Hyper – G and Hyperwave

Chapter 13

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History

- Research by IICM during the 1980s on: 
  - Videotex - a system for sending text pages to a user in computerized form, usually to be presented on a television.
  - Computer Aided Instruction Systems -

Hyper – G Developers claim:

- "Hyper – G represents the first of a new generation of Internet information systems – it provides real hypermedia, supporting tools for structuring, maintaining and serving heterogeneous multimedia data including:
  - Text
  - Images
  - Digital audio
  - Digital video
  - PostScript scenes
  - 3D scenes"
Hyper – G Overview

- Traditional link model (like WWW)
- Session – based connections to the server for a better support of interactions types that involve state information
- Homogeneous and steady structure and strong control of the objects (documents, links)

Hyper – G Overview

- A complex set features that include:
  - Standards
  - Protocols
  - Tools
  - Applications
  - Rich data model
  - Ability to coexist with World Wide Web

Hyper – G Overview

- Might be viewed as the extension to WWW, though they developed in parallel
- Currently an important commercial success
- Continues to be under development of:
  - Institute for Information Systems and Computer Media (IICM) [http://www.ibm.edu](http://www.ibm.edu)

Concepts: General

- Distributed hypermedia management system
- Multi-user access
- Management of multiple media documents across the internet
- Operates with WWW, FTP, Telnet and Gopher
Hyper – G Session

Concepts: Hyper-G Architecture

- Client-server based
- The clients (Harmony, Amadeus or WWW browsers) visualize:
  - Content
  - Meta-information about the content
  - Meta-information about server operations
  - Provide new content to server

Concepts: Hyper-G Architecture

- Web client-server systems:
  - New connection established with each request with a perhaps different server
- Hyper-G:
  - Connection to a single server for the entire session
  - Proxy server
  - User authorization is allowed
  - Document annotations
  - Communication minimization
  - Improved security management
Concepts: Hyper-G Architecture

- Initially developed to perform with its specific client
- Available in shrank version for use with Web browsers such as Netscape and IE
- Multiple users support
- Multi-author support

Concepts: Document Management

- Collection – an object that acts as a container for other Hyper-G objects
- Every document (text, audio, video, graphics, music etc) must be a part of a collection
- The only exception is the root collection

Concepts: Document Management

- A document may belong to more than one collection
- Any newly added document has to be added to some collection
- The document is immediately accessible
- No links needed (unlike the Web)
- Maintenance cost is reduced
- Document hierarchy can be used as a browsing tool
Collection head – when collection is browsed, if present, collection heads are listed instead of documents.

Collections can be of two types:
- **Cluster** – a collection of documents viewed together
- **Sequence** – a collection that views documents in some particular order

**Concepts: Link Management**

- Associative linking (hypermedia system)
- Hyper-G defines anchors for all types of media:
  - Anchor = source and destination of a hyperlink
  - Define a region of a document (text, audio, video etc.)
  - Anchors have attributes such as owner or access right
  - Can be accessed only by specified set of users
Document – Anchor relationship attaches the anchor to a specific document
- Anchors are defined independently of documents (unlike in the WWW)
- Can be viewed as pointers
- Source anchor can be selected to follow to a specific link or to a destination anchor
- Destination anchor might be a part of a document or even a collection

Source anchor can be linked only to a single document
- Possible: 1-1; n-1
- Impossible: 1-n; n-n
- Possible solutions:
  - Overlapping source anchors
  - Create a link to a collection of destinations

Anchor benefits:
- Document can be replaced by a different one without losing all the anchors
- Overlapping anchors are simple to create and to define
- Similarly to Microcosm anchors and links can be logically viewed as a separate linkbase
- Can be based on any media type (WWW accepts links only to text and images)
Concepts: Hyper-G/Hyperwave Servers and Clients

- Hyper-G Server is available for a few Unix platforms and for Windows NT
- Hyper-G Clients available for Windows (3.1, 95, NT) and Unix systems
- Hyperwave uses Web browsers => clients are available for almost all platforms
- Hyper-G server is a set of components with a three layer structure

Hyper-G clients available to communicate with the server:
- Harmony (Unix) => highest level of functionality
- Amadeus (Windows)
- Easy (simple PC-based client for information kiosks etc)
- HGTV (terminal viewer)
Concepts: Hyper-G/Hyperwave

Servers and Clients

- Important tools of Harmony:
  - Local Map:
    - graphical representation of relationships associated with a selected object
    - Additional navigation mechanism
    - Maintenance assistance
  - Changes in local map also shown in the collection browser

- Harmony Information Landscape:
  - 3D representation of the collection structure

- Hyperwave functionality is fully available through Web browsers as opposed to Hyper-G

- Place:
  - Hyperwave server language
  - Meta HTML
  - HTML page is created with ‘placeholders’ with information about an object
  - Result: Hyper-G interface components combined into a single Web page
Product Issues

Navigation and Browsing
- Searching
- Navigation through a hierarchical structure
- Hyperlinking
- Searching metadata
- Full text searching
- Collections navigation
- Overlapping anchors

Examples

Local Maps (using metadata and link database)

Examples (Continue)

3D landscape visualizations (using collections and link database)

Examples (Continue)

Information Pyramids (Under Development)
Cognitive Management

Definition:
Assisting user in understanding their location within the information space.

In Hyper-G:
- all documents and collections are part of another collection
- visualization of all applications
- “location feedback” (Harmony)

Information Contextualization

- Better contextualization due to the “location feedback”
- … due to the collections structure of the system (allows to view to which collection does the item belong as well as provides the context information)
Link and Content Validity
- Link database is separate from the content
- Complete control of interlinked elements
- No invalid or dangling links
- Syntactically correct links
- Link integrity & consistency
- Indirectly supported (but not guaranteed) link semantics (via link location in collection)

Information Structure
- Collections as directed acyclic graphs
  - Support any form of information structure by means of collections (trees, matrices, etc.)
  - Separation of the structure from content (good for cognitive management, maintainability, reuse)
  - No mechanism for managing structure of application

Media Management
- Support for any form of anchors
- Support for different languages
- Possible support of more complex features (different formats, resolutions, quantities, etc.)
- Direct and automatic adaptation to the system at use to access information
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<tr>
<th>Process - Application Maintenance</th>
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</thead>
<tbody>
<tr>
<td>- Use of collections</td>
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<tr>
<td>- Object search ability (particularly for large systems)</td>
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<tr>
<td>- Separate database storage for different objects (i.e. links, attributes, data)</td>
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<td>- Ability to include attributes related to the maintenance of information</td>
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<thead>
<tr>
<th>Process - Full Lifecycle Support</th>
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<tr>
<td>No built-in support for overall development but rather assists development process</td>
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<tr>
<td>- design – use of collections</td>
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<td>- links identification – ability to search the content</td>
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<td>- versioning and development – specifying different categories of users and user authentication</td>
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<td>- testing and evaluation – providing direct control over the documents and structures</td>
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<th>Process - Reuse</th>
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<tr>
<td>- Does not provide support for information reuse</td>
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<td>- Copy of objects occurs only at document level</td>
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<td>- No strong support in reusing links (links are position dependant within document)</td>
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<td>- Weak support for content reuse</td>
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<th>Process – Cognitive Management during development</th>
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<td>- Search facilities (effective indexation) =&gt; reduced need to manage information space</td>
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<td>- Hierarchically layered collections =&gt; easy identification of an appropriate location for new content</td>
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<td>- Immediate access to a newly added information</td>
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<td>- * Consistent databases =&gt; applications are never incomplete</td>
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Process - Productivity Support

Small applications can be easily migrated into Hyper-G, while being developed by another application.

Large applications and large-scale document systems must be completed manually.

Hyper-G provides no support for migrating documents.

Future Development

- Support for more document formats
- Support for enhanced gateways for alternative protocols
- Support for automatic classification of documents
- Automatic generation of links
- Version management
- Configuration control
- Support for collaboration mechanisms & active communication of media

Conclusion

- Questions
- Comments