

Dimensional Informatics

Tim Brailsford

The problem with data

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Why is this a problem?











The Null Conundrum

First Name	Middle Name	Last Name
Timothy	John	Brailsford
James	NULL	Goulding

Semi-Structured Data

Dimensional Informatics

- Inspired by Ted Nelson's ZigZag System
- Data is contained in cells
- Cells are arranged in ordered lists ranks in dimensions
- Dimensions usually have semantic meaning
- All cells exist in all dimensions but the ordering can be different

Complex Data

Н					1011 - 1	(4)).	He
Li	Be	В	С	Ν	0	F	Ne
Na	Mg	AI	Si	Р	S	CI	Ar
К	Ca	Ga	Ge	As	Se	Br	Kr

Element	Symbol	Atomic mass	Density	Melting poi
	\mathbf{H}	g/mol	kg/m3	K
Hydrogen	Н	1.01	0.09	14.0
Helium	He	4.00	0.17	1.0
Lithium	Li	6.94	534.00	452.0
Beryllium	Be	9.01	1800.00	1550.0
Boron	В	10.81	2500.00	2600.0
Carbon	C	12.01	2300.00	-3800.0
Nitrogen	Ν	14.01	1.17	-63.3
Oxygen	0	16.00	1.33	-54.7
Fluorine	F	19.00	1.70	-53.5
Neon	Ne	20.18	-0.84	-24.5
Sodium	- Na	22.99	970.00	371.0
Magnesium	Mg	24.31	1741.00	924.0
Aluminium	AI	26.98	2700.00	933.2
Silicon	Si	28.09	2300.00	1680.0



Hyperorders

- James Goulding PhD
- Any cell may be associated with any other in any dimension
- In set theory:

 $HM_{hyperorder} = \langle C, \{ D_1, D_2, ..., D_n \} \rangle$ where $D_i \subset C_2$

You then don't need a separate linking mechanism

Objectives

- CFFRC will have a lot of complex semistructured data
- Develop a dimensional informatics storage layer - based on hyperorders for CFFRC datasets
- Implement this as a layer that can co-exist with conventional structures (i.e. RDMS)
- This should provide associations and inferences that would previously have been difficult or impossible

Supervision Team

- Tim Brailsford (UNMC)
- James Goulding (Horizon, UoN UK)
- Sean Mayes (CFFRC)

Approaches & Methodologies

- Continue the theoretical work
- Develop a DI server and associated query/retrieval language
- Test this with selected CFFRC data sets
- Implement an overlay to integrate the CFFRC knowledgebase with the DI server

Ideal student

- Really good programmer/software engineer
- Good knowledge of database theory
- Not afraid of maths!