

A sunset scene over a body of water with mountains in the background. The sun is low on the horizon, casting a bright orange glow across the sky and reflecting on the water. The mountains are silhouetted against the bright sky.

# ***Applying the Inherent Structure of Digital Records***

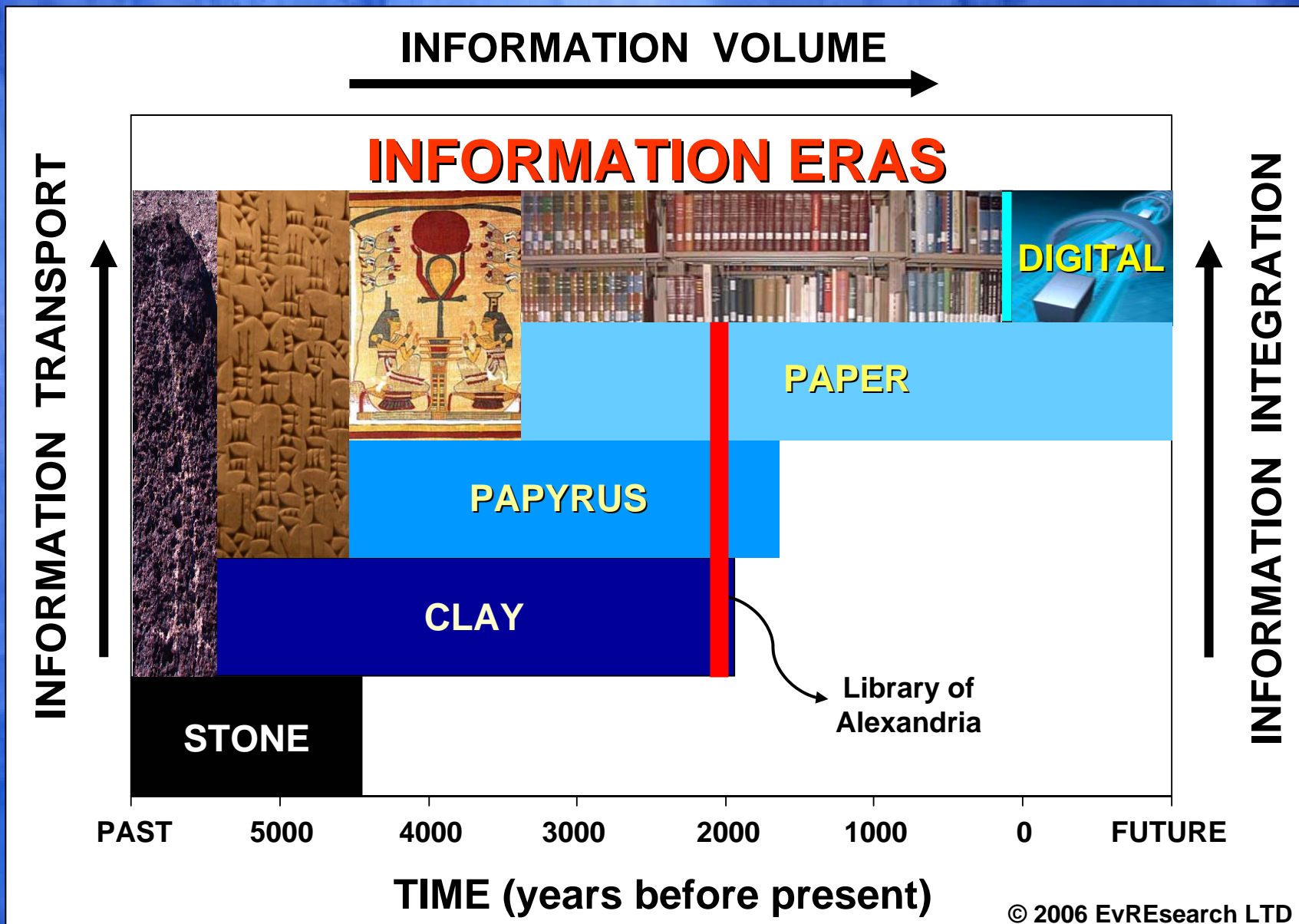
*Applying the Inherent Structure of Digital Records*

**Paul Arthur Berkman, Ph.D.**

**Research Professor, University of California Santa Barbara  
Chief Executive Officer, EvREsearch LTD**

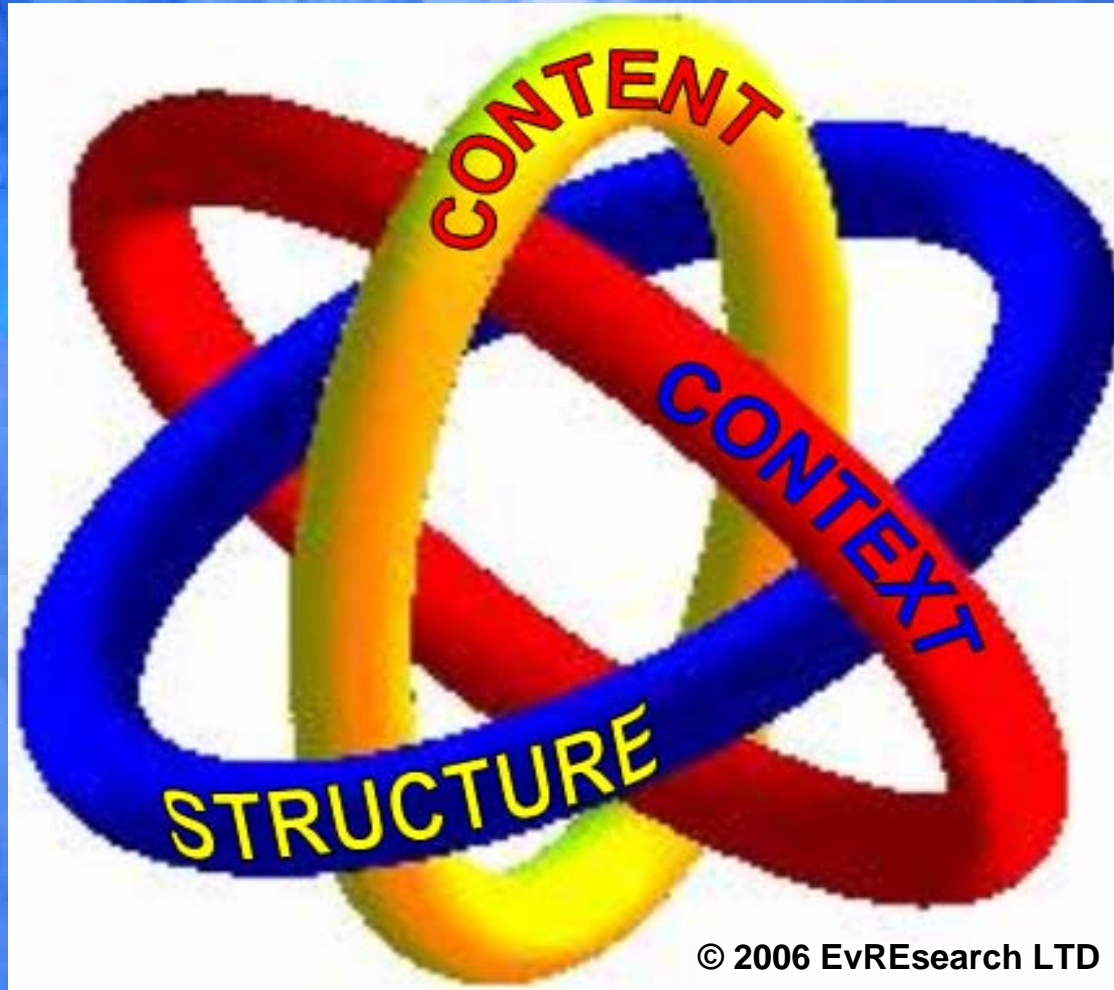
**WHAT IS THE FUNDAMENTAL  
DIFFERENCE BETWEEN  
DIGITAL AND HARDCOPY  
INFORMATION?**

# "ONCE IN A HUNDRED GENERATIONS"





# INTERTWINED ELEMENTS OF INFORMATION THAT TOGETHER REVEAL MEANING



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**STRUCTURE IS DEFINED BY  
BOUNDARIES BETWEEN  
GRANULES OF CONTENT**

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**STRUCTURE REVEALS THE  
GRANULARITY OF AN  
INFORMATION RESOURCE**

**HOW IS STRUCTURE  
CURRENTLY APPLIED IN THE  
MANAGEMENT OF DIGITAL  
INFORMATION?**

# THE CHALLENGE OF OUR DIGITAL ERA

## ***RESPOND TO THE FLOOD OF INFORMATION***

**>85%**

**UNSTRUCTURED INFORMATION**

Information Resources

**METADATA**

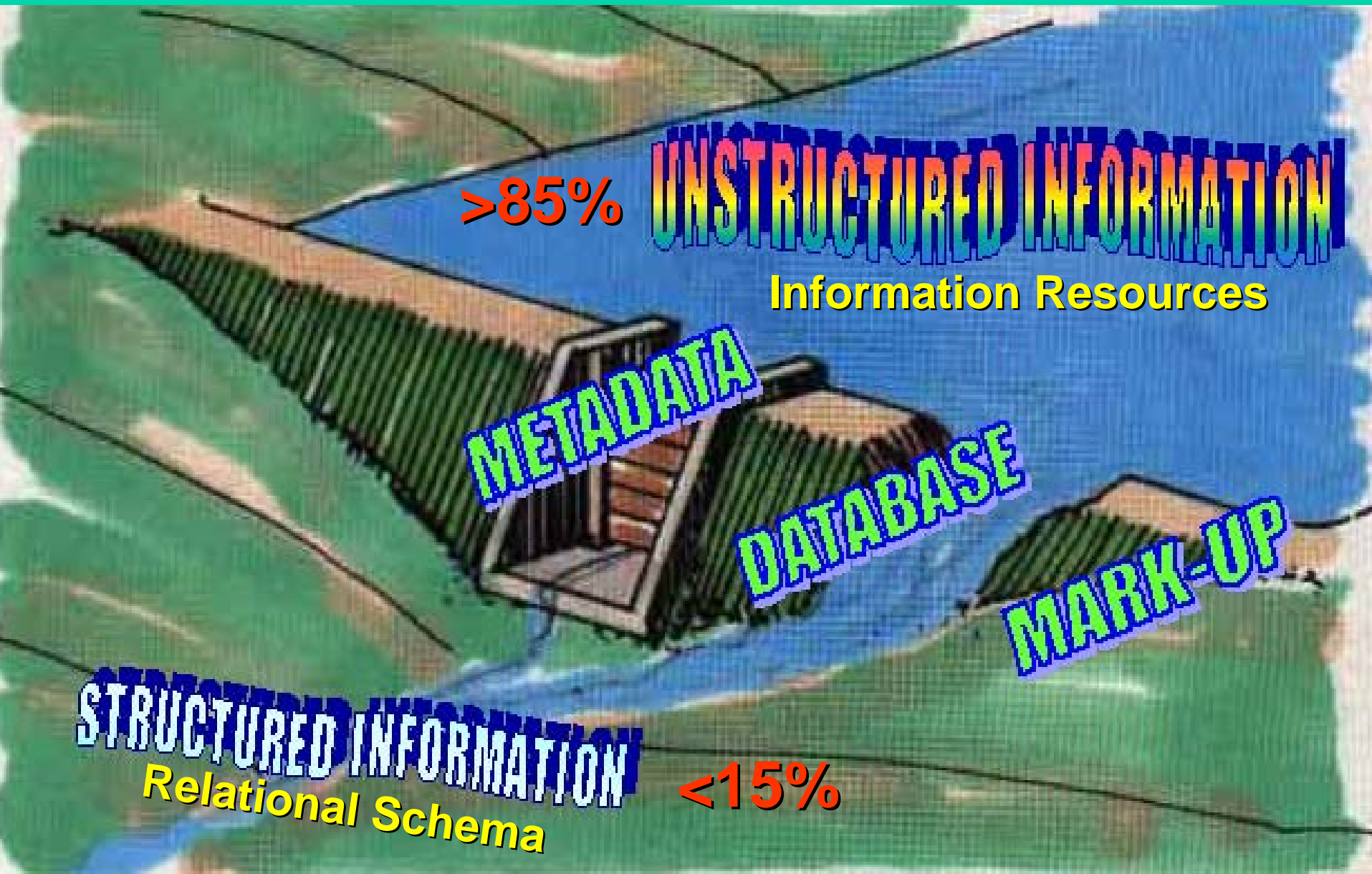
**DATABASE**

**MARK-UP**

**STRUCTURED INFORMATION**

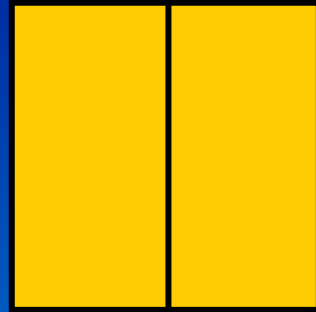
Relational Schema

**<15%**

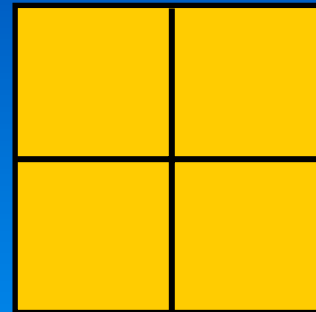


# INTEGRATION IS PROPORTIONAL TO GRANULARITY

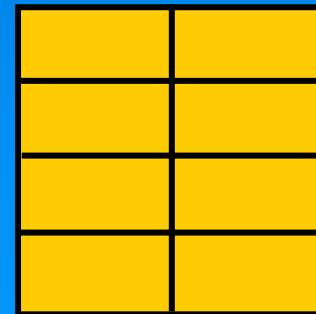
## Permutations



4



16

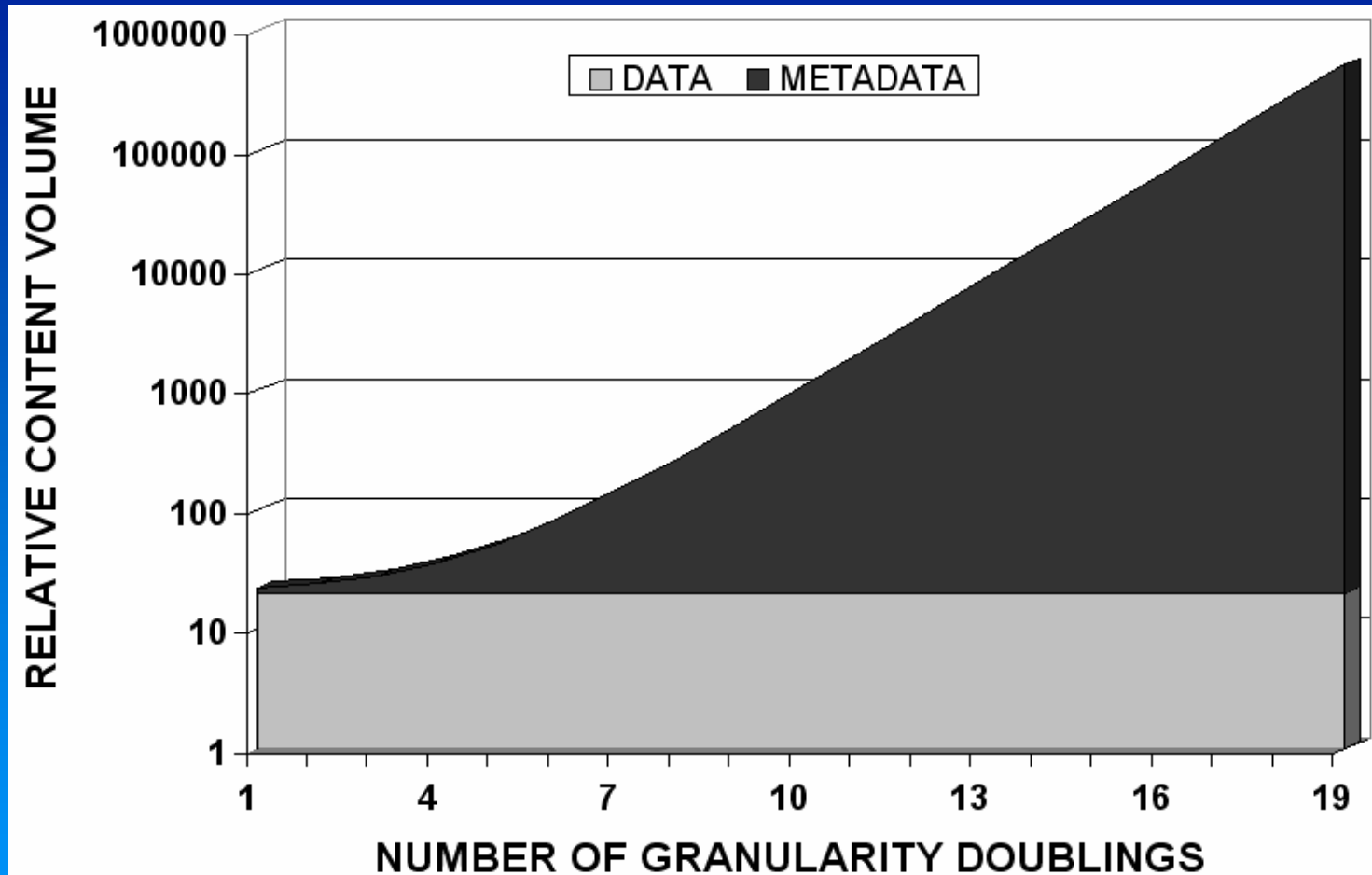


256

$2^N$  (where  $N$  = number of granules)

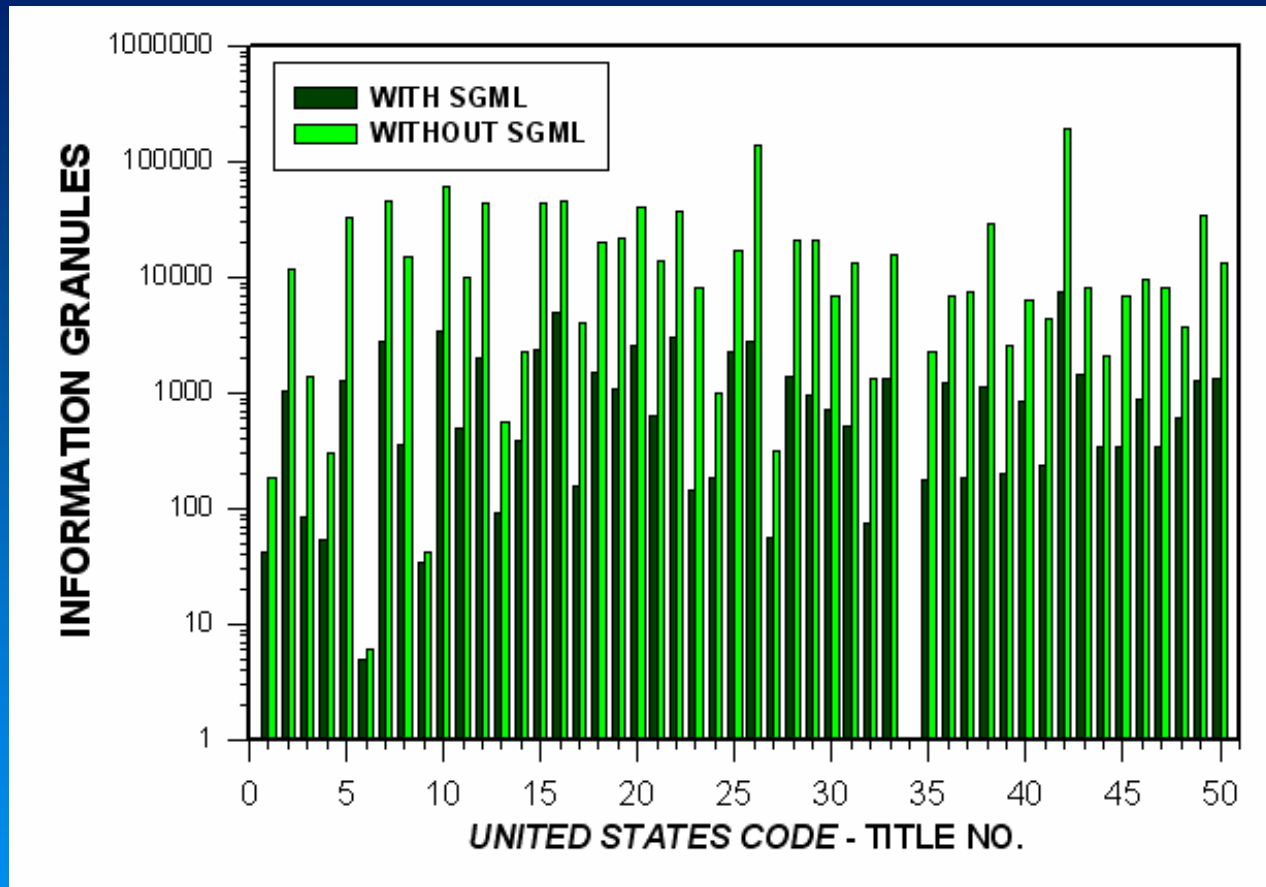


# METADATA LIMITATIONS



In this model of doubling granularity – the total content volume is constant (arbitrarily 20 units) and total volume of the metadata schema for each granule is fixed (arbitrarily 1 unit).

# United States Code Analyses



## Among the 50 Titles of the *United States Code*

- 56,847 **“apparent”** information granules with  $5.98 \pm 0.48$  SGML tags per granule
- 1,042,646 **“actual”** information granules based on their structure (without SGML)

**HOW CAN THE STRUCTURE OF  
DIGITAL INFORMATION BE  
UTILIZED?**

# AUTOMATED GRANULARITY DYNAMIC 2<sup>N</sup> RELATIONAL DISPLAYS

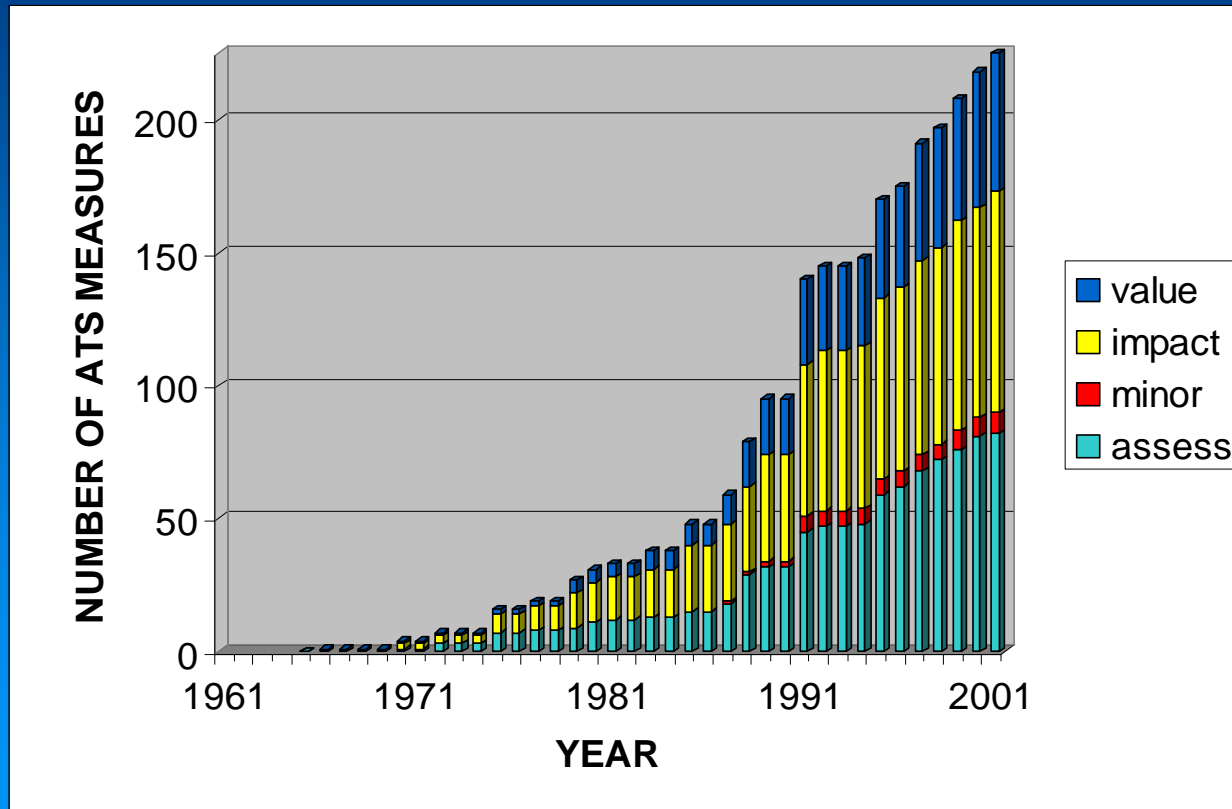
"minor or transitory"

Project ASPIRE

- [-] 1987
  - [-] Fourteenth Consultative Meeting
    - [...] (02) XIV-2 Mans impact on the Antarctic environment environmental impact
- [-] 1989
  - [-] Fifteenth Consultative Meeting
    - [...] (17) XV-17. Facilitation of scientific research the siting of stations
- [-] 1991
  - [-] Protocol on Environmental Protection to the Antarctic Treaty
    - [...] (08) Article 8 Environmental impact assessment
    - [-] Annex I Environmental Impact Assessment
      - [...] (01) Article 1 Preliminary stage
      - [...] (02) Article 2 Initial environmental evaluation
      - [...] (03) Article 3 Comprehensive Environmental Evaluation
- [-] 1999
  - [-] Twentythird Consultative Meeting
    - [-] Resolutions
    - [-] Appendices

# AUTOMATED GRANULARITY QUANTITATIVE 2<sup>N</sup> INTERPRETATIONS

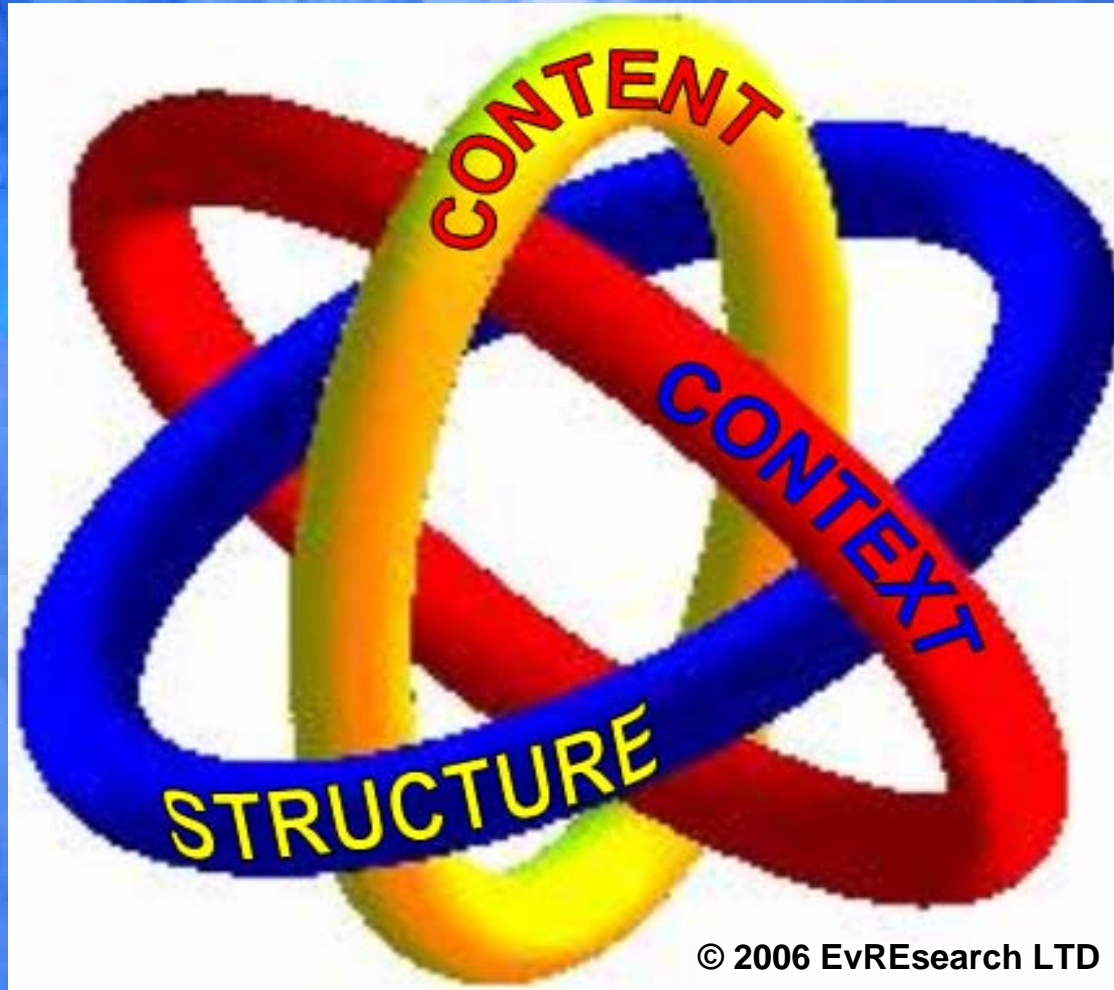
*Antarctic Treaty Searchable Database – Example*



- Manage information resources (e.g., versioning)
- Objective relationships within and between resources



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