
- Reduced training times – Intuitive tool based on todays technology
- Growing statutory requirements

Final Thoughts II.....

EPC & Service Providers:

Owner operator EDM maturity growing rapidly

Digital Plant handover requirements expanding

Use of International Standards increasing (ISO 15926 established)

Uptake of design tools within medium to large companies becoming the norm.

Mega projects are becoming common practice

Major commercial advantage if EPC's understand and delivers what the customer really wants ! (Novel Concept).

Questions

