Why you should read RFCs and Internet Drafts
(and what you need to know to do so)

AusNOG 2015

Mark Smith
markzzzsmith@gmail.com

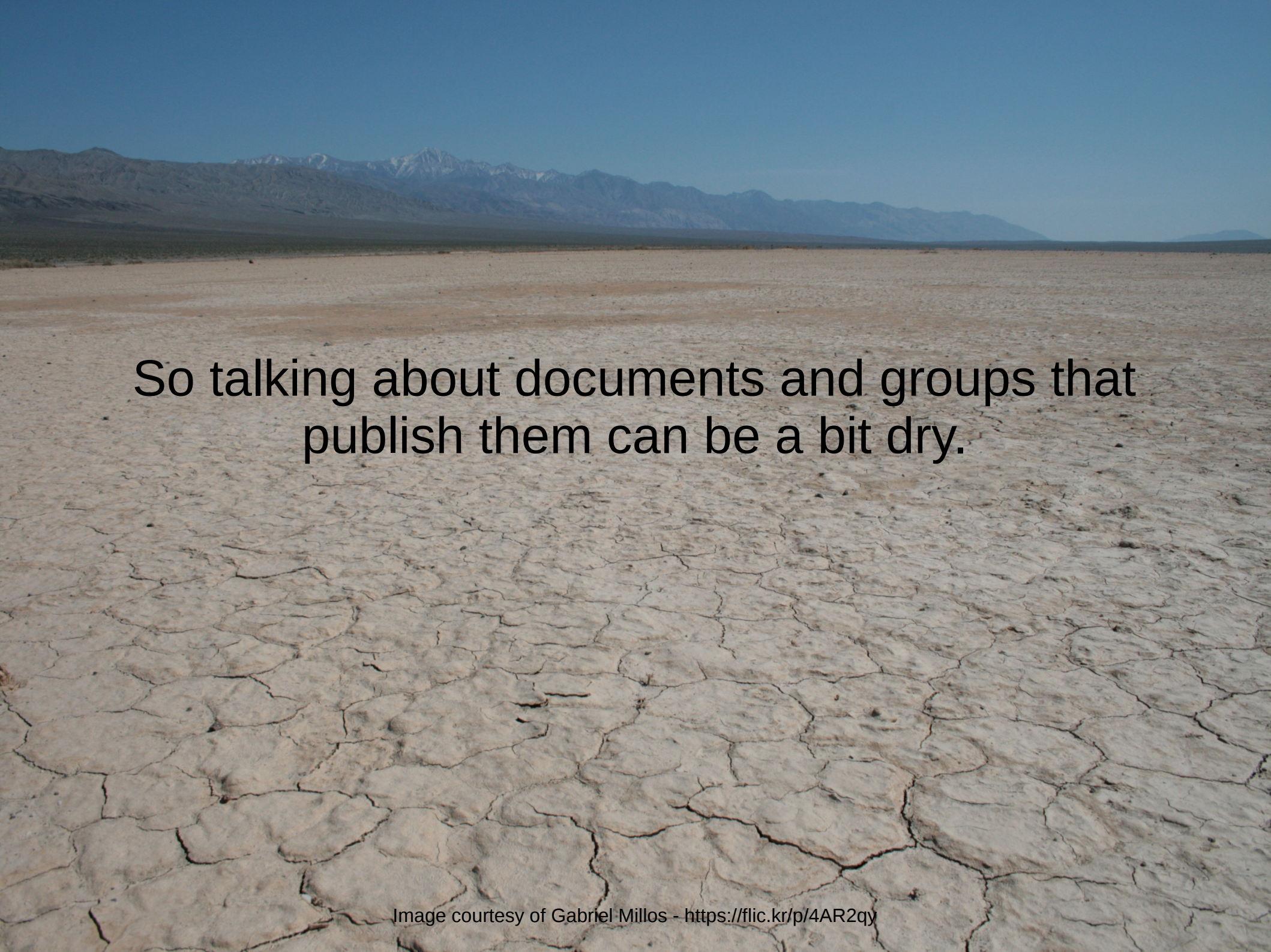


Image courtesy of Gabriel Millos - https://flic.kr/p/4AR2qy

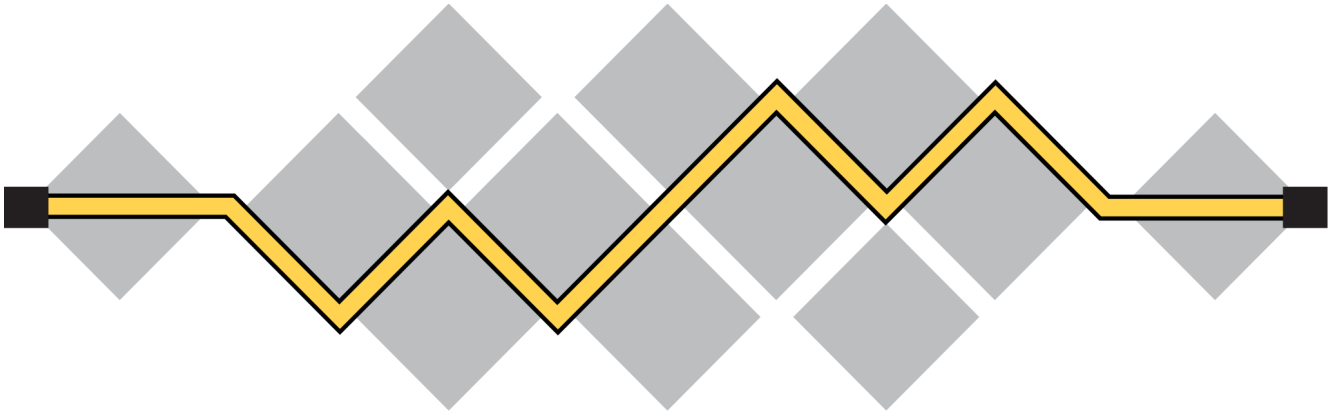
So why should you read RFCs?

But first, **what are they**?

“**Request For Comments**” documents, published by the **IETF**.

Or the

Internet Engineering Task Force



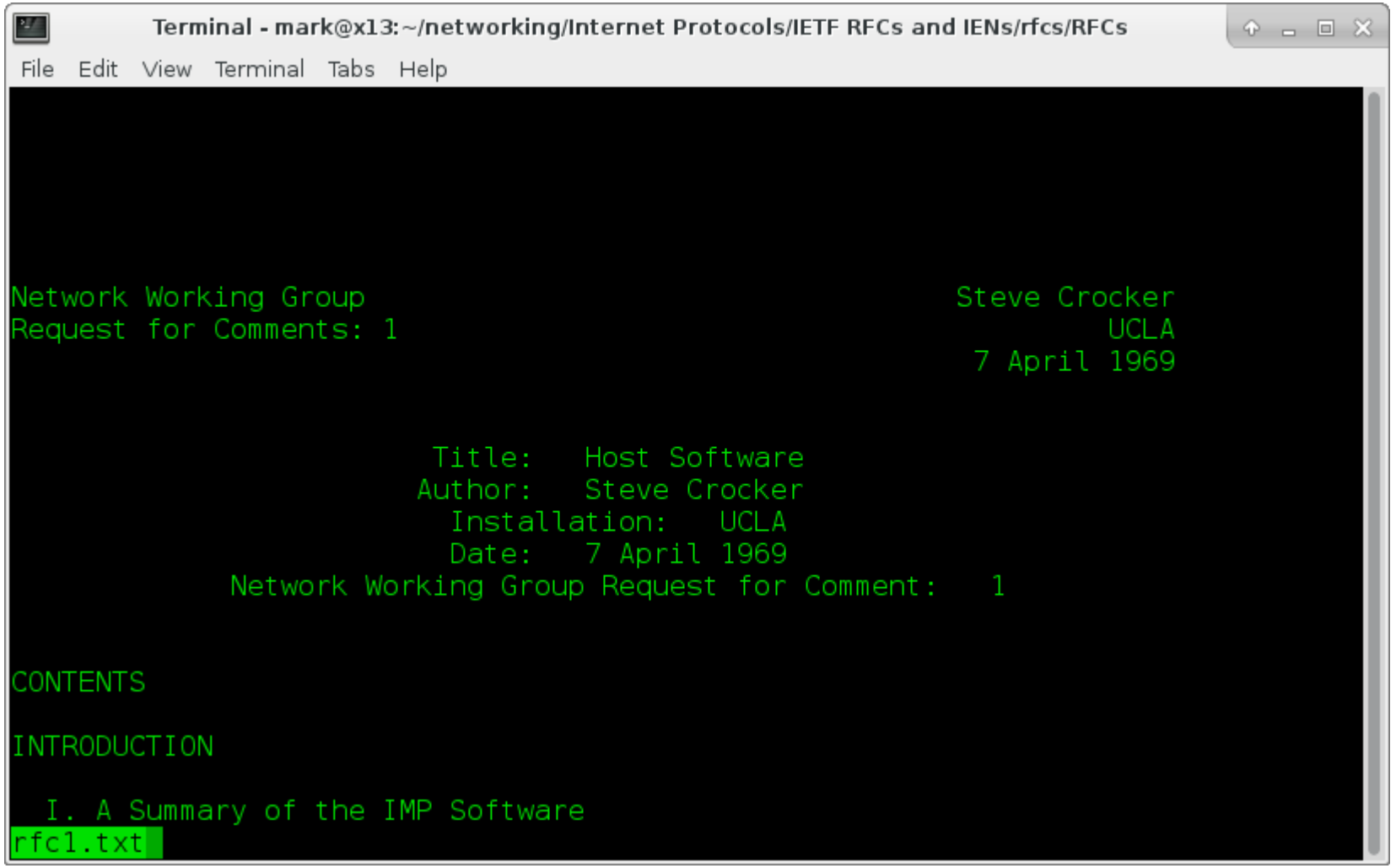
I E T F®

“The Internet Engineering Task Force is a **loosely self-organized group of people** who **contribute** to the **engineering** and **evolution** of **Internet technologies**.”

- **RFC3160**

So people **participate** in the **IETF**, helping to **produce RFCs**.

The **first RFC** was written on a **typewriter** in a **bathroom** in **1969** by **Steve Crocker**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Network Working Group
Request for Comments: 1
Steve Crocker
UCLA
7 April 1969
Title: Host Software
Author: Steve Crocker
Installation: UCLA
Date: 7 April 1969
Network Working Group Request for Comment: 1
CONTENTS
INTRODUCTION
I. A Summary of the IMP Software
rfc1.txt

There are now more than **7500** of them!

You can **access all** of the **RFCs** at:

https://www.ietf.org/rfc.html

So why should you read them?

Reason

To find out how things are really supposed to work.

Reason

Because books don't yet exist.

Reason

To help improve them by making them clearer.

Reason

To find related information.

Reason

So you can better lodge bugs with vendors.

Reason

To see what might be coming.

Reason

To create future feature demand.

Reason

Because they're readable!

Reason

To have something to do on public transport.

Reason

To be amused and entertained.

So what do you **need to know** to **read RFCs**?

RFCs **aren't** just **protocol specifications**.

4 Common RFC types

Standards Track

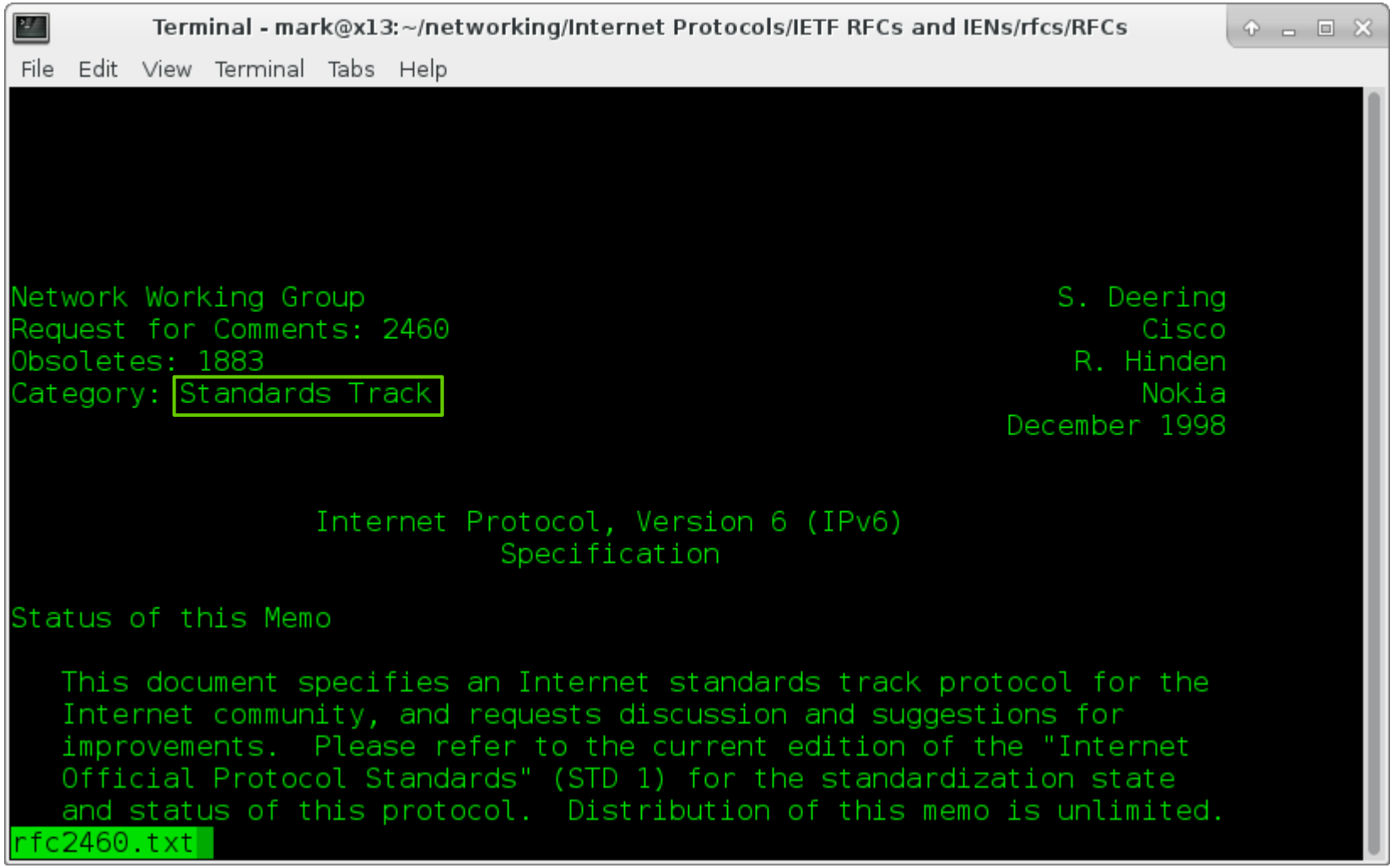
Experimental

Informational

Best Current Practice

Standards Track RFCs

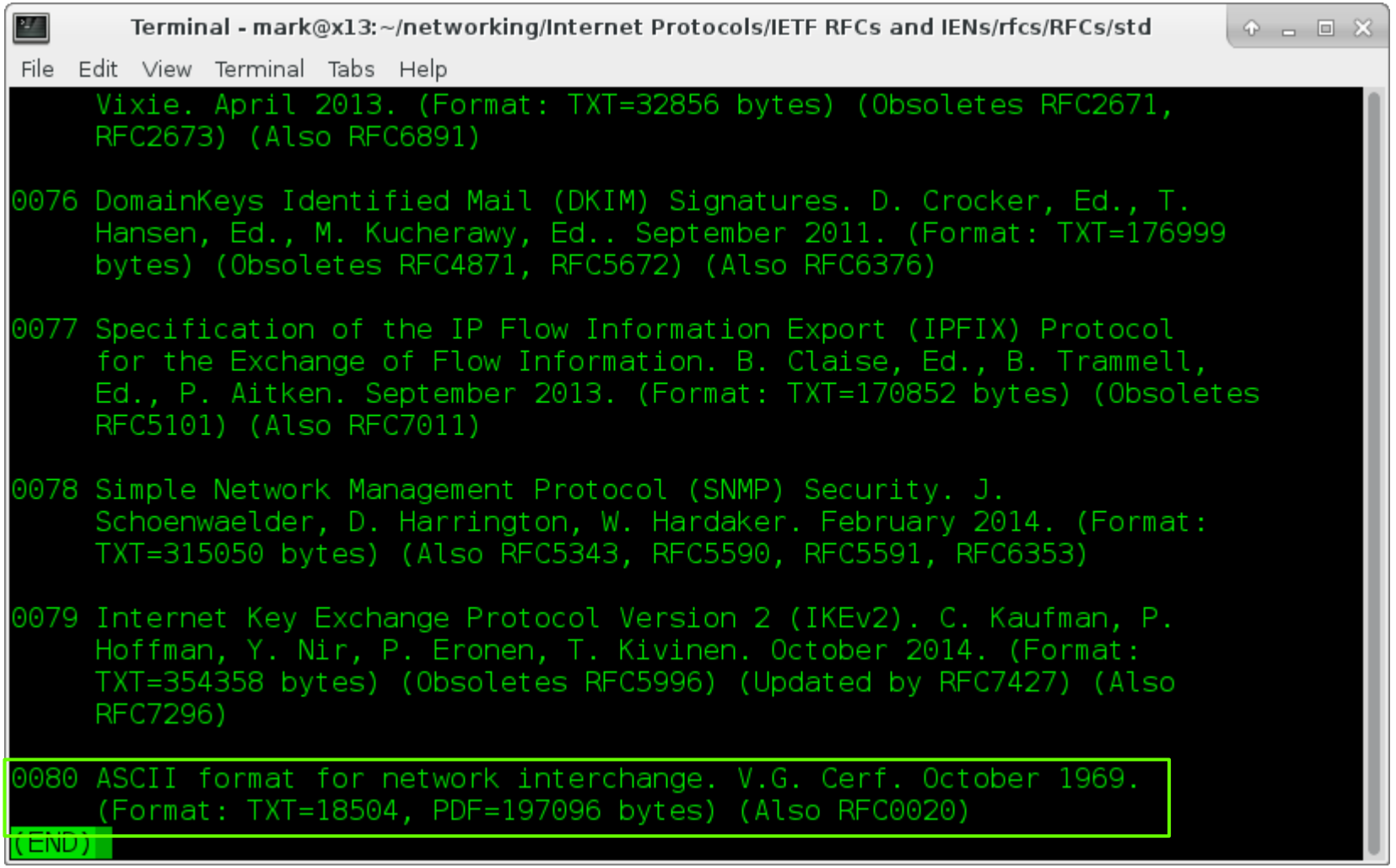
Standards Track RFCs are **protocol specifications** on the way to **becoming** an **Internet Standard**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Network Working Group
Request for Comments: 2460
Obsoletes: 1883
Category: Standards Track
S. Deering
Cisco
R. Hinden
Nokia
December 1998
Internet Protocol, Version 6 (IPv6)
Specification
Status of this Memo
This document specifies an Internet standards track protocol for the
Internet community, and requests discussion and suggestions for
improvements. Please refer to the current edition of the "Internet
Official Protocol Standards" (STD 1) for the standardization state
and status of this protocol. Distribution of this memo is unlimited.
rfc2460.txt

There actually **aren't many** proper **Internet Standards** though, because the IETF believe in **“rough consensus and running code.”**

The IETF **expect** protocols to be **shown to work before** they become **full Internet Standards**.

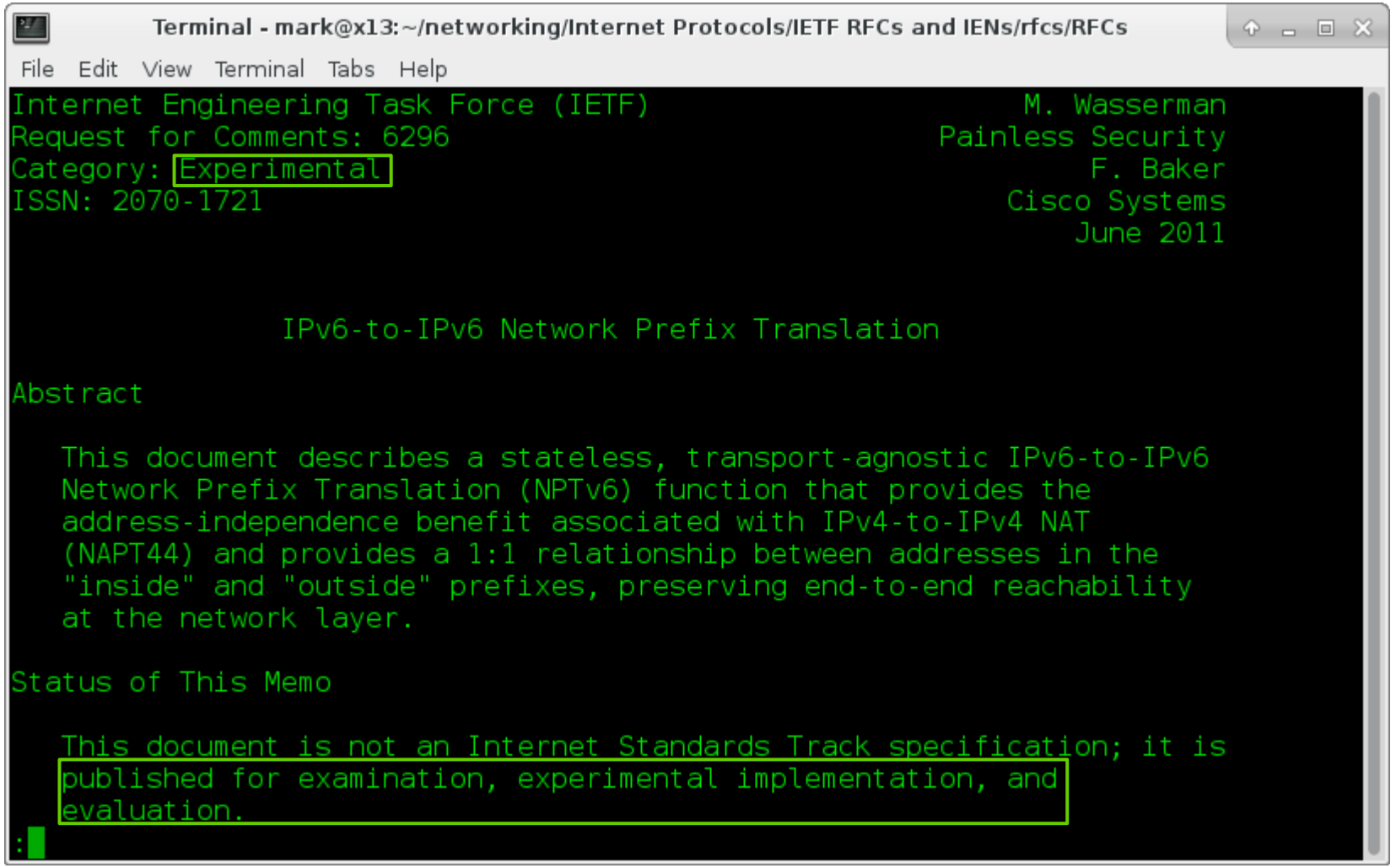
Of all **7500+** RFCs, only **80** are currently Internet Standards.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs/std
File Edit View Terminal Tabs Help
Vixie. April 2013. (Format: TXT=32856 bytes) (Obsoletes RFC2671, RFC2673) (Also RFC6891)
0076 DomainKeys Identified Mail (DKIM) Signatures. D. Crocker, Ed., T. Hansen, Ed., M. Kucherawy, Ed.. September 2011. (Format: TXT=176999 bytes) (Obsoletes RFC4871, RFC5672) (Also RFC6376)
0077 Specification of the IP Flow Information Export (IPFIX) Protocol for the Exchange of Flow Information. B. Claise, Ed., B. Trammell, Ed., P. Aitken. September 2013. (Format: TXT=170852 bytes) (Obsoletes RFC5101) (Also RFC7011)
0078 Simple Network Management Protocol (SNMP) Security. J. Schoenwaelder, D. Harrington, W. Hardaker. February 2014. (Format: TXT=315050 bytes) (Also RFC5343, RFC5590, RFC5591, RFC6353)
0079 Internet Key Exchange Protocol Version 2 (IKEv2). C. Kaufman, P. Hoffman, Y. Nir, P. Eronen, T. Kivinen. October 2014. (Format: TXT=354358 bytes) (Obsoletes RFC5996) (Updated by RFC7427) (Also RFC7296)
0080 ASCII format for network interchange. V.G. Cerf. October 1969. (Format: TXT=18504, PDF=197096 bytes) (Also RFC0020)
(END)

Experimental RFCs

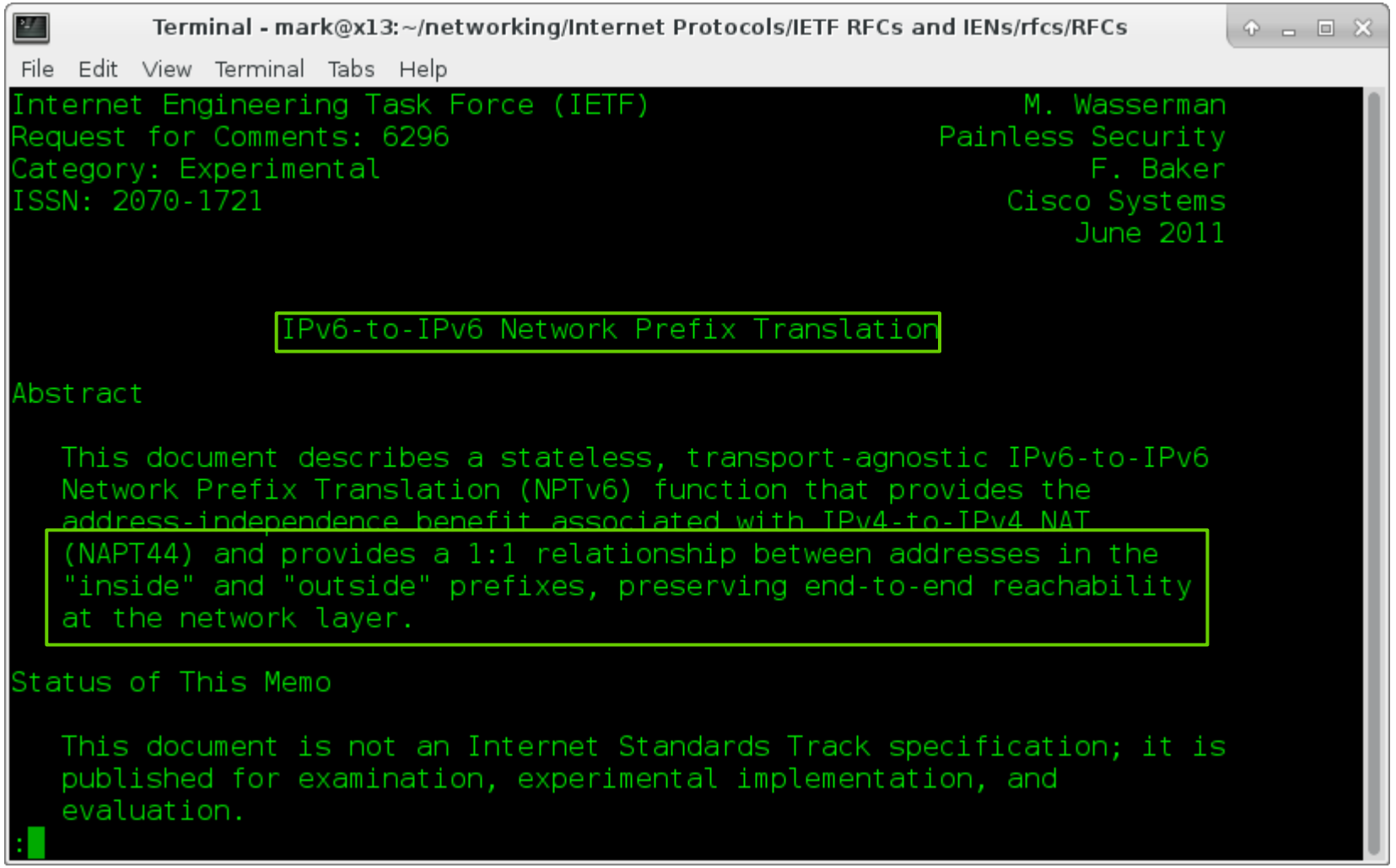
Experimental RFCs are “published for **examination**, **experimental implementation**, and **evaluation**.”

In other words, the IETF think there is **merit in them**, but they're **not completely confident** of their **value**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Internet Engineering Task Force (IETF)
M. Wasserman
Request for Comments: 6296
Painless Security
Category: Experimental
F. Baker
ISSN: 2070-1721
Cisco Systems
June 2011
IPv6-to-IPv6 Network Prefix Translation
Abstract
This document describes a stateless, transport-agnostic IPv6-to-IPv6
Network Prefix Translation (NPTv6) function that provides the
address-independence benefit associated with IPv4-to-IPv4 NAT
(NAPT44) and provides a 1:1 relationship between addresses in the
"inside" and "outside" prefixes, preserving end-to-end reachability
at the network layer.
Status of This Memo
This document is not an Internet Standards Track specification; it is
published for examination, experimental implementation, and
evaluation.
:

Standards Track RFCs are **not allowed to depend** on **Experimental** RFCs.

Make sure you're **well aware** of **limitations** of **Experimental RFCs** and their **implementations** if you're **going to use them**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Internet Engineering Task Force (IETF)
Request for Comments: 6296
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at the network layer.
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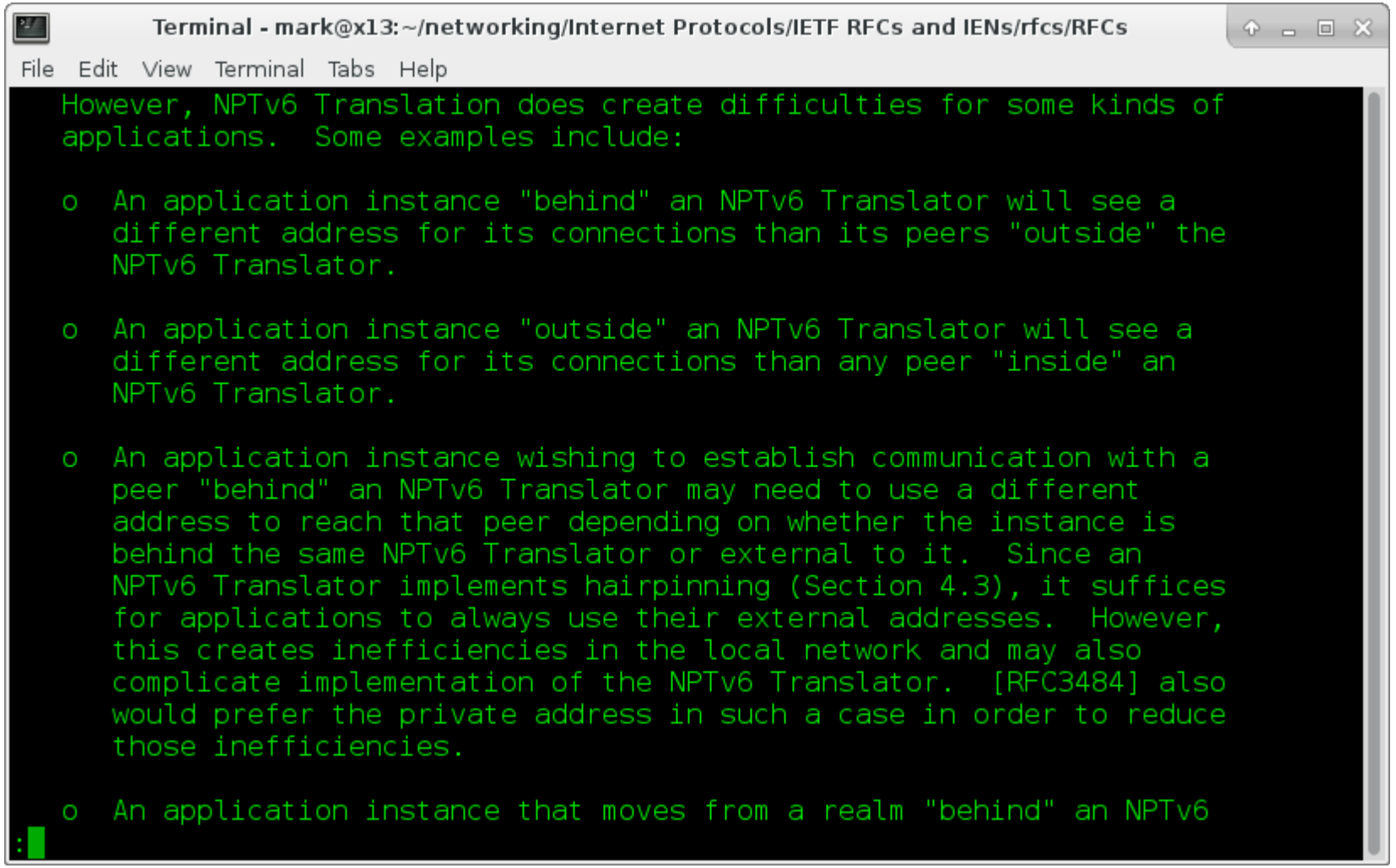
published for examination, experimental implementation, and
evaluation.
:

Yes, that is **1:1 Stateless NAT** for **IPv6**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
However, NPTv6 Translation does create difficulties for some kinds of applications. Some examples include:
o An application instance "behind" an NPTv6 Translator will see a different address for its connections than its peers "outside" the NPTv6 Translator.
o An application instance "outside" an NPTv6 Translator will see a different address for its connections than any peer "inside" an NPTv6 Translator.
o An application instance wishing to establish communication with a peer "behind" an NPTv6 Translator may need to use a different address to reach that peer depending on whether the instance is behind the same NPTv6 Translator or external to it. Since an NPTv6 Translator implements hairpinning (Section 4.3), it suffices for applications to always use their external addresses. However, this creates inefficiencies in the local network and may also complicate implementation of the NPTv6 Translator. [RFC3484] also would prefer the private address in such a case in order to reduce those inefficiencies.
o An application instance that moves from a realm "behind" an NPTv6
:

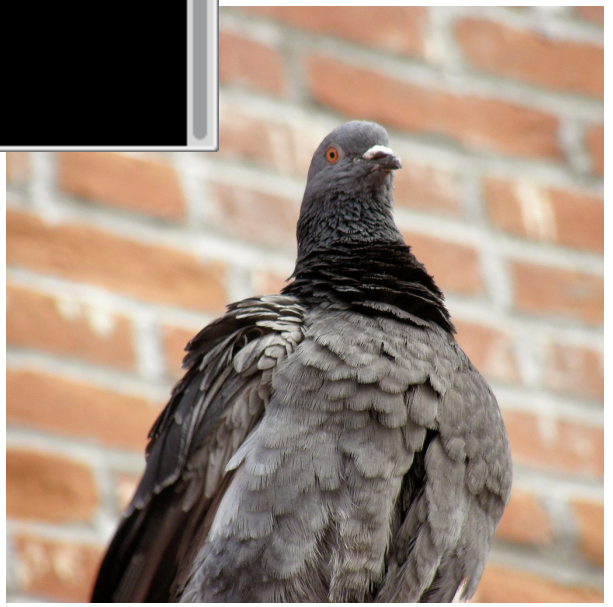
The **IETF** don't think those **limitations** are all that **acceptable** (**RFC2993**), which is why that RFC is **Experimental**.

Experimental RFCs can also include the **famous April Fools RFCs**.

Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs

File Edit View Terminal Tabs Help

```
Network Working Group                                        D. Waitzman
Request for Comments: 1149                                       BBN STC
                                                           1 April 1990


   A Standard for the Transmission of IP Datagrams on Avian Carriers

Status of this Memo

   This memo describes an experimental method for the encapsulation of
   IP datagrams in avian carriers.  This specification is primarily
   useful in Metropolitan Area Networks.  This is an experimental, not
   recommended standard.  Distribution of this memo is unlimited.

Overview and Rational

   Avian carriers can provide high delay, low throughput, and low
rfc1149.txt
```



CC Image courtesy of OliBac
http://www.flickr.com/photos/olibac/2415284302/sizes/l/in/photostream/

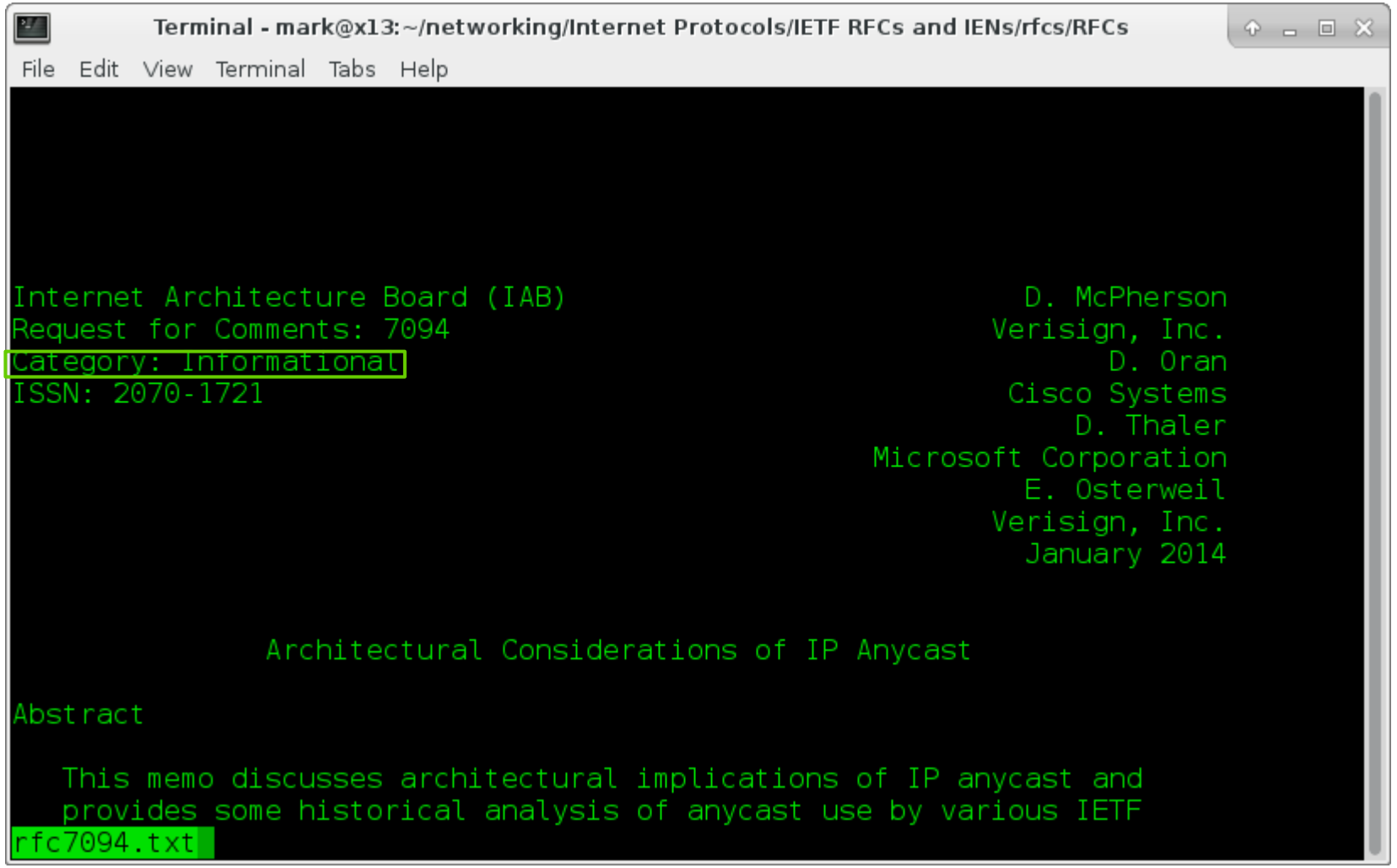
Getting a bit thirsty?

Here's a refreshing picture of a glass of water.

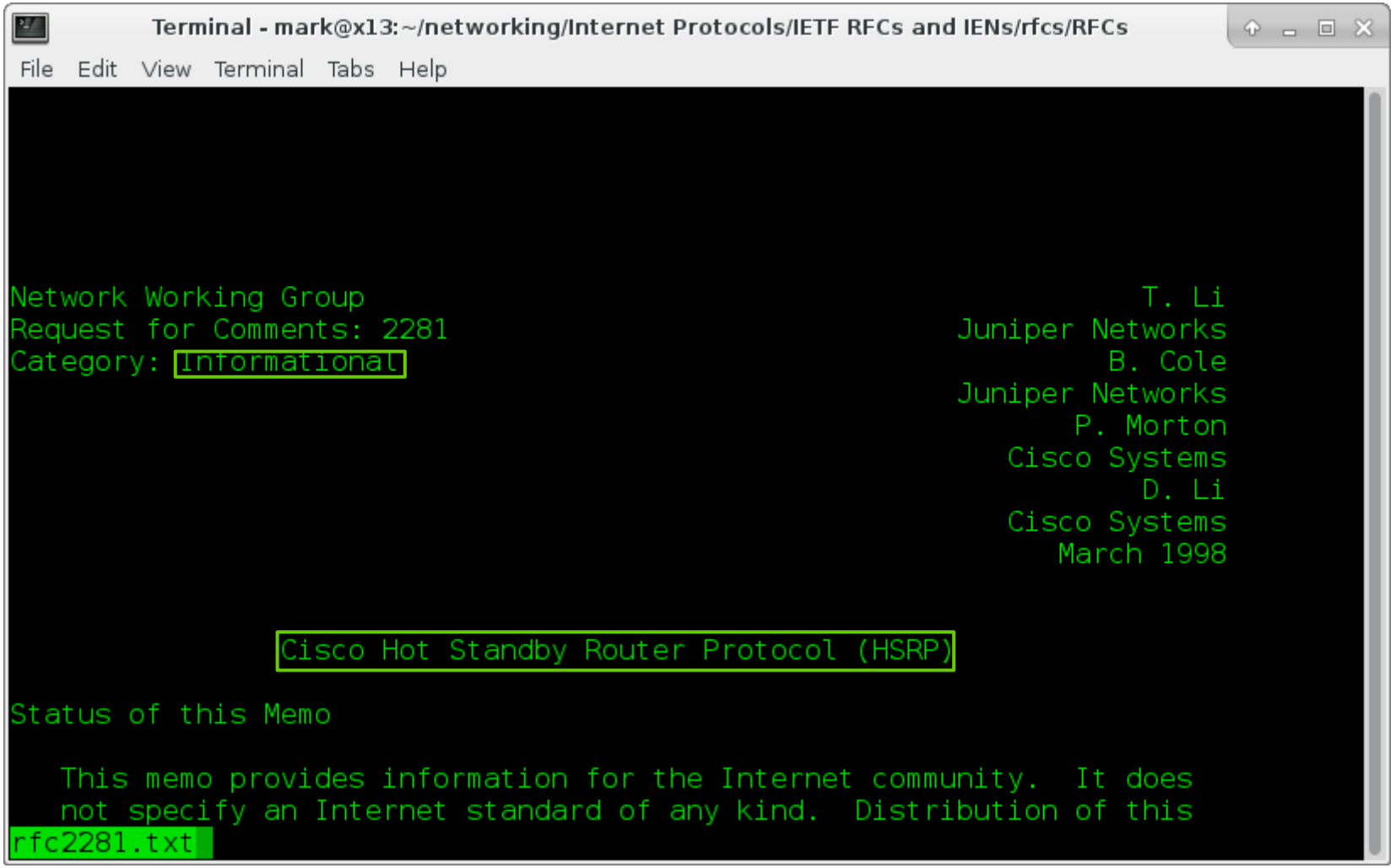
Courtesy of [cipher] - https://flic.kr/p/5UHweP

Informational RFCs

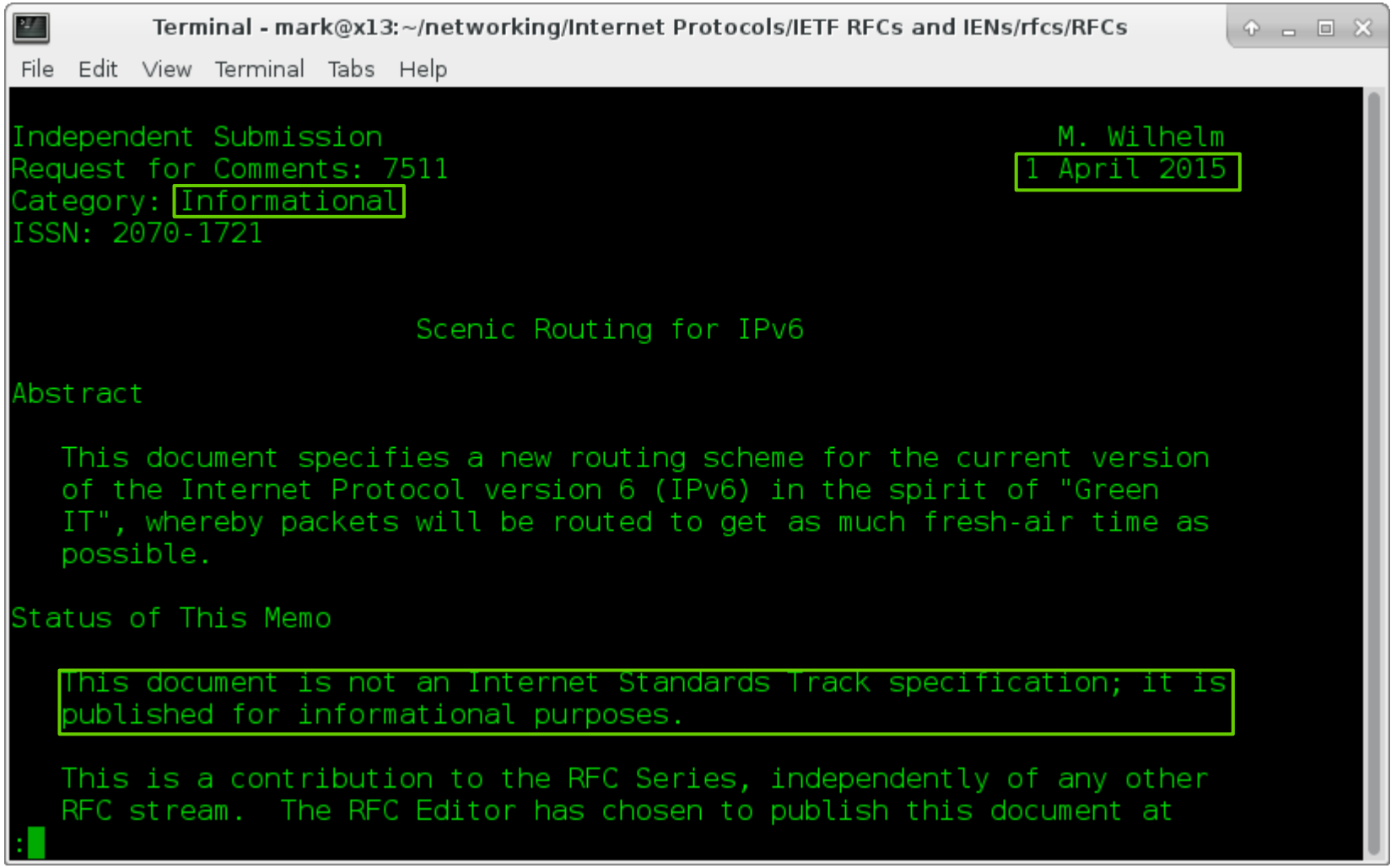
Informational RFCs provide information that the IETF **consider** to be **useful**, **interesting** or **amusing** to the **networking community**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Internet Architecture Board (IAB)
Request for Comments: 7094
Category: Informational
ISSN: 2070-1721
D. McPherson
Verisign, Inc.
D. Oran
Cisco Systems
D. Thaler
Microsoft Corporation
E. Osterweil
Verisign, Inc.
January 2014
Architectural Considerations of IP Anycast
Abstract
This memo discusses architectural implications of IP anycast and
provides some historical analysis of anycast use by various IETF
rfc7094.txt

This can **include protocol specifications** or **device methods of operation** that are **not IETF standards**.

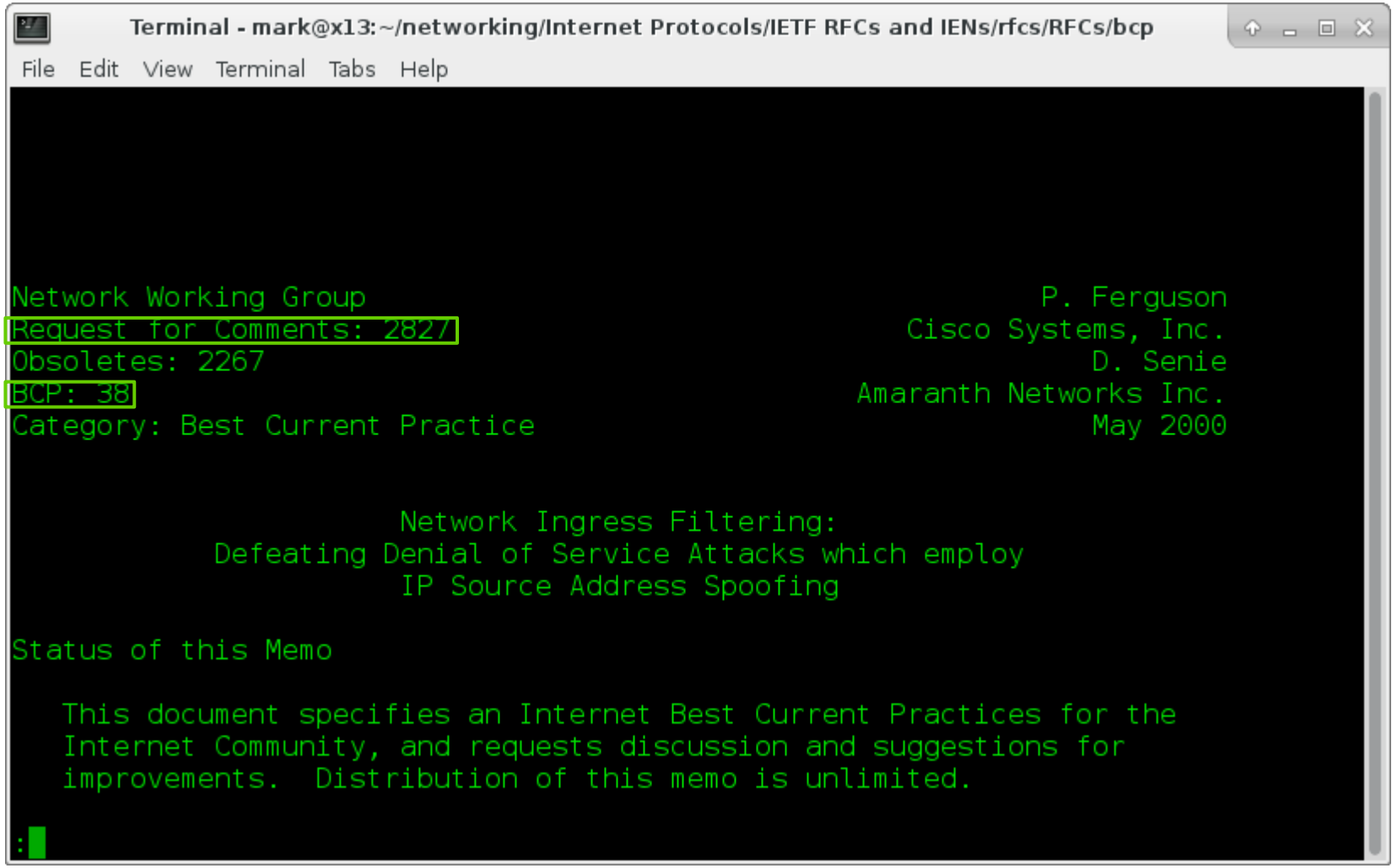

Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Network Working Group
Request for Comments: 2281
Category: Informational
T. Li
Juniper Networks
B. Cole
Juniper Networks
P. Morton
Cisco Systems
D. Li
Cisco Systems
March 1998
Cisco Hot Standby Router Protocol (HSRP)
Status of this Memo
This memo provides information for the Internet community. It does
not specify an Internet standard of any kind. Distribution of this
rfc2281.txt

Informational RFCs can also include the **famous April Fools RFCs.**


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs
File Edit View Terminal Tabs Help
Independent Submission
Request for Comments: 7511
Category: Informational
ISSN: 2070-1721
M. Wilhelm
1 April 2015
Scenic Routing for IPv6
Abstract
This document specifies a new routing scheme for the current version of the Internet Protocol version 6 (IPv6) in the spirit of "Green IT", whereby packets will be routed to get as much fresh-air time as possible.
Status of This Memo
This document is not an Internet Standards Track specification; it is published for informational purposes.
This is a contribution to the RFC Series, independently of any other RFC stream. The RFC Editor has chosen to publish this document at
:

Best Current Practice (BCP) RFCs

BCP RFCs describe **best current practices** for the **operation** of the **Internet** and the **IETF**.


Terminal - mark@x13:~/networking/Internet Protocols/IETF RFCs and IENs/rfcs/RFCs/bcp
File Edit View Terminal Tabs Help
Network Working Group
Request for Comments: 2827
Obsoletes: 2267
BCP: 38
Category: Best Current Practice
P. Ferguson
Cisco Systems, Inc.
D. Senie
Amaranth Networks Inc.
May 2000
Network Ingress Filtering:
Defeating Denial of Service Attacks which employ
IP Source Address Spoofing
Status of this Memo
This document specifies an Internet Best Current Practices for the
Internet Community, and requests discussion and suggestions for
improvements. Distribution of this memo is unlimited.
:

So that is **why** I think you **should read RFCs**, and **what** you **need to know** to **do so**.

So why should you read Internet Drafts?

But first, **what are they**?

Internet Drafts (**IDs**) are the **documents** that **may eventually become IETF RFCs**.

But they also **may not become RFCs**.

In other words, **IDs** are usually **work(s) in progress, and have no formal IETF status**.

So why should you read them?

Reason

Because many of the reasons to read RFCs also apply to IDs.

Reason

Discover future networking directions.

Reason

To help make them better.

Reason

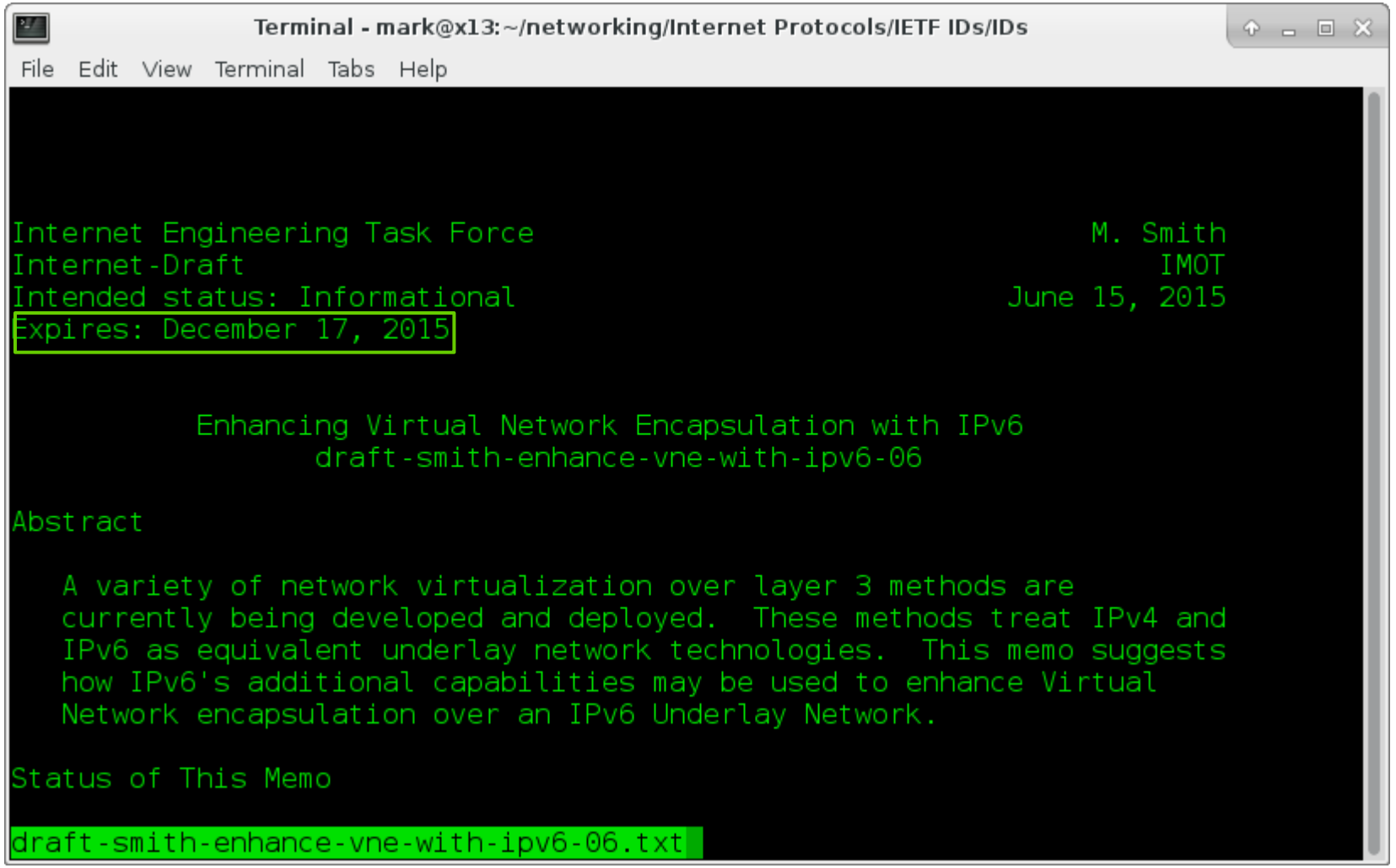
For recognition.

So what do you **need to know** to **read IDs**?

They can be **written** and **submitted** to the IETF **by anybody.** (**At all**!)

Or they may **originate** in an **IETF Working Group**.

They **automatically expire** after **6 months.**


Terminal - mark@x13:~/networking/Internet Protocols/IETF IDs/IDs
File Edit View Terminal Tabs Help
Internet Engineering Task Force
M. Smith
Internet-Draft
IMOT
Intended status: Informational
June 15, 2015
Expires: December 17, 2015
Enhancing Virtual Network Encapsulation with IPv6
draft-smith-enhance-vne-with-ipv6-06
Abstract
A variety of network virtualization over layer 3 methods are currently being developed and deployed. These methods treat IPv4 and IPv6 as equivalent underlay network technologies. This memo suggests how IPv6's additional capabilities may be used to enhance Virtual Network encapsulation over an IPv6 Underlay Network.
Status of This Memo
draft-smith-enhance-vne-with-ipv6-06.txt

Publishing a **new ID version revives** or **updates** an ID, **pushing out** the **six month expiry date**.

Discovering IDs to **read**

ID-Announce Mailing List

ID-Announce mailing list subscriptions and HTTP archives

https://www.ietf.org/list/announcement.html

https://tools.ietf.org/dailydose/

IETF TOOLS

IETF Home
About Tools
Tools:
diffs spell
xml2rfc idnits
tracker src
News
Get Passwd
IETF-94:
Rooms
Agenda
Calendar
Documents
RFCs
Doc fetch:

The Daily Dose of IETF

"Be conservative in what you send and liberal in what you accept"

« Prev — Issue 2398 — 2015-08-21

IETF-Announce List

- Protocol Action: 'Clarification of the Flowspec Redirect Extended Community' to Proposed Standard (draft-ietf-idr-flowspec-redirect-rt-bis-05.txt) (The IESG)
- Last Call: <draft-ietf-idr-as-migration-06.txt> (Autonomous System Migration Mechanisms and Their Effects on the BGP AS_PATH Attribute) to Proposed Standard (The IESG)
- UPDATED Results of IETF-conflict review for draft-crocker-diversity-conduct-06 (The IESG)
- IESG Statement on Maxi
- RFC 7431 on Multicast-Only Fast Reroute (rfc-editor)

more recent RFCs »

Drafts Sent to IESG

- Autonomous System Migration Mechanisms
  BGP AS_PATH Attribute (draft-ietf-idr-as-mig
  Call

IESG Progress

- RTP Stream Pause and Resume (draft-ietf-a
  IESG Evaluation » ::AD Followup

warding Detectio

New and Revived Drafts

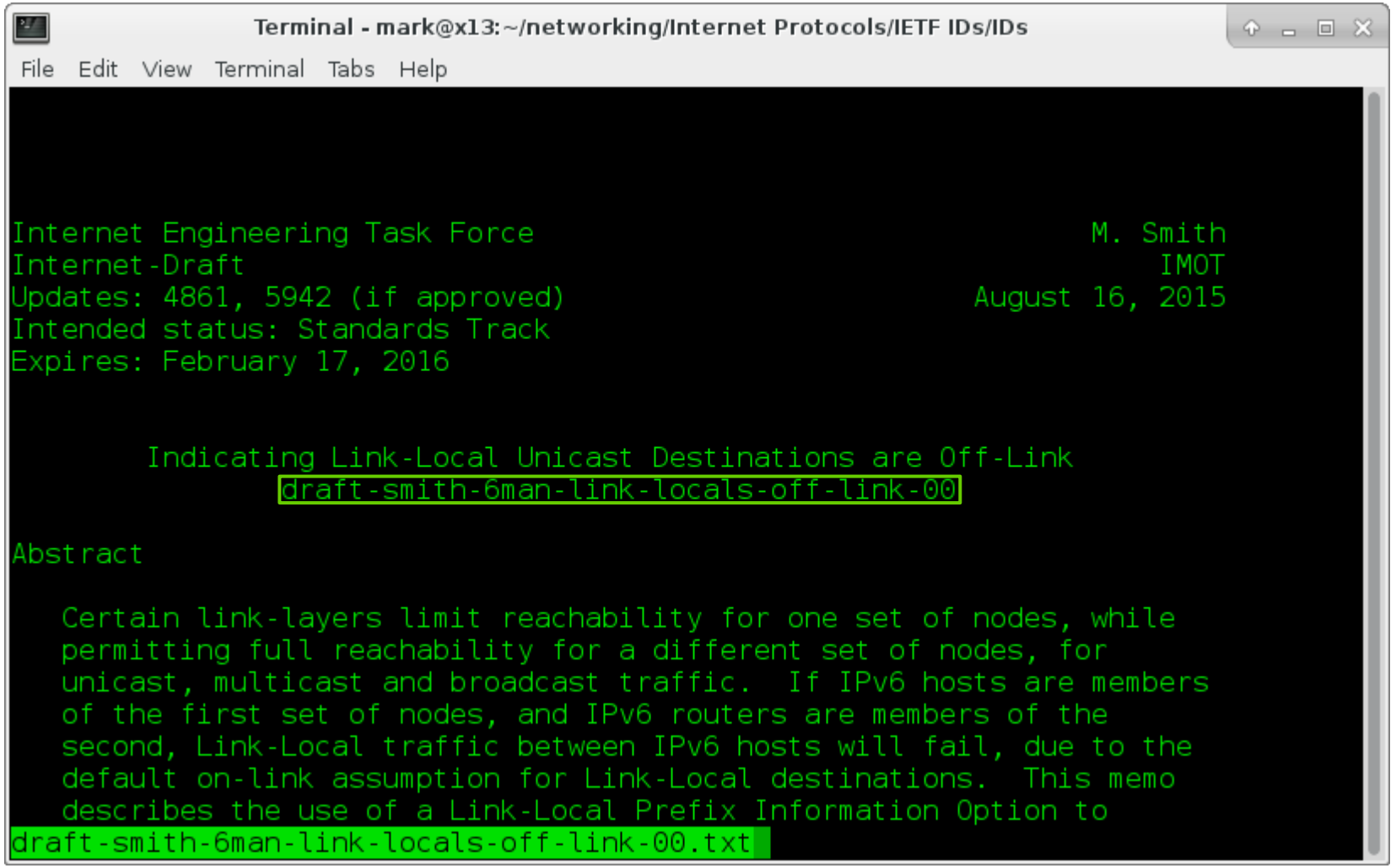
- Internet Storage Sync: Problem Statement (draft-cui-iss-problem)
- NAT traversal for LISP (draft-ermagan-lisp-nat-traversal)

Updated Drafts

- Directory-Based Information Services: Automounter (draft-bannister-dbis-automounter)
- RFC Format Framework (draft-flanagan-rfc-framework)
- Mobile Communication Congestion Exposure Scenario (draft-ietf-conex-mobile)
- Anonymity profile for DHCP clients (draft-ietf-dhc-anonymity-profile)
- A One-Way Delay Metric for IPPM (draft-ietf-ippm-2679-bis)
- A One-Way Loss Metric for IPPM (draft-ietf-ippm-2680-bis)
- Ethernet-Tree (E-Tree) Support in Virtual Private LAN Service (VPLS) (draft-ietf-l2vpn-vpls-pe-etree)
- OSPFv2 Prefix/Link Attribute Advertisement (draft-ietf-ospf-prefix-link-attr)

ID name format

draft-<author>-[<IETF WG>]-<ID-brief-id>-<version#>


Terminal - mark@x13:~/networking/Internet Protocols/IETF IDs/IDs
File Edit View Terminal Tabs Help
Internet Engineering Task Force
M. Smith
Internet-Draft
IMOT
Updates: 4861, 5942 (if approved)
August 16, 2015
Intended status: Standards Track
Expires: February 17, 2016
Indicating Link-Local Unicast Destinations are Off-Link
draft-smith-6man-link-locals-off-link-00
Abstract
Certain link-layers limit reachability for one set of nodes, while
permitting full reachability for a different set of nodes, for
unicast, multicast and broadcast traffic. If IPv6 hosts are members
of the first set of nodes, and IPv6 routers are members of the
second, Link-Local traffic between IPv6 hosts will fail, due to the
default on-link assumption for Link-Local destinations. This memo
describes the use of a Link-Local Prefix Information Option to
draft-smith-6man-link-locals-off-link-00.txt

Need more water?

Here is much more!

Courtesy of Loz Pycock - https://flic.kr/p/4DtcXG

The **primary place** where IDs are **discussed** are IETF **Working Groups (WGs)**.

IETF **Working Groups** focus on **specific problems** and related **technologies.**

6man WG – IPv6 Protocol Maintenance

v6ops WG – IPv6 Operations

lager WG – Label Generation Rules

drinks WG – Data for Reachability of Inter/Intra-Network SIP

and many others.

Working Groups are managed by **Working Group Chairs**.

The **majority** of **discussion** about IDs takes place on **WG email lists**.

Active WGs are at the following link, which also provides **email list subscription details**:

https://datatracker.ietf.org/wg/

Discussion also happens at **quarterly face-to-face IETF meetings**.

IETF47

PROCEEDINGS OF THE FORTY-SEVENTH

INTERNET ENGINEERING TASK FORCE

Hosted by Connect.com.au
Adelaide, Australia
March 26-31, 2000

Working Groups are organised into **IETF Areas**.

Area examples:

Applications Area (app)

Internet Area (int)

Operations and Management Area (ops)

6man WG is under the **Internet Area**.

v6ops WG is under the **Operations and Management Area**.

Areas are looked after by **elected Area Directors**.

The **group** of **Area Directors** form the **Internet Engineering Steering Group (IESG)**.

Once a **WG** thinks an **ID** is **ready to be published** as an **RFC**, it goes to the **IESG** for **review and/or approval**.

If the **IESG approve it**, after some **editorial steps**, it becomes an **RFC**.

New RFCs are **announced** on the **IETF-Announce** mailing list.

https://www.ietf.org/list/announcement.html

Some **recommended reading** before you start reading **RFCs and IDs**.

RFC1925 -

“The Twelve Networking Truths”

RFC1958 -

“Architectural Principles of the Internet”

RFC2119 -

“Key words for use in RFCs to Indicate Requirement Levels”

RFC3160 -

“The Tao of IETF - A Novice's Guide to the Internet Engineering Task Force”

RFC3439 -

“Some Internet Architectural Guidelines and Philosophy”

RFC5505 -

“Principles of Internet Host Configuration”

RFC7282 -

“On Consensus and Humming in the IETF”

A **few other** IETF related **groups/entities** you should know of.

Internet Architecture Board (IAB)

An **elected group** who provide **oversight** to the IETF's activities, and **think about** the “**big picture**”.

Internet Assigned Numbers Authority (IANA)

Manage the **numbers** of the **Internet** and its **protocols**:

Address Space Numbers (which they give to RIRs to give to us)
Port Numbers
Error and Status Codes

RFC Editor

Administer the **publishing** of **RFCs**, and **maintain** the **RFC archives**.

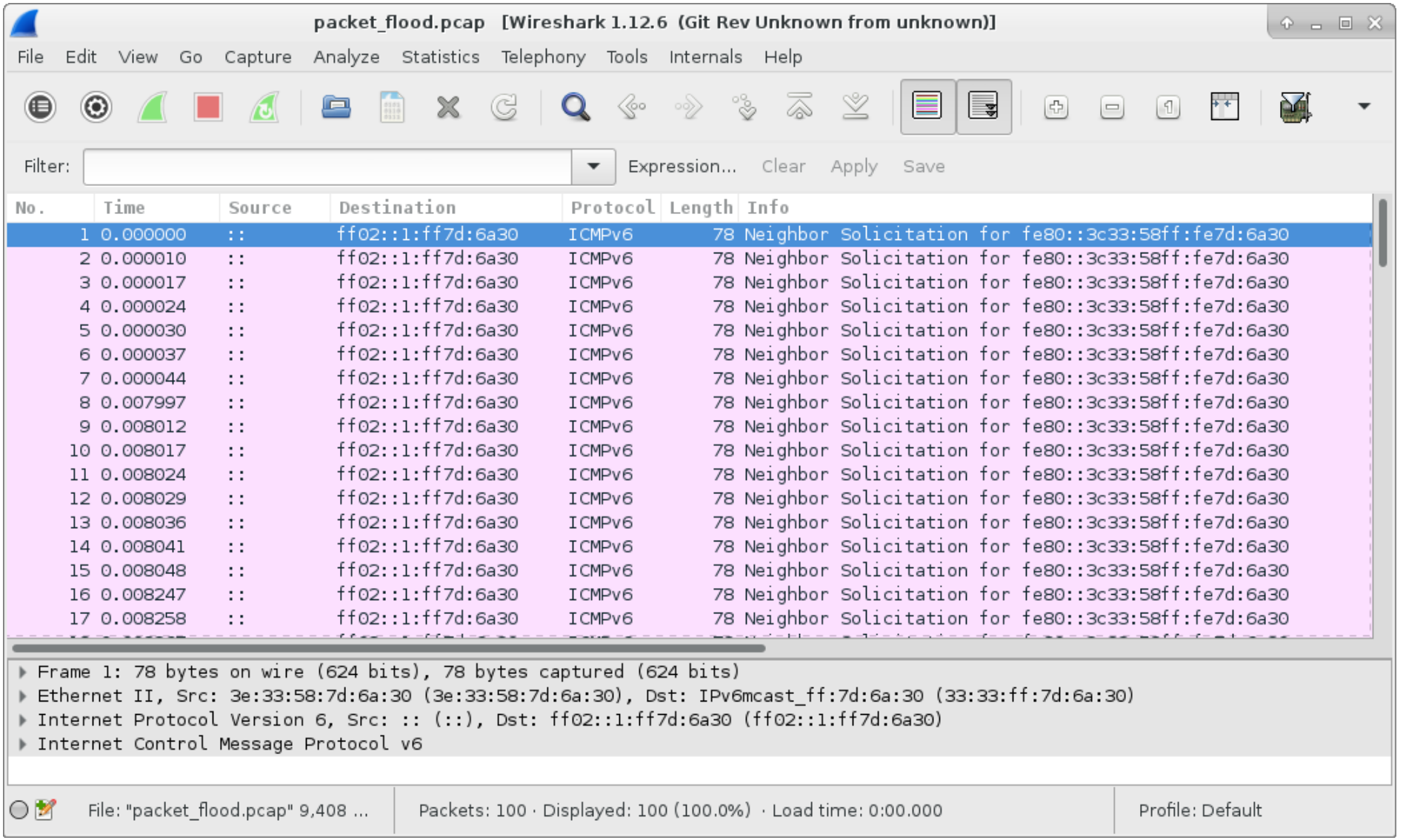
Other recommended reading

“Where Wizards Stay Up Late: The Origins Of The Internet” by Katie Hafner

“Network Geeks: How They Built the Internet” by Brian E. Carpenter

Even more refreshment for such a **dry topic**?

Here's a flood.



Courtesy of Tim Green - https://flic.kr/p/cWJF5L

Questions?

CC image courtesy of Kiwithing
http://www.flickr.com/photos/kiwisaotome/8261132558/sizes/c/in/photostream/

Thanks for listening!