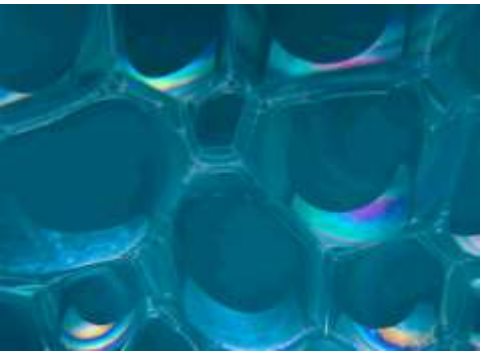
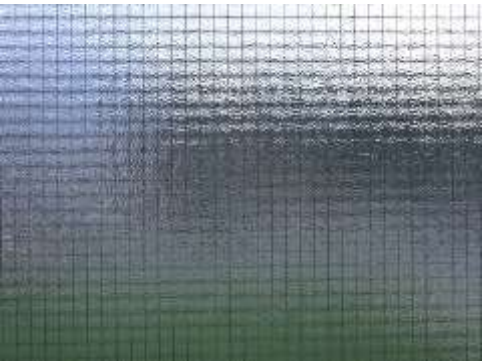




mat

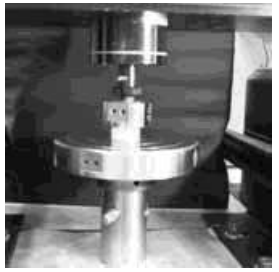
a world of materials

many products

reality

each with its own reality

material data



compressive

stress relaxation

tensile

viscosity

fatigue

conductivity

expansion

properties that describe reality

web services for material data

Material Data Management in a Collaborative Product Development Environment

Hubert Lobo

matereality

Modern product development

- Highly collaborative
- Many stakeholders
  - Material suppliers
  - Part suppliers
  - Consultants
  - CAE vendors

globally located…

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Collaborative Engineering

- Provides a common platform for development
  - Share all data
  - Eliminate duplication of effort
  - Eliminate inconsistent use of data
  - Permit simultaneous development

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Data Sharing

- Advanced for geometry/CAD sharing
- Very poor for material data sharing

yet both are important…

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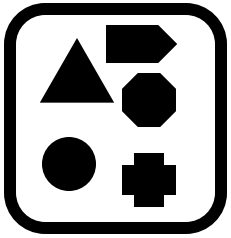
Why?

- Material data is very diverse
- It is not absolute
- Very complex to store
- Incompatible with CAD data structures
- Data does not fit into PDM environment



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Problem

Current dilemma

- Imagine wading through enormous swamps looking for the right data
  - Handbooks
  - Internet
  - Databases
  - File cabinets
  - Colleagues and co-workers

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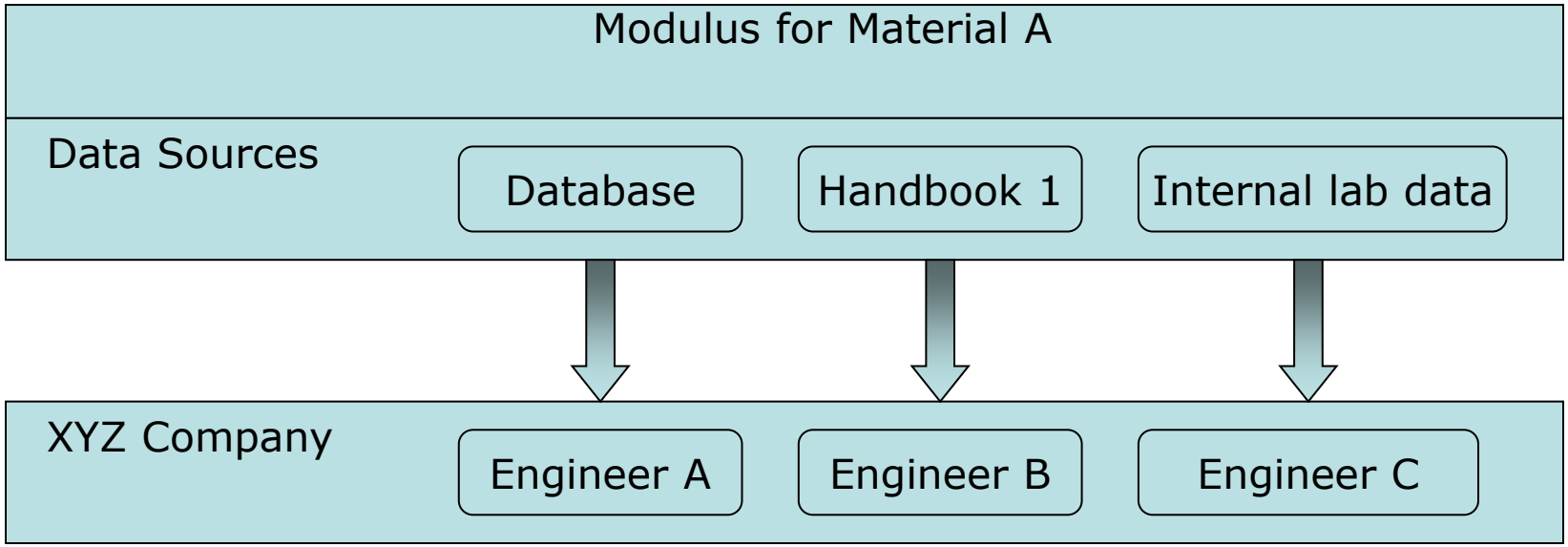
Problem

Inconsistent use of data



the six sigma killer…

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Problem

Further complications

- We need to store a multitude of varied properties
- Which depend on the end use application
- For diverse applications
- For diverse material types
- Useable in a variety of CAE solutions

a major mess…

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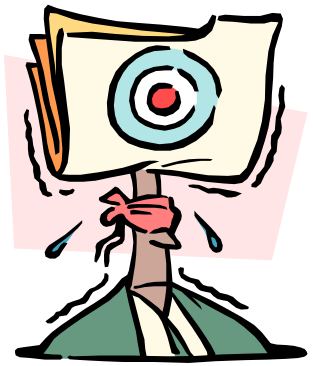
Problem

Poor properties can be fatal

- Property no longer represents the behavior being simulated
- Can be a root cause of error in CAE
- Presents a serious credibility problem for analyst, CAE tool, and VPD



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Goal of MDM

- Material data specific data structures
  - Store diverse data, simple or complex
  - Handle all types of data used in product development
- Within a PDM type framework
  - Share data selectively, securely
  - Extensible to entire product life cycle

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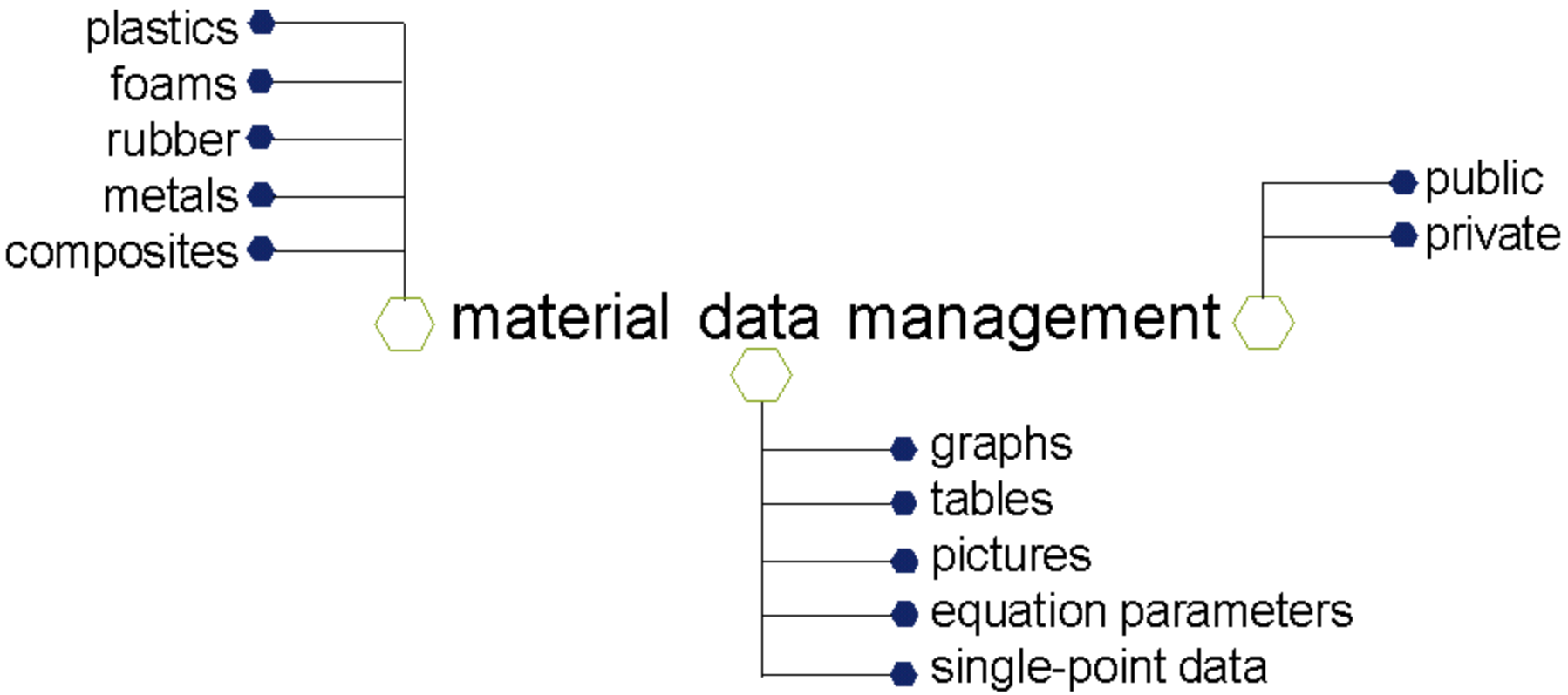
Solution

Introducing Matereality



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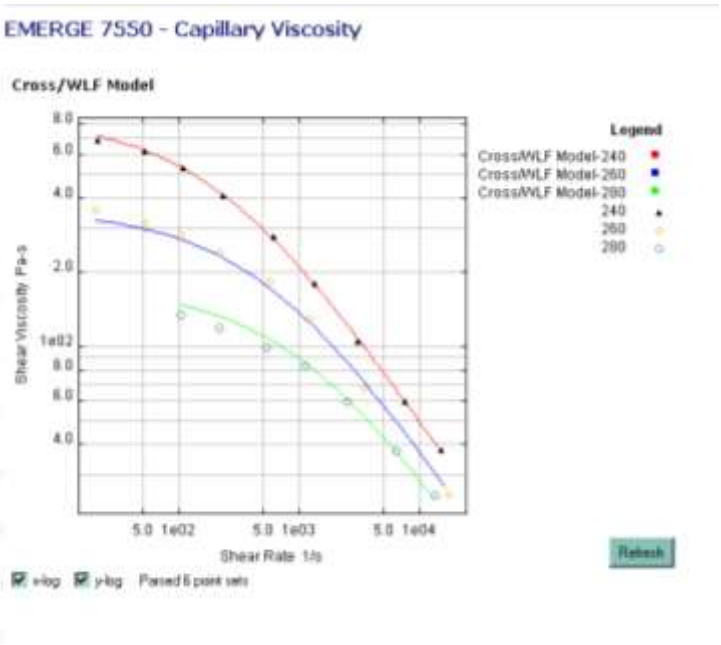
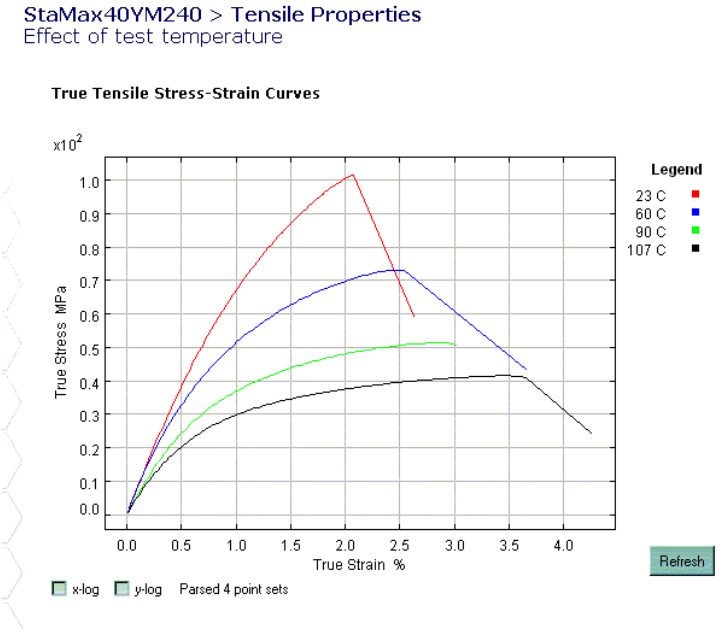
Solution

Handles data diversity





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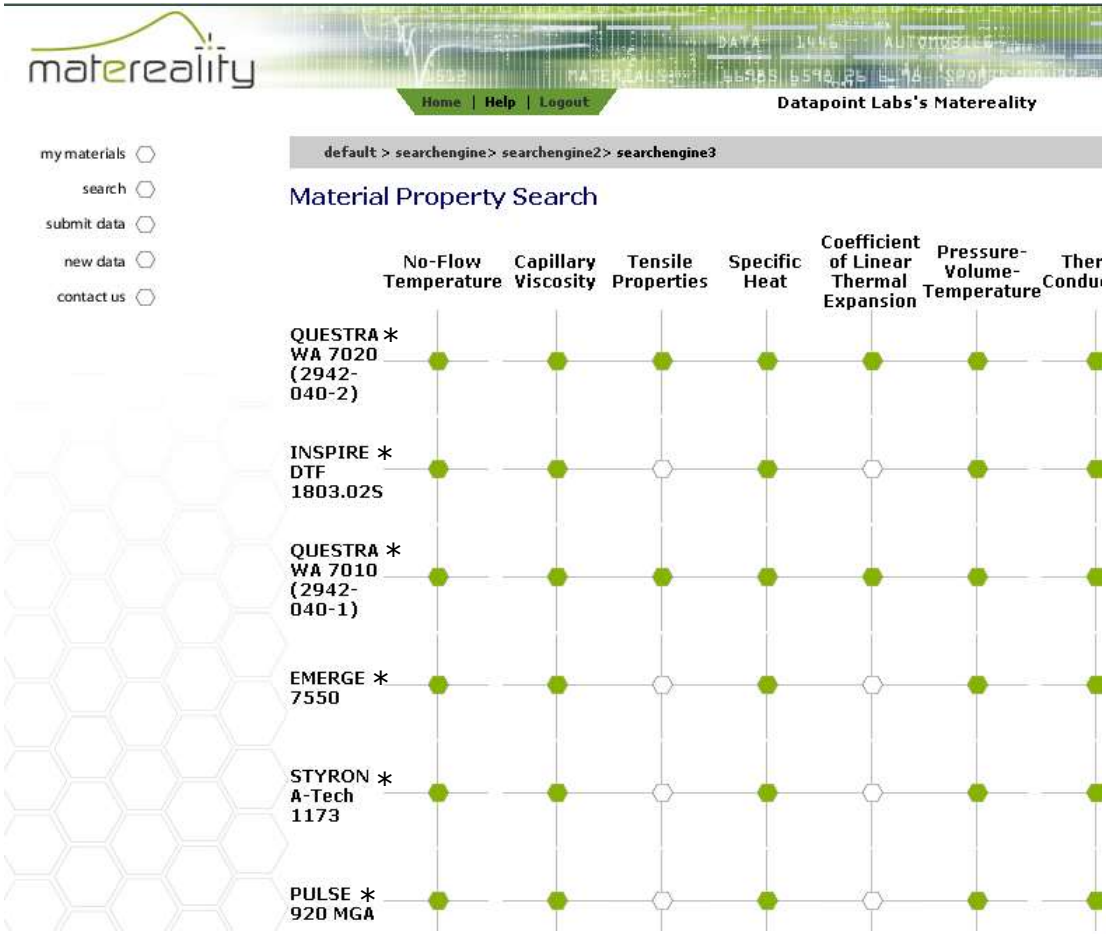
Solution

Stores pertinent data



Material names are trademark of Dow Chemical

matereality

Solution

Records traceability

Material names are trademark of Dow Chemical

matereality

Solution

Displays variability

Tensile Modulus - Youngs

2223 MPa	1
2138 MPa	2
2229 MPa	3
2197 MPa	Average

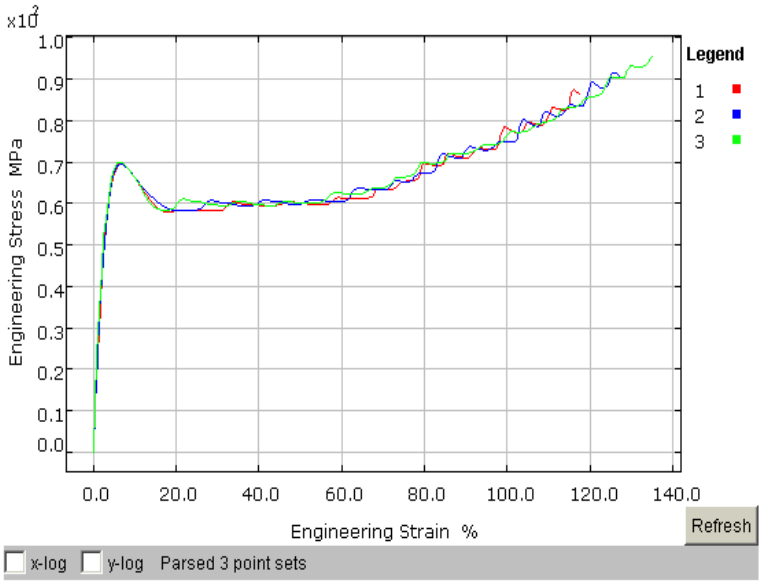
Offset Yield Stress in Tension

44.27 MPa	1
46.04 MPa	2
41.07 MPa	3
43.79 MPa	Average

Offset Yield Strain in Tension

2.12 MPa	1
2.24 MPa	2

Engineering Tensile Stress-Strain Curves



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Example

Application to VPD and beyond

Part designer's matereality
- Stress-strain data
- Impact data
- Refractive index

Moldflow analyst's matereality
- Viscosity
- Thermal conductivity
- Melt density
- Specific heat
- No-flow temperature

Molder's matereality
- Melt flow rate
- Izod strength

Product: safety glasses

Material: polycarbonate

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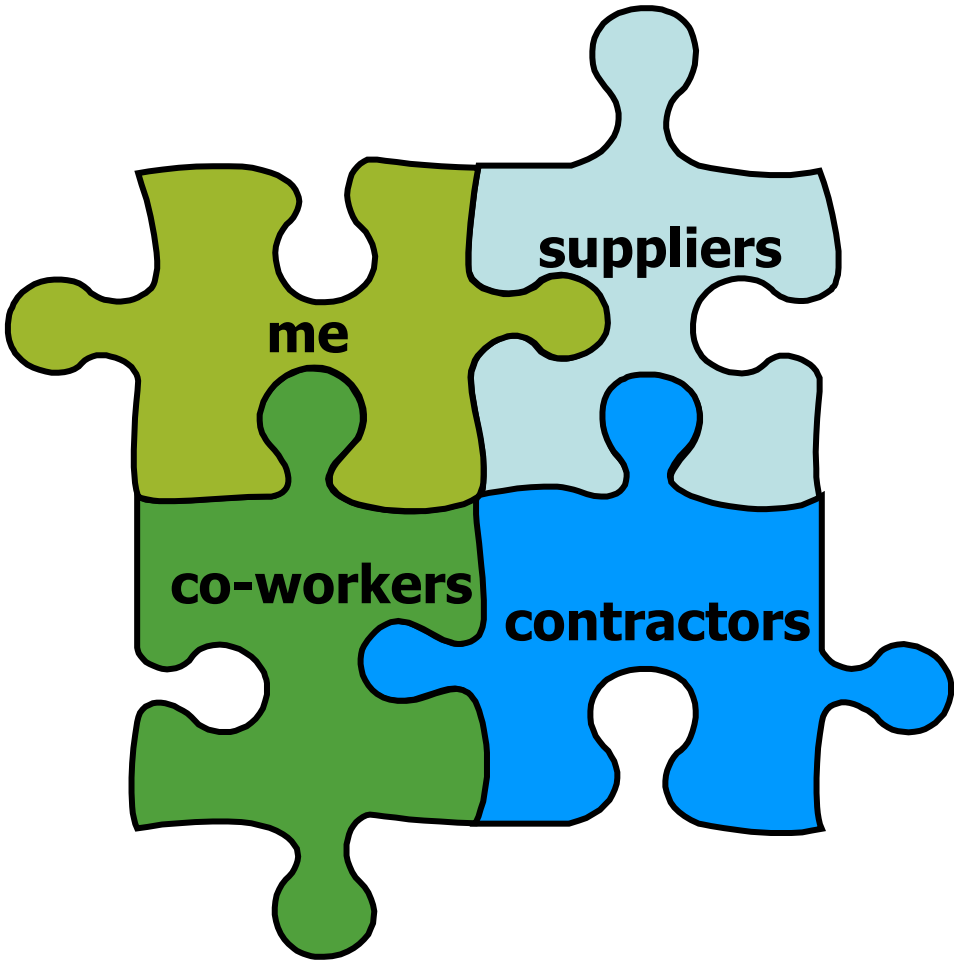
Collaborate

Matereality is collaborative,



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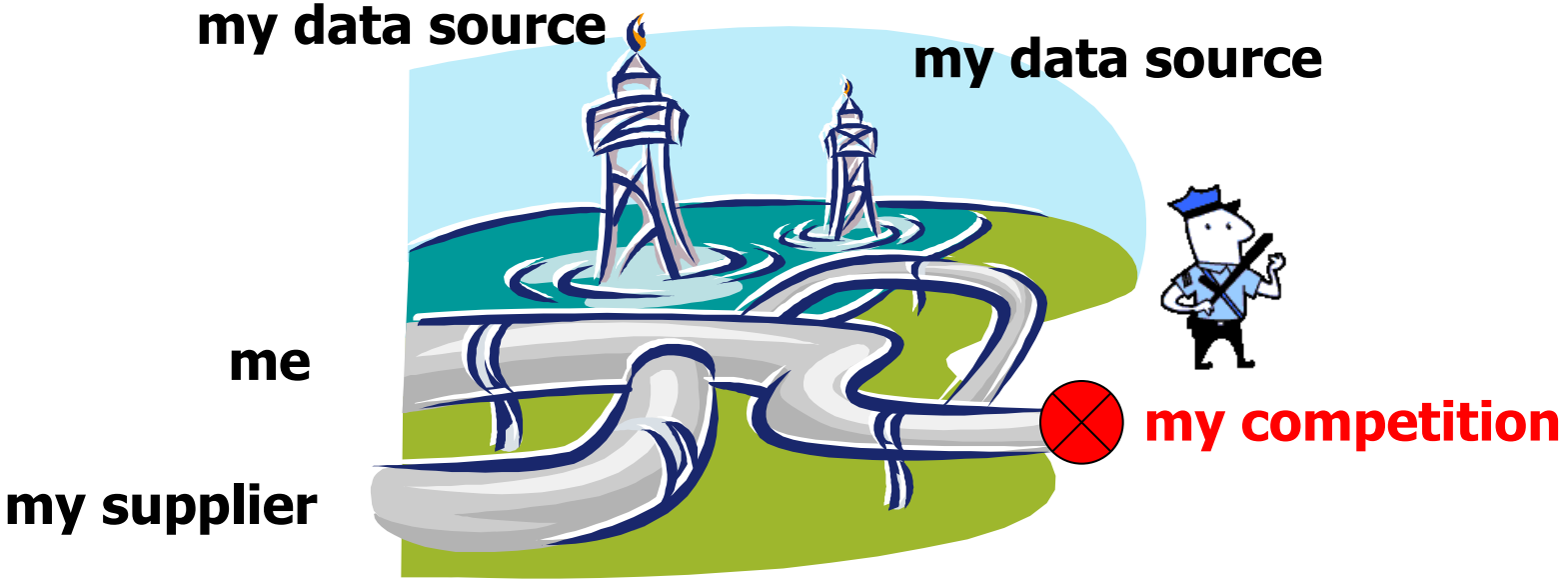
Collaborate

flexible,

- Highly efficient data pipelines



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Collaborate

secure!

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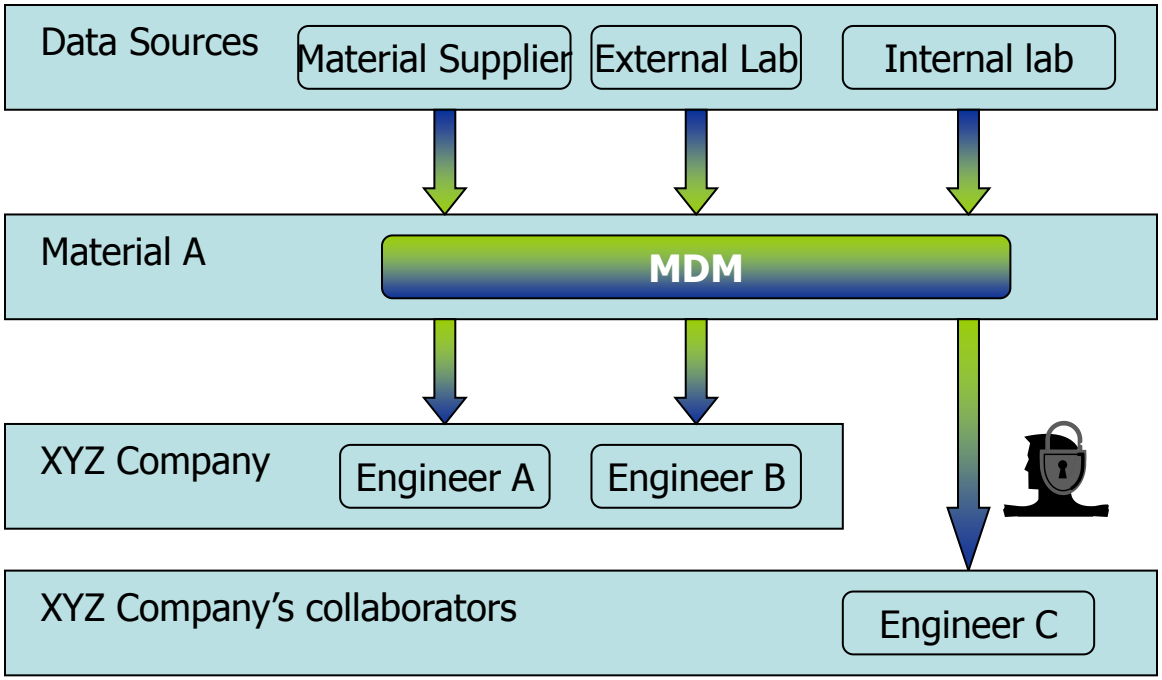
creates secure, flexible networks

Matereality applied consistently



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Cost savings

- Only the properties needed are measured
- Once measured, properties are shared by all stakeholders
- Reduced risk- no searching in dubious places for data

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Conclusions

- Authoritative source of material data for the enterprise
- Handles any kind of material data
- Selectively shareable by stakeholders
- Achieves cost benefits
- Reduces time to market
- Reduces risk
- Extensible to entire product life cycle

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