

mat 

a world of materials

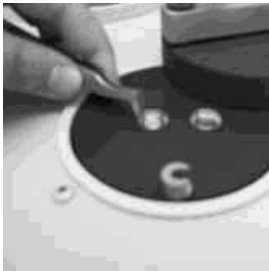
many products



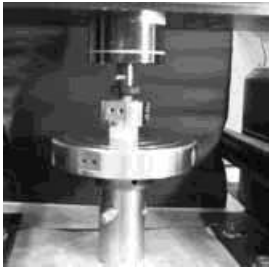
reality

each with its own reality

material data



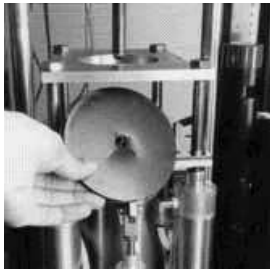
stress relaxation



compressive



viscosity



fatigue



conductivity



expansion

properties that describe reality



web services for material data

Material Data Management in a Collaborative Product Development Environment

Hubert Lobo



Modern product development

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

globally located...

Collaborative Engineering

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

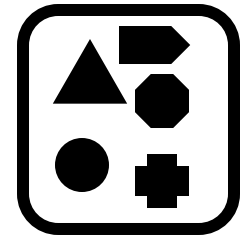
Data Sharing

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

yet both are important...

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



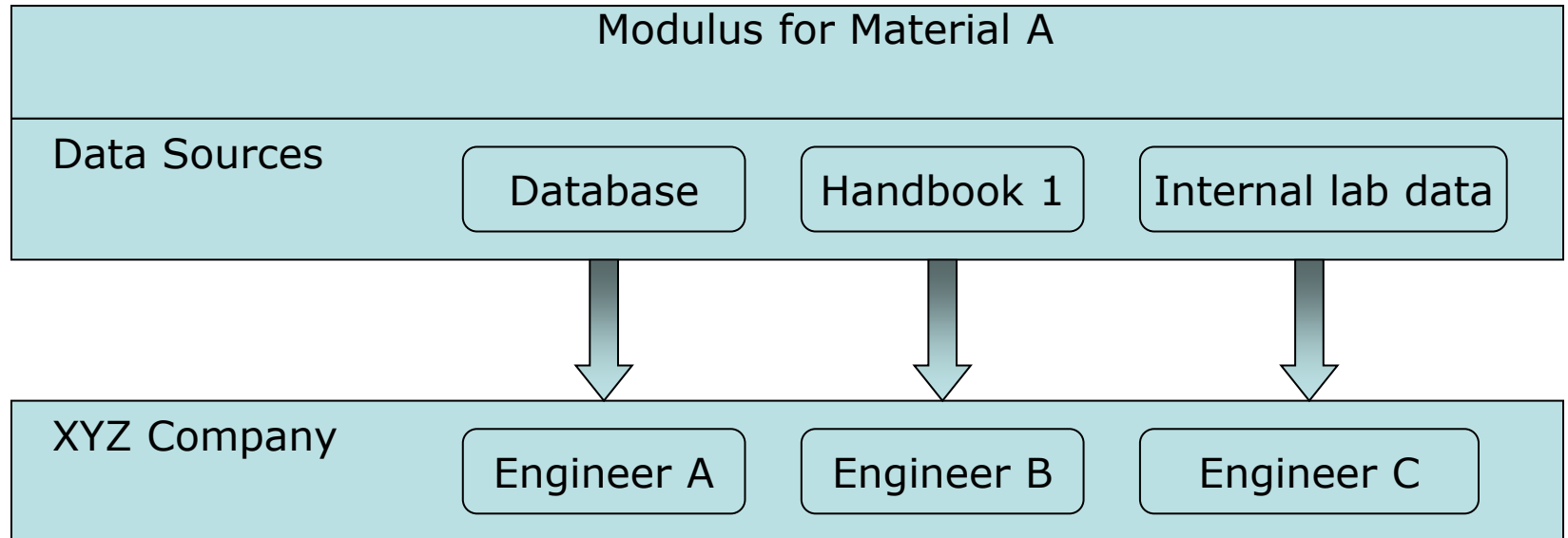
Current dilemma

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



Problem

Inconsistent use of data



the six sigma killer...

Problem

Further complications

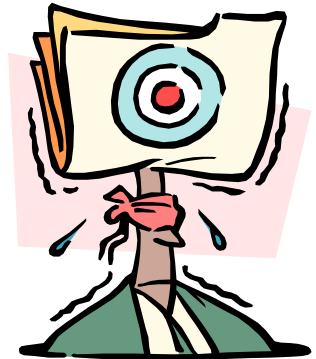
- We need to store a multitude of varied properties
- Which depend on the end use application
- For diverse applications
- For diverse material types
- Useable in a variety of CAE solutions

a major mess...

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

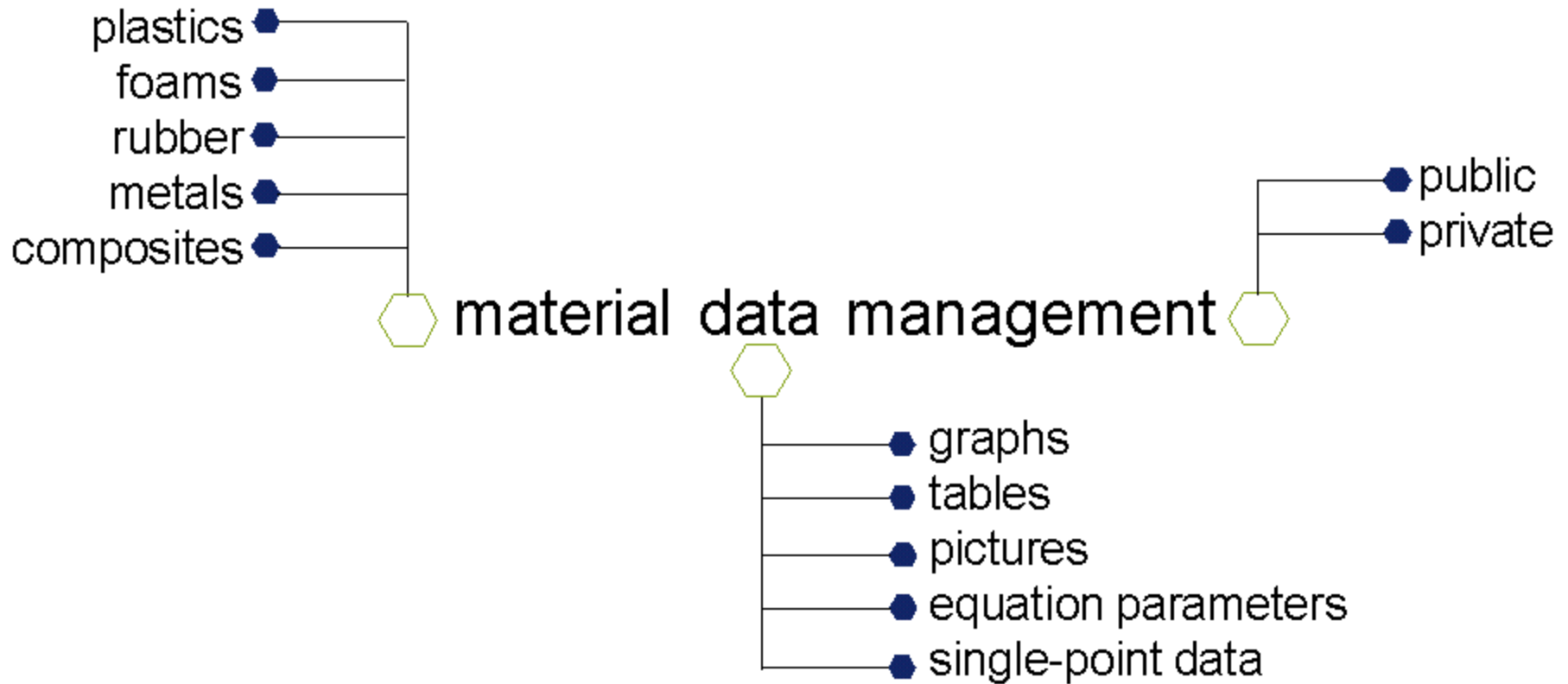


Goal of MDM

- 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

Solution

Introducing Matereality

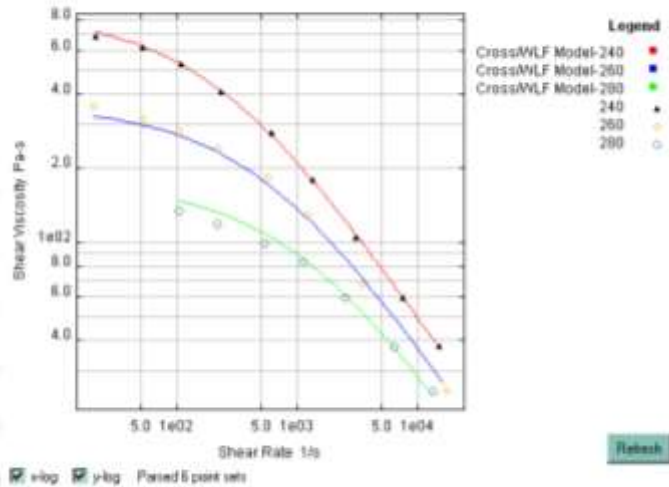


Solution

Handles data diversity

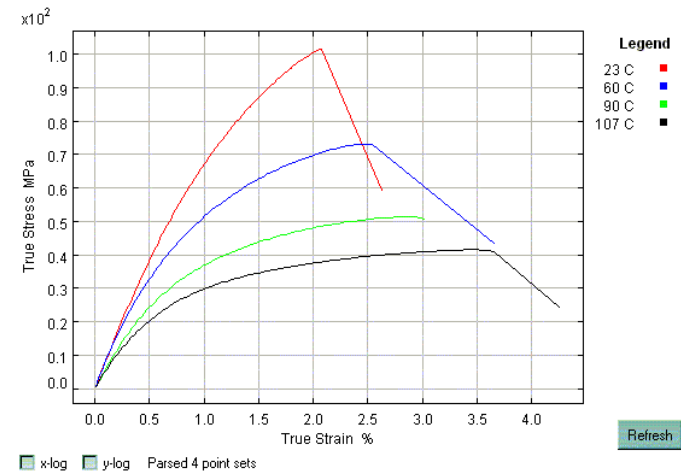
EMERGE 7550 - Capillary Viscosity

Cross/WLF Model



StaMax40YM240 > Tensile Properties
Effect of test temperature

True Tensile Stress-Strain Curves



Solution

Stores pertinent data

matereality

Home | Help | Logout

Datapoint Labs's Matereality

default > searchengine > searchengine2 > searchengine3

Material Property Search

	No-Flow Temperature	Capillary Viscosity	Tensile Properties	Specific Heat	Coefficient of Linear Thermal Expansion	Pressure-Volume-Temperature	Ther Condu
QUESTRA * WA 7020 (2942-040-2)	●	●	●	●	●	●	●
INSPIRE * DTF 1803.02S	●	●	○	●	○	●	●
QUESTRA * WA 7010 (2942-040-1)	●	●	●	●	●	●	●
EMERGE * 7550	●	●	○	●	○	●	●
STYRON * A-Tech 1173	●	●	○	●	○	●	●
PULSE * 920 MGA	●	●	○	●	○	●	●

Material names are trademark of Dow Chemical



Solution

Records traceability

The screenshot displays the Matereality website interface. At the top left is the Matereality logo. Below it are navigation links: Home, Help, Logout. On the right, it says "Datapoint Labs's Matereality". A breadcrumb trail reads: default > searchengine > searchengine2 > searchengine3 > prepsummary > prepresult > prepresultparams. The main heading is "Measurement Details for EMERGE *550 - Capillary Viscosity". On the left side, there are links: mymaterials, search, submit data, new data, and contact us. The central content is a table with the following data:

Technique	standards organization	ASTM
	standard number	D3835-96
	uncertainty analysis	per standard
Sample Details	identification	5209
	source	client
Corrections	data correction	Rabinowitsch
Specimen Details	drying	none
	form	pellets
	other preparation	none
Test Parameters	barrel diameter	12 mm
	die diameter	1 mm
	die entry angle	180 deg
	die length	20 mm
	preheat time	6 min
	test temperature	240 C
Traceability	test temperature	260 C
	test temperature	280 C
	measurement date	3/4/2002
	accredited	Yes
	measurement instrument	Goettfert Rheograph 2003 Capillary Rheometer
	performed by	JA
	certified by	TB

At the bottom of the table area, there are links: Print, Report, View Result, Update, Legal.

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Solution

Displays variability

Tensile Modulus - Youngs

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

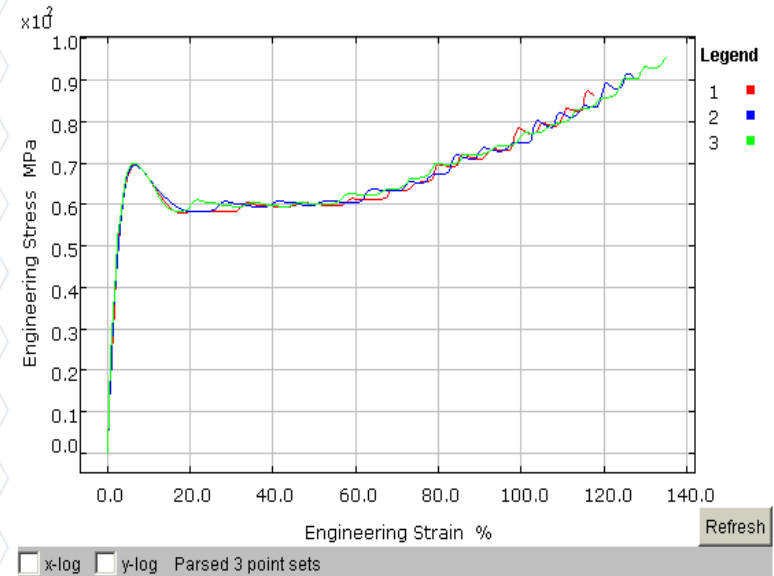
Offset Yield Stress in Tension

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



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

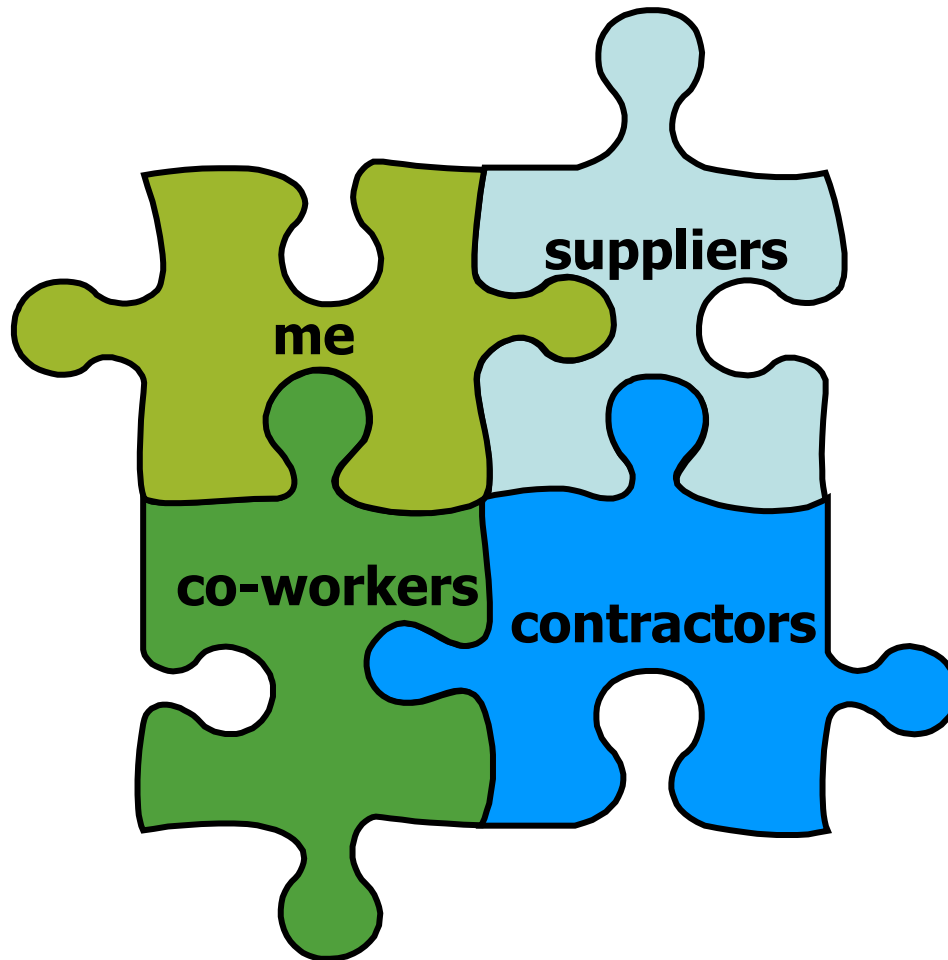
Product: safety glasses



Material: polycarbonate

Collaborate

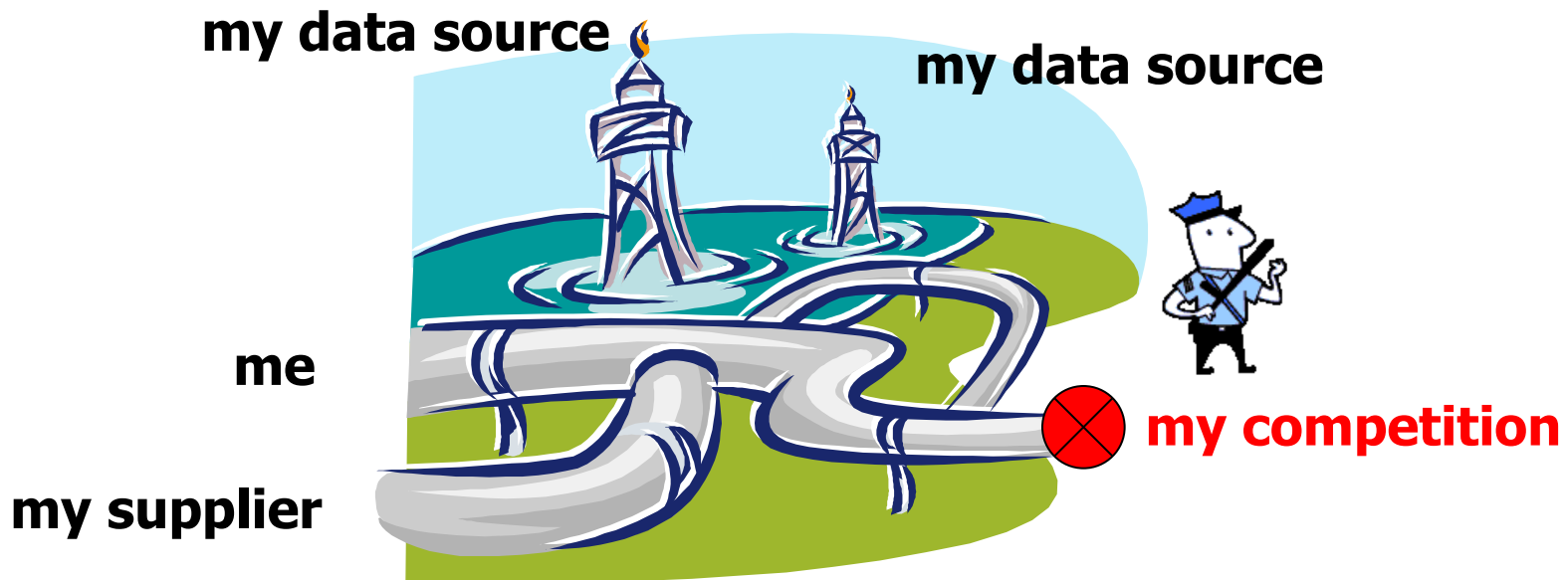
Matereality is collaborative,



Collaborate

flexible,

- Highly efficient data pipelines



Collaborate

secure!

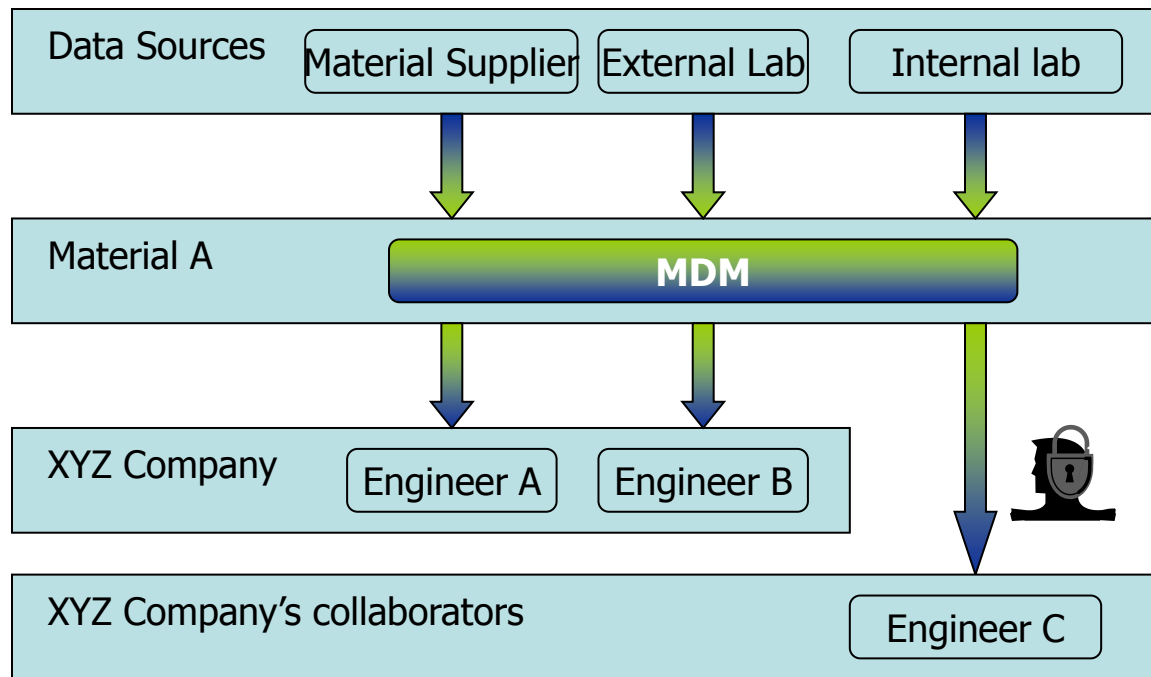




matereality

creates **secure**, flexible networks

Matereality applied consistently



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

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