

# Cyberinfrastructure for the Ages

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# What is cyberinfrastructure?

Supercomputers  
Visualization, HCI facilities  
High-performance communication networks  
The “Grid”  
Federated data repositories  
Collaboration tools  
On-line instruments and fabrication facilities  
Digital libraries

.....

Collaboratories, knowledge networks, knowledge ecologies, research universities of the future.

From the NSF Blue Ribbon Panel on Cyberinfrastructure - Dan Atkins, University of Michigan



# DAKS Technology Layers

Spatial Information Systems

**Applications: Ecoinformatics,  
environmental science...**

**Visualization**

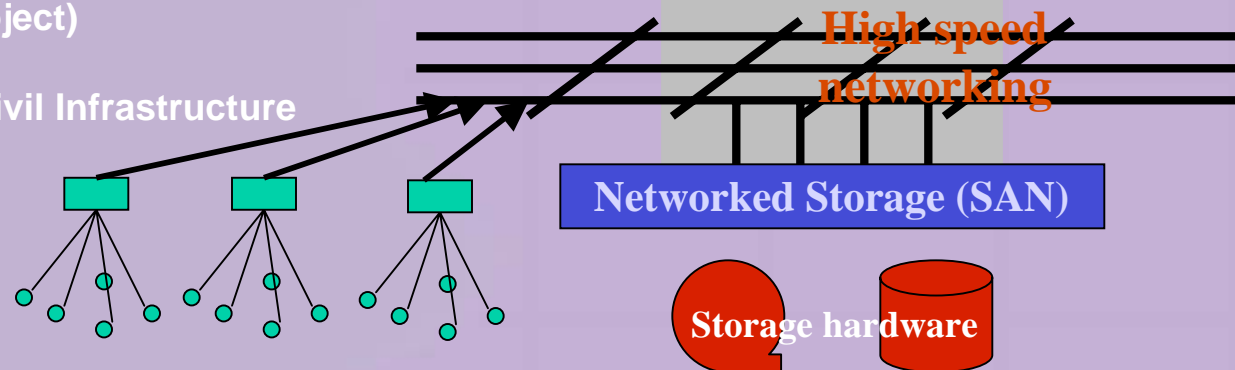
**Data Mining, Simulation Modeling,  
Analysis, Data Fusion**

**Knowledge-Based Integration  
Advanced Query Processing**

**Grid Storage (Curated Database)  
Filesystems, Database Systems**

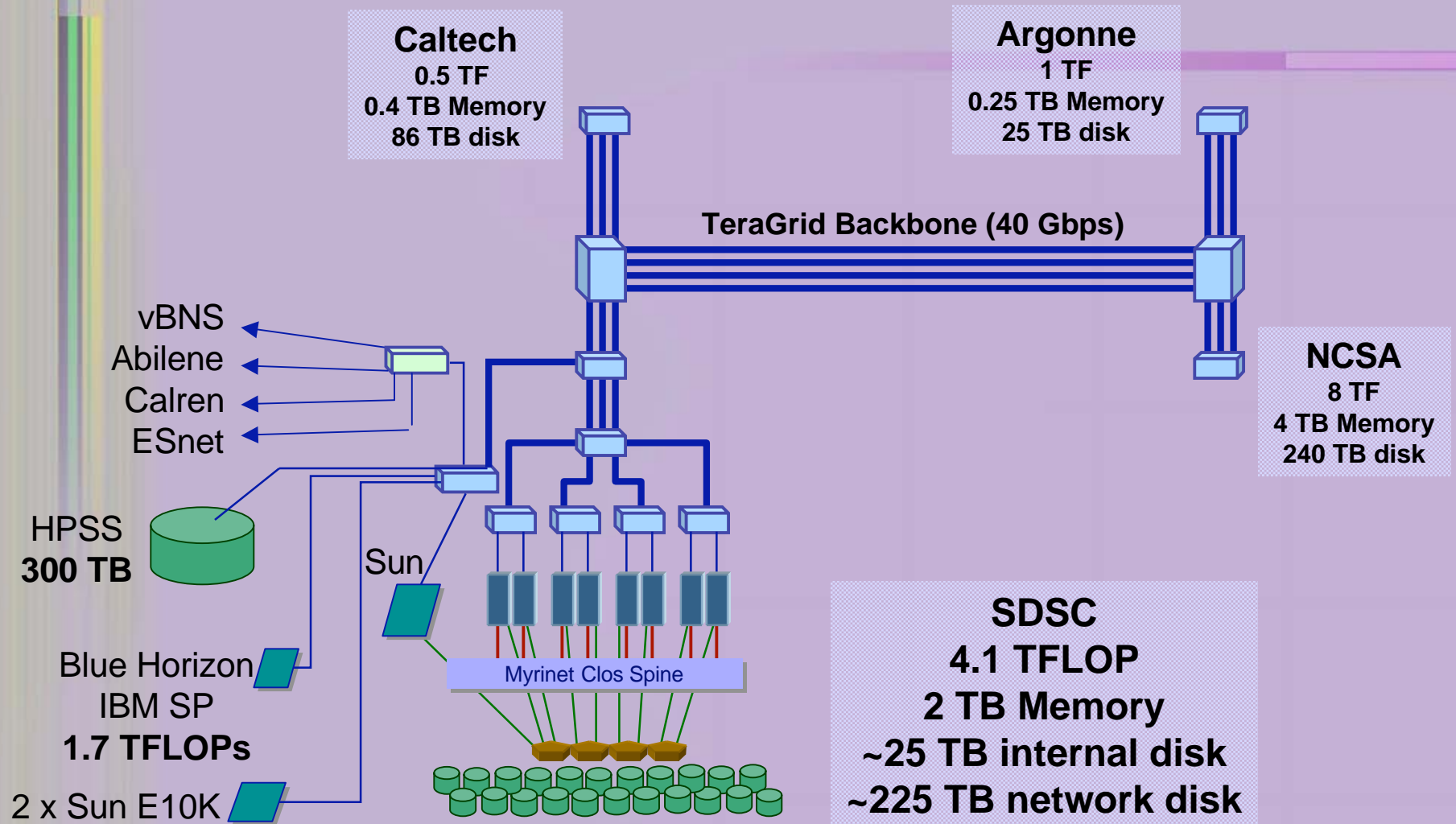
Sensornets (real-time data, video streams)

- ROADNet (NSF ITR project)
- ActiveCampus
- Monitoring Health of Civil Infrastructure





SDSC “node” configured to be best site for data-oriented computing in the world





# Community IT Infrastructure Projects

Information Integration Testbed (I2T) and GeoGrid (NSF Digital Government / ITR)

GriPhyN—Grid Physics Network (NSF ITR)

NVO—National Virtual Observatory (NSF ITR)

BIRN—Biomedical Informatics Research Network (NCRR/NIH)

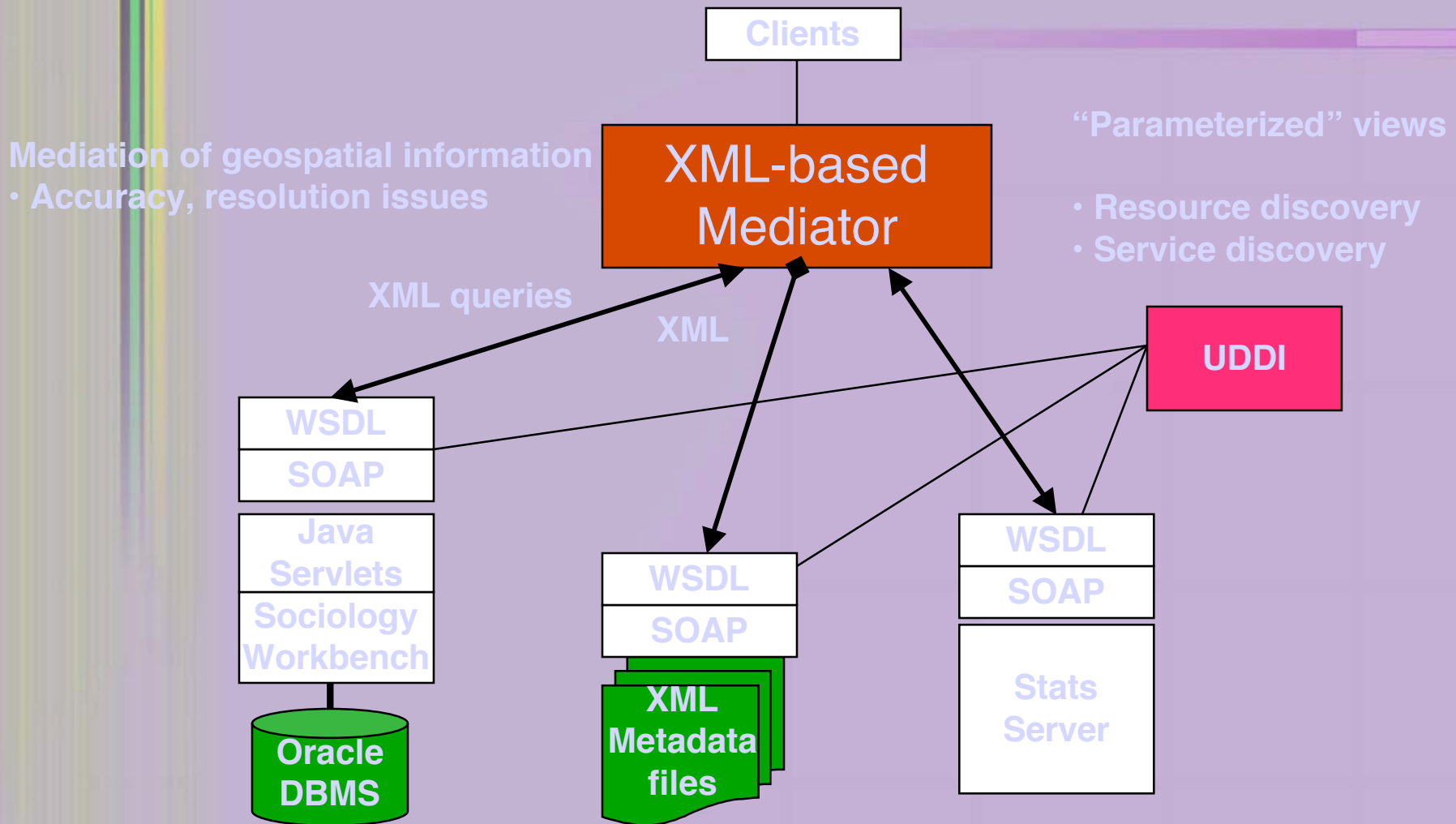
GEON—GEOsciences Network

- A Geoinformatics community effort

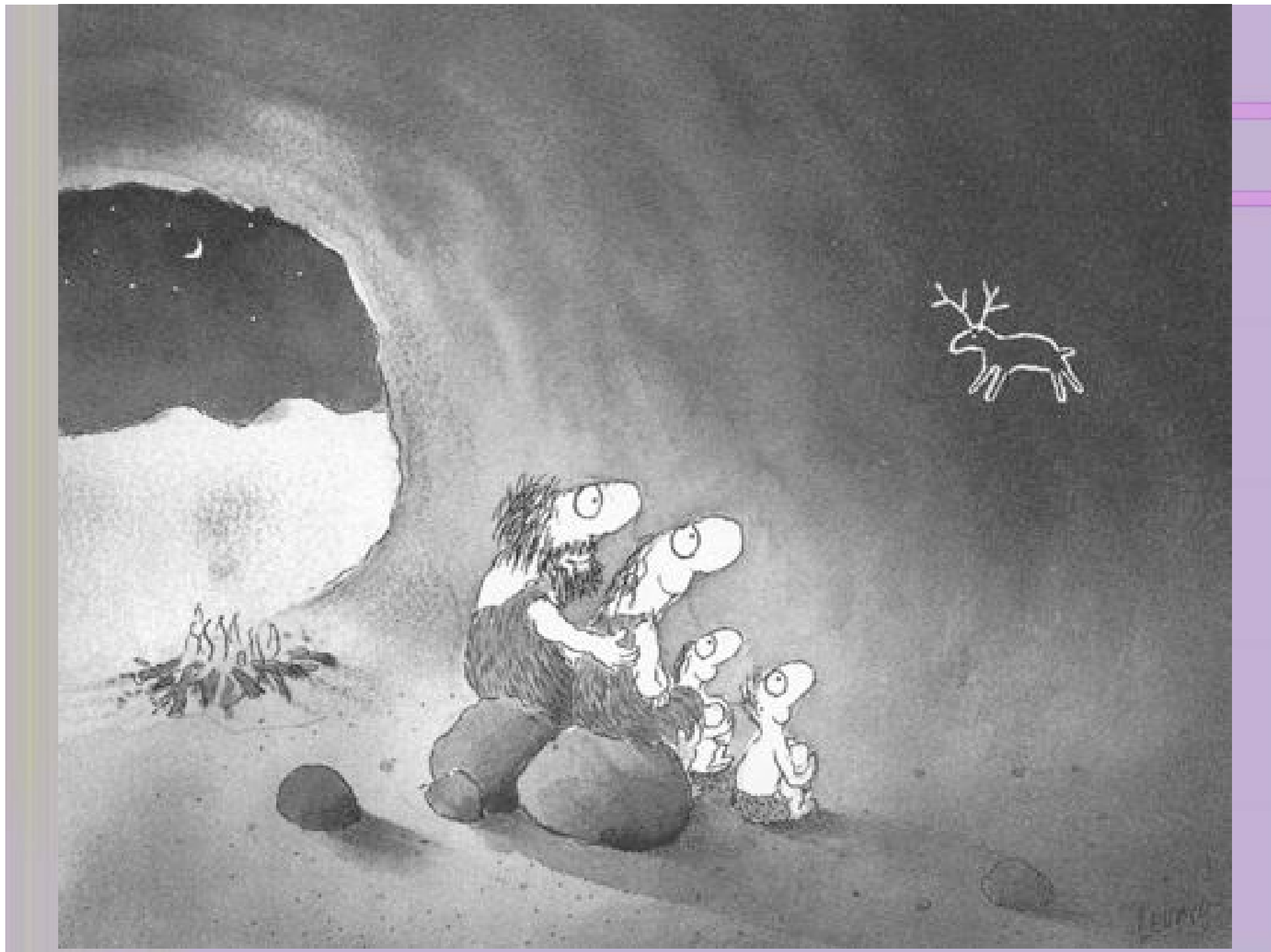


# Information Integration Testbed/GeoGrid

(NSF Digital Government/ITR grants)









# The Database

As a cultural form, database represents the world as a list of items and it refuses to order this list. In contrast, a narrative creates a cause-and-effect trajectory of seemingly unordered items (events). Therefore, database and narrative are natural enemies. Competing for the same territory of human culture, each claims an exclusive right to make meaning out of the world (Manovich 1999).



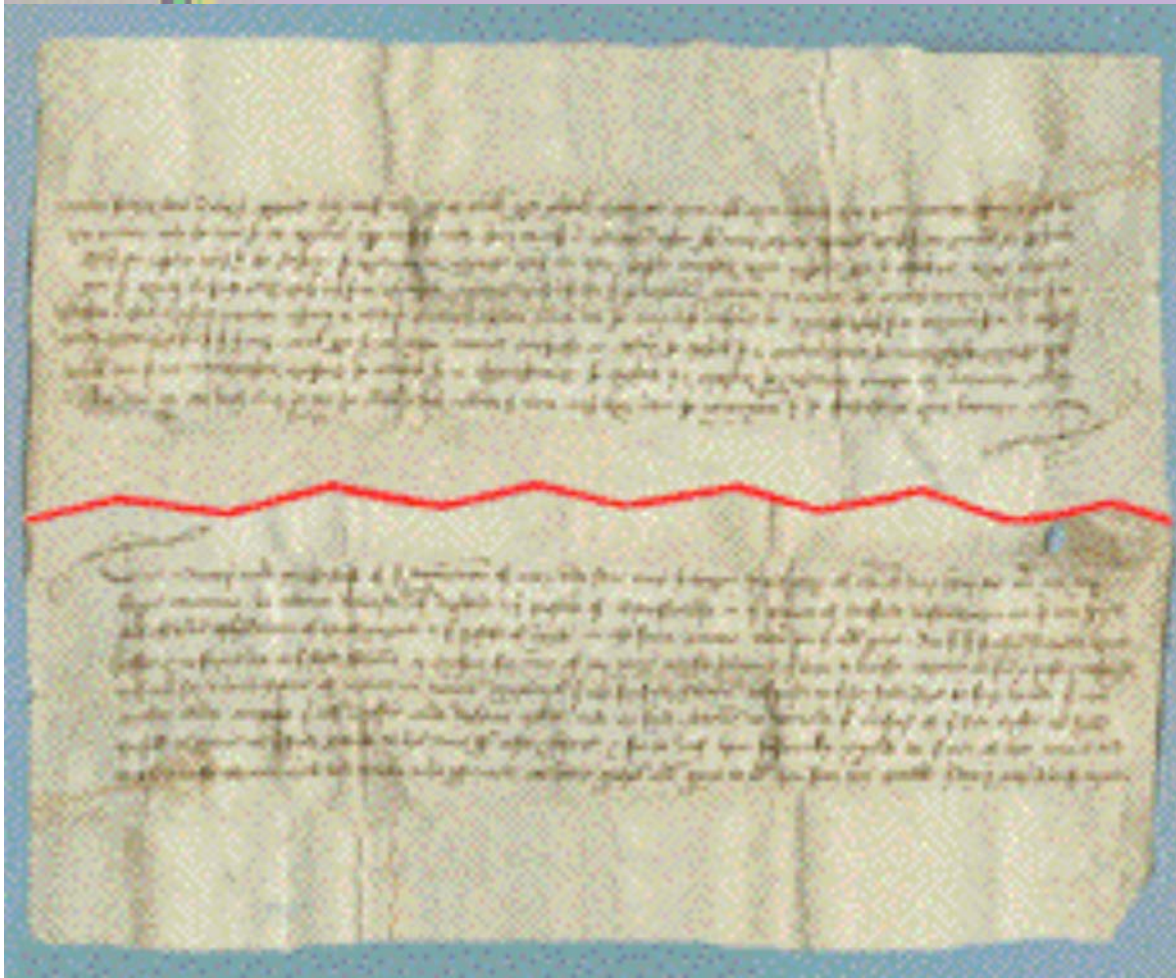


*Databases* bring your company  
in to the 20th century leaving  
behind a paper trail!



# From Memory to Written Record

## Phantoms of Remembrance









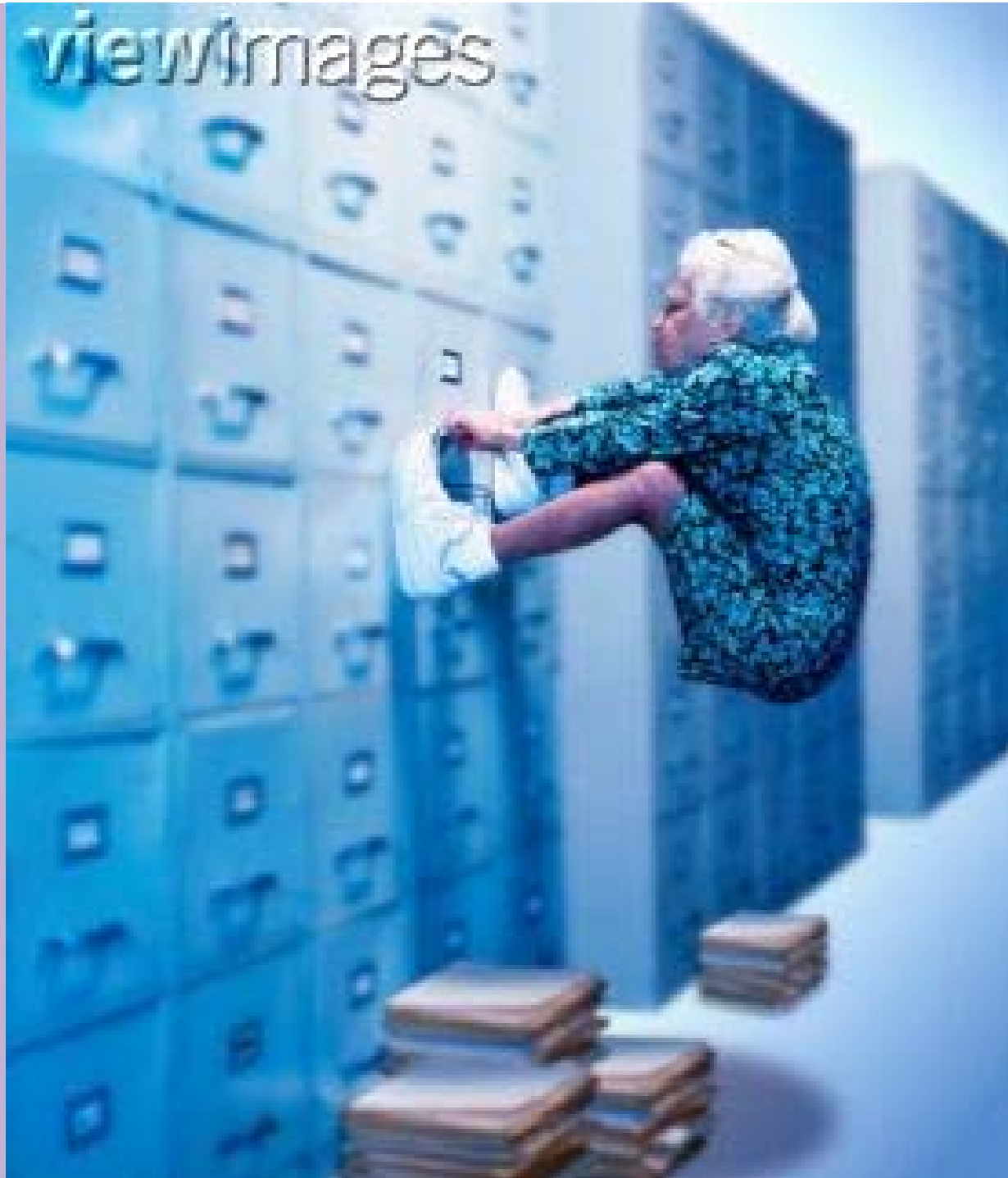






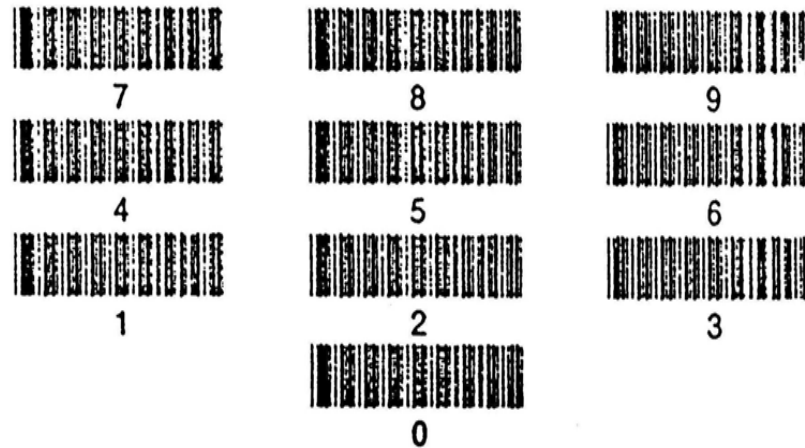


viewImages





# Databasing the world ...



## CONVERSATION: EXPRESSION OF ODD IDEAS



1. None
2. Occasionally present ( less than twice monthly)
3. Frequent eg. weekly but most speech is appropriate
4. Very frequently eg. daily
5. Virtually all conversation is inappropriate
- 99.No data

## LAUGHING OR TALKING TO SELF



1. No such behaviour
2. 1 or 2 times in the past month but can stop if reminded
3. 3 times in the past month - difficulty stopping if reminded
4. Occurs weekly
5. Daily episodes or long-lasting or noisy
- 99.No data



[http://www.savingsand clone.com](http://www.savingsandclone.com)



Genetic Savings & Clone, Inc.

Peaches, Clone



Mango, Genetic Donor

Appearing at the CFA International Cat Show in Houston November 19-21







# The Virtues of Forgetting 1

Approving his proposals, the First Emperor collected up and got rid of the *Songs*, the *Documents*, and the saying of the hundred schools in order to make the people stupid and ensure that in all under Heaven there should be no rejection of the present by using the past. The clarification of laws and regulations and the settling of statutes and ordinances all started with the First Emperor. He standardized documents (Qian 1994: 31). (The translator notes that this refers to the standardization of bureaucratic practices, not of the script).  
Sima Qin



## The Virtues of Forgetting 2

During the 1670s there was a memorial calendar for the Tories and a competing regime for the Whigs, each with its high cultural and popular dimensions. At the same time there were counter-memories, suppressed memories, even legislated Acts of Oblivion, to extinguish the deeds of the revolution. (Cressey 1994: 69)





ITEM NO. 9008  
Patent: 9911762.6

- Product Size: 95(L)x5.5(W)x10.5(H)cm
- Color: Transparent Color
- Hand held
- Shredder size: 55mm (64gsm)
- Packing: Each in Printed Box

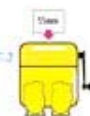
## 2 in 1 Hand Shredder



with  
memo holder



Insert the  
paper



Turn the handle  
in a clockwise  
direction.



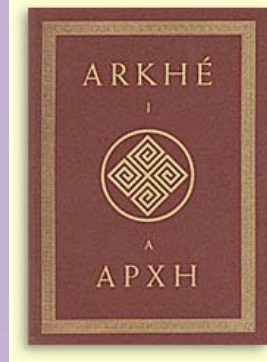
Open the cover  
& pull shredded  
paper for future  
use as gift  
wrapping ... etc.



## The Persistent Problem of Memory

Funes remembered not only every leaf on every tree of every wood, but every one of the times he had perceived or imagined it. He determined to reduce all of his experience to some seventy thousand recollections, which he would later define numerically. Two considerations dissuaded him: the thought that the task was interminable and the thought that it was useless. He knew that at the hour of his death he would scarcely have finished classifying even all the memories of his childhood. (Borges 1998) 135-136.





‘Arkhe’, Derrida notes:

names at once the *commencement* and the *commandment*. This name apparently coordinates two principles in one: the principle according to nature or history, *there* where things *commence* – physical, historical or ontological principle – but also the principle according to the law, *there* where men and gods *command*, *there* where authority, social order are exercised, *in this place* from which order is given (Derrida 1996: 1)



## Babbage and the Printing Press

“the mass of mankind were in many respects almost the creatures of instinct” (Babbage 1837): 59. Now, the great were encouraged to write, knowing that: “they may accelerate the approaching dawn of that day which shall pour a flood of light over the darkened intellects of their thankless countrymen”, seeking: “that higher homage, alike independent of space and time, which their memory shall for ever receive from the good and the gifted of all countries and all ages” (Babbage 1837): 54 .

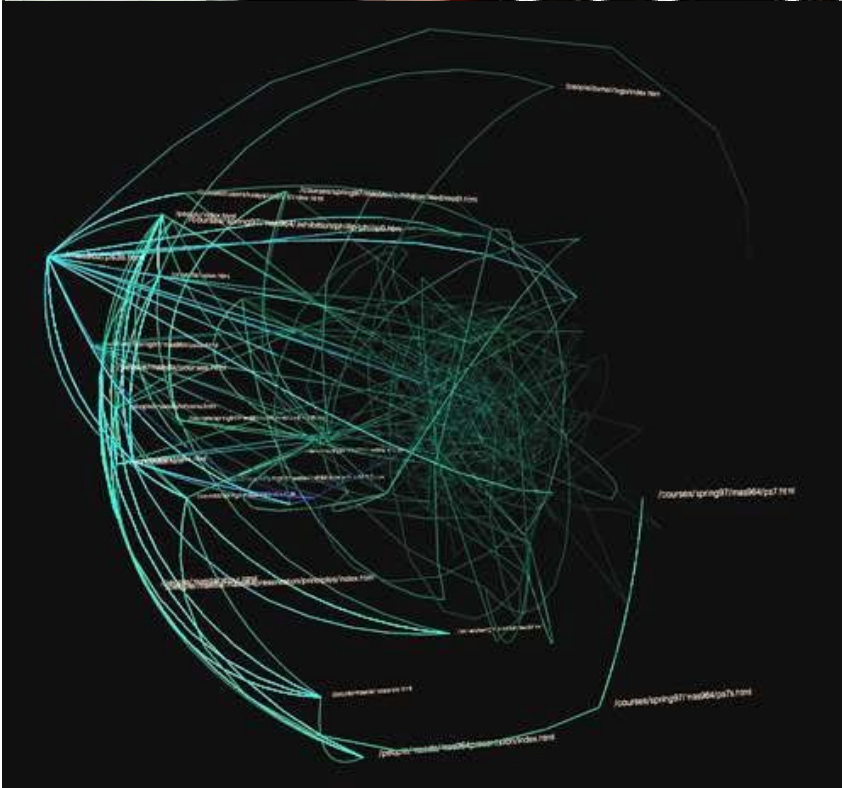


# H.G. Wells and the World Brain



Both the assembling and the distribution of knowledge in the world at present are extremely ineffective, and thinkers of the forward-looking type whose ideas we are now considering, are beginning to realize that the most hopeful line for the development of our racial intelligence lies rather in the direction of creating a new world organ for the collection, indexing, summarizing and release of knowledge, than in any further tinkering with the highly conservative and resistant university system, local, national and traditional in texture, which already exists.

The phrase "Permanent World Encyclopaedia" conveys the gist of these ideas. As the core of such an institution would be a world synthesis of bibliography and documentation with the indexed archives of the world. A great number of workers would be engaged perpetually in perfecting this index of human knowledge and keeping it up to date. Concurrently, the resources of micro-photography, as yet only in their infancy, will be creating a concentrated visual record.





# Avi Silberschatz

There is now effectively one worldwide telephone system and one worldwide computer network. Visionaries in the field of computer networks speak of a single world-wide file system. Likewise, we should now begin to contemplate the existence of a single, worldwide database system from which users can obtain information on any topic covered by data made available by purveyors, and on which business can be transacted in a uniform way. (Avi Silberschatz 1994: 929)





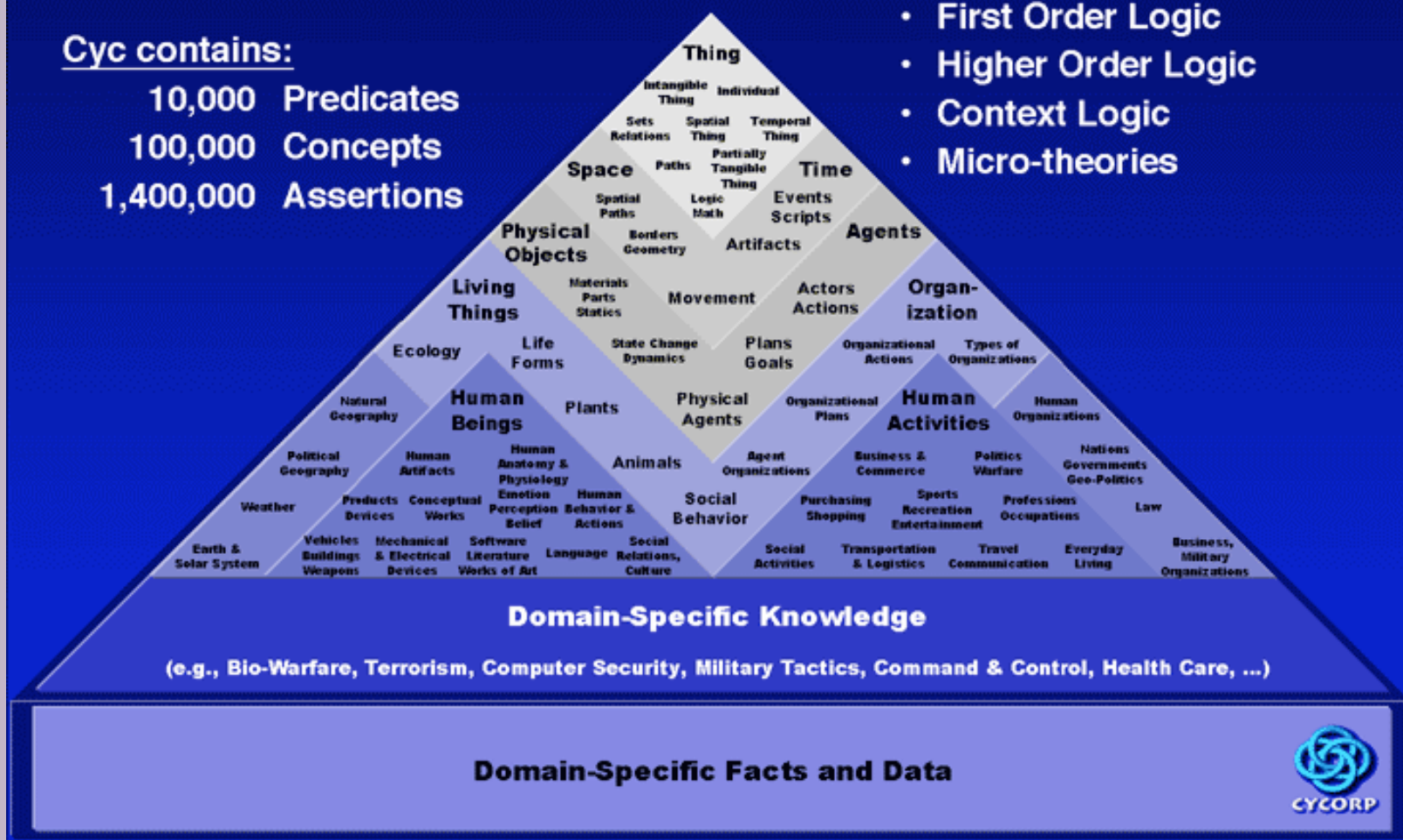
# Cyc Ontology & Knowledge Base

## Cyc contains:

10,000 Predicates  
100,000 Concepts  
1,400,000 Assertions

## Represented in:

- First Order Logic
- Higher Order Logic
- Context Logic
- Micro-theories







## From the Index Card to the Internet

**The Man Who Wanted to Classify the World** tells the story of a Belgian utopian, Paul Otlet (1868-1944).

Barely known in his own country, Paul Otlet is considered today by historians of communication as one of the precursors to the **Internet**. Already in 1934, he conceived of a library with no physical books whose contents could be viewed on a screen.

All his life, this Belgian utopian cultivated a strange sort of obsession: to classify, encode and unify all kinds of books and documents published in the world. Over the years, he and his staff would fill in 12 million index cards. His classification system is regarded today as similar to the **hypertext** that enables us to navigate through the computer network. In 1928, he asked the architect **Le Corbusier** to draw up plans for a **World City** dedicated to Peace, Knowledge and Fraternity. This World City was to be built in Geneva.

A pacifist, but especially an internationalist, Paul Otlet believed that improved relations between peoples could lead to lasting peace. In 1914, he was one of the driving forces behind the **League of Nations**.

The film is told through autobiographical texts of Paul Otlet as well as through the work of two researchers who unearth hundreds of boxes never before inventoried.

**The Man Who Wanted to classify the World** tells the story of a utopia that could have come true, of an intuition that winds up becoming an obsession, of a dream of Universal Peace ending in frenzy... The story of an apparent failure and an unforeseen posthumous victory...

© Igor Rabieroff



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**The Man  
Who Wanted  
to Classify  
the World**

A DOCUMENTARY BY  
FRANÇOISE LEVIE

# The Man Who Wanted to Classify the World

60' - Betacam Digital -  
French version - English version -  
Dutch version -  
Original script written by Françoise  
Levie and Benoît Peeters  
Photography : Wim Le Compte  
Sound : Benoît Bruwier  
Editing : Anne Christophe

Original Music : Johan Hoogewijs  
With the collaboration of the  
Mundaneum (Mons), of the  
Fondation Le Corbusier (Paris), and  
the Museum Hendrik Andersen  
(Roma)

Executive producers: Pierre Levie -  
Anna Van der Wee

Associate producer : Bill  
Binnemans (RTBF- Charleroi)

A Coproduction Sofidoc, Wild Heart  
Productions, Memento Production,  
RTBF Charleroi.

With additional funding from the  
Centre du Cinéma et de  
l'Audiovisuel du Ministère de la  
Communauté française de Belgique,  
des Télédiffuseurs wallons, et du  
Film Fonds in Vlaanderen.

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“Interdisciplinary oceanographic research will be increasingly common, as exemplified by programs such as the Global Ecosystems Dynamics Experiment (GLOBEC). (...) Successfully realizing the goals of such programs will almost certainly require a concerted effort to ensure that the electronic infrastructure supports and sustains collaboration across disciplines, *whose tools and data types can differ greatly.*” (Cerf, p. 20)



# Heterochrony

Reed emphasized two phenomena he has observed while working at the NCSA and now at the Renaissance Computing Institute at UNC. First, the divergences in timescales between the various players involved in the construction of CI. CI is subject to the funding cycles of various state bodies, such as the NSF or the NIH. Often these operate in three or five-year cycles. Meanwhile CI operates on its own schedule of development. Intended as a long-term community resource, funding has been possible for the construction cycle, but lacking for the corresponding 'maintenance' timeframe.







