

CASCADE ***Computer Augmented Support for Collaborative Authoring and Document Editing***

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Overview

- Introduction
 - Motivation, context, benefits
- Features
- Structural Design
 - Three tier client/server
- Functional Design
 - Augmentation and agents
 - Information
 - Visualization

Motivation for CASCADE

- Motivation
 - The Internet and the World Wide Web allow both individuals and groups to access documents that exist in a structured electronic form. The collaborative creation of documents is not well supported by web browsers.
- Focus
 - CASCADE focuses on supporting editing and commenting activity in loosely structured collaborative efforts directed to the development of structured documents. It uses sophisticated human-computer interaction techniques to accomplish this goal.

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3

CASCADE in Context

- Creation of new document ideas and drafting of material are better done in personal editors
- CASCADE is optimized for commenting, editing, and review of material as well as balloting
- It is minimally suitable for publishing, formatting, printing or sales

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4

CASCADE: Benefits

- Reduces calendar time required to develop group authored/approved documents by providing real time editing, commenting, and balloting
- Reduces the on task authoring effort by providing visual overviews of document activity and augmented commenting tools
- Reduces cost of document development by reducing the need to travel to share comments, reproduction and mailing costs, and the need to convert documents

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5

CASCADE Features

- An extensible repository (native support & plugins)
- Access control to projects and documents
- Project and user definable semantics at all levels, e.g. comment semantic and ballot form and function.
- “Augmented” tools for commenting and balloting
- Integrated tools for comment and activity review
- A comprehensive, integrated visual navigation system
- Integrated tools for ballot building and review
- Basic XML viewing and editing capability
- Tools for project, document, and group management

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6

CASACDE Deficiencies

- Many corporations firewall all but a few ports
- Many users require built-in specialty editors for equations, graphics, and tables that allow commenting
- Many organizations want a core application that will feed both the WWW and professional systems
 - automated mirroring of selected documents to websites is well within the scope of CASCADE development
 - an export facility for XML documents to publishing systems is a part of the design of CASACDE

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7

Future CASCADE Features Infrastructure Allowed

- A DTD instantiation tool
 - will build a document/directory structure
 - allows sets of files to be recombined as a document
- A “partial file” locking scheme for XML elements
 - document “tree structures” will allow locking of sets of or individual document elements within a file.
- Agents that provide “considered” information
- Visualization tools to reveal structural and semantic document information

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8

Design Assumptions for CASCADE

- State of the art workstation
 - 400 + MHz
 - 128M+ memory
 - large monitors (20-25 inches; 1500 x 1000 pixels)
- High speed net connection with semi-permeable firewalls
- Acceptance of XML encoded documents collaborative authoring processes

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9

How CASCADE Works

- CASCADE is a “three tier client server” application that uses RPC protocols
- Practically speaking:
 - The client runs on a workstation providing a familiar “look and feel” to the user. Matters related to display are handled on the PC.
 - The server responds to requests from users. The server applies a rules and conditions to the requests.
 - When the server needs data, it asks for it from a database, the ultimate repository for the information.

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10

The client -- what does it do?

- The client is the users window onto the project.
- The goal is to simultaneously maximize functionality and simplicity.
- The CASCADE client consists of four parts:
 - Document access and control modules allow the user to look at, comment on, and edit documents
 - Navigation modules allow for easy movement in the project
 - Information and communications modules provide access to information about what is going on
 - Administration modules provide access to preferences, folder and document management, and as appropriate project management

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11

The server -- what does it do?

- The server applies the business processing rules that:
 - implement the access control policies
 - facilitate optimal use of the DBMS and the network
- The server uses a relational database management system for persistent store. The RDBMS keeps track of:
 - document protections and user rights.
 - what documents a user accesses and changes.
 - The semantics for projects, groups, people, documents, activity, comments, ballots, etc.

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12

CASCADE HCI Design Principles

- **Standardization** to make the interface consistent a user's expectations. Thus, CASCADE looks and acts, where possible, like any other PC application.
- **Visualization** to tap the human capability to process visual data faster than equivalent symbolic data.
- **Peripheral information processing** to make use of known information to make the users job easier.
- **Augmentation** by allowing the computer to do tasks for users.

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13

Standardization in CASCADE

The system works in the way the user would expect it to work.

- consistent look and feel
- standard dialogs
- expected use of left and right mouse buttons
- normal menu contents and placement

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14

Augmentation and Agents

- The computer undertakes tasks on behalf of the user
- so the user doesn't have to worry about them.
- In making a comment, the user only needs to take the essential actions. All else is done by the system
- When CASCADE is started, the system provides information about where activity has taken place
- Comments may be inserted with a single click
- The system keeps track of who is in a group and how they like to get their mail

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15

Visualization

Whenever we can, we try to represent large amounts of data visually in such a that the user can find or see what they want more quickly way

- Documents and folders are color coded for rapid identification
- Comments are color coded for classification
- The docuverse navigational tool maps document attributes to color ranges to allow rapid manipulation
- The mural tool allows document structure visualization

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16

Peripheral Information

- Information in the system is used to aid the user, or is
- presented to the user as appropriate when it is needed.
- File Folder bar provides peripheral information about what's open and how many children a given folder or document has.
- In creating a document, information about group access and protections is automatically inherited
- In creating a ballot, balloting members are automatically notified by the system

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17

Next Steps: Agents in CASCADE

- Agents are loosely coupled software modules that have:
 - Persistent memory
 - Message passing capability
 - Embedded logic (which may be self modulating)
 - A persona (interaction style) appropriate to their function.
- Agents start directly or indirectly in response to user or agent requests
- Agents terminate when their task is done

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18

Agent Classes and Personalities

- Collaborative agents are responsible for actions involving more than one person
- Contributory agents are responsible action involving only a single individual.
- Communications agents are responsible for managing communications.
- Service agents are responsible for low level services to individual. The tasks are simple and implicitly understood.
- Collaborative: trust develops based on results of efforts -- must be trusted by all involved.
- Contributory: Trust based on the results of the efforts for one particular individual.
- Communications: Must be seen as representing the wishes of the initiator without bias.
- Service: The agent begins with implicit trust and loses that trust only when performance shows significant failures.

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19

CASCADE Agent Modules

- Awareness agents: Keep members aware of the activities and disposition of others on the team
- Balloting agents: Assist the project leader in managing the ballot process -- notification of ballot, reminders, summary of votes.
- Editorial agents: Observe an author and provide editorial advise or assistance
- Summary agents: Conduct comment analysis to highlight the controversial issues and areas of agreement

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20

CASCADE Demo

- Colors and graphic cues keep the user situated
 - colors depict type for files and comments
 - lines -- red for children, blue for active
- Comments and ballot are situated with a single click
 - semantics vary by project
- Activity is accessible many ways
 - reports on document, comment, and user activity
- Navigational aids allowing large document spaces with minutes, resources, drafts correspondence.

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21

A Demo of CASCADE

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22