                        FYI on Questions and Answers
         Answers to Commonly asked "Experienced Internet User" Questions

Status of this Memo

   This FYI RFC is one of two FYI's called, "Questions and Answers"
   (Q/A), produced by the User Services Working Group of the Internet
   Engineering Task Force (IETF). The goal is to document the most
   commonly asked questions and answers in the Internet.

   This memo provides information for the Internet community. It does
   not specify any standard. Distribution of this memo is unlimited.

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1. Introduction

   During the last few months, several people have monitored various
   major mailing lists and have extracted questions that are important
   or commonly asked. This FYI RFC is one of two in a series of FYI's
   which present the questions and their answers. The first FYI, FYI 4,
   presented questions new Internet users commonly ask and their
   answers.

The goal of this FYI is to codify the Internet lore so that network
operations staff, especially for networks just joining the Internet,
will have an accurate and up to date set of references from which to
work. Also, redundancies are moved away from the electronic mailing
lists so that the lists' subscribers do not have to read the same
queries and answers over and over again.

Although the questions and their responses are taken from various
mailing lists, they are presented here loosely grouped by related
topic for ease of reading. First the question is presented, then the
answer (or answers) as it appeared on the mailing list.

Sometimes the answers are abridged for better use of space. If a
question was not answered on the mailing list, the editors provide an
answer. These answers are not distinguished from the answers found
on the lists. Sometimes, in order to be as complete as possible, the
editors provide additional information that was not present in the
original answer. If so, that information falls under the heading
"Additional Information".

The answers are as correct as the reviewers can make them. However,
much of this information changes with time. As the FYI is updated,
temporal errors will be corrected.

Many of the questions are in first person, and the answers were
directed to the originator of the question. These phrasings have not
been changed except where necessary for clarity. References to the
correspondents' names have been removed.

The Q/A mailing lists are maintained by Gary Malkin at FTP.COM. They
are used by a subgroup of the User Services Working Group to discuss
the Q/A FYIs. They include:

quail@ftp.com   This is a discussion mailing list. Its
                        primary use is for pre-release review of
                        the Q/A FYIs.

quail-request@ftp.com   This is how you join the quail mailing list.

quail-box@ftp.com   This is where the questions and answers
                        will be forwarded-and-stored. It is
                        not necessary to be on the quail mailing
                        list to forward to the quail-box.

2. Acknowledgments

   The following people deserve thanks for their help and contributions
   to this FYI Q/A: Jim Conklin (EDUCOM), John C. Klensin (MIT),
   Professor Kynikos (Special Consultant), Jon Postel (ISI),
   Marshall Rose (PSI, Inc.), David Sitman (Tel Aviv University),
   Patricia Smith (Merit), Gene Spafford (Purdue), and
   James Van Bokkelen (FTP Software, Inc.).

3. Questions about the Internet

   3.1. How do I get statistics regarding the traffic on NSFNET?

      Merit/NSFNET Information Services maintains a variety of
      statistical data at 'nis.nsf.net' (35.1.1.48) in the 'stats'
      directory. Information includes packet counts by NSS and byte
      counts for type of use (ftp, smtp, telnet, etc.). Filenames are
      of the form 'NSFyy-mm.type'.

      Files are available for anonymous ftp; use 'guest' as the
      password.

      The data in these files represent only traffic which traverses the
      highest level of the NSFNET, not traffic within a campus or
      regional network. Send questions/comments to nsfnet-
      info@merit.edu.

4. Questions About Other Networks and Internets

   4.1. We have a user who would like to access a machine on
        "EARN/BITNET". I can't find anything on this in the domain
        name tables. Please, what is this, and how do I connect to it?

      There are several machines on the Internet that act as gateways
      between the Internet and BITNET. Two examples are UICVM.UIC.EDU
      and CUNYVM.CUNY.EDU. You can address a mail message to
      user%nodename.bitnet@uicvm.uic.edu where the message will be
      passed from the Internet to BITNET.

      Additional Information:

         These same gateways, known as INTERBIT on the BITNET/EARN side,
         transfer mail from computers on that network which support SMTP
         mail headers, onto the Internet. (Many BITNET/EARN computers
         still do not support SMTP, which is not a part of the IBM
         protocol used, and it is not possible to send mail from those
         computers across the gateways into the Internet, in general.)

BITNET and EARN are the two largest of several cooperating
networks which use the IBM RSCS/NJE protocol suite, but are not
limited to IBM systems. These independently administered,
interconnected networks function as a single, worldwide network
directly connecting more than 3,300 computers in about 1,400,
mostly higher-education, organizations worldwide. This
worldwide network supports electronic mail, including mailing
lists, sender-initiated file transfer, and short "interactive"
messages.

BITNET, frequently used (outside of Europe) to refer to the
whole worldwide network, technically refers to that portion in
the United States, plus sites in other countries which are
connected through the United States and do not have their own
separately administered cooperating networks. More than 550
organizations in the U.S. participate in BITNET.

EARN is the European Academic Research Network. EARN links
more than 500 institutions in Europe and several surrounding
countries.

BITNET and CSNET merged organizationally on October 1, 1990, to
form CREN, the Corporation for Research and Educational
Networking. The two networks remain separate at the
operational level level, however. (EARN and the other
Cooperating Networks were not involved in this merger.)

5. Questions About Internet Documentation

5.1. Where do I get information regarding ordering documents related to GOSIP?

The complete information as issued by NIST is available online on
the NIC.DDN.MIL host as PROTOCOLS:GOSIP-ORDER-INFO.TXT. The file
contains pointers to contact people, ordering addresses, prices,
and, in some cases, online pathnames, for various GOSIP related
documents. In addition, the information as of August 1990 was
published as an appendix to RFC 1169, "Explaining the Role of
GOSIP" [1].

6. Questions About Domain Name System (DNS)

6.1. Is there a DNS Query server?

Actually, what you are looking for is the service that host
128.218.1.109 provides on port 5555 - you simply connect to that
host at that port, type in a fully qualified domain name and it
responds with an internet address and closes the connection. I

used it when I had a host that still only had /etc/hosts and it
did just what I needed - which was basically a manual nslookup.

However, the vast majority of users will find it simpler to just
use a DNS query tool and ask the DNS directly. This doesn't
require much sophistication, and does allow the user to see how
short names are expanded at the user's site rather than at
128.218.1.109 (wherever that is). For example, suppose a user
wants to find out the address of a fully-qualified domain name
"X.MISKATONIC.EDU", and also see what host and address are used
when "Z" is typed as a host name.

Assuming the user is on a UNIX host and has a copy of the dig
program, type:

    dig x.miskatonic.edu
and
    dig z

and the answers will appear. You are now on your way to
becoming a DNS expert. There are other UNIX alternatives,
e.g., nslookup, and similar programs for non-UNIX systems.
Your local DNS guru certainly has one or more of these tools,
and although they are often kept from the public, they are
really quite easy to use for simple cases.

6.2. We have been having a frequent BIND failure on both our VAX
     and Solbourne that is traced to TCP domain queries from an
     IBM NSMAIN nameserver running in cache mode (UDP queries do
     not cause this problem, though it is usually a UDP
     resolution that is active upon the crash -- this resolution
     is an innocent victim).

     I have discovered that something is trashing the hash areas
     (sometimes even as it is being recursively used in a
     resolution). Also, occasionally the socket/file descriptor
     for the TCP connection is changed to invalid entries causing
     a reply write fail (though this is not necessarily fatal,
     and the rest of the structure is not apparently altered).

     Has any one else had frequent BIND failures (especially
     major domain sites that have heavy TCP domain loads)?

     In both the case of BIND and the IBM implementation, often called
     FAL, there are multiple versions, with older versions being truly
     bad. Upgrade to recent version before exploring further.

     BIND has always had a problem with polluting its own database.

These problems have been related to TCP connections, NS RRs with
small TTLs, and several other causes. Experience suggests that
the style of bug fixing has often been that of reducing the
problem by 90% rather than eliminating it.

IBM's support for the DNS (outside of UNIX systems) is interesting
in its techniques, encouraging in its improvement, but still
somewhat depressing when compared to most other DNS software. IBM
also uses terminology that varies somewhat from the usual DNS
usage and preserves some archaic syntax, e.g., "..".

The combination of an old BIND and an old IBM server is just plain
unpleasant.

6.3. Is the model used by the domain name system for host names
     that the owner of a name gets to choose its case?

The model used by the DNS is that you get to control at a specific
point in the name space, and are hence free to select case as you
choose, until points where you in turn give away control. As a
practical matter, there are several implementations that don't do
the right thing. IBM implementations often map everything into a
single case.

6.4. According to RFC 1034 [2], section 4.2.1, one should not have
     to code glue RR's for name server's names unless they are below
     the cut. When I don't put glue RR's in, and do a query for
     NS records, the "additional" field is left blank. As far as I
     can tell, all other zones I query for NS records have this
     filled with the IP addresses of the NS hosts. Is this required
     or should I not be concerned that the additional field is empty?

The protocol says that an empty additional field is not a problem
when the name server's name is not "below" the cut.

In practice, putting in the glue where it is not required can
cause problems if the servers named in the glue are used for
several zones. This is broken behavior in BIND. Not putting in
glue can cause other problems in BIND, usually when the server
name is difficult to resolve. So, the bottom line is to put glue
in only when required, and don't use aliases or anything else
tricky when it comes to identifying name servers.

7. Questions About Network Management Implementations

    7.1. In reading the SNMP RFCs [3,4,5,6] I find mention of
        authentication of PDUs. Are there any standards for
        authentication mechanisms?

        There is a working group of the IETF that is working on this
        problem. They are close to a solution, but nothing has yet
        reached RFC publication yet. Expect something solid and
        implementable by October of 1991.

    7.2. Can vendors make their enterprise-specific variables available
        to users through a standard distribution mechanism?

        Yes. But before someone submits a MIB, they should check it out
        themselves.

        On uu.psi.com in pilot/snmp-wg/, there are two files

            mosy-sparc-4.0.3.c

            mosy-sun3-3.5

        The first will run on a Sun-Sparc, the second will run on a Sun-3.
        After retrieving one of these files in BINARY mode via anonymous FTP,
        the submittor can run their MIB through it, e.g.,

            % mosy mymib.my

        Once your MIB passes, send it to:

            mib-checker@isi.edu

        If everything is OK, the mib-checker will arrange to have it
        installed in the /share/ftp/mib directory on venera.isi.edu.

        Note: This processing does not offer an official endorsement. The
        documents submitted must not be marked proprietary, confidential,
        or the like.

    7.3. I have a question regarding those pesky octet strings again.
        I use the variable-type field of the Response pdu to determine
        how the result should be displayed to the user. For example,
        I convert NetworkAddresses to their dotted decimal format
        ("132.243.50.4"). I convert Object Identifiers into strings
        ("1.3.6.1.2....").

        I would LIKE to just print Octet Strings as strings. But,

this causes a problem in such cases as atPhysAddress in
which the Octet string contains the 6 byte address instead
of a printable ASCII string. In this case, I would want to
display the 6 bytes instead of just trying to print the
string.

MY QUESTION IS: Does anyone have a suggestion as to how I
can determine whether I can just print the string or whether
I should display the octet bytes. * Remember: I want to
support enterprise specific variables too.

In general, there is no way that you can tell what is inside an
OCTET STRING without knowing something about the object that the
OCTET STRING comes from. In MIB-II [6], some objects are marked
as DisplayString which has the syntax of OCTET STRING but is
restricted to characters from the NVT ASCII character set (see the
TELNET Specification, RFC 854 [7], for further information).
These objects are:

   sysDescr
   sysContact
   sysName
   sysLocation
   ifDescr

If you want to be able to arbitrarily decide how to display the
strings, without knowing anything about the object, then you can
scan the octets, looking for any octet which is not printable
ASCII. If you find at least one, you can print the entire string,
octet by octet, in "%02x:" notation. If all of the octets are
printable ASCII, then you can just printf the string.

7.4. If archived MIBs must be 1155-compatible [3], it would be nice
     if those who submit them check them first. Where are these
     MIB tools available for public FTP? Ideally, a simple
     syntax checker (that didn't actually generate code) would be
     nice.

     In the ISODE 6.0 release there is a tool called MOSY which
     recognizes the 1155 syntax and produces a flat ASCII file. If you
     can run it through MOSY without problems then you are OK.

7.5. Suppose I want to create a private MIB object for causing
     some action to happen, say, do a reset. Should the syntax
     or this object specify a value such as:

```
      Syntax:
         INTEGER {
            perform reset (1),
         }
```

   even though there is only a single value? Or, is it ok to
   just allow a Set on this object with any value to perform
   the desired action? If the later, how is this specified?

   For our SNMP manageable gizmos and doohickies with similar
   "action" type MIB variables, I've defined two values

```
      Syntax:
         INTEGER {
            reset(1)
            not-reset(2)
         }
```

   And defined behavior so that the only valid value that the
   variable may be set to is "reset" (which is returned in the get
   response PDU) and at all other times a get/getnext will respond
   with "not-reset".

8. Questions about Serial Line Internet Protocol (SLIP) and
   Point-to-Point Protocol (PPP) Implementations

   8.1. I seem to recall hearing that SLIP [8] will only run on
        synchronous serial lines. Is this true? ... is there
        something about SLIP which precludes it's being implemented
        over async lines?

        Other way around: SLIP is designed for async lines and is not a
        good fit on sync lines. PPP [9, 10] works on either, and is what
        you should be implementing if you're implementing something.

   8.2. Since we are very interested in standards in this area,
        could someone tell me were I can find more information on PPP?

        Also, can this protocol be used in other fields than for the
        Internet (i.e., telecontrol, telemetering) where we see a
        profusion of proprietary incompatible and hard to maintain
        Point-to-Point Protocols?

        PPP was designed to be useful for many protocols besides just IP.
        Whether it would be useful for your particular application should
        probably be discussed with the IETF's Point-to-Point Protocol
        Working Group discussion list. For general discussion: ietf-
        ppp@ucdavis.edu. To subscribe: ietf-ppp-request@ucdavis.edu

The PPP specification is available as RFC 1171 [9], and a PPP
options specification is available as RFC 1172 [10].

In UnixWorld of April 1990 (Vol. VII, No. 4, Pg. 85), Howard
Baldwin writes:

"Point-to-Point Protocol (PPP) has just been submitted to the
CCITT from the Internet Engineering Task Force. It specifies a
standard for encapsulating Internet Protocol data and other
network layer (level three on ISO's OSI Model) protocol
information over point-to-point links; it also provides ways to
test and configure lines and the upper level protocols on the
OSI Model. The only requirement is a provision of a duplex
circuit either dedicated or switched, that can operate in
either an asynchronous or synchronous mode, transparent to the
data-linklayer frame.

"According to Michael Ballard, director of network systems for
Telebit, PPP is a direct improvement upon Serial Line Internet
Protocol (SLIP), which had neither error correction nor a way
to exchange network address."

8.3. Does anyone know if there is a way to run a SLIP program on
     a IBM computer running SCO Xenix/Unix, with a multi-port
     serial board?

SCO TCP/IP for Xenix supports SLIP. It works. However, be
warned: SCO SLIP works *only* with SCO serial drivers, so it will
not work with intelligent boards that come with their own
drivers. If you want lots of SLIP ports, you'll need lots of dumb
ports, perhaps with a multi-dumb-port board.

Here's the setup -- SunOS 3.5, with the 4.3BSD TCP, IP & SLIP
distributions installed. Slip is running between the "ttya" ports
of two Sun 3/60's. "ping", "rlogin", etc., works fine, but a NFS
mount results in "server not responding: RPC Timed Out".

SunOS 3.5 turns the UDP checksum off, which is legal and works
okay over interfaces such as ethernet which has link- level
checksumming. On the other hand, SLIP doesn't perform checksums
thus running NFS over SLIP requires you to turn the UDP checksum
on. Otherwise, you'll experience erratic behavior such as the one
described above.

Save the older kernel and try,

```
% adb -k -w /vmunix /dev/kmem udpcksum?w 1
```

to patch up the kernel.

9. Questions About Routing

9.1. Some postings mentioned "maximum entropy routing". Could
     someone please provide a pointer to on-line or off-line
     references to this topic?

Try NYU CSD Technical Report 371: "Some Comments on Highly Dynamic
Network Routing," by Herbert J. Bernstein, May 1988.

10. Other Protocol and Standards Implementation Questions

10.1. Does anyone recognize ethernet type "80F3"? I don't see it
      in RFC 1010, but I am seeing it on our net.

Ethernet type 0x80F3 is used by AppleTalk for address resolution.
You must have Macs on your network which are directly connected to
Ethernet. These packets are used by the Mac (generally at
startup) to determine a valid AppleTalk node number.

Additional Information:

RFC 1010 is obsolete. Please consult RFC 1060 [11], the current
"Assigned Numbers" (issued March 1990), which does list "80F3":

Ethernet		Exp. Ethernet		Description	References
decimal	Hex	decimal	octal		
33011	80F3	-	-	AppleTalk AARP (Kinetics)	[XEROX]

10.2. Does anyone know the significance of a high value for
      "Bad proto" in the output from netstat on Unix machines using
      ethernet? We're seeing values in the tens of thousands out of
      a few hundred thousand packets sent/received in all. Some
      "Bad proto" values are negative, too. (Off the scale?) Any
      help would be appreciated.

This probably indicates that you are getting tens of thousands of
broadcast packets from some host or hosts on your network. You
might want to buy or rent a LAN monitor, or install one of the
public-domain packages to see what private protocol is guilty.
"FYI on a Network Management Tool Catalog: Tools for Monitoring
and Debugging TCP/IP Internets and Interconnected Devices" (RFC

     1147, FYI 2), [12] contains pointers to tools that may help you
     zero in on the problem.

   10.3. Which RFC would explain the proper way to configure broadcast
         addresses when using subnets?

     Consult RFC 1122, "Requirements for Internet Hosts --
     Communication Layer" [13].

   10.4. Can anyone tell me what .TAR files exactly are? Is it like
         ZIP or LZH for the IBM PC's? IF so, how do I go about getting
         a compressor/decompressor for .TAR files and what computer
         does this run on?

     TAR stands for "Tape ARchive". It is a Unix utility which takes
     files, and directories of files, and creates a single large file.
     Originally intended to back up directory trees onto tape (hence
     the name), TAR is also used to combine files for easier electronic
     file transfer.

11. Suggested Reading

   For further information about the Internet and its protocols in
   general, you may choose to obtain copies of the following works:

     Bowers, K., T. LaQuey, J. Reynolds, K. Roubicek, M. Stahl, and A.
     Yuan, "Where to Start - A Bibliography of General Internetworking
     Information", RFC 1175, FYI 3, CNRI, U Texas, ISI, BBN, SRI,
     Mitre, August 1990.

     Braden, R., Editor, "Requirements for Internet Hosts --
     Communication Layer", RFC 1122, Internet Engineering Task Force,
     October 1989.

     Braden, R., Editor, "Requirements for Internet Hosts --
     Application and Support", RFC 1123, Internet Engineering Task
     Force, October 1989.

     Comer, D., "Internetworking with TCP/IP: Principles, Protocols,
     and Architecture", Prentice Hall, New Jersey, 1989.

     Frey, D. and R. Adams, "!%@:: A Directory of Electronic Mail
     Addressing and Networks", O'Reilly and Associates, Newton, MA,
     August 1989.

     Krol, E., "The Hitchhikers Guide to the Internet", RFC 1118,
     University of Illinois Urbana, September 1989.

LaQuey, T, Editor, "Users' Directory of Computer Networks",
Digital Press, Bedford, MA, 1990.

Malkin, G., and A. Marine, "FYI on Questions and Answers - Answers
to Commonly asked "New Internet User" Questions", RFC 1206, FYI 4,
FTP Software, Inc., SRI, February 1991.

Postel, J., Editor, "IAB Official Protocol Standards", RFC 1140,
Internet Activities Board, May 1990.

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Systems Worldwide", Digital Press, Bedford, MA, 1989.

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USC/Information Sciences Institute, March 1990.

Socolofsky, T., and C. Kale, "A TCP/IP Tutorial", RFC 1180, Spider
Systems Limited, January 1991.

Stevens, W., "UNIX Network Programming", ISBN 0-13-949876-1,
Prentice Hall, Englewood Cliffs, NJ, 1990.

Stine, R., Editor, "FYI on a Network Management Tool Catalog:
Tools for Monitoring and Debugging TCP/IP Internets and
Interconnected Devices" RFC 1147, FYI 2, Sparta, Inc., April 1990.

12. References

[1] Cerf, V., and K. Mills, "Explaining the Role of GOSIP", RFC 1169,
    IAB, NIST, August 1990.

[2] Mockapetris, P., "Domain Names - Concepts and Facilities", RFC
    1034, USC/Information Sciences Institute, November 1987.

[3] Rose, M., and K. McCloghrie, "Structure and Identification of
    Management Information for TCP/IP-based Internets", RFC 1155,
    Performance Systems International, Hughes LAN Systems, May 1990.

[4] McCloghrie, K., and M. Rose, "Management Information Base for
    Network Management of TCP/IP-based internets", RFC 1156, Hughes
    LAN Systems, Performance Systems International, May 1990.

[5] Case, J., M. Fedor, M. Schoffstall, and J. Davin, "A Simple
    Network Management Protocol (SNMP)", RFC 1157, SNMP Research,
    Performance Systems International, Performance Systems
    International, MIT Laboratory for Computer Science, May 1990.

[6] Rose, M., Editor, "Management Information Base for Network

          Management of TCP/IP-based internets: MIB-II", RFC 1158,
          Performance Systems International, May 1990.

     [7] Postel, J., and J. Reynolds, "TELNET Protocol Specification", RFC
         854, USC/Information Sciences Institute, May 1983.

     [8] Romkey, J., "A Nonstandard for Transmission of IP Datagrams over
         Serial Lines: SLIP", RFC 1055, June 1988.

     [9] Perkins, D., "The Point-to-Point Protocol: A Proposal for Multi-
         Protocol Transmission of Datagrams Over Point-to-Point Links",
         RFC 1171, CMU, July 1990.

    [10] Perkins, D., and R. Hobby, "The Point-to-Point Protocol (PPP)
         Initial Configuration Options", CMU, UC Davis, July 1990.

    [11] Reynolds, J., and J. Postel, "Assigned Numbers", RFC 1060,
         USC/Information Sciences Institute, March 1990.

    [12] Stine, R., Editor, "FYI on a Network Management Tool Catalog:
         Tools for Monitoring and Debugging TCP/IP Internets and
         Interconnected Devices" RFC 1147, FYI 2, Sparta, Inc., April
         1990.

    [13] Braden, R., Editor, "Requirements for Internet Hosts --
         Communication Layer", RFC 1122, Internet Engineering Task Force,
         October 1989.

13. Security Considerations

   Security issues are not discussed in this memo.

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