

Web Clipping

**Alex Jacobs, Philip Kim, Nathan Po
Osmar Zaiane
Cmput 499
April 2002**

Introduction

The World Wide Web has become a rich multimedia experience; as personal computer users we have the luxury of viewing the Internet over fast and inexpensive Internet connections on large, colorful displays. Internet connections for personal computers have become relatively fast and relatively inexpensive. As a result, web content providers are placing an ever-decreasing emphasis on optimizing bandwidth and streamlining content. Presentation of web sites is becoming more and more entrenched with heavy graphic use and complex navigational elements; the use of video and animation is also becoming increasingly prevalent. As a result of this emphasis on presentation, the amount of data being transferred to the user's personal computer from the web server is continuously increasing. Technological advances continuously result in faster connections. As a result, content providers often take advantage of the increased bandwidth by loading their web pages with even more graphically rich, bandwidth consuming elements. However, technological advances are also heading in another direction; not only is the Internet getting faster, it is also becoming more portable.

The increasing portability of the Internet results in a new set of problems for content providers and developers. Accessing the Internet from a small wireless device (such as a mobile phone or PDA) is limited in both display capabilities and bandwidth capabilities. As a result, many different solutions are being discussed and touted as possible solutions to the problem of accessing the Internet from a portable device. The solution that will be discussed in this paper is the concept of Web Clipping, developed by Palm Inc.

What is Web Clipping?

When you're at the airport, in a cab, or between sales meetings, the last thing you want from the Internet is a bunch of things to slow you down. Yet most websites contain bandwidth-hungry graphics and even videos that are not designed for the wireless environment.

We've invented a way to get exactly what you want from the web in the fastest way possible. It's called web clipping. Use the Fidelity web clipping application, for example, to quickly "clip" stock quotes from the Fidelity site. All without modems, wires, or long waits.

- Palm marketing blurb

Web Clipping has been described as clipping a desired article out of a newspaper. Actually, it's more like someone clipping out a specific article for you. There's no need for you to browse through the entire newspaper looking for the article, the information you need is given to you minus the extraneous content, photographs and advertisements.

The idea of Web Clipping consists of two parts: the Palm query application and the web clipping.

The Palm query application (PQA):

The PQA is a special mini web application that can be stored on the PDA. It is made up of static pages and images written with a subset of HTML 3.2. The page(s) are compiled with the Web Clipping Application Builder provided by Palm (<http://www.palmos.com/dev/tech/webclipping/gettingstarted.html>). The result of compilation is a PQA application that can be installed on the Palm device. The web pages comprising the PQA are generally used to send requests for specific information to Internet web servers.

Web clipping

A web clipping is the page that is sent back from the web server containing the result of the PQA query, usually generated by a CGI script

Developing Web Clippings and PQAs

PQAs are created by compiling standard HTML. Because Palm devices are limited in comparison to personal computers, some features of HTML 3.2 are not supported by web clipping.

The following are not valid for web clipping:

- Cascading style sheets
- Cookies
- Frames
- Image maps and animated GIFs
- Java Applets
- JavaScript
- Layers
- Named typefaces
- Nested tables

Many of these features, such as JavaScript were not included because they place too many demands on the limited hardware resources of a Palm device, and because they would have unnecessarily consumed bandwidth.

There are also a number of important meta tags that provide information to both the Palm proxy server and the PDA.

Special META Tags:

- PalmComputingPlatform

```
<meta name="palmcomputingplatform" content="true">
```

- Tells Palm proxy server that the page is Palm friendly. If this meta tag is not included images will not be transmitted and pages will be truncated after 1024 bytes of data. Use this tag for all pages being used in the web clipping process.

- PalmLauncherRevision

```
<meta name="palmlauncherrevision" content="X">
```

- Specifies the version number (X) of your PQA. Use this tag in the root page of the PQA.

- LocalIcon

```
<meta name="localicon" content="image.gif">
```

```
<meta name="localicon" content="page.html">
```

- Allows your graphics and HTML files to be included with your local PQA without being referenced by the PQA, this will be important for the conservation of bandwidth. Use this tag in the root page of the PQA.

- HistoryListText

```
<meta name="historylisttext" content="yourstring"  
&date &time">
```

- The title that will represent the web clipping in the Palm's history list, use this tag in remote pages being sent back to the PDA.

Other than the aforementioned unsupported features and the special meta tags, writing PQAs and Web Clippings are identical to writing simple pages, forms and form results in HTML. Once the HTML pages for the PQA have been written they are simple compiled into a PQA application by the Web Clipping Application Builder.

Web Clipping Design

When designing PQA applications and Web Clipping pages the developer must take into account the two restrictions inherent to the use of mobile Internet: the size and graphical limitations of the PDA, as well as the limited bandwidth available.

Optimizing the page for display on a Palm device

The screen of a Palm device, while being considerably more functional than a mobile phone screen, is still quite limited. Many models of the Palm, including the wireless capable Palm VII only supported 2 bit colour (so only 4 different colours could be displayed). Furthermore, the size of a Palm device's screen is still much smaller than that of the smallest computer monitor. The resolution of a Palm device is 160x160, typically allowing for only 11 lines of text.

Keeping the query response small and trying to fit the response on a single page can facilitate use of the limited display. Another prudent design decision would be to have links to less essential content instead of trying to fit it on the screen.

Optimizing the transfer over a wireless network

The wireless network is quite limited, with less bandwidth than the slowest dialup modems, capable of operating at 8kbps but effectively operating at 2kbps after error correction and processing.

Since the data throughput of the connection is so low, it is imperative that the amount of data transferred is minimized. This can be done in a number of different ways: sending only content that is necessary and relevant, minimizing source code or shortening variable names.

Another effective way of reducing the amount of data transferred that is facilitated by the web clipping model is storing graphics locally instead of transferring them. The web clipping model divides information into two categories: local (included with the PQA) and remote (the web clipping returned to the PQA). This division of information is not available if the conventional web browsing model is used. The division of information can be used to reduce bandwidth use by including with the PQA, images and pages that can be referenced by the returned web clipping page. In this manner, we reduce the number of images and pages that need to be transferred over the air. Using the 'localicon' meta tag, images and files not referenced by the PQA pages (which would not ordinarily be included) are included in compilation of the PQA. The remote file can reference these images and files using the file url descriptor.

```
E.g. <IMG SRC="file:MyApp.pqa/logo.gif">  
      <A HREF="file:MyApp.pqa/help.html">Help</A>
```

The Palm.net System

There are three important entities that make possible mobile web clipping access with a Palm device (Figure 1). Firstly, a wireless enabled Palm device is required such as a Palm VII, an i705 handheld, or another Palm handheld equipped with a separate wireless modem. The second important entity is the web clipping proxy server, this server is owned and operated by Palm. The web clipping proxy receives requests from the wireless network, processes them and sends off to a web server. The third entity is a standard web server on the Internet.

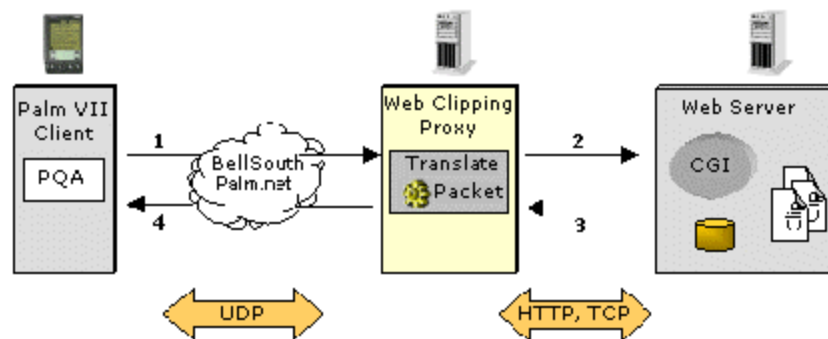


Figure 1: Data flow through the Palm.net System

The user generates a request from a wireless enabled Palm device by using a PQA, this request is in the form of CML (compressed markup language) and may be encrypted using ECC (Elliptic Curve Cryptography) technology. It will be encrypted if the form action requests the HTTPS protocol. The request is sent to the Web Clipping Proxy using UDP (User Datagram Protocol), this protocol is lighter weight and more efficient than TCP/IP and is thus more suitable for transfer over the air.

The Web Clipping Proxy receives that packet and processes it. Processing involves, decompression and translation from CML to standard HTML, and any necessary decryption. The proxy server then sends the request to the required web server via a conventional HTTP request.

The web server, generates a web clipping (a Palm friendly web page) and it is returned to the Web Clipping Proxy. The Web Clipping Proxy will again compress and encrypt the information and send it back to the Palm device.

All network wire transfer is encrypted by SSL, however, SSL generates too much overhead for over the air transfer. This is why ECC is used; ECC generates the equivalent of 128-bit encryption. As a result the entire web

clipping process is secure and can therefore be used for sensitive applications such as those involving e-commerce.

Advantages of Web Clipping

The main reason web clipping was created was to allow mobile palm users access to information on the internet virtually wherever and whenever they wanted. The main advantage of using web clipping is simply efficiency. Its all about getting the need information as fast as possible and with the least amount of effort. It allows users to specifically locate what they want on the internet with just the use of their wireless enabled PDA. Web clipping literally clips the important information from the rest of the "noise" on the internet.

Web Clipping is all about timing. Whether a stock investor wants up to the minute stock quotes or a caffeine addict looking for the nearest Starbucks, all the information is available instantaneously and accurately. Web Clipping is perfect to accommodate the limited bandwidth of the wireless PDA's. Instead of browsing a rich content web page which takes quite a long time, web clipping retrieves exactly what the user wants in a fraction of that time.

With the idea of the PQA where the users must first download the application to interact with the specific website. This method allows the developers to include static information and bandwidth consuming graphic logos with the PQA as the user downloads it with a higher bandwidth on the main computer and then transfers it to the PDA via hotsync.

Security is handled well when it comes to web clipping. With the use of Certicom's Elliptic Curve Cryptography technology and the standard Secure Socket Layer (SSL) protocol end-to-end security and encryption is attained. From the wireless PDA device to the proxy server Certicom's technology is used and from the proxy server to the rest of the Internet SSL comes into play. By limiting the sites that the user can browse too, this decreases the chances of the user visiting sites that have not been authorized by Palm, thus maintaining security.

Disadvantages of Web Clipping

Some of the main problems with web clipping come from the lack of bandwidth of PDA devices. The 2 kbps bandwidth do not allow for very much data to be passed. So these clippings are scaled down from normal web pages. In addition, bandwidth is very expensive. This leads to a restriction in the amount of data that can be sent in both the query and the response. And users may not want to pay extra when they exceed their bandwidth quota so they may reduce their use of web clipping. Advertising is also not realistic since users would not

want to use their limited bandwidth for advertisements, although this could also be seen as an advantage. In addition to low bandwidth, there is high latency. So the requests take a long time to process (about 10 seconds).

The low bandwidth is coupled with small screen size, low resolution, and limited computing power of the Palm device. This means that the web pages (both PQAs and Clippings) are limited to a small and simple subset of HTML 3.2. Only simple tables and forms are available, and the images must be small and sparse.

Web Clipping is a proprietary service provided by Palm. This means that in order for a website to deliver a web clipping service, they must register with Palm.net. As a result, there is quite a limited number (600) of web pages that support Web Clipping. In addition, the coverage of web clipping is limited to large American cities and the service is currently unavailable in Canada. Another downside is that Web Clipping only works on Palm devices. (Fig)

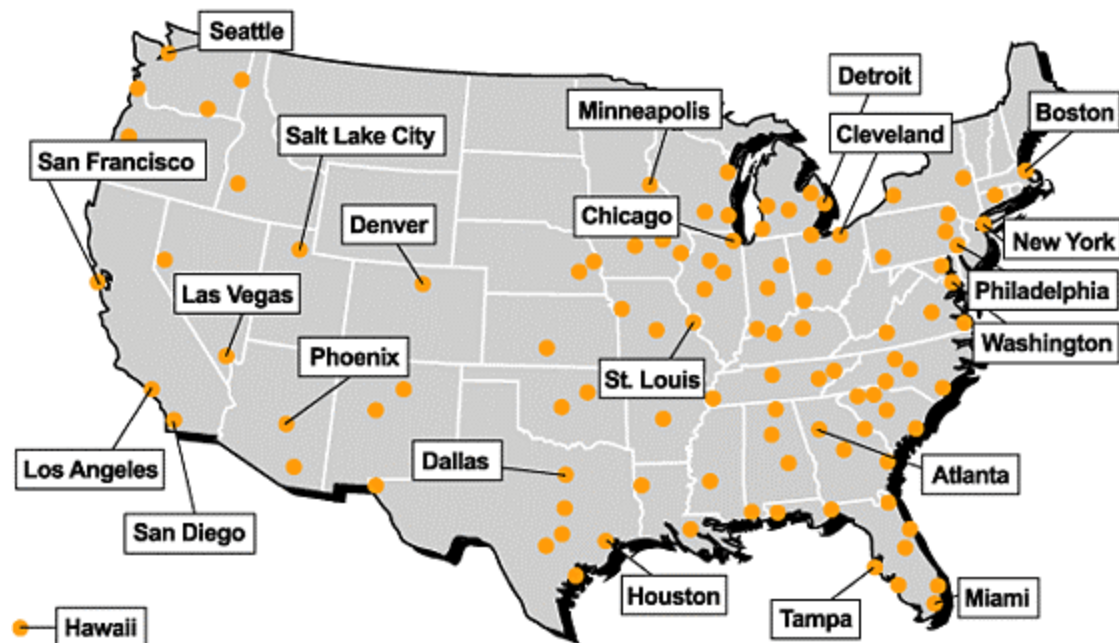


Figure 2: Coverage

Finally, the PQA must be stored locally. This is a disadvantage in that if an updated PQA is required, a new application must be located and installed. This is a relative nuisance when compared to browsing. In addition, there is a limit to the information that can be accessed. With browsing, the entire Internet can be accessed, but only a small portion with web clipping. So for the situations where the user does not know specifically what he is looking for and does not have an application ready to find what he is looking for, Web Clipping is not a suitable alternative.

Conclusion

Web clipping is not a new cutting edge technology. It is an innovation to scale web browsing down to a state where it can be used with much slower bandwidth to provide necessary information for the user. It is not a complete solution since there is much information on the web that is not clipped and sent to the user, but with the limited capabilities of handheld devices today, web clipping is very beneficial in providing necessary services. Web clipping is not perfect, but in the cases where the user needs to access specific information, it is very useful.

References

http://www.tow.com/publishing/Developing_Web_Clippings/

<http://www.webreference.com/dev/webclip/>

<http://www.palm.com/pr/palmvii/7whitepaper.pdf>