

SSE3: Advanced Software Technologies for Knowledge Management

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Project

- It is okay to be 2 people in a group!
 - Has been updated in project description
- Any questions?

Lecture 2: Topics

- Brief history of hypertext
 - Hypertext pioneers
 - Architectural evolution of hypertext systems
- The role of modern hypermedia technology in knowledge management
 - Hypertext structuring
 - Structuring mechanisms (domains)
 - Scenario
 - Examples
- Exercise

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Brief history of hypermedia

Goals

- Knowledge about hypertext pioneers
- History from a technical point of view
- Monolithic systems, client-server systems, open hypertext systems (OHS), component-based OHS (CB-OHS)
- Brief overview about example hypertext systems

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Brief overview: Pioneers

- Vannevar Bush:
Memex (1945)
- Douglas C. Engelbart:
Augment (1963) and *NLS* (1968)
- Theodor H. Nelson:
Xanadu (1965)

Memex (1945)

- Cognitive view:
Hypertext as memory extension
- Vannevar Bush
- Memex = “Memory extender”
- Extends human memory
- Stored on unlimited microfilm



Augment and NLS (1963/68)

- Cooperative view:
Hypertext as problem solving tool
- Douglas C. Engelbart
- NLS = “oN-Line-System”
- Metaphor: “traveling through working files”
- Graphical interaction, mouse
- Support for knowledge worker



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Xanadu (1965)

- Communicative view:
Hypertext as linked text base
- Theodor Holm Nelson
- Universal archive: “docuverse”
- Text never to be deleted
 - Record of all versions
⇒ temporal scrolling
 - No missing documents (no “file not found” errors)
- Adapted to the WWW

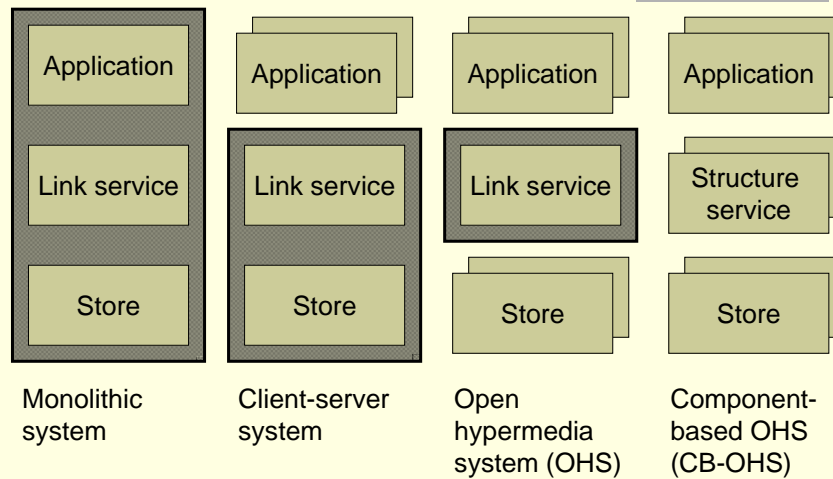


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History: a technical point of view



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Example systems

- Monolithic
 - KMS
 - Client-server
 - EHTS / HyperBase
 - OHS
 - HyperDisco
 - CB-OHS
 - Construct
- (in next part)

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Monolithic systems

- All in one
- No application program interfaces (API)
- No communication protocols

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KMS Author: IIA Traxinus Knowledge Systems User: kgrombak TimesRoman16 Spacing: 2 Justification: Left

Home frame

This is your initial **home frame**, which you are free to edit. It is your "base of operations" in KMS. KMS automatically displays your home frame when you enter KMS. You can return to this frame at any time by clicking on the Home command item at the bottom of the frame.

Typically, a person's home frame has links to all the projects and documents they're working on in KMS. As they create new sets of frames, they add links to them from this frame.

• Click here to see several real-life examples of home frames

Index to your frames
(possible topics)


Projects I'm working on
Documents I'm writing
Tasks I need to do
Tasks for my assistant
Conference planning
Miscellaneous notes
Financial records
Letters and memos
Names and addresses
Meeting agendas
Calendar

Resources

- KMS Walking Tour (we recommend you take this Tour to start learning about KMS)
- KMS Information frame (has links to many on-line resources)
- KMS on-line documentation
- KMS Help Index
- Your profile frames (for customizing the interface)
- Your saved KMS message frames
- *H T98-EliliDavid KaR ob1

KMS Information

Window system commands



Detach system cursor from KMS cursor
Reattach KMS cursor
Redisplay both KMS windows

Operation

Click all 3 mouse buttons together
Move cursor into KMS window and click any button
Click Left and Middle buttons

How to do it

- Set KMS window to half size (click on these items)
- Set KMS window to full size
- Get item from X Windows clipboard
- Send attached item to X Windows clipboard

References

- KMS documents
- KMS Walking Tour
- KMS Help Index
- How to edit things (matrix)
- Your top Profile frame
- Examples of fillpatterns, fonts, and colors
- KMS cursors
- Property abbreviations
- Change default property values

Programs

Some names are abbreviated!

| | Frame | Frameset | Tree | Text File |
|---------|--------------|----------------|------------------|-------------|
| Copy | • Info | | • CopyTree | |
| Delete | • DeleteFr | • DeleteFrest | | |
| Freeze | | • FreezeFrest | • FreezeTree | |
| Print | • Print on d | • PrintFrest | • PrintFrameTree | |
| Protect | • Info | • ProtectFrest | | |
| Read | | | | • ReadText |
| Search | Ctrl s | • SearchFrest | • SearchTree | |
| Write | | | | • WriteText |

- Format a document (Linear)
- Spell Checker
- More programs
- How to run programs

Symbols

Click on this item to display the frame with the symbol menu, copy the symbol, and position and scale it.

Fonts

Merge one of the items below into an item to change its font family or face:

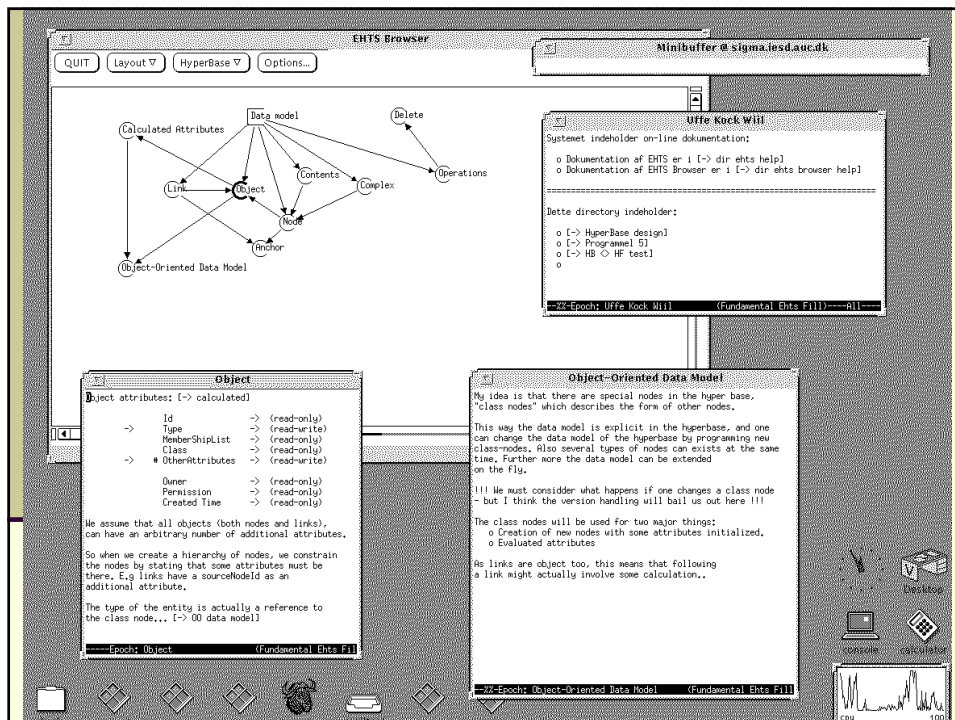
| | | |
|-------------------|-------------------|------------------|
| Face: Plain | Family: Times | Face: Roman |
| Face: Oblique | Family: Helvetica | Face: Italic |
| Face: BoldOblique | Family: Courier | Face: Bold |
| | Family: Symbol | Face: BoldItalic |

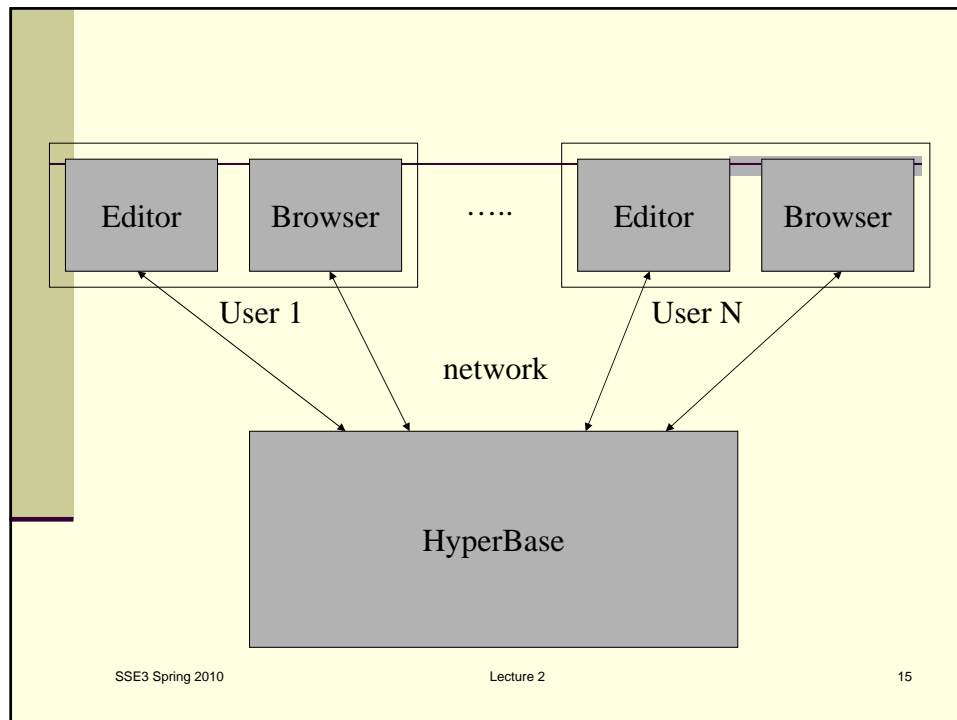
File Save Exit Reset Msg Home Prev Next Goto Help ReCalc Linear Print Font UnDel Grid Show

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Client-server systems

- Main feature:
Different applications can access hypertext system





Open hypermedia systems

- OHS offer open link services
- Types
 1. Link server system (LSS): provides hypertext structuring facilities to an open set of applications
 2. Hyperbase management system (HBMS): like LSS, but also includes hypertext storages facilities

Open hypermedia systems

■ Advantages

- Well-defined open interfaces
- Open client layer: 3rd party applications are able to access the link service
- Separate backend and middleware layer: different contexts can be implemented easily

■ Disadvantages

- Increased system complexity
- Standardized communication protocols?

OHS: Co-existence?

■ Problems

- Different hypermedia services
- Different data models (e.g. different link types)
- Different hypermedia architectures

■ Results

- Applications can only use certain OHS
- Hypermedia structure only useable for certain storage architectures
- Hypermedia structures cannot be extended beyond the system (island problem)

Presentation of Distributed Workspaces

XEmacs as a participating HyperDisco application



Anchors are bold-faced and underlined. HyperDisco operations are available from the keyboard and through the menu. Links can also be followed by double-clicking on the anchors.

workspaces <-> buffers

link creation scenario

link traversal (frame / viewer)

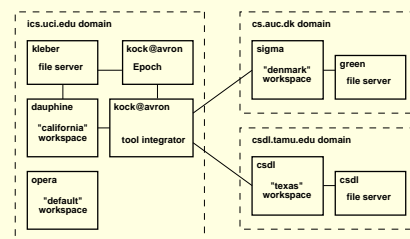
add endpoints in other files

multiple views (app & file)

load from any workspace

Internet Distribution of Workspaces

Single user distributed workspace scenario



User "leggett" can join by:

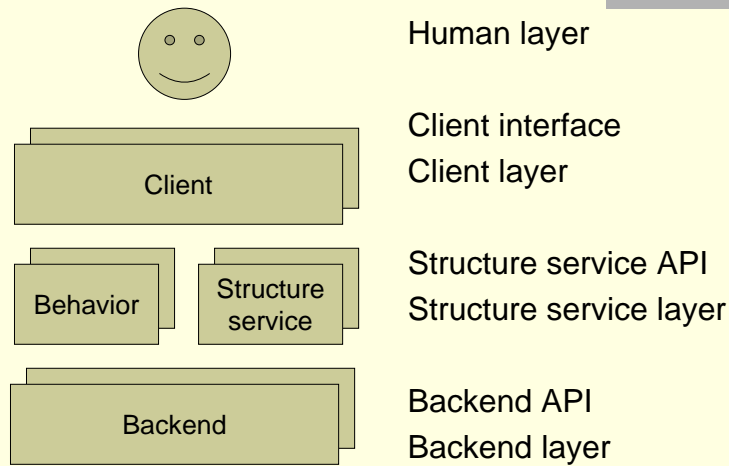
starting tool integrator on his personal workstation

starting his favorite integrated editing tool

"get" and "put" files name service

An example scenario with four workspaces ("default", "california", "denmark" and "texas") running at different Internet domains

CB-OHS



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The role of modern hypermedia technology in KM

- KM angle
- Background
- What is hypermedia?
- What is modern hypermedia technology?
- Modern hypermedia technology in KM
 - A scenario
- Construct
- Conclusions

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Knowledge Management

- Computers are used to manage knowledge!
 - Focus on knowledge "units"
 - Letters, technical documents, bank records, etc.
 - Knowledge units are not independent "islands"
 - Knowledge units have relations to other units
 - Computers provide limited support for capturing the structural relationships between knowledge units
 - Hypermedia technology has something to offer here

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Background

- Previous projects / prototypes
 - HyperBase & EHTS (1989 - 1991)
 - Hyperform (1990 - 1995)
 - HyperDisco (1993 - 1998)
 - Reference models & standards (1994 - 2001)
 - Construct (1997 - 2005)
- Since 2007
 - Focus on application areas

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What is Hypermedia?

- Most people are familiar with hypermedia from the World Wide Web (Web)
 - Documents
 - Links
 - Anchors

What is Hypermedia?

- The hypermedia pioneer Vannevar Bush (1945) invented the idea of these associate structures (to map how the brain works)
- One might ask: "Is this the only way that we structure knowledge?"

What is Hypermedia?

- No! Hypermedia researchers have discovered many ways that people structure knowledge
 - Associative structures
 - Classification structures
 - Spatial structures
 - Issue-based structures
 - Annotation structures
 -

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What is Modern Hypermedia Technology?

- Characterized by:
 - Many overlapping disciplines
 - State-of-the-art software technology features
 - Multiple structuring mechanisms in one system
 - Separation of documents and structure
 - Provide structure in existing applications

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What is Modern Hypermedia Technology?

- Many overlapping disciplines
 - Human computer interaction
 - Distributed systems
 - Computer supported cooperative work
 - Operating systems
 - Programming technology
 - Databases
 -

What is Modern Hypermedia Technology?

- State-of-the-art software technology features
 - Open systems
 - Flexible architectures
 - Services with well-defined interfaces
 - Component frameworks
 - Emerging standards and reference models
 - Development tools
 -

What is Modern Hypermedia Technology?

- Multiple structuring mechanisms in one system
 - Association (links)
 - Classification
 - Argumentation support
 - Spatial organization
 - Metadata
 - Annotations

What is Modern Hypermedia Technology?

- Separation of documents and structure
 - Unlike the WWW
 - Store structure elsewhere
 - Structure can be "added" to all kinds of documents (even read-only)
 - Allows for multiple structures ("structural views") over the same set of documents

What is Modern Hypermedia Technology?

- Provide structure in existing applications
 - Provide a set of structuring services in existing desktop applications
 - otherwise they will not be used
 - Applications are responsible for getting and displaying structure over documents

Modern Hypermedia Technology in Knowledge Management

- Scenario
 - A look into the future
 - Focus on scholarly work

Scenario Setting

Anna is a graduate student in computer science. As part of her enrollment in a hypermedia course, she is given the assignment to make a report and a presentation to the class about the **open hypermedia research area**

Scenario Setting

The students have access to a number of both traditional paper based and electronic literature sources. Anna decides to base her study on the ACM digital library, which is available online and, which, she is told, contains the proceedings of both the ACM Hypertext and ACM Digital Libraries conferences and the ACM TOIS journal (all well known sources for high quality hypermedia papers)

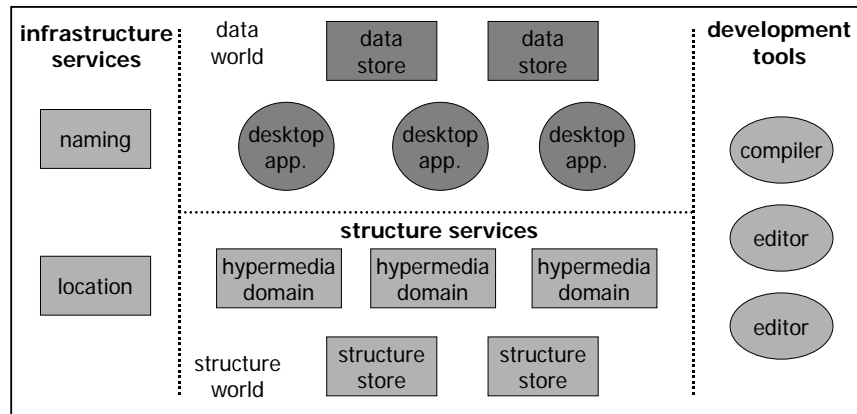
Scenario

- Browse DL material using standard browser
 - Too much information for sequential browsing
- Search DL material (full text, author)
 - Much relevant material located
 - How to organize and structure?

Scenario

- Structuring
 - Association and metadata services
 - Spatial service to organize material
 - Data mining service to classify (automatically)
 - Taxonomic service to classify (manually)
 - Argumentation service to support the results

Construct: Conceptual Overview

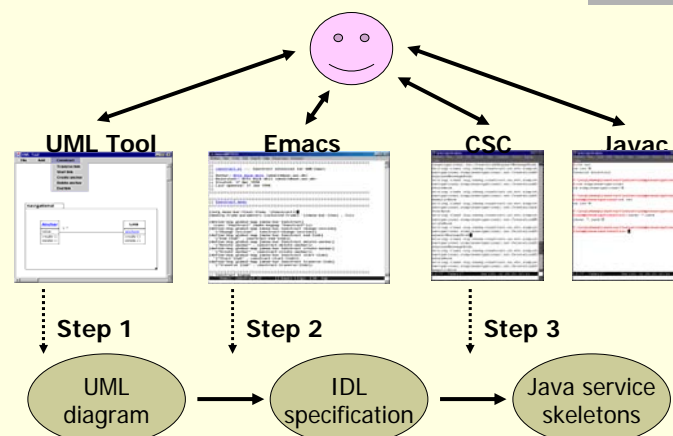


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Construct: Development Environment

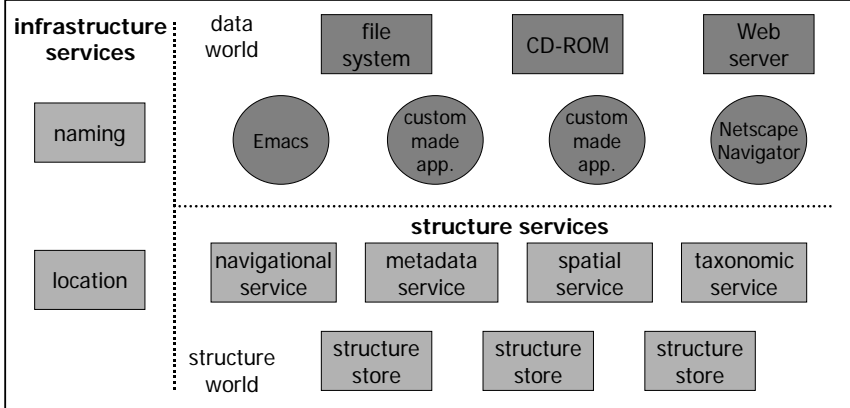


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Construct: Actual Prototype

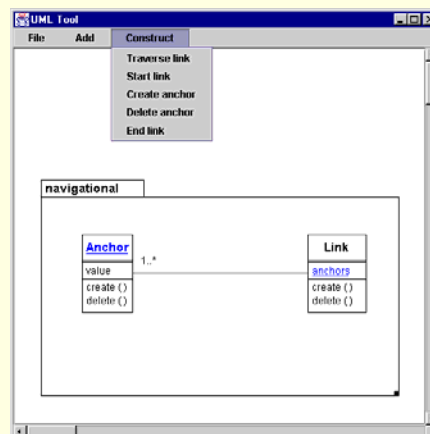


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Construct: Association (link)

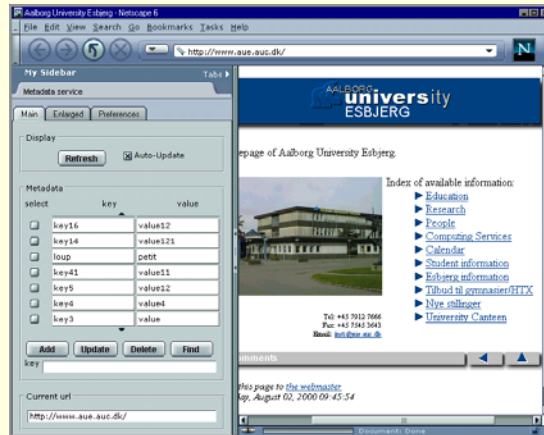


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Construct: Metadata

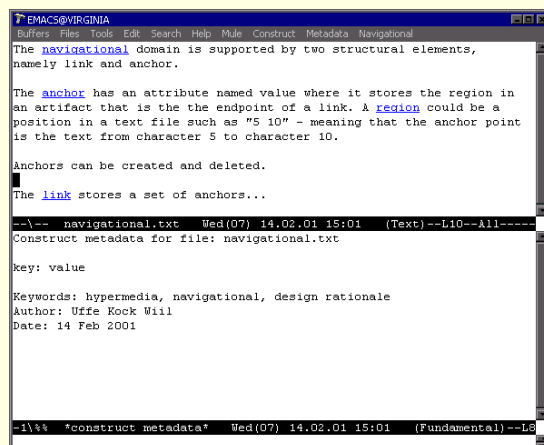


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Construct: Association & Metadata

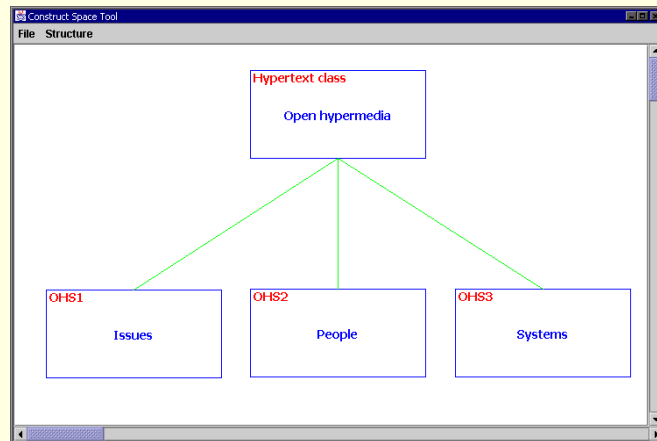


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Construct: Spatial

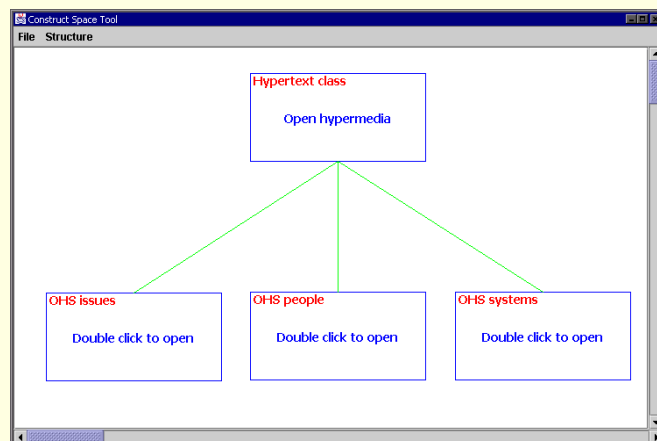


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Construct: Spatial

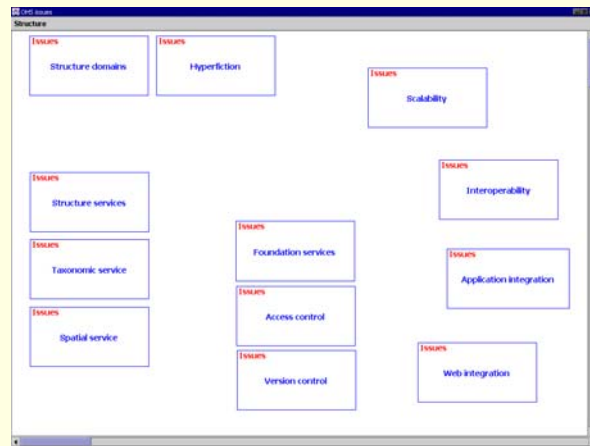


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Construct: Spatial



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Construct: Taxonomic



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Conclusions

- Introducing a new structure dimension
 - Support for multiple types of structures
 - Support for multiple structural views
 - Support for versions of structure
 - Support for multiple users
 - Sharing of structure, views, versions, ...
 -
- Many challenging issues ahead

Example structuring mechanisms

- Hypertext structuring mechanisms are currently being used in many existing applications!
- What types are they?

A screenshot of a Windows desktop environment. The background is a scenic landscape photograph of a valley with rolling green hills, dense forests, and a small village nestled in the distance. In the foreground, there are more trees and a large red flower in the bottom right corner. On the left side of the screen, there is a vertical column of desktop icons including folders like 'Bilder' and 'Musik', and applications like 'Internet Explorer'. At the bottom, the Windows taskbar is visible, showing several open application windows and the system tray area with the date and time.

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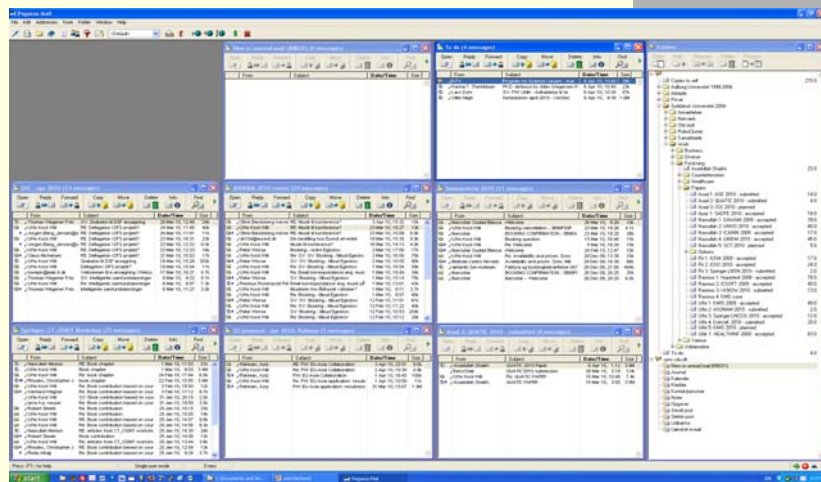
51

[illegible]

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Pegasus Mail

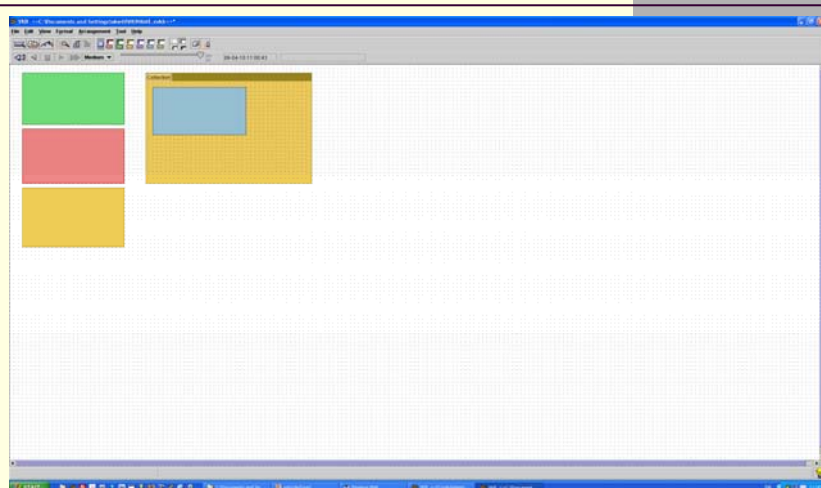


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VKB

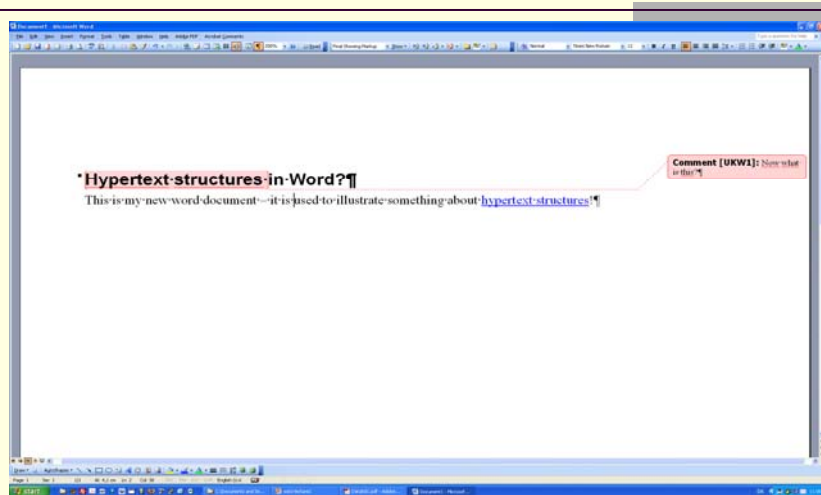


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Adobe Acrobat



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Example structuring mechanism

- Can you think of other examples from applications that you use?
- Can you see some problems in the way structuring is supported?

Questions

- The two papers (1 + 2)

Exercise: Structure abstractions

- Navigational
 - (node, link, anchor, ...)
- Spatial
 - ??
- Taxonomic
 - ??
- Issue-based
 - ??
- Annotation
 - ??