Hyperstructure: Computers built around things that you care about

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Ross Mohilner and Nadeem Abbas
Computer Science Department
Office 2-7, 700 Ellis Street, San Mateo, CA 94401
Ross@Mohilner.com Nadeem@Abbas.com

Abstract

Computers process and **manipulate** data, rather than managing those data efficiently. We propose a new computer architecture, called **hyperstructure**, that manages data by **storing them in a hierarchy** of **associations** that **mirror the way people think about those data**. Hyperstructure **automatically** and **transparently** manages data, **optimizes** data access, **synchronizes** data across computers, **shares** data among users, **secures** data, **backs up** data, and **recovers** data after a failure. We also propose a new **hyperstructure-based operating system** that provides a **hierarchy of associations** for **all** of a computer's data, and **hyperstructure-based applications** that use those associations to **share** data with other users and computers.

We discuss Bonds, an implementation of hyperstructure, and describe our experiences using Bonds to develop hyperstructure-based applications.

1 Introduction

Computers process and manipulate data, but they do not manage those data efficiently. Instead, computers process and manipulate data without regard for their meaning, and people must do the work of managing those data themselves. For example, people must:

- **organize** data into **hierarchies** that mirror the way they think about those data,
- **synchronize** data across computers,
- **share** data with other users,
- **secure** data,
- **back up** data, and
- **recover** data after a failure.

We propose a computer architecture that manages data by **storing them in a hierarchy of associations** that mirror the way people think about those data. We call this architecture **hyperstructure**. Hyperstructure automatically and transparently manages data, optimizes data access, synchronizes data across computers, shares data among users, secures data, backs up data, and recovers data after a failure.

We also propose a new **hyperstructure-based operating system** that provides a hierarchy of associations for all of a computer's data, and **hyperstructure-based applications** that use those associations to share data with other users and computers.

We discuss Bonds, an implementation of hyperstructure, and describe our experiences using Bonds to develop hyperstructure-based applications.

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