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Soaring through hyperspace: A snapshot of Hyper-G and its Harmony client

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Abstract. This paper describes the current status of work on Hyper-G and its new viewer, Harmony. Hyper-G is a general-purpose, large-scale, distributed hypermedia information system under development at Graz University of Technology. It is based on the client-server model across the Internet and is interoperable with both Gopher and World Wide Web.

Harmony is the new native Hyper-G client for X Windows on Unix platforms. It takes advantage of Hyper-G's structuring and retrieval features to provide both intuitive navigational facilities and informative feedback about the location of information.

1 Introduction

The requirements of a large volume of information impose certain design decisions on the implementation of a large-scale hypermedia information system. An important issue is support for automatic structuring and maintenance of a dynamically changing body of information. Another aspect of the size of hypermedia datasets is that orientation and navigation become more difficult as size increases. Problems of users of such systems include: becoming "lost in hyperspace", having difficulty gaining an overview, not being able to find information that is known to exist, determining how much information on a given topic exists, how much of it has been seen, and how much is left. These issues have been identified as crucial for the acceptance of hypermedia and have been intensely discussed in the literature (see for example [5, 13, 14]). However, solutions which work well on small systems fail completely when applied to large-scale hypermedia (such as global maps [20]). The Hyper-G project was started in 1990 in order to explore these issues as applied to a large-scale, distributed hypermedia information system.

The first Hyper-G client was a simple terminal viewer[1], which is now a stable, universal point of entry to any Hyper-G server. In October 1992 work started

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[1] The terminal viewer can be tried out by `telnet`'ing to `hyperg.tu-graz.ac.at` which starts a session on Graz University of Technology's main Hyper-G server.

on Harmony, a Hyper-G client for X Windows on Unix platforms. Harmony is a modern, Motif-style graphical interface for Hyper-G with Version 1.0 scheduled for release in mid-1994.

This paper presents a snapshot of the current status of Hyper-G and Harmony, emphasising particularly interesting and original features not found in comparable systems.

2 Hyper-G

Hyper-G is designed as a general-purpose, large-scale, distributed, multi-user, hypermedia information system, similar in scope to Xanadu [12], Intermedia [8], WAIS [18], Gopher [1], and World Wide Web (WWW) [3]. Based on previous experience with large-scale videotex information systems, the aim of Hyper-G is to develop a flexible hypermedia framework in order to study and possibly eliminate the problems typically associated with large-scale hypermedia systems. The basic concepts underlying Hyper-G have been presented elsewhere [11, 10, 9], here we provide a general overview of current functionality.

At the server level, Hyper-G provides a number of orthogonal structuring and retrieval facilities:

- Structuring of documents into so-called *collections*, which may themselves belong to other collections. Navigation may be performed down through the collection hierarchy, access rights assigned on a collection-by-collection basis, and searches restricted to particular collections.
- Hyperlinks from a *source anchor* within one document to either a *destination anchor* within another document, an entire document, or a collection. Links are not stored within documents (as in WWW) but in a separate database, which has the advantage that they are bidirectional and may be added to read-only documents.
- Attribute and full text search. Documents have an associated set of attributes (author, title, keywords, etc.) which may be searched for, including boolean combinations. Full text search facilities include fuzzy boolean queries [16] and WAIS-like nearest-neighbour searches based on the vector space model [17]. Every document and collection is automatically added to the full text index on insertion into the database. The scope of a search may be as narrow as one collection on a single server or as wide as all collections on all Hyper-G servers worldwide.

Other features supported by Hyper-G and not found in comparable systems such as Gopher and WWW include:

- Four user identification modes: from anonymous to fully identified.
- Support for user groups.
- Access rights per user group for documents and collections.

- Support for multilingual versions of documents and language preferences.
- An underlying object-oriented database to guarantee the consistency and integrity of data (for example the updating of links when a document is moved or the elimination of dangling links when a document is deleted).