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Cloudtop

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files, the desktop becomes cluttered [2, 3]. Without support for managing old resources, users must occasionally garbage collect items—a difficult task, which users often put off [4].

To explore potential solutions to these issues, this paper proposes Cloudtop, a prototype browser plugin that offers a centralized and lightweight workspace similar to the traditional desktop, but optimized around the fact that all of its contents originate from and will ultimately return to the web.

CLOUDTOP

Cloudtop appears as a drag-and-drop zone attached to the bottom of the browser. Users may drag in images, links, or text snippets from the web, access file downloads, and drag resources back to web sites (e.g., to paste or upload files). Cloudtop aims to retain the benefits of the desktop, such as quick, spatial access to temporary or working resources. By targeting the cloud, Cloudtop also extends the desktop metaphor by capturing web metadata, managing clutter, and providing an open and uniform interface for data. Cloudtop differs from web clipping packages in its focus: Cloudtop is designed to allow users to easily transfer resources between sites, rather than serve as the canonical home for data.

As a motivating scenario, suppose a user needs to create a flyer for a birthday party and then email a PDF of that flyer to friends. In a web-based workflow, the user might use Google Docs to combine clipart and photos found on the web, followed by GMail to send a PDF document to friends. Figures 1–3 illustrate the workflow using Cloudtop.

Web Resources

Cloudtop represents web resources as *Webits*. Webits are analogous to files on the traditional desktop, but unlike files, Webits house both a local copy of the resource along with an extensible set of associated metadata. A typical Webit may bundle a local copy of a photo found on the web with the photo's source URI, along with the URI and contents of the page on which the user saw the photo. Naming a Webit is optional, as it is typically recognizable by its thumbnail.

Like traditional files, the user model and gestures for interacting with Webits are simple. Double clicking on a Webit renders the content in a browser tab. Dragging a Webit into a rich text editor (e.g., Google Docs) pastes the resource inline (Figure 2), while dragging it into areas that accept files (e.g., GMail, Figure 3) uploads a copy of the resource. Hovering over a Webit reveals "knobs". Users drag knobs to override the default drag behavior, e.g., to paste the URI of a resource (instead of its contents), or the URI of the page originally containing that resource (e.g., for citations).

ABSTRACT

Even as users rely more on the web for their computing needs, they continue to depend on a desktop-like area for quick access to in-use resources. The traditional desktop is file-centric and prone to clutter, making it suboptimal for use in a web-dominated world. This paper introduces Cloudtop, a browser plugin that offers a lightweight workplace for temporary items, optimized around the idea that its contents originate from and will ultimately return to the web. Cloudtop improves upon the desktop by 1) implementing a simple, time-based notebook metaphor for managing clutter, 2) capturing and bundling extensible metadata for web resources, and 3) providing a platform for greater interface uniformity across sites.

ACM Classification: H5.2 [Information interfaces and presentation]: User Interfaces. - Graphical user interfaces.

General terms: Design, Human Factors

Keywords: Desktop, cloud, clutter

INTRODUCTION

As the use of traditional desktop applications continues to diminish in favor of workflows that are entirely web-based, the browser stands a good chance of someday replacing the desktop altogether. Google's Chrome OS [1], with its absence of a desktop, suggests such a future.

However, a pure web environment has two notable issues. First, there is no lightweight, desktop-like area to hold frequently accessed information or ephemeral resources relevant to the user's current work. Second, given the general impossibility of transferring resources between arbitrary websites, users need a non-web area to hold intermediary data.

The desktop is not without pitfalls and simply porting the desktop area for use in pure web-based environments would miss opportunities to improve its utility. One problem with the desktop is that users must switch between UI models (e.g., generic file systems and the web) or manage ancillary identifiers (e.g., temporary file names). Another is that the desktop only knows about files, folders, and local applications—but little about the web. Finally, as a pastebin for temporary
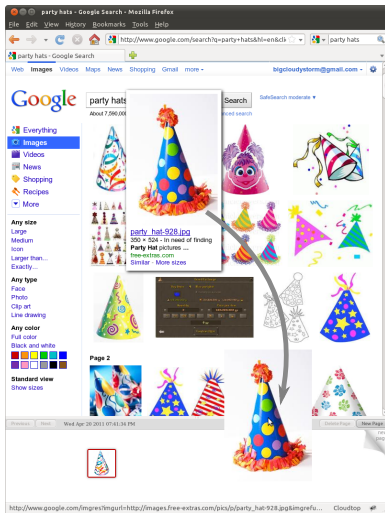
Figure 1: First, the user drags images from a Google search into Cloudtop.
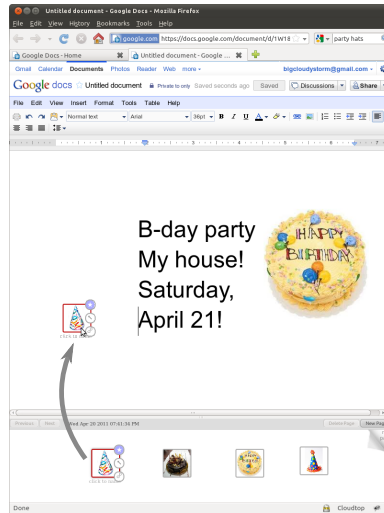

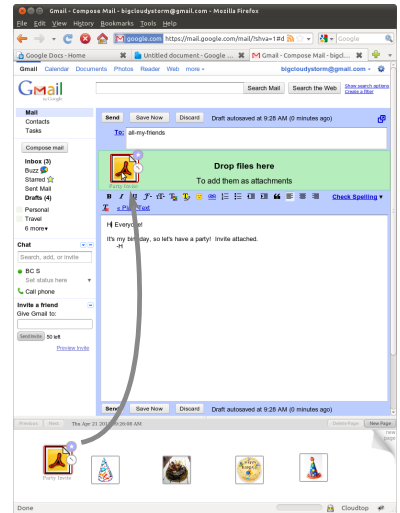Figure 2: Next, the user drags the best clip art from Cloudtop into a Google Document.

Figure 3: Finally, the user attaches the invitation to an e-mail sent to all guests.

In the cloud, data tends to live in silos scattered across multiple web applications with no common or consistent way to transfer data between sites. As shown in Figures 1 and 3, Webits capture web data and enable users to move that data between different web applications, even (and especially) if the applications do not provide a direct pathway for sharing data between them.

Clutter Management

Web providers already offer permanent homes for storing and archiving user resources, so Cloudtop instead focuses on providing quick access to ephemeral or working files from different sources via a chronological notebook (or scrapbook) metaphor. Users drag resources from the web into the current Cloudtop sheet and arrange those icons spatially, much like the traditional desktop. When the current sheet becomes cluttered with icons, users can simply "turn the page" to start another blank sheet. Cloudtop keeps all sheets ordered by time, much like a physical notebook. We hypothesize that the notebook metaphor offers several advantages. Because Cloudtop is intended to hold temporary working resources, by the time the sheet is cluttered, many of those resources may no longer be relevant. Rather than expend effort to clean up, conjuring a fresh sheet is quick and allows the user to postpone or completely avoid garbage collection.

Uniformity and Extensibility

The web excels at offering tightly-tuned user interfaces for specific tasks or activities, but it lacks a consistent, over-arching user interface model. By providing a central UI component for the cloud, Cloudtop also serves as a natural place for supporting extensibility, via plug-ins, to enhance or further ease sharing of specific resource types. For example, developers can contribute plug-ins that capture and bundle additional metadata into Webits, such as associated tag clouds and descriptions of images from photo sharing sites. Providers could honor such metadata when Webits are dropped to enrich the user experience. We believe that one

important contribution for a tool like Cloudtop is to provide a centralized platform to foster experimentation that could lead to better standardization and uniformity across the web.

SUMMARY AND STATUS

Cloudtop aims to provide a lightweight workplace for a web-dominated environment. It extends the traditional desktop by automatically capturing the rich metadata and context associated with web resources, and experiments with a notebook metaphor to help manage clutter.

We conducted an informal pilot study, consisting of seven volunteers within our computer science laboratory, to get a general sense of how useful Cloudtop might be towards helping users manage temporary web data. Subjects carried out two scenarios, one of which was the "party flyer" scenario, and we observed their usage. Every subject successfully completed the tasks without material help. Subjects reported satisfaction using Cloudtop, citing its potential usefulness in their daily workflow. While our study was preliminiary, we find Cloudtop's direction encouraging from user feedback. We plan to iterate Cloudtop based on that feedback and conduct an in-depth study of the tool's potential usefulness.

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