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# Virtual Notes: Annotations on the WWW for Learning Environments

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## Abstract

This paper describes Virtual Notes, small yellow stickers which can be freely placed on instrumented HTML-pages using standard Internet technology. In a teaching and research environment they provide a user-friendly and flexible way of improving collaboration by annotations, feedback, post-its and blackboards.

## Introduction

Traditional Web annotations are usually found at the end of a Web page or in a separate frame. However, if the Web page is large, it is often the case, that it is unclear to which part of the page the annotation refers. Positioning annotations exactly on the point to which they refer delivers this important contextual information. E.g. consider a spelling error and an annotation pointing directly to it. In this case, the positional information reduces the correction time needed by the author of the course material.

A number of ways have been tried to implement annotations using proprietary technology or non-standard applications, which require additional effort by every prospective user of the system. This seems a problem especially in heterogenous learning environments which can be used by students from all over the world.

For example, Röscheisen et al. describe a solution called ComMentor that relies on a remodeled browser with the annotations stored on a separate server (Röscheisen et al. 1995). The annotations are attached to the text they refer to using small icons. Also they are not necessarily public, but can be private or group specific. However, the problem with this approach is that each user must install and use this browser.

GrAnT as proposed by Schickler et al. uses a specialized proxy that merges document, annotations and a toolbar (Schickler et al. 1996). This solution is browser-independent and also realizes in-place and group annotations. But it still requires that the user changes the configuration of his browser to use such a proxy.

Bessler et al. describe DIANE that allows creation of elaborate in-place multimedia annotations, but constitutes a separate system which is not WWW-based (Bessler et al. 1997).

GroupWeb (Greenberg 1997) is a groupware Web browser implemented in GroupKit that incorporates shared annotations to any page. These annotations are displayed and edited in a separate text editor window. Telepointers used to implement gesturing are displayed over the same text in the windows of all participants regardless of settings. The disadvantage is that this solution requires a specialized browser too.

Also some commercially available solutions exist that implement annotations. Adobe Acrobat Exchange stores these notes (also depicted as small stickers) with the respective document. The user therefore needs writing privileges on the document to add annotations. This is a problem when being used collaboratively that can only be solved using additional software (e.g. PDF inFusion from ITM Associates with Lotus Notes). Additionally Lotus Smartsuite incorporates annotations and thus specialized products based on this system can contain these also, but the software, of course, must be available to any prospective user.

Virtual Notes address the problem with standard Internet technology. In addition, Virtual Notes can be used as feedback, to memoize additional information, or to construct public blackboards as group communication mechanisms. Next, we give an overview of the Virtual Notes architecture, a short description of the user interface, and several examples for its use.

## The Virtual Notes Approach

Virtual Notes (for a guided tour and examples see <http://lux6.wu-wien.ac.at/~robots/notes/doku/notes.html>) are based on standard Internet technology. No specific plugins or native code extensions are necessary to view or create annotations on a HTML page. No modifications are made to the document containing annotations, as these are stored on a separate server. Annotations can be placed anywhere on the page and stay at the same position regardless of the browser settings of particular users. No changes in any form to the system of a prospective user are necessary, although a Java- and Javascript-capable browser (Netscape Navigator or Microsoft Internet Explorer) is required.

## The Virtual Notes Architecture

The proposed solution realizes an architecture based on distributed computing. On the uppermost level three components interact: the browser, the server that supplies the HTML page and the annotation server.

To use Virtual Notes, the HTML material must be instrumented by inserting Javascript code into each HTML page. This task has been automated, e.g. for the LaTeX2html translator. This code causes the client to execute a query to the annotation server when the base document is requested and retrieves any annotations associated with the page. These annotations are then placed on the page in the form of dynamically positioned Java-Applets and the result is displayed by the browser. The manipulation of an annotation (commenting on it or creating a new one) results in an insert operation at the annotation server and a reload to update the page presented to the user.

Virtual Notes are based on a mixture of different technologies, including Perl, C++, Java and the Linda coordination language (Carriero and Gelernter 1989).

For any page containing annotations, the URL and the relative position on the page for every annotation are stored in addition to the annotation-text itself. To deal with the problems resulting from different URLs associated with a given page (e.g. because of generation with LaTeX2html) a list of known synonyms for every page containing annotations and aliases for host-names are stored. These synonyms for pages are detected by a rule-based agent that tries several approaches to find other URLs that might reference the same page, tests these for identity and stores them if applicable.

Before instrumenting his pages, each author has to retrieve a user ID/password pair from the annotation server. The user ID is used in the Javascript code to authenticate the author. For the administration of the annotations, a separate CGI-based interface has been provided. By using his ID and the corresponding password, the author can remove single annotations, all annotations on a single page or all annotations on all his pages. Further services include an automatic e-mail notification of the author when a note is placed so that the pages need not be checked regularly, and the possibility to make all notes on a page invisible.

It would be possible to retain several servers for Virtual Notes. The software can be installed on any (UNIX-)system and only small, easily automated changes to the Javascript code to enable Web material, the Java-Applet for presentation and the CGI-based administration interfaces would be necessary to accommodate for a different or additional server. The annotations would of course still be available for every user of the World Wide

Web. Therefore Virtual Notes offer a completely scalable solution.

## The Virtual Notes User Interface

An annotation can be created by pointing the cursor at the chosen area of the page and clicking there while pressing the CTRL- and the ALT-Button. This provides an easy and intuitive way to select the desired part of the page (Schickler et al. 1996) for the annotation to refer to. To keep as much of the page visible as possible the annotations are displayed as small icons depicting little stick-on-notes with a title extracted from the text providing a preview (see figure 1). This sticker metaphor is already widely used for similar applications and should help users understand the functionality of Virtual Notes.

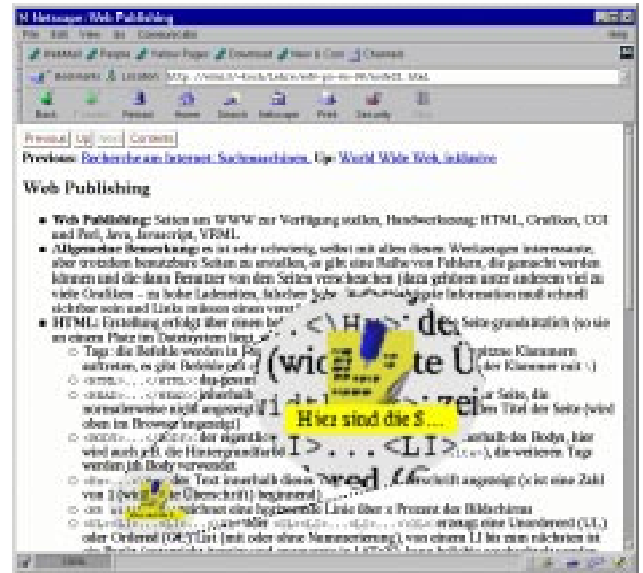


Figure 1: A Virtual Note (to scale and magnified)

If the cursor is over one of them, the note expands to show its text. If clicked upon, it stays in this form even if the cursor leaves, until the EXIT-Button is clicked (see figure 2). The note in full form contains, below the text (that is displayed in a form suggesting a conversation) a button to add text to this note (i.e. a new statement in the conversation).

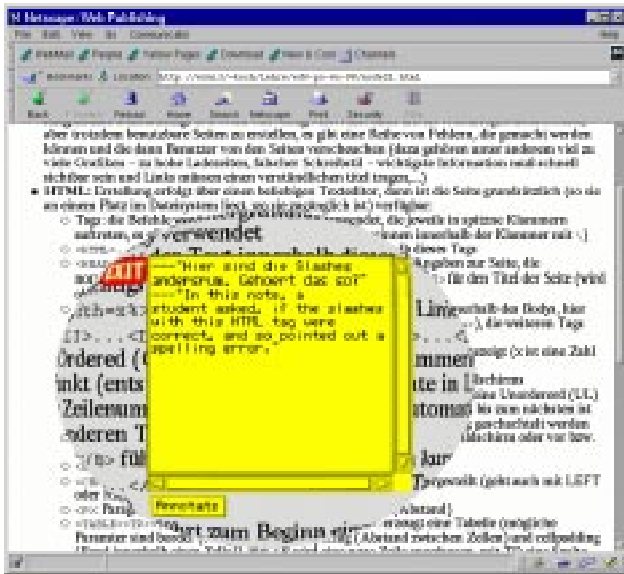


Figure 2: An expanded Virtual Note (magnified)

A special banner (see figure 3) can (automatically) be placed on Virtual Notes enabled Web material to indicate to any user the possibility of placing annotations. This icon is linked to a short tutorial on the usage of Virtual Notes to help new users. In addition, this banner is dynamically changed if the annotation server is not online to show this status.



Figure 3: Virtual Note banner

### How are Virtual Notes used in Courses?

In the first field test we observed a student who wrote a memo for remembering a login procedure not explained in the course script. Public memos give teachers hints on essential material missing from the course materials. Memos of this kind are intended for private use, but they are a valuable source of feedback.

Some students glued a sticker to each spelling error they found, they explicitly provided feedback. In this setting, the value of constructive feedback can be emphasized: with Virtual Notes the teacher has the opportunity to show that feedback leads to incremental course improvement.

However, other uses include triggering online discussions, counselling of students, as blackboards for brainstorming, meeting coordination, and material collections. Also students papers (for example in seminars) are today often written or transformed to HTML. If these were enabled for Virtual Notes the

teacher (or other students) could give feedback using this technology.

The administration of Virtual Notes, including enabling Web material, deleting and detecting Virtual Notes has been automated, so that the teacher can concentrate on creating content. The means of automation include e-mail notification of the placement of new Virtual Notes, several CGI-based interfaces and a style for the LaTeX2html-translator.

### Conclusion

The proposed annotation service is based on standard Internet technology. As a server based component it can be easily integrated by teachers in their Web courses without administrative overhead. It is especially suited for fostering collaboration in an open learning environment without a groupware product, as no effort is necessary for any student to use Virtual Notes. A limitation of the current version is that only public annotations are supported and that the movement of existing notes is not implemented. A further area of improvement is the integration of voice-annotations and the possibility to integrate at least hypertext links into an annotation.

### References

Bessler, S., Hager, M., Benz, M. and Mecklenburg, R. "DIANE: A multimedia annotation system," in *Lecture Notes in Computer Science* (1242), Springer Verlag, Berlin, 1997, pp. 183-198.

Carriero, N. and Gelernter, D. "Linda in context," *Communications of the ACM* (32:4), April 1989, pp. 444-458.

Greenberg, S. "Collaborative Interfaces for the Web," in *Human Factors and Web Development*, C. Forsythe, E. Grose and J. Ratner (eds.), LEA Press, Mahwah, NJ, 1997, pp. 241-254.

Röscheisen, M., Mogensen, C. and Winograd, T. "Beyond browsing: shared comments, SOAPs, trails, and on-line communities," *Computer Networks and ISDN Systems* (27:6), April 1995, pp. 739-749.

Schickler, M.A., Mazer, M.S. and Brooks, C. "Pan-browser support for annotations and other meta-information on the world wide web," *Computer Networks and ISDN Systems* (28:7-11), May 1996, pp. 1063-1074.