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Takashi Masuda Yoshifumi Masunaga
Michiharu Tsukamoto (Eds.)

Worldwide Computing and Its Applications

International Conference, WWCA'97
Tsukuba, Japan, March 1997
Proceedings

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Preface

The international conference named "Worldwide Computing and Its Applications '97 (WWCA'97)" was held in Tsukuba, Japan, on March 10-11, 1997. About three hundred participants got together for this brand new conference and discussed new software technology (the Internet) and its applications.

The program committee requested extended abstracts for presentation at the conference. Despite the fact that this was a new conference, we received fifty submissions from all over the world. All the submissions were read by three outside reviewers and the program committee selected fifteen excellent papers for presentation. The rest of the presentations were invited by session chairs appointed by the program committee. We had fifteen interesting presentations by the outstanding researchers we invited. The table shown below lists the number of submissions, accepted papers, and invited papers, classified by country.

	USA	Canada	Australia	Germany	Spain	Taiwan	Japan	Total
Submitted	2	2	3	1	3	3	36	50
Accepted	1	1	0	0	1	0	12	15
Invited	5	1	2	1	0	0	6	15

These proceedings include all thirty papers and two keynote addresses. The full papers presented at the conference were reviewed after the conference by the program committee. The papers included in these proceedings are the revised versions of the presented papers.

Finally, we would like to express our gratitude to all the members of the program committee, the session chairs, and reviewers. The success of this conference is due to their efforts. We also thank the members of the organizing committee and the executive committee for their devotion to the conference.

March 1997

Takashi Masuda, Program Chair
Yoshifumi Masunaga, Executive Co-Chair
Michiharu Tsukamoto, Executive Co-Chair

Message from the General Chair

Science is the driving force behind the social revolution we are experiencing in today's information society. The great advances humankind has undergone have been shouldered by information technology, including the Internet, multimedia, and autonomous, distributed, and cooperative systems. The introduction of new technological applications opens up new possibilities and challenges for every aspect of our society. Research and development in academia based on promising concepts is centred in this field.

It is in response to these demands that WWCA'97 aims to provide a forum for discussion of the latest results in computing research. In obtaining the generous cooperation of outstanding researchers involved at the very forefront of information technology, I strongly believe that this symposium will be fruitful for all. It is my earnest wish that this year's conference will give rise to an annual WWCA conference.

I would like to extend my sincere appreciation to the organizing and executive committees, consisting mainly of researchers from the Electrotechnical Laboratory of the Agency of Industrial Science and Technology, the Ministry of International Trade and Industry, for making this symposium possible. Last but not least, my special gratitude is due to the Information Processing Society of Japan, the Electrotechnical Laboratory, and the Information-technology Promotion Agency, Japan, for their unsparing cooperation as organizers, and the Association for Computing Machinery and the Institute of Electronics, Information and Communication Engineers for their invaluable support.

March 1997

Hideo Aiso

Message from the Organizing Chair

Technology focuses on an aspect of reality and creates something new in response to its needs, in turn becoming a new part of reality. In the beginning, something new is born and grows as a simplex form. As time passes, the simplex is combined with other simplexes and forms a multiplex or a complex through a process of integration. Information technology is no exception.

Various types of simplexes were created in the 1970s and early 1980s which were integrated with each other and further developed in the 1980s, reaching a developmental peak in 1990s. The same goes with the physical morphology of information systems. We had a mere collection of stand-alone mainframes in the 1970s. Now we have a computer network complex. Along with this evolution, the relationship between computers and people has also changed.

Personal computing has achieved for us a restoration of individual rights, an enormous change in comparison with the period of mainframes. However, the relationship then remained one-to-one. Now it is changing into group computing, i.e. multiple-to-multiple relationships through networks.

The emergence of network computing is a significant phenomena. Yet, traditional wired networks still restrict us by physical locations. We will soon experience mobile computing. We are indeed experiencing an evolution from distributed computing to worldwide computing. Moreover, the processing of information itself is changing from isolated processing within each system to multimedia processing.

These evolutions have a great impact not only on human-computer relationships but also on social computing, and as many people have pointed out, society itself is changing by the advancement of computer technology. Thus, advancements in technology have brought about new changes in society. Advanced technology recursively demands new development. That is exactly why the WWCA conference is so important.

The technological advancement that has been achieved over the last ten years is, indeed, remarkable. However, the roots of these technological changes can be found in the 1980s. Many of the current de-facto standards can be traced back to the technological paradigm of those days. Do you think this is enough? As technology surfaces and becomes more widely available to the public, we see the development of a certain technological conservatism under the name of interoperability. It is probably too early to discuss this in our field. Information technology is still in its infancy and we have many unsolved problems. We have only begun with the first few steps towards reaching maturity. Further advancement is necessary before information technology becomes true reality. We need not only the existing technological paradigm but also a shift to a new paradigm.

We hope that this conference will focus not only on the technological development of information systems closely associated with the current situation, but also on contributing to a breakthrough to a new development.

March 1997 Kazuhiro Fuchi

Message from the Executive Co-Chairs

Both co-chairs of the executive committee have resided in Tsukaba Science City, developed to promote science and technology in Japan. They have held numerous discussions over how information should be disseminated to the society.

For the last five years, the Open Fundamental Software Technology Program Promotion Committee of the Information-technology Promotion Agency, Japan (IPA), one of the organizing parties of this conference, has also been a forum for such discussions, especially concerning the dissemination of research results. It is headed by Prof. Takashi Masuda, Chairman of the committee as well as Program Chair of WWCA'97, and Dr. Akio Tojo, IPA Managing Director in charge of the committee. Furthermore, the same theme with more focus on academia was pursued in the Information Processing Society of Japan (where Masunaga chairs the Computer Science Group, one of IPSJ's three research groups, and Tsukamoto is Managing Director of the International Activity Committee).

Meanwhile, the early 1990s witnessed a rapid development in our specialties of database and distributed systems, represented by the Internet, WWW, and Java. This stream of movement convinced us that it is from this field that information deserves to be relayed to the world, which encouraged further and deeper discussions around us. Under these circumstances, the Electrotechnical Laboratory, another co-organizing party of this conference, was designated as a COE (Center of Excellence) institute by the Science and Technology Agency, which promotes the dissemination of research results. Such support as well as requests from the IPA Open Fundamental Software Technology Program enabled us to convene a conference in Tsukaba, open to the world under the theme of Worldwide Computing and Its Applications.

WWCA'97 is in collaboration with the ACM Track of the 54th National Convention of the Information Processing Society of Japan (IPSJ) (where Masunaga is the Program Chair and Tsukamoto a Committee member). WWCA'97 itself owes much to the firm support from the IPSJ and the ACM. This conference is nothing but the product of cooperation among institutes and academic societies both within and outside Japan. The Science and Technology Basic Law having been enacted, the social atmosphere is maturing to strongly support such projects. We are currently planning to organize WWCA'98 in the next fiscal year based on our experiences this year. For the conference to be realized, we sincerely request your continuous support.

This is the inaugurating year for WWCA; we had merely 6 months in essence for preparation. On behalf of the Executive Committee, we would like to express our profound gratitude to General Chair Prof. Hideo Aiso, members of the Organizing, Program and Executive Committees, and the Secretariat for taking on tight schedules and making WWCA'97 outstanding in quality and scope.

March 1997

Yoshifumi Masunaga
Michiharu Tsukamoto

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Java and the Emerging Technology

Ken Urquhart

Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043-1100, USA

Abstract. The Java^{tm} Platform reached a new level of maturity with the nearly simultaneous release in February 1997 of version 1.1 of the Java Development Kit (JDK) and version 1.0 of the JavaBeans^{tm} Development Kit (BDK). In addition to being faster and more robust, JDK 1.1 also contained new classes and included several of the new Java Standard Extension APIs whose objects and methods promise to ease the development of Java applets and applications for multimedia, electronic commerce, and enterprise data access. This paper provides an overview of the past, the present, and the future of the Java Platform and describes Sun Microsystems goals for its Java Technology.

1 Introduction

It is impossible to talk about the Internet, intranets, or networked devices without talking about Java. Seemingly overnight, Java has established itself as the *de facto* standard platform for building networked applications.

The Java programming language [1] has been adopted more quickly than any other programming language in history — and the Java Platform has been recognized by most corporations as a key technology for supporting platform-independent access to a wide range of corporate resources.

Java has also become incredibly popular among software developers. It's simple new model of network computing has the virtues of being both easy to understand and easy to program. As such, Java has considerably reduced the problems associated with developing and deploying Internet and intranet applications.

But perhaps the most important aspect of the new Java technology is the promise that it holds for significantly reducing the time and cost of developing software applications. Specifically, the platform-independent nature of Java means that a program written in pure Java should run the same way, and produce the same results, on every platform it is run on. A developer should therefore be able to write a program once, test it on only one platform, and then rest assured that it will run anywhere.

The Java Platform [2], consisting of the Java language, the virtual machine, and the Java application programming interfaces (APIs), is growing and maturing at a phenomenal rate. This paper provides an overview of the past, the present, and the future of Java. We begin with a review of how fast Java grew in the first 500 days after the release of version 1.0. We then go on to describe how Java has been improved and enhanced in version 1.1 and then consider the future of the Java technologies. Since it is impossible to condense all of the important

technical details into one short paper, we will limit ourselves to giving overviews of the new and evolving features of the Java Platform and provide references to more detailed information.

2 Java: the first 500 days

The October 1996 Gilder Technology Report contained some interesting numbers concerning how popular and how pervasive the Java Platform had become during the first 500 days following the release of Version 1.0 of the JDK. The report noted that:

- 83,202 web pages featured Java applets (a 247% increase over the previous 6 months),
- 57 colleges and universities were offering Java courses,
- over 150 books had been published on Java (more than all of the books published on C++), and
- 33% of developers employed at corporations of 5000 or more employees where using Java.

Another report by the Gartner Group estimated that the number of serious C++ programmers in the United States exceeded the number of serious Java programmers in the U.S. by only a factor of 2.

This rapid adoption of Java can be traced directly to its ability to provide interactive content on HTML pages served up over the world wide web. Until Java was released, HTML pages were limited to conveying essentially static information in the form of text and graphic images. Java applets (Java applications embedded in HTML pages) allowed complex programs to be downloaded and executed inside a browser in a safe and secure manner [3]. The ability of an applet to interact with both the end-user and with services located on the HTTP server that downloaded it to the browser, introduced a new and simplified model for client/server computing. Add to this Java simple language syntax, its use of garbage collection to recover memory, and the elimination of pointers [1], and the reason for Java's instant popularity among software developers and Internet/Intranet architects becomes easy to understand.

3 Java: the present

The first release of Java was somewhat limited in the sense that the implementations of Java on various operating systems and hardware combinations did not behave the same way when it came to delivering user interface events to Java applets and applications. In addition, the graphic user interface (GUI) elements of the Abstract Windowing Toolkit (AWT) were primitive and behaved somewhat differently from implementation to implementation. As a result, software developers often could not write just one version of a Java program and then run it anywhere. They had to write slightly different versions for each platform.

After listening to feedback from developers, licensees, and industry experts, Sun refined and extended the Java APIs and class libraries. In February 1997, version 1.1 of the JDK was released. This new version had several important improvements. First, the Java Virtual Machine (JVM) had been rewritten to execute Java programs two to three times faster than the previous JVM. The AWT was enhanced to include a unified event delivery model to insure uniform event reporting across all implementations and a lightweight component model was added to allow custom GUI "widgets" to be built more easily.

Further, JDK 1.1 was based on Unicode 2.0 and provided a rich set of internationalization APIs to simplify the development of globalized applets and applications. Programs could now automatically adapt to specific locales and languages.

Taken together, these changes significantly improved the Java Platform and brought Java much closed to its promised ability to allow developers to write a Java program once, and then run it anywhere.

3.1 Java Standard Extension APIs

The enhancements to Java were not limited to simply improving performance and providing for consistent interaction with the end-user. Release 1.1 of the JDK also saw several new additions to the set of Java Platform APIs. These additions were developed in cooperation with industry experts to provide new capabilities that had been requested by the marketplace [2].

Before going further, it's important to understand that Java actually has two distinct sets of APIs. The first set is referred to as the Java Core APIs. These are the building blocks for creating fully functional Java applets and applications. The core APIs consist of the APIs released in JDK 1.0.2.

The second set of APIs are the Java Standard Extension APIs. These are standard in the sense that they form a published, uniform and open set of APIs that anyone can implement. These extension APIs provide many new and important services to Java applets and applications. We will now briefly describe these six new APIs. Note that several of them are still in the development phase and have not been included in JDK 1.1. Please visit the Sun Java web site for the most up to date information [4]

Java Security API provides facilities for encryption, authentication, and digital signatures [2], [3].

Java Media API provides facilities to create Java applets and applications that can handle a wide range of rich, interactive, media types. These include audio, video, 2D images, 3D graphics, telephony, animation, speech, and collaboration [4].

Java Enterprise API connects Java to enterprise information resources. It enables enterprise developers to build distributed client/server applications in Java that can connect to databases, interact with transaction services, and interoperate with existing applications through Java-to-CORBA interfaces [4].

Java Commerce API allows the development of secure electronic commerce applications in Java for the Internet and corporate intranets [4], [5].

Java Server API allows server applications to be written entirely in Java [4]. The API contains server-side class libraries for server administration, access control, and dynamic server resource handling. One of these dynamic resources is called a "servlet" — a Java object designed to plug into compatible servers (that don't have to be written in Java) to provide additional services and protocols that can extend a running server's capabilities. Servlets are intended to replace typical server-side plug-ins and CGIs with Java objects that use a simplified interface. Servlets can even be uploaded to running servers over the network (subject to security restrictions [3]).

Java Management API standardizes the integration of system and network management applications [4]. The API provides a set of extensible objects and methods for building applets and servlets that can manage an entire enterprise network.

3.2 JavaBeans

Over the past several years, constructing applications by piecing together re-useable software components has proven to be a highly productive way to develop custom programs - this is usually referred to as "Rapid Application Development ". These software components can range from small graphical user interface "widgets" like buttons and sliders all the way up to full-size applications like spreadsheets and word processors. Components aren't limited to display objects either. It's quite possible to have components that do things like sorting an array.

JavaBeans [6] brings re-useable software components to the Java Platform. Beans know about ActiveX, OpenDoc, and Live Connect. As such, Beans are re-useable in a wide variety of components, assembly tools, and containers including: the HotJava Browser, Netscape Navigator, Borland Delphi, Microsoft Internet Explorer, Visual Basic, Word, and Claris Works. The Beans Developer Kit (BDK), version 1.0, was released in February 1997. Support for ActiveX is currently in beta test and OpenDoc support is coming very soon. Beans have received broad industry support.

4 Java: the future

In order to insure the future of the Java Platform, Sun has established several goals for its Java technology.

- Java technology should be ubiquitous. Java applets and applications should run everywhere, on everything, ranging from smart cards you carry around in your wallet to large mainframe systems.

- Java implementations and Java programs must remain compatible and interoperable. A Java applet or application run on one particular hardware and OS combination should run the same way, and produce the same results, on all other hardware and OS combinations.
- The development of the Java platform should continue to be open and carried out in collaboration with recognized industry leaders and partners.
- There should be rapid, parallel evolution of all implementations of the Java Platform. As new enhancements are introduced, all implemenations should incorporate the new features as quickly as possible.

4.1 100% Pure Java^{tm} Initiative

In order to achieve the full cross-platform compatibility and interoperability inherent in the Java Technology, both developers and end-users need assurance that Java programs will run flawlessly on all certified Java platforms and devices. To this end, Sun has created the 100% Pure Java program [7]. The initiative defines a common set of Java APIs whose use will guarantee cross-platform compatibility. The initiative also offers a variety of education, training, testing and certification, and branding and co-marketing programs for Java developers. Products that meet the test criteria are certified and can use the "100% Pure Java" logo.

The payoff for the developer is four-fold:

- his programs can be written once and then run everywhere,
- his programs can be safely delivered over the Internet and won't compromise or violate the security of an end-user's computer,
- his JavaBeans will run on any platform and be reusable, and
- his programs will have access to an large, worldwide market.

5 Summary

The Java Platform reached a new level of maturity with the release of version 1.1 of the Java development kit and version 1.0 of the JavaBeans development kit. New Java Standard Extension APIs will significantly simplify the development of Java multimedia, enterprise, and client/server applications.

Sun's goal for its Java technology is to make Java ubiquitous and to insure that Java applets or applications developed on one particular hardware and operating system combination run the same way, and produce the same results, on all other hardware/OS combinations. The 100% Pure Java Initiative will give end-users and developers assurance that Java programs carrying the "100% Pure Java" logo will run anywhere.

6 Further Information

The latest information on the Java Platform can always be found at the URL:

http://java.sun.com.

The latest Java technology whitepapers are located at the URL:

http://java.sun.com/nav/read/whitepapers.html,

and the latest Java technology (including the latest versions of the JDK and the BDK) can be downloaded from the URL:

http://java.sun.com/nav/download/index.html.

Note that these URLs are subject to change without notice. They were valid at the time this paper was written (March 1997).

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Transcopyright: A Simple Legal Arrangement for Sharing, Re-use, and Republication of Copyrighted Material on the Net

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1 Introduction

On computer networks, portions of a document may be assembled from other source documents for presentation to the user. This arrangement I propose to call transpublishing. [1]

This arrangement has interesting and special properties. If each quoted piece is bought on-line from its original publisher,

- the publisher gets paid for each copy distributed;
- the author (who may also be the publisher) gets credit;
- the quotation provides a path back to the original for anyone wishing to pursue the original context.

If a payment system, especially a payment system in very small amounts, can be attached to the separate transcluded items, this will make it practical for people to sell material proportionally by the individual download, and for publishers to make materials available more readily and with more sense of confidence.

While this is different from any arrangement in paper publishing, it seems fair.

Transpublishing can mean a new simplicity of copyright arrangements, making unrestricted quotation possible without negotiation. Any participating documents will be as freely quotable and republishable as if they were in the public domain. Anyone may use all material participating in this scheme for any new purpose. (However, since it is being delivered from the original it may not be altered or paraphrased.)

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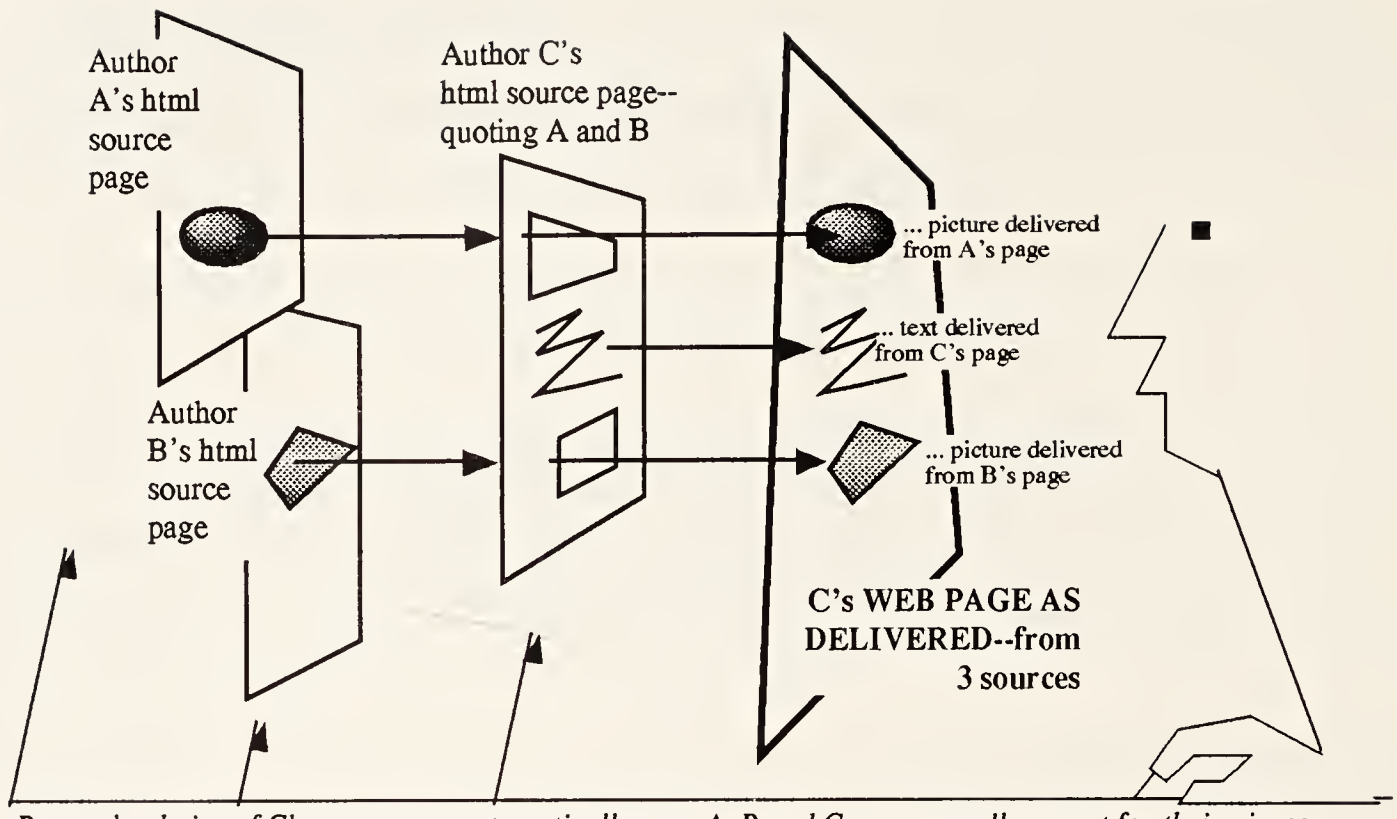
[1] Transpublishing is an old idea [1]. Transpublishing is a special case of transclusion. Transclusion in its general sense means that one thing may appear on-line in many contexts. Transpublishing means that each piece delivered to a user is delivered from the original (or as if from the original), with payment (if any) to the original publisher.



By user's choice of C's page, user automatically pays A, B and C a very small amount for their pieces.

2 Legality: The transcopyright permission

To make this possible, rightsholders must give permission. Many laws protect intellectual property rights, and they are not likely to change soon. Transpublishing of others' material without permission from the rightsholder is presumptively a copyright violation.

Therefore I have proposed [2] a permission method which I call transcopyright. It is simply a way of giving explicit advance permission for such on-line, virtual quotation and republication.

"Transcopyright" or "trans©" next to a picture or text is a highly condensed way of saying, "As the rightsholder of copyright in this material, I give permission for the re-use of this picture in any on-line context, as long as the delivery is from my server."

The provision "in any new context" is necessary, since setting any conditions at all greatly reduces the likelihood of re-use.

But I have been assured by lawyers in both the United States and Japan that this method is legal in both countries. It is officially a conditional license, making clear the rights which are being given away and those which are not. Thus lawyers think it is a good idea.

3 Implementation

On the World Wide Web, transpublishing requires no implementation at all for pictures (especially GIF and JPEG format). All you need to do is put into a Web page the tag <IMG SRC=...> and name the Internet location of the picture you wish to include on your page– no matter where it originates and no matter who it belongs to.

Besides pictures, we would like to have a way of transcluding text – quoting from any participating source on the Internet – as well. Thus we propose the <TXT SRC=...> tag, which will bring in an arbitrary amount of text from the specified starting point of a specified document[3], and insert it in-line in the new document's context.

At Keio University we have a test implementation of TXT SRC now running. Someone who wishes to try out the TXT SRC tag may send our server a URL and see the resulting page, compiled to look the way it should if TXT SRC were actually implemented in the browser.

Adoption of TXT SRC is a political issue, involving the WWW consortium and other parties. But in the meantime, we intend that others may use the TXT SRC tag to offer such pages through our server. Anyone jumping to such a page from a document already published on our server should receive the page looking as if TXT SRC actually worked– with text quotations actually in place, and markers to indicate their boundaries.

4 Formats

At Keio University we are working on visual and permission formats for making this practical and easy. These include transcopyright emblems to go with transcluded images, text, sound and video. We are also working out legal (but friendly) permission statements to formalize the transcopyright permission. We recommend linking a permission statement to the transcopyright symbol as a simple way to make the exact permission clear. (And any new viewer may check the permission statement and re-use the material without hesitation.) Such a proposed permission statement, and its HTML source, follow this paper.

5 Not a proposal

This is not a proposal but a system which can be used immediately for pictures on the Internet, providing a bridge to the picture's original context. We hope that some content providers (photographers, stock photo houses) will find it in their interest to experiment with the system immediately, without payment.

Acknowledgement

Thanks to Prof. Hajime Ohiwa and Kenji Naemura of Keio University Shonan Fujisawa Campus; Prof. Yuzuru Tanaka of Hokkaido University; Andrew Pam for designing the TXT SRC tag, and Yousuke Igarashi for implementing the TXT SRC tag; the Xanadu team back in the USA; and especially Marlene Mallicoat for guidance and coordination.

References

1. T. Nelson, Literary Machines. Mindful Press, Sausalito, California; distributed by Eastgate Systems, Cambridge, Mass, USA.
2. T. Nelson, "Transcopyright: Dealing with the Dilemma of Digital Copyright." Educom Review, Jan/Feb 97, vol. 32, no.1, p32.
3. Andrew Pam, definition of TXT SRC tag for HTML, unpublished.

Appendix 1: A sample permission statement.

97.01.20

doug.in.garden.permish.html

/97w3

PICTURE OF DOUG ENGELBART

©1996. May be republished under transcopyright permission (below).

No Title. To original context of picture **Date taken: August 1996**

Subject: Douglas C. Engelbart To Doug Engelbart's Home Page

Photographer: Ted Nelson To Ted Nelson's Home Page

Charge per downloaded copy: Zero.

Availability: as long as it remains on source page.

Transcopyright Notice:

PERMISSION TO REPUBLISH VIRTUALLY

on the World Wide Web

(Read more about the Transcopyright Permission System, a Win-Win sharing method.)

Permission is hereby given to republish virtually, by the method explained below, the picture to be found at

`http://www.sfc.keio.ac.jp/~ted/celeb.pix/doug.in.garden`

Please note that permission is NOT given--

- to transmit this picture from any server except http://www.sfc.keio.ac.jp/~ted/;
- to put the actual picture data on your page, or on any other server;
- to modify the picture in any way.

Rightsholder / copyright owner:

Ted Nelson

January 19, 1997

TRANSCOPYRIGHT PERMISSION DETAILS

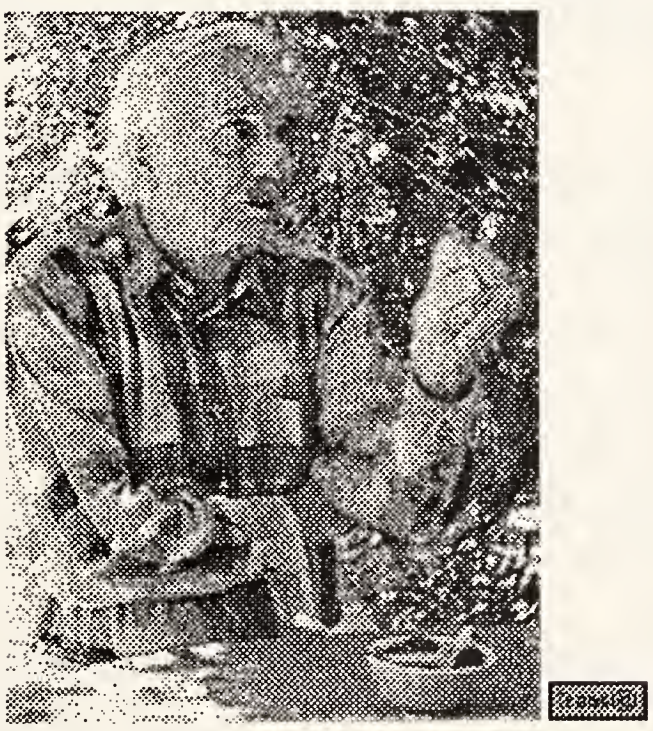
PERMISSION IS GRANTED ONLY TO USE THE FOLLOWING METHOD, which will:

1. allow anyone to re-use this picture as clip art on any Web page in the world;
2. deliver the picture to each user from my designated server;
3. include with the picture its transcopyright emblem;
4. maintain connection between the transcopyright emblem and this original permission page.

Permission is granted to republish virtually by including one of the following sequences of characters in your Web page. (You probably cannot see or copy the characters right now, since they are doing their job of bringing in the images. However, they can easily be seen and copied from the source HTML.)

1. For half size, include the following source string:

2. For full size, include the following source string:



Appendix 2: HTML version of the previous permission statement, showing the copiable strings.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2//EN">
<HTML>
<HEAD>
```

```
   <TITLE>PERMISSION TO REPUBLISH</TITLE>
   <META NAME="GENERATOR" CONTENT="User-Agent: Mozilla/3.0Gold (Ma
cintosh; I; 68K)">
</HEAD>
<BODY BGCOLOR="#FFFFFF">

<DIV ALIGN=right><P><FONT SIZE=-2>97.01.20<BR>
doug.in.garden.permish.html<BR>
/97w3</FONT></P></DIV>

<CENTER><P>
<HR></P></CENTER>

<CENTER><P><BOLD><B><FONT SIZE=+2>PICTURE OF DOUG ENGELBART </BOLD>
<BR>
<IMG SRC="http://www.sfc.keio.ac.jp/~ted/transpub/cosymb.gif" >
</FONT><FONT SIZE=-1>1996.
May be republished under transcopyright permission (below).<BR>
<BR>
<BOLD></FONT>No Title. </B><A
HREF="http://www.sfc.keio.ac.jp/~ted/celeb.pix/comp.celebs.html">To
original context of picture</A><B> Date taken: August 1996</B></P>
</CENTER>

<CENTER><P><B>Subject: Douglas C. Engelbart </B><A
HREF="http://www.bootstrap.org/">To
Doug Engelbart's Home Page<BR>
<BR>
</A><B>Photographer: Ted Nelson </B><A
HREF="http://www.sfc.keio.ac.jp/~ted/">To
Ted Nelson's Home Page</A></P></CENTER>

<UL>
<DIV ALIGN=right><P><B><FONT SIZE=-1>Charge per downloaded copy: Ze
ro.<BR>
Availability: as long as it remains on source page.</FONT></B>
<FONT SIZE=-1>
</FONT></P></DIV>
</UL>

<CENTER><P>
<HR></P></CENTER>

<CENTER><P><B><FONT SIZE=+2><I>Transcopyright Notice:<BR>
</I>PERMISSION TO REPUBLISH VIRTUALLY <BR>
```

```
</FONT><FONT SIZE=+1>on the World Wide Web <BR>
</FONT></B><FONT SIZE=-1>(Read more about the <A
HREF="http://www.sfc.keio.ac.jp/~ted/transpub/transpub.transco.html"
>Transcopyright Permission System</A>, a Win-Win sharing method.)
</FONT></P></CENTER>

<P><BR>
<BR>
<FONT SIZE=-1>Permission is hereby given to republish virtually, by
the
method explained below, the picture to be found
at</FONT></P>

<CENTER><P><TT>http://www.sfc.keio.ac.jp/~ted/celeb.pix/doug.in.gar
den</TT></P></CENTER>

<P><FONT SIZE=-1>Please note that permission is NOT given--</FONT>
</P>

<UL>
<LI><FONT SIZE=-1>to transmit this picture from any server except
http://www.sfc.keio.ac.jp/~ted/;</FONT>
</LI>

<LI><FONT SIZE=-1>to put the actual picture data on your page, or on
 any other server;</FONT> </LI>

<LI><FONT SIZE=-1>to modify the picture in any way.</FONT> </LI>
</UL>

<DIV ALIGN=right><P><B><I>Rightsholder / copyright owner:<BR>
</I>Ted Nelson<BR>
January 19, 1997</B></P></DIV>

<DIV ALIGN=right><P>
<HR ALIGN=RIGHT></P></DIV>

<P><B>TRANSCOPYRIGHT PERMISSION DETAILS</B></P>

<P><FONT SIZE=-1>PERMISSION IS GRANTED ONLY TO USE THE FOLLOWING MET
HOD, which will:</FONT></P>

<OL>
<LI><FONT SIZE=-1>allow anyone to re-use this picture as clip art on
 any Web page in the world;</FONT></LI>
```

```
<LI><FONT SIZE=-1>deliver the picture to each user from my designate
d server;
</FONT></LI>

<LI><FONT SIZE=-1>include with the picture its transcopyright emblem;
</FONT></LI>

<LI><FONT SIZE=-1>maintain connection between the transcopyright emb
lem and this original permission page. </FONT></LI>
</OL>

<P><FONT SIZE=-1>Permission is granted to republish virtually by inc
luding one of the following sequences of characters in your Web page.
 (You probably cannot see or copy the characters right now, since th
ey are doing their job of bringing in the images. However, they can
easily be seen and copied from the source HTML.)</FONT></P>

<P><B>1. For half size, include the following source string:</B></P>

<P><IMG SRC="http://www.sfc.keio.ac.jp/~ted/celeb.pix/doug.in.garden"
HEIGHT=160 WIDTH=120>
<A HREF="http://www.sfc.keio.ac.jp/~ted/transpub/doug.in.garden.perm
ish.html"><IMG SRC="http://www.sfc.keio.ac.jp/~ted/transpub/tcosymb.
gif" HEIGHT=14 WIDTH=41></A>
</P>

<P><B>2. For full size, include the following source string:</B></P>

<P><IMG SRC="http://www.sfc.keio.ac.jp/~ted/celeb.pix/doug.in.garden"
HEIGHT=320 WIDTH=240>
<A HREF="http://www.sfc.keio.ac.jp/~ted/transpub/doug.in.garden.perm
ish. html"><IMG SRC="http://www.sfc.keio.ac.jp/~ted/transpub/tcosymb
.gif" HEIGHT=14 WIDTH=41></A></P>

</BODY>
</HTML>
```

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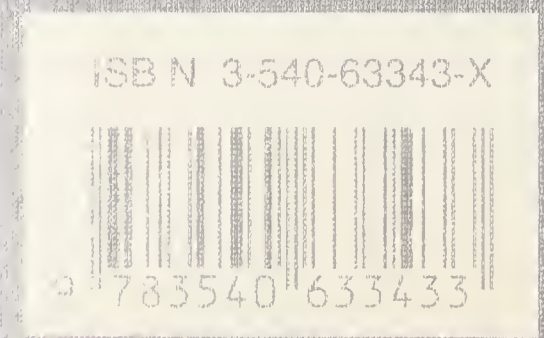

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