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## The Finger User Information Protocol

### Status of this Memo

This memo defines a protocol for the exchange of user information. This RFC specifies an IAB standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "IAB Official Protocol Standards" for the standardization state and status of this protocol. Distribution of this memo is unlimited.

### Abstract

This memo describes the Finger user information protocol. This is a simple protocol which provides an interface to a remote user information program.

Based on RFC 742, a description of the original Finger protocol, this memo attempts to clarify the expected communication between the two ends of a Finger connection. It also tries not to invalidate the many existing implementations or add unnecessary restrictions to the original protocol definition.

This edition corrects and clarifies RFC 1196.

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## 1. Introduction

### 1.1. Intent

This memo describes the Finger user information protocol. This is a simple protocol which provides an interface to a remote user information program (RUIP).

Based on RFC 742, a description of the original Finger protocol, this memo attempts to clarify the expected communication between the two ends of a Finger connection. It also tries not to invalidate the many current implementations or add unnecessary restrictions to the original protocol definition.

The most prevalent implementations of Finger today seem to be primarily derived from the BSD UNIX work at the University of California, Berkeley. Thus, this memo is based around the BSD version's behavior.

However, the BSD version provides few options to tailor the Finger RUIP for a particular site's security policy, or to protect the user from dangerous data. Furthermore, there are MANY potential security holes that implementors and administrators need to be aware of, particularly since the purpose of this protocol is to return information about a system's users, a sensitive issue at best. Therefore, this memo makes a number of important security comments and recommendations.

## 1.2. History

The FINGER program at SAIL, written by Les Earnest, was the inspiration for the NAME program on ITS. Earl Killian at MIT and Brian Harvey at SAIL were jointly responsible for implementing the original protocol.

Ken Harrenstien is the author of RFC 742, "Name/Finger", which this memo began life as.

## 1.3. Requirements

In this document, the words that are used to define the significance of each particular requirement are capitalized. These words are:

### \* "MUST"

This word or the adjective "REQUIRED" means that the item is an absolute requirement of the specification.

### \* "SHOULD"

This word or the adjective "RECOMMENDED" means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.

### \* "MAY"

This word or the adjective "OPTIONAL" means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

An implementation is not compliant if it fails to satisfy one or more of the MUST requirements. An implementation that satisfies all the MUST and all the SHOULD requirements is said to be "unconditionally compliant"; one that satisfies all the MUST requirements but not all the SHOULD requirements is said to be "conditionally compliant".

## 1.4. Updates

The differences of note between RFC 1196 and this memo are:

- o the optional /W switch in the Finger query specification was mistakenly placed at the end of the line. The 4.3BSD Finger specifies it at the beginning, where this memo now also puts it.

- o the BNF in the Finger query specification was not clear on the treatment of blank space. This memo is more exacting by including an explicit token for it.
- o The flow of events in a Finger connection is now better defined on the topic of the close of the Finger connection.

## 2. Use of the protocol

### 2.1. Flow of events

Finger is based on the Transmission Control Protocol, using TCP port 79 decimal (117 octal). The local host opens a TCP connection to a remote host on the Finger port. An RUIP becomes available on the remote end of the connection to process the request. The local host sends the RUIP a one line query based upon the Finger query specification, and waits for the RUIP to respond. The RUIP receives and processes the query, returns an answer, then initiates the close of the connection. The local host receives the answer and the close signal, then proceeds closing its end of the connection.

### 2.2. Data format

Any data transferred MUST be in ASCII format, with no parity, and with lines ending in CRLF (ASCII 13 followed by ASCII 10). This excludes other character formats such as EBCDIC, etc. This also means that any characters between ASCII 128 and ASCII 255 should truly be international data, not 7-bit ASCII with the parity bit set.

### 2.3. Query specifications

An RUIP MUST accept the entire Finger query specification.

The Finger query specification is defined:

```
{Q1}    ::= [{W}|{W}{S}{U}]{C}
{Q2}    ::= [{W}{S}][{U}]{H}{C}
{U}      ::= username
{H}      ::= @hostname | @hostname{H}
{W}      ::= /W
{S}      ::= <SP> | <SP>{S}
{C}      ::= <CRLF>
```

{H}, being recursive, means that there is no arbitrary limit on the number of @hostname tokens in the query. In examples of the {Q2} request specification, the number of @hostname tokens is limited to two, simply for brevity.

Be aware that {Q1} and {Q2} do not refer to a user typing "finger user@host" from an operating system prompt. It refers to the line that an RUIP actually receives. So, if a user types "finger user@host<CRLF>", the RUIP on the remote host receives "user<CRLF>", which corresponds to {Q1}.

As with anything in the IP protocol suite, "be liberal in what you accept".

#### 2.4. RUIP {Q2} behavior

A query of {Q2} is a request to forward a query to another RUIP. An RUIP **MUST** either provide or actively refuse this forwarding service (see section 3.2.1). If an RUIP provides this service, it **MUST** conform to the following behavior:

Given that:

Host <H1> opens a Finger connection <F1-2> to an RUIP on host <H2>.

<H1> gives the <H2> RUIP a query <Q1-2> of type {Q2} (e.g., F00@HOST1@HOST2).

It should be derived that:

Host <H3> is the right-most host in <Q1-2> (i.e., HOST2)

Query <Q2-3> is the remainder of <Q1-2> after removing the right-most "@hostname" token in the query (i.e., F00@HOST1)

And so:

The <H2> RUIP then must itself open a Finger connection <F2-3> to <H3>, using <Q2-3>.

The <H2> RUIP must return any information received from <F2-3> to <H1> via <F1-2>.

The <H2> RUIP must close <F1-2> in normal circumstances only when the <H3> RUIP closes <F2-3>.

## 2.5. Expected RUIP response

For the most part, the output of an RUIP doesn't follow a strict specification, since it is designed to be read by people instead of programs. It should mainly strive to be informative.

Output of ANY query is subject to the discussion in the security section.

### 2.5.1. {C} query

A query of {C} is a request for a list of all online users. An RUIP MUST either answer or actively refuse (see section 3.2.2). If it answers, then it MUST provide at least the user's full name. The system administrator SHOULD be allowed to include other useful information (per section 3.2.3), such as:

- terminal location
- office location
- office phone number
- job name
- idle time (number of minutes since last typed input, or since last job activity).

### 2.5.2. {U}{C} query

A query of {U}{C} is a request for in-depth status of a specified user {U}. If you really want to refuse this service, you probably don't want to be running Finger in the first place.

An answer MUST include at least the full name of the user. If the user is logged in, at least the same amount of information returned by {C} for that user MUST also be returned by {U}{C}.

Since this is a query for information on a specific user, the system administrator SHOULD be allowed to choose to return additional useful information (per section 3.2.3), such as:

- office location
- office phone number
- home phone number
- status of login (not logged in, logout time, etc)
- user information file

A user information file is a feature wherein a user may leave a short message that will be included in the response to Finger requests. (This is sometimes called a "plan" file.) This is easily implemented by (for example) having the program look for a specially named text

file in the user's home directory or some common area; the exact method is left to the implementor. The system administrator **SHOULD** be allowed to specifically turn this feature on and off. See section 3.2.4 for caveats.

There **MAY** be a way for the user to run a program in response to a Finger query. If this feature exists, the system administrator **SHOULD** be allowed to specifically turn it on and off. See section 3.2.5 for caveats.

### 2.5.3. {U} ambiguity

Allowable "names" in the command line **MUST** include "user names" or "login names" as defined by the system. If a name is ambiguous, the system administrator **SHOULD** be allowed to choose whether or not all possible derivations should be returned in some fashion (per section 3.2.6).

### 2.5.4. /W query token

The token /W in the {Q1} or {Q2} query types **SHOULD** at best be interpreted at the last RUIP to signify a higher level of verbosity in the user information output, or at worst be ignored.

### 2.5.5. Vending machines

Vending machines **SHOULD** respond to a {C} request with a list of all items currently available for purchase and possible consumption. Vending machines **SHOULD** respond to a {U}{C} request with a detailed count or list of the particular product or product slot. Vending machines should **NEVER NEVER EVER** eat money.

## 3. Security

### 3.1. Implementation security

Sound implementation of Finger is of the utmost importance. Implementations should be tested against various forms of attack. In particular, an RUIP **SHOULD** protect itself against malformed inputs. Vendors providing Finger with the operating system or network software should subject their implementations to penetration testing.

Finger is one of the avenues for direct penetration, as the Morris worm pointed out quite vividly. Like Telnet, FTP and SMTP, Finger is one of the protocols at the security perimeter of a host. Accordingly, the soundness of the implementation is paramount. The implementation should receive just as much security scrutiny during design, implementation, and testing as Telnet, FTP, or SMTP.

### 3.2. RUIP security

Warning!! Finger discloses information about users; moreover, such information may be considered sensitive. Security administrators should make explicit decisions about whether to run Finger and what information should be provided in responses. One existing implementation provides the time the user last logged in, the time he last read mail, whether unread mail was waiting for him, and who the most recent unread mail was from! This makes it possible to track conversations in progress and see where someone's attention was focused. Sites that are information-security conscious should not run Finger without an explicit understanding of how much information it is giving away.

#### 3.2.1. {Q2} refusal

For individual site security concerns, the system administrator SHOULD be given an option to individually turn on or off RUIP processing of {Q2}. If RUIP processing of {Q2} is turned off, the RUIP MUST return a service refusal message of some sort. "Finger forwarding service denied" is adequate. The purpose of this is to allow individual hosts to choose to not forward Finger requests, but if they do choose to, to do so consistently.

Overall, there are few cases which would warrant processing of {Q2} at all, and they are far outweighed by the number of cases for refusing to process {Q2}. In particular, be aware that if a machine is part of security perimeter (that is, it is a gateway from the outside world to some set of interior machines), then turning {Q2} on provides a path through that security perimeter. Therefore, it is RECOMMENDED that the default of the {Q2} processing option be to refuse processing. It certainly should not be enabled in gateway machines without careful consideration of the security implications.

#### 3.2.2. {C} refusal

For individual site security concerns, the system administrator SHOULD be given an option to individually turn on or off RUIP acceptance of {C}. If RUIP processing of {C} is turned off, the RUIP MUST return a service refusal message of some sort. "Finger online user list denied" is adequate. The purpose of this is to allow individual hosts to choose to not list the users currently online.

#### 3.2.3. Atomic discharge

All implementations of Finger SHOULD allow individual system administrators to tailor what atoms of information are returned to a query. For example:



- Administrator A should be allowed to specifically choose to return office location, office phone number, home phone number, and logged in/logout time.
- Administrator B should be allowed to specifically choose to return only office location, and office phone number.
- Administrator C should be allowed to specifically choose to return the minimum amount of required information, which is the person's full name.

#### 3.2.4. User information files

Allowing an RUIP to return information out of a user-modifiable file should be seen as equivalent to allowing any information about your system to be freely distributed. That is, it is potentially the same as turning on all specifiable options. This information security breach can be done in a number of ways, some cleverly, others straightforwardly. This should disturb the sleep of system administrators who wish to control the returned information.

#### 3.2.5. Execution of user programs

Allowing an RUIP to run a user program in response to a Finger query is potentially dangerous. BE CAREFUL!! -- the RUIP MUST NOT allow system security to be compromised by that program. Implementing this feature may be more trouble than it is worth, since there are always bugs in operating systems, which could be exploited via this type of mechanism.

#### 3.2.6. {U} ambiguity

Be aware that a malicious user's clever and/or persistent use of this feature can result in a list of most of the usernames on a system. Refusal of {U} ambiguity should be considered in the same vein as refusal of {C} requests (see section 3.2.2).

#### 3.2.7. Audit trails

Implementations SHOULD allow system administrators to log Finger queries.

### 3.3. Client security

It is expected that there will normally be some client program that the user runs to query the initial RUIP. By default, this program SHOULD filter any unprintable data, leaving only printable 7-bit characters (ASCII 32 through ASCII 126), tabs (ASCII 9), and CRLFs.

This is to protect against people playing with terminal escape codes, changing other peoples' X window names, or committing other dastardly or confusing deeds. Two separate user options SHOULD be considered to modify this behavior, so that users may choose to view international or control characters:

- one to allow all characters less than ASCII 32
- another to allow all characters greater than ASCII 126

For environments that live and breathe international data, the system administrator SHOULD be given a mechanism to enable the latter option by default for all users on a particular system. This can be done via a global environment variable or similar mechanism.

#### 4. Examples

##### 4.1. Example with a null command line ({C})

Site: elbereth.rutgers.edu  
Command line: <CRLF>

Login	Name	TTY	Idle	When	Office
rinehart	Mark J. Rinehart	p0	1:11	Mon 12:15	019 Hill x3166
greenfie	Stephen J. Greenfiel	p1		Mon 15:46	542 Hill x3074
rapatel	Rocky - Rakesh Patel	p3	4d	Thu 00:58	028 Hill x2287
pleasant	Mel Pleasant	p4	3d	Thu 21:32	019 Hill 908-932-
dphillip	Dave Phillips	p5	021:	Sun 18:24	265 Hill x3792
dmk	David Katinsky	p6	2d	Thu 14:11	028 Hill x2492
cherniss	Cary Cherniss	p7	5	Mon 15:42	127 Psychol x2008
harnaga	Doug Harnaga	p8	2:01	Mon 10:15	055 Hill x2351
brisco	Thomas P. Brisco	pe	2:09	Mon 13:37	h055 x2351
laidlaw	Angus Laidlaw	q0	1:55	Mon 11:26	E313C 648-5592
cje	Chris Jarocha-Ernst	q1	8	Mon 13:43	259 Hill x2413

##### 4.2. Example with name specified ({U}{C})

Site: dimacs.rutgers.edu  
Command line: pirmann<CRLF>  
Login name: pirmann In real life: David Pirmann  
Office: 016 Hill, x2443 Home phone: 989-8482  
Directory: /dimacs/u1/pirmann Shell: /bin/tcsh  
Last login Sat Jun 23 10:47 on ttyp0 from romulus.rutgers.  
No unread mail  
Project:  
Plan:

Work Schedule, Summer 1990  
Rutgers LCSR Operations, 908-932-2443

Monday	5pm - 12am
Tuesday	5pm - 12am
Wednesday	9am - 5pm
Thursday	9am - 5pm
Saturday	9am - 5pm

larf larf hoo hoo

#### 4.3. Example with ambiguous name specified ({U}{C})

Site: elbereth.rutgers.edu

Command line: ron<CRLF>

Login name: spinner

Office: Ops Cubby, x2443

Directory: /u1/spinner

Last login Mon May 7 16:38 on ttyq7

Plan:

In real life: Ron Spinner

Home phone: 463-7358

Shell: /bin/tcsh

```

          ught i
        ca      n
      ,m        a
    I      ...  t
      !      .  i
      !      !  m
    p_l      !pool e
      e
    H

```

Login name: surak

Office: 000 OMB Dou, x9256

Directory: /u2/surak

Last login Fri Jul 27 09:55 on ttyq3

No Plan.

In real life: Ron Surak

Shell: /bin/tcsh

Login name: etter

Directory: /u2/etter

Never logged in.

No Plan.

In real life: Ron Etter

Shell: /bin/tcsh

#### 4.4. Example of query type {Q2} ({U}{H}{H}{C})

Site: dimacs.rutgers.edu

Command line: hedrick@math.rutgers.edu@pilot.njin.net<CRLF>

[pilot.njin.net]

[math.rutgers.edu]

Login name: hedrick

Office: 484 Hill, x3088

In real life: Charles Hedrick

Directory: /math/u2/hedrick                      Shell: /bin/tcsh  
Last login Sun Jun 24 00:08 on ttyp1 from monster-gw.rutge  
No unread mail  
No Plan.

## 5. Acknowledgments

Thanks to everyone in the Internet Engineering Task Force for their comments. Special thanks to Steve Crocker for his security recommendations and prose.

## 6. Security Considerations

Security issues are discussed in Section 3.

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