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## **Community System Users and Uses**

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### **ABSTRACT**

As the role of the Internet in everyday life has expanded, community computing systems have been at the forefront of making new electronic tools for information access, education, and communication available to the public. This work presents findings based on the Prairienet community computing system that may help other systems to make decisions about which services to offer, to evaluate the relative worth of local materials versus providing access to Internet-based materials, and allocate resources such as modems and staff time. The core question for the work is, "to what extent is Prairienet serving its intended purpose as a community forum for education and information access?" This report only addresses the question through the analysis of usage patterns and logs. Future work will include a user survey and discussion of external activities such as public-access sites and workshops which may enhance Prairienet's purpose.

### **INTRODUCTION**

This work reports results of a descriptive study of a community computing system, Prairienet. Prairienet is a "Free-Net" affiliated with the National Public Telecomputing Network, and has been in operation since November, 1993. Prairienet is used to make community information available in

electronic form and is also used as a free access point to Internet information resources.

The fundamental question to be addressed by the research is, “to what extent is Prairienet serving its intended purpose as a community forum for education and information access?” The work describes a set of results which address this question. The bulk of the work is based on analysis of usage patterns and content of the Prairienet system. A future report will describe results of a user survey that is underway as of Spring, 1996. The survey will take another approach to addressing the question.

Other studies have traced the development of Free-Net systems (e.g., Wiencko 1993; Walsh 1993). Many authors have written of the benefits of public-access to the Internet (especially Grundner 1992, also Gore, 1991; Nickerson 1992). This work will not develop those arguments and descriptions, instead focusing on the actual use made of one particular existing community computing system.

The Prairienet system is a typical Free-Net, although it among the busier and larger Free-Net systems. (For a listing of Free-Nets, visit the NPTN WWW site, <http://nptn.org/>.) Prairienet offers the following services and features:

- public-access modems that allow terminal logins (no SLIP/PPP or other forms of TCP/IP access)
- free usernames for the public of Illinois with email, some disk storage space, and access to the Prairienet content and other services
- content provided by over 400 information providers (described below)
- a menu interface to the information provider content plus other material. For example, menu options which provide telnet access to the Library of Congress, full text of the Telecommunications Act of 1996, access to a listing of local restaurants, and many other items
- Internet information servers for the World Wide Web, Gopher, anonymous FTP, electronic mailing lists, and network news for access by individual users and information providers

- Complete access to Internet facilities through the menu system (e.g., people can use Lynx, a text-based interface to the World Wide Web)
- Training and support for information providers; essentially unlimited access to the various Internet servers, disk space, and technical support
- Telephone and email help for end-users plus a walk-in office open 40 hours per week
- Support for regional public-access sites for walk-up use

Prairienet's primary mission is to be an accessible and free forum for the public to get access to community information in electronic form, and to provide the necessary infrastructure and support to create and maintain the collection of information. (For the complete mission statement, see Prairienet, 1996). Prairienet has been active in supporting access for citizens of East-Central Illinois. As a free service, Prairienet is more accessible than fee-based Internet access providers. As a service that caters especially to people who are new to computer-based communication, the Prairienet system is intended to be as easy to use as possible.

## WHO USES PRAIRIENET?

This section presents an analysis of the basic demographic factors of Prairienet users. The growth rate of Prairienet has been fairly stable since the official grand opening in June, 1994. Since November 1993, when online registration was first activated, an average of 24 persons per day have run the online registration program (7 days per week). Only 6 out of 10 actually send in the necessary follow-up paperwork (proof of Illinois residency or an out-of-state fee) and so result in a username being activated.

Table 1: New username registration and activation

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 From November 1993 through February 1996 (845 days)

Total new username registrations:	20,431
Usernames actually activated:	12,839
Average new registrations per day:	24
Avg. yield new registrations per day:	15

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Individuals who register for a Prairienet username are asked to supply their birth date and address (a more recent version of the online registration program also requests voluntary participation in a demographic survey, results of which will be reported in a future publication). Analysis of common names yielded a breakdown of gender.

Prairienet is located in Champaign, Illinois and most of the users of Prairienet are from the local calling area. (Prairienet is hosted by the Graduate School of Library and Information Science at the University of Illinois.)

Analysis of the gender and age breakdown of Prairienet users is interesting for its relation to estimates of Internet user demographics. O'Reilly and associates completed a 1995 survey of Internet users (O'Reilly, 1995) which yielded an almost identical breakdown for gender (67% male; 33% female). The age breakdown, however, is somewhat different. On Prairienet, the age distribution is closer (although not nearly matched) to actual population demographics. Notably, the proportion of young adults (under age 24) who use Prairienet is higher than the O'Reilly figure and considerably above population demographics, and the proportion of older adults (over age 55) who use Prairienet is higher than the O'Reilly figure. Neither O'Reilly nor Prairienet figures have a large number of users under the age of 18, yet this is 25% of the US population.

The breakdown of who utilizes Prairienet and their age and gender indicates that Prairienet is reaching a predominantly local audience. The overall pattern of age and gender use is not far different than that found in the O'Reilly study, and is not generally well-matched to the US population (note that we utilized US population figures here for comparison; proportions for the state of Illinois or Champaign County are similar).

In order to better achieve its goal of being accessible across educational, social-economic, gender, and other factors that produce potential inequity for access, Prairienet should develop programs or partnerships to reach out to women, children under 18, and adults over 45. Figures dealing with access by gender, economic status, and other factors are being developed as part of additional demographic data being collected during online registration since early February 1995. These figures, when they are sufficient to represent the Prairienet user population as a whole, will aid in reaching the Prairienet target audience better.

Table 2: Age and residence

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Source of statistics:

Prairienet O'Reilly US \*

Gender:

Male :	65	67	49%
Female:	35	33	51%

Age:

18 - 24 years	30	23	11%
25 - 34	27	32	combined
			with 35-44
35 - 44	22	25	32%
45 - 54	12	15	10%
55 - 64	5	3	8%
over age 65	4	1	12%

Residence of Prairienet users:

In Champaign-Urbana:	70%
Other Champaign County (local phone)	23%
Outside of Champaign County	7%

\* US population demographics taken from The World Almanac (1995).

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## WHAT MAY PRAIRIENET BE USED FOR?

Users of the Prairienet system login with a username and password and then interact with a textual menu system (Figure 1). The menus offer access to the Prairienet content, and also allow off-Prairienet use (e.g., use of telnet or Lynx). The menu prompt also allows many options to avoid navigating through the menu hierarchy. For example, a user may simply type `lynx http://thomas.loc.gov` rather than finding the appropriate menu option for "lynx." A variety of "go codes" are available to jump to particular menu items.

Figure 1: A Prairienet menu

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                << Center Square >>
                (go center)

Prairienet is your electronic community information center.
Welcome!

  1 The Prairienet Experience /
  2 Information Booth ("go info") /
  3 City Directory (Prairienet maps and navigation aids) /
  4 Prairienet's Town Hall and Administration Center /
  5 Agriculture Center /
  6 Arts and Entertainment /
  7 Business and Professional District /
  8 Community Center /
  9 Communication Center /
 10 Education Center /
 11 Government Center /
 12 Library and Information Center /
 13 Recreation, Sports, and Hobbies /
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x=Exit "go help"=Extended help  m=main menu p=previous menu
** Type a number, "go" code, or word **      ?=other options

Your Choice ==>
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The Prairienet system has 665 menus reachable by 1,222 “go codes.” In total, there are over 4,300 options selectable from the menu system. Fewer than 100 menus are created and maintained by systems staff. The balance are maintained by Prairienet’s information providers, known as “IPs.”

More than 425 organizations, individuals, groups, clubs, and businesses have completed IP training and been granted access to create and maintain an information area on Prairienet. IPs may utilize Prairienet menus (authored with a simple macro language), WWW pages, Gopher pages and FTP archives. They may also run mailing lists or network newsgroups. Email may be used for general purposes as well. IPs with special needs (e.g., an Internet-accessible database) are given assistance by the Prairienet staff.

Of the 425 IPs, however, only 231 are active. The rest have either failed to maintain their information areas or never actually created an area after training. Although some IPs move on to commercial Internet providers, these tend to request their Prairienet areas be removed. Thus, the majority of the 45% of IPs who get trained but do not maintain their area simply never get fully started or committed to maintaining an information area.

Table 3: Information Provider Areas by Type

	Number	Percentage
<u>Businesses</u>		
5 or fewer employees:	64	27%
6 or more employees:	32	14%
Subtotal	96	41%
<u>Non-profit organizations</u>		
Community Service		
Organizations & Charities	36	16%
Social Clubs and Associations	27	12%
Churches	19	8%
Individuals	14	6%
Health-related	10	4%

Municipal and County Service	9	4%
Schools & other education	9	4%
Political Action groups	7	3%
Professional Organizations	5	2%
University of Illinois	5	2%
Libraries	4	2%
Municipalities, Counties	4	2%
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Subtotal	135	59%

The breakdown of IP areas yields a picture of Prairienet which focuses more on community organizations than on businesses, which is perhaps opposite of the focus of the Internet as a whole (where businesses dominate, at least in terms of the number of Internet hosts. See <http://www.isoc.org/> for analysis of patterns of Internet growth).

The role of accessibility to a variety of community organizations, clubs, businesses, and other groups appears to be well-served, and the growth rate of 25 new IPs per month which Prairienet has sustained for more than 18 months indicates continued accessibility. However, the figures do not indicate a reality of the process of becoming an IP: People functioning as IPs on behalf of their organizations are required to first be familiar with basic Prairienet system use and features as individual users. This means that organizations whose membership does not generally fit within the individual demographics above are less likely to become Prairienet IPs.

In order to be accessible to IPs that cut across all strata of society in the Prairienet service area (that is, Champaign County and surrounding areas), it is necessary to identify individuals who belong to under-reached groups and target organizations to which they belong as potential IPs.

One important drawback of this approach is funding. As a charitable organization itself, Prairienet suffers from staff and equipment shortages (as do all Free-Nets to some extent). This makes it impractical to engage in the significantly increased training and outreach for many potential IPs, as staff are barely able to keep up with growth of the typical "self-selected" new IPs.

## WHAT IS PRAIRIENET USED FOR?

The Prairienet system menus offer essentially unlimited access to the Internet in addition to the content on the system itself. This section examines the overall usage patterns and numbers for Prairienet, and also assesses the relative use of various types of activities.

The global usage figures for Prairienet are impressive, and in fact represent the most frequently used computer systems at the University of Illinois. Prairienet runs 72 modems for public access (48 of these are 14.4Kbaud modems, 16 of which permit only a 15 minute "express" connection. The balance are 2400 baud modems). Except for the "express" modems, people are limited to one hour per login session, but may login as many times as they wish (such a policy is typical of Free-Net systems).

The Internet login record indicates a strong component of use by local sources, with over 60% of logins occurring via modem and another 15% from local (Champaign-Urbana) sources. Prairienet is a net importer of login traffic from other Free-Nets: 975 logins came from other Free-Nets (833 of which came from the two other Free-Nets in Illinois), but Prairienet users made only 14 logins from Prairienet to other Free-Nets.

Login figures overall are supportive of Prairienet's mission, in that the prevalence of busy signals on the Prairienet modems make it likely that people who have alternate access to the Internet (e.g., modem service from a commercial Internet service provider) would tend to use that service, rather than compete for Prairienet's limited modem pool. Thus, it may be inferred that people who utilize the Prairienet modems have no other Internet access, and therefore no other means of accessing the Prairienet content.

Table 4: Logins

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Login activity during a typical one week period \*

Login frequency:

Logins via modem	25,517
Logins via the Internet	15,111

Total logins	40,628
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Internet login source types:

University of Illinois (UIUC)	4,677
Other local access points	844
Other Free-Nets	975
Other Internet locations	8,778

Total logins via the Internet	15,111
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Internet locations from which logins originated:

Unique UIUC hosts	1,017
.edu hosts	1,462
.gov hosts	22
.com hosts	502
.us hosts	151
others	7

Total unique Internet locations	3,161
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Total unique locations

\* Not included in these figures are logins for email only using POP and other non-menu logins (FTP, WWW server, etc.)

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There is no unambiguous way to measure the frequency of use for items located within the Prairienet menus. Although the menu system is used to collect statistics on which menu options are selected, most IPs do not enable this feature. The main impediment, though, is that many data are accessible from more than one point. Particularly, many IPs menus (and many of the system menus as well) mirror their content for access via WWW. It's difficult to report on the frequency of use for local Prairienet content via the

menus, and difficult to gauge the relative use of particular menus or menu options. However, use of facilities for getting access to information off of the Prairienet system is easily measured due to the small number of programs which facilitate this -- each program is able to keep its own logs, which this section reports.

Telnet is the program which enables direct login to another computer on the Internet. On Prairienet, several menu options are used for telnet. In addition, Prairienet users may select any Internet host to telnet to. (In the future, the use of MUDs for telnet will be restricted to off-peak hours, as Prairienet runs its own MUD and MUSH, as described below.) Telnet is used relatively infrequently. In a given day, 220 people utilized telnet to connect to 194 unique Internet hosts (only telnet usage is reported by day, other usage is reported in longer time periods).

Of the 194 hosts people used telnet to connect to on a particular day, 125 hosts were used for MUDs, MUSHs, or other interactive game environments. The uses of the rest cannot be gleaned without asking the users, but may be assumed to be mostly regular telnet connections to hosts on which a user has an approved username.

Lynx is the plain text WWW client available on Prairienet. Mosaic, Netscape, and other graphical WWW clients may not be used on Prairienet directly due to the lack of SLIP or PPP on Prairienet's modems. People may access Prairienet's WWW server using any software they wish, of course, and a later section provides some detail on this. On Prairienet, Lynx is limited to connect to "http" style URLs only. This prevents ambiguity in the logs which would otherwise be produced by enabling Lynx's capability to make telnet, Gopher, and other styles of Internet connections or to be used for access to local files and directories.

During a two-week period for which logs of Lynx, IRC, FTP and Gopher were collected, 1898 individuals made some use of Lynx. The average use was about 3 times per week, but the range was from 1 to over 250 uses. Of 12,361 total uses of Lynx, 5,193 were to local (Prairienet) content. With Lynx, however, people can follow hyperlinks anywhere on the WWW, and may open new http URLs at any time. So, it's hard to know where people end up with Lynx, even though the logs do show the starting point.

FTP and Gopher are lightly utilized services on Prairienet, but they are available. Most people utilize Lynx as a front-end to eventually download files that would have been retrieved by FTP in the past, and Gopher is not nearly as popular as WWW for current Internet contents. 620 individuals made use of Gopher during a two-week period an average of 1.5 times each (with a maximum of 72 times).

FTP was utilized by 246 individuals during the same period an average of 2 times each, with a maximum of 106 times (but the next most frequent user employed FTP only 32 times).

IRC or Internet Relay Chat is a popular service which enables real-time chat on a variety of topics. Another Prairienet facility, talk, allows one-on-one conversations but is not otherwise reported here. IRC was utilized by 563 individuals during the two-week period, and has been used at least once by over 8% of Prairienet users. Prairienet has a set of restrictions for IRC which enable access only to a short list of IRC servers during prime-time, but allows connections to other servers during off-peak hours (evenings and weekends, although these hours are being re-worked and will become shorter). In fact, nearly 100% of the 7838 IRC sessions during the two-week period were to the “approved” prime-time hosts (the hosts are `firefly.prairienet.org`, `irc.undernet.org`, and `irc.uiuc.edu`).

Of the 563 individuals who utilized IRC during the two-week period, the average number of uses was just over 6 per week with a maximum of 190 uses in two weeks (the next highest number of uses was 171, with one dozen people topping out over 100).

Network news is available on Prairienet thanks to the UIUC Computing and Communications Services Office, which runs the news server utilized by Prairienet and the rest of UIUC. The server has about 6,000 network newsgroups. The addition of existing newsgroups may be requested by Prairienet users, and new local groups may be created for Prairienet IPs (80 such groups have been created). 50% of Prairienet users have made some use of network news at one time. Frequencies and patterns of use are not currently available.

Lastly, email is a standard service that nearly 100% of Prairienet users utilize. On Prairienet, about 33% of users have made the switch from a simple menu-driven email system to Pine, a more flexible and commonly available email system. Logs of email usage are not normally kept due to their size: inbound and outbound email is in the thousands per day. Prairienet also supports over 50 electronic mailing lists, most of which are maintained by IPs and serve audiences ranging from local to global.

Table 5: Use of Prairienet Internet services

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Utilization during a two week period. Percentages are based on 5445 individuals who logged into Prairienet during this period.

	Total uses	% who used	Avg. uses / week	Max uses
IRC	12,361	10%	6.1	190
Lynx	7,838	35%	3.2	505
FTP	993	5%	2.0	190
Gopher	1,961	11%	1.5	72

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The numbers for utilization of the various Internet resources from Prairienet do not include session lengths. Simply put, IRC and MUD utilization tends to last for the entire login session (typically one hour, although extended time limits are granted during late night hours). Lynx, Gopher, FTP, and other remote telnet sessions tend to last only a few minutes each, although Lynx usage, in particular, has a broad range of only a few seconds to a full hour.

In order to provide a useful assessment of the impact of Internet-accessible resources that are utilized through Prairienet, it would be necessary to examine the particular resources being accessed and their value to the user. In addition, the relative amount of time spend on the resources would need to be measured (especially as time spent for one purpose on a Prairienet modem excludes the possibility of that same modem being spent for another purpose

by someone else at the same time on that modem. That is, utilization of resources that do not benefit the Prairienet mission can help to prevent utilization of resources that do).

The overall pattern shows that the Internet resources are used extensively. Of 5445 individuals who utilized Prairienet during a two-week period, 2532 made use of telnet, Lynx, Gopher, or FTP. 919 people made use of two or more of these facilities. Would these individuals have utilized Prairienet at all if the facilities were not available or restricted? We hope the survey currently underway will help to address this important issue which relates to the types of services that should be made available as well as the implications of the services offered for fundraising, promotion, and solicitation of new IP and users.

## WHO'S LOOKING?

The previous section outlined the sources for login traffic to Prairienet. The other principal means of accessing Prairienet content is via the World Wide Web. Although FTP and Gopher servers exist on Prairienet, and mailing list and newsgroup content is also made available on a wide basis, Prairienet's WWW server use far exceeds use of these other facilities.

Web server use logs are processed and archived; the current log is accessible at <http://www.prairienet.org/access.html>. Overall use of the Prairienet Web server is between 500,000 and 600,000 "hits" per week. As for all Web servers, "hits" are not pages delivered but files -- for example, a given Web page, accessed with a single URL, may generate a number of hits if the page incorporates graphics or other content types. The numbers are confounded further by clients such as Lynx which do not retrieve the same graphics (and therefore do not produce the same number of hits) as Mosaic or Netscape does.

During a one-week period that coincided with the data collection times for other figures reported here, Prairienet's Web server was accessed by clients in 100 countries, with slightly over 70% from Internet hosts within the US. In total, over 35,000 unique Internet hosts from 12,000 unique Internet domains accessed the server. ("Domains" do not match Internet domains within the

Domain Name System or DNS exactly as the program used for log analysis, `wwwstat`, does not match domains exactly.)

During the one-week period, 18,303 unique files (including things like GIF images retrieved as part of an HTML page) were retrieved from the Prairienet WWW server. Difficulties with knowing which actual files on the Prairienet computers are intended to be Web-accessible make it impossible to know for certain what proportion of the total unique Web-accessible files this number represents.

The number of accesses for these 18,303 files ranged from one single access to over 11,313 accesses for a GIF counting utility used by many IPs and users and 4838 accesses by a “blue ribbon” GIF. The median number of accesses for any Web file was only 4, however. Only 69 files had more than 1000 hits; only 911 had more than 100 hits.

About 10,200 of the 18,303 pages are maintained by IPs, the rest are maintained by individual users who allocate a portion of their personal directory for public WWW access. This figure is a bit vague, as some IPs point to or utilize individual pages, and some individual pages are really IP pages that have not been properly located.

664 individuals’ personal WWW pages were accessed during the one-week period. The range of utilization for IP pages and personal pages is about the same (i.e., neither IP pages nor personal pages are more popular).

These figures are not surprising given the recent popularity of the World Wide Web. From the point of view of an IP, Prairienet accessibility is greater and more varied through the Web than through the menu system for people with individual usernames. IPs with a desire to reach people who do not login to Prairienet regularly (that is, almost all IPs) should make use of the WWW to author their materials in addition to any other means they choose.

The role of the Web for Prairienet’s mission is uncertain. The Web is the primary means by which residents in Prairienet’s service area can view Prairienet content without logging in (the service area being East-Central Illinois). Yet the Web is utilized most heavily by people out of that service area. The best interpretation, perhaps, is that the global access to material on Prairienet is part of the appeal for IPs. It follows that anything that promotes

IPs and helps to create inspiration in the IPs to produce interesting content is also good for Prairienet's mission. In the current Prairienet environment, however, significant hardware resources are devoted to insuring the Web server is able to deliver on the hits it receives, so such logic cannot be allowed to stand without some scrutiny.

## CONCLUSION

This work has presented simple descriptive analysis of usage logs and patterns on the Prairienet community computing system. Although all Free-Nets and other community systems have significantly different missions, user populations, and availability of functions such as Lynx and IRC, it is likely that the overall usage patterns and trends are similar across systems.

The question under investigation is, "to what extent is Prairienet serving its intended purpose as a community forum for education and information access?" The question is far from answered as a result of the analysis presented here, but some indications of an answer have been produced. In order to get a better notion of a useful answer it is necessary to incorporate findings from a user survey with activities which take place off of the Prairienet system itself. Such activities include training classes, the use of public-access sites, and support given via telephone.

This work presents firm evidence that information access occurs on Prairienet. The number of information providers (IPs) and the quantity of use for facilities such as Lynx show that information on the Prairienet system is utilized by Prairienet users as well as a larger global audience. Prairienet also acts as an access point to information elsewhere.

Non-information functions are also extremely popular, yet compose a smaller portion of the Prairienet mission: email, network news, IRC, and other facilities are used primarily for communication, not for information. The extent to which the popularity of these services help to create a platform from which users may become self-educated or access information is not clear from this work. However, in an environment where Prairienet (like all community systems) must actively position itself relative to commercial Internet service providers, school Internet access, and traditional means of accessing information such as the public library, it would be foolhardy to

avoid such services entirely even if their use does conflict with general information access uses.

The extent to which education occurs on Prairienet is difficult to measure by the log data analyzed here, but an important factor is without doubt: a significant portion of Prairienet's users have learned to use a large number of facilities for communication and information access. Self-teaching can occur by reading menu information or other online help, experimentation, consulting with friends and colleagues, or reading a book -- or, of course, attending a class or Prairienet workshop. Whether education about how to use information resources is a direct indicator of real-world education or of truly enhanced ability to seek out relevant information is difficult to gauge. At least some of each happens on Prairienet, and has been experienced by a large number of users. (A reasonable question is, how should the other users be reached?)

This study is only the first in a series which will utilize different means to address the overall issue of the efficacy of the Prairienet system. Although the results cannot be conclusive with regards to information access and education, it does provide evidence that Prairienet is heavily utilized by a variety of individuals for a great variety of purposes. That alone is a significant accomplishment for a community computing system operated by member and community donations on a not-for-profit basis.

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