                      The IEEE 802/IETF Relationship

Abstract

   This document describes the standardization cooperation between
   Project 802 of the Institute of Electrical and Electronics Engineers
   (IEEE) and the Internet Engineering Task Force (IETF). This document
   obsoletes RFC 4441.

   Note: This document was collaboratively developed by authors from
   both the IEEE 802 and IETF leadership and was reviewed and approved
   by the IEEE 802 Executive Committee prior to publication.

Status of This Memo

   This document is not an Internet Standards Track specification; it is
   published for informational purposes.

   This document is a product of the Internet Architecture Board (IAB)
   and represents information that the IAB has deemed valuable to
   provide for permanent record. It represents the consensus of the
   Internet Architecture Board (IAB). Documents approved for
   publication by the IAB are not a candidate for any level of Internet
   Standard; see Section 2 of RFC 5741.

   Information about the current status of this document, any errata,
   and how to provide feedback on it may be obtained at
   http://www.rfc-editor.org/info/rfc7241.

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1. Introduction

   This document contains a set of principles and guidelines that serve
   as the basis for coordination between Project 802 of the Institute of
   Electrical and Electronics Engineers (IEEE 802) and the Internet
   Engineering Task Force (IETF), a program under the Internet Society
   (ISOC) organizational umbrella [BCP101]. The objective is to
   encourage timely development of technical specifications that
   facilitate maximum interoperability with existing (fixed and mobile)
   Internet systems, devices, and protocols. Each organization will
   operate according to their own rules and procedures including rules
   governing IPR policy, specification elaboration, approval, and
   maintenance.

   While this document is intended to improve cooperation between the
   two organizations, it does not change any of the formal practices or
   procedures of either organization.

1.1. Why Cooperate?

   IEEE 802 and the IETF are independent standards organizations that
   each use standards produced by the other organization and develop
   standards dependent on those produced by the other organization.
   This dependency may extend to carrying attributes in protocols that
   reflect technologies defined by the other organization.

   The dependencies between IEEE 802 and IETF standards are a motivation
   for cooperation between the organizations. However, since the
   benefits of cooperation come at the cost of coordination overhead,
   the benefits of coordination must outweigh the cost.

   The IETF benefits from coordination by obtaining improved access to
   IEEE 802 expertise in the widely deployed and widely used IEEE 802
   Local Area Network architecture [ARCH802].

   IEEE 802 benefits from coordination by obtaining improved access to
   IETF expertise on IP datagram encapsulation, routing, transport, and
   security, as well as specific applications of interest to IEEE 802.

2. Organization, Participation, and Membership

   IEEE 802 and IETF are similar in some ways but different in others.
   When working on projects of interest to both organizations, it is
   important to understand the similarities and differences.

2.1. IEEE 802

   The IEEE Standards Association (IEEE-SA) is the standards-setting
   body of the IEEE. The IEEE-SA Standards Board oversees the IEEE
   standards development process.

   The IEEE-SA Standards Board supervises what IEEE calls "sponsors" --
   IEEE entities that develop standards. The IEEE 802 LAN/MAN Standards
   Committee is a sponsor that develops and maintains networking
   standards and recommended practices for local, metropolitan, and
   other area networks, using an open and accredited process, while
   advocating for them on a global basis. Areas of standardization work
   include Ethernet, Bridging and Virtual Bridged LANs, Wireless LAN
   (Local Area Network), Wireless PAN (Personal Area Network), Wireless
   MAN (Metropolitan Area Network), Wireless Coexistence, Media
   Independent Handover Services, and Wireless RAN (Regional Access
   Network). Within IEEE 802, a Working Group provides the focus for
   each of these areas.

   In IEEE 802, work is done in Working Groups operating under an
   Executive Committee. Each Working Group is led by a Working Group
   Chair. Most Working Groups have one or more Task Groups. A Task
   Group is responsible for a project or group of projects.

   The Executive Committee is comprised of the Executive Committee
   Chair, Executive Committee Officers (e.g., Vice-Chairs, Secretaries,
   Treasurer), and Working Group Chairs.

   A good place to learn more is the IEEE 802 Home Page, at
   <http://www.ieee802.org/>. An IEEE 802 Orientation for new
   participants that gives an overview of IEEE 802 process is available
   from the home page.

   The IEEE 802 Executive Committee and all Working Groups meet three
   times per year at plenary sessions. Plenary sessions are held in
   March, July, and November. Most Working Groups hold interim
   meetings, usually in January, May, and September. The meeting
   schedule can be found at <http://www.ieee802.org/meeting/index.html>.

   A Study Group is a group formed to consider starting a new project
   and, if new work is found to be suitable, to develop an IEEE Project
   Authorization Request (PAR), similar in purpose to an IETF Working
   Group charter. A Study Group may operate under a Working Group or
   under the Executive Committee depending on whether the new work under
   consideration falls within the scope of an existing Working Group.
   Study Groups are expected to exist for a limited time, usually for
   one or two plenary cycles, and must be authorized to continue at each
   plenary if they have not completed their work.

Participation in IEEE 802 Working Groups is at the level of
individuals -- participants are human beings and not companies.
While participation is open, individuals are required to declare
their affiliation (i.e., any individual or entity that financially or
materially supports the individual's participation in IEEE 802).

Working Groups maintain membership rosters, with voting membership
attained on the basis of in-person meeting attendance. Retention of
voting membership generally requires continued attendance and
responsiveness to letter ballots. Voting membership allows one to
vote on motions and on Working Group Ballots of drafts. All drafts
are also balloted by a Sponsor ballot pool before approval as
standards. Joining a Sponsor ballot pool does not require
participation in meetings. It is not necessary to be eligible to
vote in order to comment on drafts, and the Working Group is required
to consider and respond to all comments submitted during Working
Group and Sponsor ballots.

To foster ongoing communication between IEEE 802 and IETF, it is
important to identify and establish contact points within each
organization. IEEE 802 contact points may include:

IEEE 802 Working Group Chair: An IEEE 802 Working Group chair is an
     individual who is assigned to lead the work of IEEE 802 in a
     particular area. IEEE 802 Working Group chairs are elected by
     the Working Group and confirmed by the Executive Committee for
     a two-year term. The Working Group Chair provides a stable
     contact point for cooperation between the two organizations for
     a given topic.

IEEE 802 Task Group (or Task Force) Chair: An IEEE 802 Task Group
     chair is an individual who is assigned to lead the work on a
     specific project or group of projects within a Working Group.
     The Task Group Chair often serves for the duration of a
     project. The Task Group Chair provides a stable contact point
     for cooperation between the two organizations on a particular
     project.

IEEE 802 Study Group Chair: An IEEE 802 Study Group Chair is an
     individual assigned to lead consideration of new work and
     development of an IEEE 802 Project Authorization Request (PAR).
     The Study Group chair provides a stable contact point for
     cooperation between the two organizations on a study group
     topic.

   IEEE 802 Liaisons: It may be beneficial to establish liaisons as
        additional contact points for specific topics of mutual
        interest. These contact points should be established early in
        the work effort. The IEEE 802 and IETF projects may select the
        same individual as their contact point, but this is not
        required, so that two individuals each serve as contact points
        for one project participating in the liaison relationship.

   Informal Contact points: Other informal contacts can provide useful
        cooperation points. These include Project Editors who are
        responsible for editing the drafts and work with the Task Group
        Chairs to lead tracking and resolution of issues. Joint
        members who are active in both the IEEE 802 and IETF projects
        in an area can also aid in cooperation.

2.2. IETF

   The IETF Standards Process is defined in [BCP9]. [BCP11] is a
   helpful description of organizations involved in the IETF standards
   process. It can still be useful as an overview, although details
   have changed since 1996.

   In the IETF, work is done in Working Groups (WGs) and is mostly
   carried out through open, public mailing lists rather than face-to-
   face meetings. The IETF Working Group process is defined in [BCP25].

   WGs are organized into areas, and each area is managed by one or more
   Area Directors. Collectively, the Area Directors constitute the
   Internet Engineering Steering Group (IESG) [RFC3710].

   To foster ongoing communication between IEEE 802 and IETF, it is
   important to identify and establish contact points within each
   organization. IETF contact points may include Area Directors,
   Working Group chairs, and other points of contact who can help
   communicate between IEEE 802 and IETF Working Groups.

   The Internet Architecture Board (IAB) charter [BCP39] assigns the IAB
   several responsibilities relevant to this document:

   1. IESG Appointment Confirmation [BCP10]
   2. Architectural Oversight
   3. Standards Process Oversight and Appeal
   4. Appointment of the RFC Series Editor [RFC6635] and Independent
       Submission Editor [RFC6548]
   5. Appointment of the Internet Assigned Number Authority (IANA)
       operator [RFC6220]
   6. Oversight of External Liaisons for the IETF [BCP102]

IESG and IAB members are selected using the NomCom process defined in
[BCP10]. Working Group chairs serve at the pleasure of their Area
Directors, as described in [BCP25].

The IETF is designed to be a "bottom-up" protocol engineering
organization -- the leadership steers and manages but does not direct
work in a top-down way. Technical agreements with "the IETF" are
based on the consensus of Working Group participants, rather than
negotiated with IETF leadership.

IETF meets in plenary sessions three times per year. Some Working
Groups schedule additional interim meetings, which may be either
face-to-face or "virtual". Information about IETF meetings is
available at <http://www.ietf.org/meeting/upcoming.html>.
Information about IETF Working Group interim meetings is available on
<http://www.ietf.org/meeting/interim-meetings.html>.

The preferred way to develop specifications is to do work on mailing
lists, reserving face-to-face sessions for topics that have not been
resolved through previous mailing list discussion.

Participation in the IETF is open to anyone (technically, anyone with
access to email sufficient to allow subscription to one or more IETF
mailing lists). All IETF participants act as individuals. There is
no concept of "IETF membership".

A good place to learn more is the IETF Home Page, at
<http://www.ietf.org/>, and especially the "About the IETF" page at
<http://www.ietf.org/about>, selectable from the IETF Home Page.

The "Tao of the IETF" is also very helpful, especially for IEEE 802
participants who will also be participating in IETF Working Groups
and attending IETF meetings. It is available at
<http://www.ietf.org/tao.html>.

The current list of IETF Area Directors and Working Group chairs can
be found in the IETF Working Group charters, at
<http://datatracker.ietf.org/wg/>.

2.3. Structural Differences

   IEEE 802 and IETF have similar structures, but the terms they use are
   different, and even conflicting. For example, both IEEE 802 and IETF
   use the term "Working Group", but this means very different things in
   the two organizations.

   Thumbnail comparison between IETF and IEEE 802 entities

   IETF Area   is similar to IEEE 802 Working Group
   IETF Working Group is similar to IEEE 802 Task Group
   IETF BOF   is similar to IEEE 802 Study Group

   Both IEEE 802 Working Groups and IETF Areas are large, long-lived,
   and relatively broadly scoped, containing more narrowly chartered
   entities (IEEE 802 Task Groups and IETF Working Groups), which tend
   to be short-lived and narrowly chartered. IEEE 802 uses Study Groups
   to develop proposals for new work, and these are analogous to IETF
   Birds of a Feather ("BOF") sessions.

   Several IETF Areas also have one or more directorates to support the
   work of the Area Directors. Area Directors often ask directorate
   members to review documents or provide input on technical questions.
   These directorates are often a source of expertise on specific
   topics. The list of Area Directorates is at
   <http://www.ietf.org/iesg/directorate.html>. IEEE 802 does not have
   a corresponding organizational entity.

2.4. Cultural Differences

   IEEE 802 and IETF have cultures that are similar but not identical.
   Some of the differences include:

   Consensus and Rough Consensus: Both organizations make decisions
         based on consensus, but in the IETF, "consensus" can mean
         "rough consensus, as determined by Working Group chairs". In
         practice, this means that a large part of the community being
         asked needs to agree. Not everyone has to agree, but if
         someone disagrees, they need to convince other people of their
         point of view. If they're not able to do that, they'll be "in
         the rough" when "rough consensus" is declared. Although IEEE
         Working Groups ultimately rely on voting for decision-making,
         they vary widely in their use of consensus versus voting in the
         course of a meeting and in their attention to Robert's Rules
         [RONR].

   Running Code: David Clark coined the phrase "We reject kings,
         presidents and voting. We believe in rough consensus and
         running code" in 1992, to explain IETF culture. Although
         that's not always true today, the existence of "running code"
         as a proof of feasibility for a proposal often carries weight
         during technical discussions. IEEE 802 considers both
         technical and economic feasibility when deciding whether to
         approve new work, as noted in Section 4.1.7.

Decision-making: IEEE 802 Working Groups vary in their reliance upon
     voting versus consensus, and in the breadth of coverage of an
     individual motion, but ultimately, all rely upon a 75 percent
     vote to decide technical issues, and a 50 percent +1 vote to
     decide other issues. IETF Working Groups do not use voting.
     Working Group chairs may ask for a "show of hands" or "take a
     hum" to judge backing for a proposal and identify technical
     concerns and objections, but this is not considered "voting".
     IETF consensus and humming is discussed further in [RFC7282].

Balance between mailing lists and meetings: Both organizations make
     use of mailing lists. IETF Working Groups rely heavily on
     mailing lists, where work is done, in addition to formal
     meetings. The IETF requires all Working Group decisions to be
     made (or, often in practice, confirmed) on mailing lists --
     final decisions aren't made in meetings. IEEE 802 Working
     Groups typically meet face-to-face about twice as often as IETF
     Working Groups (three IEEE 802 plenaries plus three IETF 802
     interim meetings each year, compared to three IETF plenaries
     per year), and teleconferences are more common in IEEE 802 than
     in most IETF Working Groups. Most major decisions in IEEE 802
     are made during plenary or interim meetings, except for
     procedural decisions. Attendance at meetings is critical to
     influencing decisions and to maintaining membership voting
     rights.

Interim meetings: Both organizations use interim meetings (between
     plenary meetings). IETF Working Groups schedule interim
     meetings on an as-needed basis. IETF interim meetings may be
     face-to-face or virtual. Most IEEE 802 WGs hold regularly
     interim meetings three times a year in the middle of the
     interval between two plenary meetings. The schedules and
     locations of these meetings are typically known many months in
     advance. IEEE 802 interim meetings are face-to-face only. In
     addition to regularly scheduled IEEE 802 interim meetings,
     teleconference and ad hoc meetings are held on an as-needed
     basis.

Remote participation: Because the IETF doesn't make decisions at
     face-to-face meetings, attendance is not absolutely necessary,
     and some significant contributors do not attend most face-to-
     face IETF meetings. However, finding people interested in a
     proposal for new work, or soliciting backing for ideas, is
     often more easily accomplished face-to-face, such as in a
     hallway or bar. Significant contributors to IEEE 802 almost
     always attend face-to-face meetings; participation in IEEE 802
     meetings is a condition for WG membership.

Lifetime of Standards: IEEE 802 periodically reviews existing
     standards. IETF Standards Track documents may be updated or
     obsoleted by newer Standards Track documents, but there is no
     formal periodic review for existing Standards Track documents.
     The status of specific IETF standards is available through the
     IETF "Datatracker" [DATATRACKER]. Because these status changes
     happen independently, standards from each organization may
     refer to documents that are no longer standards in the other
     organization.

Overlapping terminology: As two independent standards development
     organizations, IEEE 802 and IETF have developed vocabularies
     that overlap. For instance, IEEE 802 "ballots" at several
     levels of the organization during document approval, while IETF
     documents are only "balloted" during IESG review. The IESG
     uses "ballots" to indicate that all technical concerns have
     been addressed, not to indicate that the IESG agrees with a
     document. The intention is to "discuss" technical issues with
     a document, and "no" is not one of the choices on an IESG
     ballot.

2.5. Mailing Lists

   All IETF Working Groups and all IEEE 802 Working Groups have
   associated mailing lists. Most IEEE 802 Task Groups also have
   mailing lists, but in some cases (e.g., the IEEE 802.1 Working
   Group), the Working Group mailing list is used for any Task Group
   matters.

   In the IETF, the mailing list is the primary vehicle for discussion
   and decision-making. It is recommended that IEEE 802 experts
   interested in particular IETF Working Group topics subscribe to and
   participate in these lists. IETF WG mailing lists are open to all
   subscribers. The IETF Working Group mailing list subscription and
   archive information are noted in each Working Group's charter page.

   In IEEE 802, mailing lists are typically used for meeting logistics,
   ballot announcements, reports, and some technical discussion. Most
   decision-making is at meetings, but in cases where a decision is
   needed between meetings, it may be done over the mailing list. Most
   technical discussion occurs at meetings and by generating comments on
   drafts that are compiled with responses in comment resolution
   documents.

   Most IEEE 802 mailing lists are open to all subscribers. For the few
   IEEE 802 mailing lists that are not open, please see the Working
   Group chair to arrange for access to the mailing list.

   Some IEEE 802 participants refer to mailing lists as "reflectors".

3. Document Access and Cross-Referencing

   During the course of IEEE 802 and IETF cooperation, it is important
   to share internal documents among the technical Working Groups. In
   addition, drafts of IEEE 802 standards, Internet-Drafts, and RFCs may
   also be distributed.

3.1. Access to IETF Documents

   IETF Internet-Drafts may be located using the IETF Datatracker
   interface (see [DATATRACKER]) or via the IETF tools site at
   <http://tools.ietf.org>. RFCs may be found at either of the above
   sites, or via the RFC Editor web site at <http://www.rfc-editor.org>.

3.2. Access to IEEE 802 Standards

   IEEE 802 standards, once approved, are published and made available
   for sale. They can be purchased from the IEEE Standards Store, at
   <http://www.techstreet.com/IEEEgate.html>. They are also available
   from other outlets, including the IEEE Xplore digital library, at
   <http://ieeexplore.ieee.org>.

   The Get IEEE 802 program, at <http://standards.ieee.org/about/get>,
   grants public access to download individual IEEE 802 standards at no
   charge (although registration is required). IEEE 802 standards are
   added to the Get IEEE 802 program six months after publication. This
   program is approved year by year, but has been in place for several
   years.

3.3. Access to IEEE 802 Working Group Drafts

   The IEEE owns the copyright to drafts of standards developed within
   IEEE 802 standardization projects. The IEEE-SA grants permission for
   an IEEE 802 draft to be distributed without charge to the
   participants for that IEEE 802 standards development project.
   Typically, access is provided over the Internet under password
   protection, with the password provided to members of the
   participating WG. Requests to the relevant WG Chair for access to a
   draft for purposes of participation in the project are typically
   granted.

An alternative access mechanism which may more easily enable document
access for IETF WGs cooperating with IEEE 802 was established by a
liaison statement sent to the IETF in July 2004 by Paul Nikolich,
Chair of IEEE 802 (available at <https://datatracker.ietf.org/
documents/LIAISON/file41.pdf>), describing the process by which IETF
WGs can obtain access to IEEE 802 work in progress. IEEE 802 WG
Chairs have the authority to grant membership in their WGs and can
use this authority to grant membership to an IETF WG chair upon
request. The IETF WG chair will be provided with access to the
username/password for the IEEE 802 WG archives and is permitted to
share that information with participants in the IETF WG. Since it is
possible to participate in IETF without attending meetings, or even
joining a mailing list, IETF WG chairs will provide the information
to anyone who requests it. However, since IEEE 802 work in progress
is copyrighted, copyright restrictions prohibit incorporating
material into IETF documents or postings.

In addition to allowing IETF participants to access documentation
resources within IEEE 802, IEEE 802 can also make selected IEEE 802
documents at any stage of development available to the IETF by
attaching them to a formal liaison statement. Although a
communication can point to a URL where a non-ASCII document can be
downloaded, sending attachments in proprietary formats to an IETF
mailing list is discouraged.

3.3.1. IEEE 802 Documentation System

Each IEEE 802 standardization project is assigned to a Working Group
(WG) for development. In IEEE 802, the working methods of the WGs
vary in their details. The documentation system is one area in which
WG operations differ, based on varying needs and traditions. In some
cases, the WGs assign the core development to a subgroup (typically
known as a Task Group or Task Force), and the documentation
procedures may vary among the subgroups as well. Prior to project
authorization, or on topics not directly related to development of a
standard, the WG may consider and develop documents itself or using
other subgroups (standing committees, ad hocs, etc.).

IEEE 802 also supports Technical Advisory Groups (TAGs) that conduct
business and develop documents, although not standards. References
here to WGs apply to TAGs as well.

3.3.2. Access to Internal IEEE 802 Working Group Documents

Generally, the archives of minutes and contributions to IEEE 802
groups are publicly and freely available.

Many IEEE 802 groups use a documentation system provided by IEEE and
known as "Mentor". The list of these groups is available at the IEEE
802 Mentor Home Page: <https://mentor.ieee.org/802>. Mentor provides
the following features:

1. The documentation system is structured and ordered, with
    documentation tags and unique numbering and versioning.

2. Online documentation is available.

3. Limited search functionality is provided, and publicly available
    search engines index the data.

4. The ability to submit documents to Mentor is limited but is
    generally available to any interested party. An IEEE web account
    is required but can be easily and freely established using the
    IEEE Account Request page, at
    <http://www.ieee.org/go/create_web_account>. If submission is
    protected, the privilege can be requested via the Mentor system
    (using the "Join group" link on each WG Mentor page) and would
    typically be granted by the WG documentation manager in a manual
    approval.

5. Submitted documents are immediately available to the general
    public at the same instant they become available for
    consideration by the group.

IEEE 802.1 and IEEE 802.3 do not use Mentor.

IEEE 802.1 documents are organized in folders by year at
<http://www.ieee802.org/1/files/public/>. The file names indicate
the relevant project, author, date, and version. The file-naming
conventions and upload link are at
<http://www.ieee802.org/1/filenaming.html>. Upload is moderated.

IEEE 802.3 documents are accessed from the home pages of the IEEE
802.3 subgroups (i.e., Task Force or Study Group) and are organized
in folders by meeting date. These home pages are available from the
IEEE 802.3 home page, at <http://www.ieee802.org/3/>. Files are
uploaded by emailing to the subgroup chair.

3.3.3. Contributions to IEEE 802 Working Groups

   In general, development of standards in IEEE 802 is contribution
   driven. In many cases, a WG or subgroup will issue a call for
   contributions with a specific technical solicitation, including
   deadlines and submission instructions. Some groups maintain specific
   submission procedures and specify a contribution cover sheet to
   clarify the status of the contribution.

   Content for drafts of standards is submitted to WGs by individual
   participants or groups of participants. Content toward other group
   documents (such as, for example, external communication statements or
   foundation documents underlying a draft of a standard) might also be
   contribution driven. At some point, the group assembles contributed
   material to develop group documents, and revision takes place within
   group meetings or by assignment to Editors. For the most part, the
   contributions toward discussion as well as the group documents
   (including minutes and other reports) are openly available to the
   public.

3.4. Cross-Referencing

   IETF and IEEE 802 each recognize the standards defined by the other
   organization. Standards produced by each organization can be used as
   references in standards produced by the other organization.

   IETF specifications may reference IEEE 802 work in progress, but
   these references should be labeled "Work in Progress". If the
   references are normative, this will block publication of the
   referring specification until the reference is available in a stable
   form.

   IEEE 802 standards may normatively reference non-expired Internet-
   Drafts, but IEEE 802 prefers that this be avoided if at all possible.

   Informative references in IEEE 802 standards are placed in a
   bibliography, so they may point to either approved IETF standards or
   IETF Internet-Drafts, if necessary.

   When an IEEE 802 standard is revised, it normally retains the same
   number and the date is updated. Therefore, IEEE 802 standards are
   dated with the year of approval, e.g., IEEE Std 802.1Q(TM)-2011.
   There are two ways of referencing IEEE 802 standards: undated and
   dated references. IEEE 802 practice allows undated reference to be
   used when referencing a whole standard. An undated reference
   indicates that the most recent version of the standard should be
   used. A dated reference refers to a specific revision of an IEEE 802
   standard. Since clauses, subclauses, tables, figures, etc., may be

   renumbered when a standard is revised, a dated reference should be
   used when citing specific items in a standard.

   IETF standards may be cited by RFC number, which would also be a
   dated reference. If an undated reference to an IETF Internet
   Standard is desired, a number is also assigned in the "STD" series
   [BCP9], and these references refer to the most recent version of an
   IETF Internet Standard.

4. Guidance on Cooperation

   This section describes how existing processes within the IETF and
   IEEE 802 may be used to enable cooperation between the organizations.

   Historically, much of the work of coordination has fallen on
   individuals attending meetings of both organizations. However, as
   noted in "Transferring MIB Work from IETF Bridge MIB WG to IEEE 802.1
   WG" [RFC4663], downward pressure on travel budgets has made it
   increasingly difficult for participants to attend face-to-face
   meetings in both organizations. That pressure has continued in the
   intervening years. As a result, the coordination mechanisms
   described in this section typically do not require meeting
   attendance.

4.1. Exchange of Information about Work Items

   The following sections outline a process that can be used to enable
   each organization to stay informed about the other's active and
   proposed work items.

   Early identification of topics of mutual interest allows the two
   organizations to cooperate in a productive way and helps each
   organization avoid developing specifications that overlap or conflict
   with specifications developed in the other organization. Where
   individuals notice a potential conflict or need for coordination, the
   issue should be brought to the attention of the relevant Working
   Group chairs and/or Area Directors.

4.1.1. How IEEE 802 Is Informed about Active IETF Work Items

   The responsibility is on IEEE 802 Working Groups to review current
   IETF Working Groups to determine if there are any topics of mutual
   interest. Working Group charters and active Internet-Drafts can be
   found in the IETF Datatracker [DATATRACKER]. If an IEEE 802 Working
   Group identifies a common area of work, the IEEE 802 Working Group
   leadership should contact both the IETF Working Group chair and the
   Area Director(s) responsible. This may be accompanied by a formal
   liaison statement (see Section 5.2).

4.1.2. How IETF Is Informed about Active IEEE 802 Work Items

   It is the responsibility of IETF Working Groups to periodically
   review the IEEE 802 web site to determine if there is work in
   progress of mutual interest.

   IEEE 802 Working Group status reports are published at the beginning
   and end of each plenary at <http://ieee802.org/minutes>. Each
   Working Group includes a list of their active projects and the
   status.

   The charter of an IEEE 802 project is defined in an approved Project
   Authorization Request (PAR). PARs are accessible in IEEE Standards
   myProject, at <https://development.standards.ieee.org>. Access
   requires an IEEE web account, which is free and has no membership
   requirement.

   In myProject, a search on "View Active PARs" for 802 will bring up a
   list of all active IEEE 802 PARs.

   If an IETF working group identifies a common area of work or a need
   for cooperation, the Working Group leadership should contact the IEEE
   802 Working Group Chair and Task Group Chair. This may be
   accompanied by a formal liaison statement (see Section 5.2).

4.1.3. Overview of Notifications of New Work Proposals

   These principles describe the notification process used by both
   organizations:

   1. For both organizations, the technical group making a proposal for
       new work that may conflict with, overlap with, or be dependent on
       the other organization is responsible for informing the top-level
       coordination body in the other organization that cooperation may
       be required.

   2. For both organizations, the top-level coordination body receiving
       that notification is responsible for determining whether
       cooperation is, in fact, required, and informing the specific
       groups within the organization who may be affected by the
       proposal for new work.

   These direct notifications will be the most common way that each
   organization is informed about proposals for new work in the other
   organization. Several other ways of identifying proposed new work
   are described in the following sections. These additional ways act

as "belt and suspenders" to reduce the chances that proposals for new
work in one organization escape notice in the other organization when
cooperation will be required.

4.1.4. The New-Work Mailing List

Several standards development organizations (SDOs), including IETF
and IEEE 802, have agreed to use a mailing list for the distribution
of information about proposals for new work items among these SDOs.

Rather than having individual IEEE 802 participants subscribe
directly to New-Work, a single IEEE 802 mailing list is subscribed.
Leadership of the IEEE 802 Working Groups may subscribe to this
"second-level" IEEE 802 mailing list, which is maintained by the
Executive Committee (EC).

This mailing list is limited to representatives of SDOs proposing new
work that may require cooperation with the IETF. Subscription
requests may be sent to the IAB Executive Director.

4.1.5. How IEEE 802 Is Informed about Proposed New IETF Work Items

Many proposals for new IETF work items can be identified in proposed
Birds of a Feather (BOF) sessions, as well as draft charters for
Working Groups. The IETF forwards all such draft charters for new
and revised Working Groups and BOF session announcements to the IETF
New-Work mailing list.

4.1.6. How IEEE 802 Comments on Proposed New IETF Work Items

Each IEEE 802 Working Group Chair, or designated representative, may
provide comments on these charters by responding to the IESG mailing
list at iesg@ietf.org clearly indicating their IEEE 802 position and
the nature of their concern.

It should be noted that the IETF turnaround time for new Working
Group charters can be as short as two weeks, although the call-for-
comment period on work items that may require cooperation with IEEE
802 can be extended to allow more time for discussion within IEEE
802. This places a burden on both organizations to proactively
communicate and avoid "late surprises" to either organization.

Although an IEEE 802 Working Group may not be able to develop a
formal consensus response unless the notification arrives during that
Working Group's meeting, the IEEE 802 Working Group chair can
informally let the IETF know that IEEE 802 may have concerns about a
proposed work item. The IETF will consider any informal comments
received without waiting for a formal liaison statement.

4.1.7. How IETF Is Informed about Proposed New IEEE 802 Work Items

   An IEEE 802 project is initiated by approval of a Project
   Authorization Request (PAR), which includes a description of the
   scope of the work. Any IEEE 802 PARs that introduce new
   functionality are required to be available for review no less than 30
   days prior to the Monday of the IEEE 802 plenary session where they
   will be considered.

   IEEE 802 considers "Five Criteria" when deciding whether to approve
   new work: Broad Market Potential, Compatibility, Distinct Identity,
   Technical Feasibility, and Economic Feasibility. The criteria are
   defined in the IEEE 802 LAN/MAN Standards Committee (LMSC) Operations
   Manual. The PARs are accompanied by responses on the "Five
   Criteria".

   IEEE 802 posts proposed PARs to the New-Work mailing list, prior to
   the IEEE 802 meetings where the PARs will be discussed. The IETF
   coordination body will notify technical groups about PARs of
   interest.

4.1.8. How IETF Comments on Proposed New IEEE 802 Work Items

   Any comments on proposed PARs should be submitted to the Working
   Group Chair and copied to the Executive Committee chair by email not
   later than 5:00 PM Tuesday of the plenary session (in the time zone
   where the plenary is located).

4.1.9. Other Mechanisms for Coordination

   From time to time, IEEE 802 and IETF may agree to use additional
   mechanisms for coordination between the two groups. The details of
   these mechanisms may vary over time, but the overarching goal is to
   communicate effectively as needed.

   As examples of such mechanisms, at the time this document was
   written, the two organizations are holding periodic conference calls
   between representatives of the IETF and IEEE 802 leadership teams,
   and are maintaining a "living list" of shared interests between the
   two organizations, along with the status of these interests and any
   related action items. At the time this document was written, the
   "living list" included about 20 topics being actively discussed, with
   more expected. These conference calls help the two organizations
   coordinate more effectively by allowing higher-bandwidth discussions
   than formal liaison statements would allow and by permitting more
   timely interactions than waiting for face-to-face meetings.

   Minutes for these conference calls, and the "living lists" discussed
   on each call, are available at <http://www.iab.org/activities/
   joint-activities/iab-ieee-coordination/>.

4.2. Document Review and Approval

   During the course of IEEE 802 and IETF cooperation, it is important
   for technical experts to review documents of mutual interest and,
   when appropriate, to provide review comments to the approving body as
   the document moves through the approval process.

4.2.1. IEEE 802 Draft Review and Balloting Processes

   IEEE 802 drafts are reviewed and balloted at multiple stages of the
   draft. Any ballot comments received from non-voters before the close
   of the ballot are required to be considered in the comment resolution
   process. The Editors, Task Group Chairs, or Working Group Chairs
   responsible for the project will facilitate the entering of comments
   from non-voters.

   IEEE 802 draft reviews and ballots sometimes produce a large volume
   of comments. In order to handle them efficiently, spreadsheets or a
   comment database tool are used. It is highly recommended that
   balloters and others submitting comments do so with a file that can
   be imported into these tools. A file with the correct format is
   normally referenced in the ballot announcement or can be obtained
   from the Editor, Task Group Chair, or Working Group Chair responsible
   for the project. Comments on a draft should be copied to the Editor,
   Task Group Chair, and Working Group Chair.

4.2.1.1. Task Group Review

   During draft development, informal task group reviews (task group
   ballots) are conducted. Though these are called "ballots" by some
   Working Groups, the focus is on collecting and resolving comments on
   the draft rather than on trying to achieve a specific voting result.

4.2.1.2. Working Group Ballot

   Once the draft is substantially complete, Working Group ballots are
   conducted. Working Group voting members are entitled and required to
   vote in Working Group ballots. Any "disapprove" votes are required
   to be accompanied by comments that indicate what the objection is and
   a proposed resolution. "Approve" votes may also be accompanied by
   comments. The comments submitted with a "disapprove" vote may be
   marked to indicate which comments need to "be satisfied" to change
   the vote.

Initial Working Group ballots are at least 30 days. Recirculation
ballots to review draft changes and comment resolutions are open at
least 10 days.

In order to submit a WG ballot, contact the WG Chair for the
submission tool currently in use, as the tools may change over time.

4.2.1.3. Sponsor Ballot

When a draft has successfully completed Working Group ballot, it
proceeds to Sponsor ballot. One may participate in IEEE 802 Sponsor
ballots with an individual membership in the IEEE Standards
Association (IEEE-SA) or by paying a per-ballot fee. Participants
are also required to state their affiliation and the category of
their relationship to the scope of the standards activity (e.g.,
producer, user, general interest).

Information about IEEE-SA membership can be found at
<http://standards.ieee.org/membership/>.

Sponsor ballot is a public review. An invitation is sent to any
parties known to be interested in the subject matter of the ballot.
One can indicate interest in IEEE myProject
(<https://development.standards.ieee.org>). An IEEE web account is
freely available and is required for login. To select interest
areas, go to the Projects tab and select "Manage Activity Profile"
and check any areas of interest. IEEE 802 projects are under
Computer Society; LAN/MAN Standards Committee.

The Sponsor ballot pool is formed from those that accept the
invitation during the invitation period.

As with other ballot levels, the IETF participants who want to
comment on Sponsor ballots need not be members in the Sponsor ballot
pool. The Editors, Task Group Chairs, or Working Group Chairs
responsible for the project will facilitate the entering of comments
from IETF participants who are not members in the Sponsor ballot
pool.

Any "disapprove" votes are required to be accompanied by comments
that indicate what the objection is, along with a proposed
resolution. "Approve" votes may also be accompanied by comments.
The comments submitted with a "disapprove" vote may be marked to
indicate which comments need to "be satisfied" for the commenter to
change the vote from "disapprove".

Initial Sponsor ballots are open for at least 30 days. Recirculation
ballots to review draft changes and proposed comment resolutions are
open at least 10 days.

4.2.1.4. Ballot Resolution

At each level, the relevant group (Task Group for TG ballots, Working
Group for WG and Sponsor ballots) examines the ballot comments and
determines their disposition. The Editor (or editorial team) may
prepare proposed dispositions. Task Group procedures vary, but at
the Working Group level, the Working Group must vote 75 percent to
approve the final ballot disposition in order to advance the
document.

4.2.2. IETF Draft Review and Approval Processes

The IETF Working Group Process is defined in [BCP25]. The overall
IETF standards process is defined in [BCP9].

As noted in Section 2.4, IETF Working Groups do not "ballot" to
determine Working Group consensus to forward documents to the IESG
for approval.

Technical contributions are welcome at any point in the IETF document
review and approval process, but there are some points where
contribution is more likely to be effective.

1. When a Working Group is considering adoption of an individual
    draft. Adoption is often announced on the Working Group's
    mailing list.

2. When Working Group chairs issue a "Working Group Last Call"
    ("WGLC") for a draft, to confirm that the Working Group has
    consensus to request publication. Although this is not a
    mandatory step in the document review and approval process for
    Internet-Drafts, most IETF Working Groups do issue WGLCs for most
    Working Group documents. WGLC would be announced on the Working
    Group's mailing list.

3. When the Internet Engineering Steering Group issues an "IETF Last
    Call" ("Last Call") for a draft. IETF Last Call is a formal and
    required part of the review and approval process, is addressed to
    the larger IETF community, and is often the first time the entire
    community has looked at the document. IETF Last Call is signaled
    on the IETF-Announce Mailing List, and comments and feedback are
    ordinarily directed to the IETF Discussion Mailing List.

In practice, earlier input is more likely to be effective input.
IEEE 802 participants who are interested in work within the IETF
should be monitoring that work and providing input long before
Working Group Last Calls and IETF Last Calls, for best results.

Some IETF Working Group charters direct the Working Group to
communicate with relevant IEEE 802 Task Groups.

4.3. Solicited Review Processes

With the number of areas of cooperation between IEEE 802 and IETF
increasing, the document review process has extended beyond the
traditional subjects of SMI (Structure of Management Information) MIB
modules and AAA (Authentication, Authorization, and Accounting)
described in [RFC4441]. IESG members routinely solicit directorate
reviews as a means to request the opinion of specialized experts on
specific aspects of documents in IESG review (examples include
security, "MIB Doctors", or congestion management reviews). Area
Directors may also require solicited reviews from IEEE 802 or IEEE
802 Working Groups when it becomes clear that the Internet-Draft has
implications that impact some area of IEEE 802's responsibility and
expertise.

IEEE 802 leadership can also solicit similar reviews, but these
reviews are not included as part of the formal IEEE 802 process.

5. Liaison Managers and Liaison Statements

Both IEEE 802 and IETF work best when people participate directly in
work of mutual interest, but that is not always possible, and
individuals speaking as individuals may not provide effective
communication between the two SDOs. From time to time, it may be
appropriate for a technical body in one SDO to communicate as a body
with a technical body in the other SDO. This section describes the
mechanisms used to provide formal communication between the two
organizations, should that become necessary.

The Internet Architecture Board (IAB) is responsible for liaison
relationship oversight for the IETF. In IEEE 802, liaison
relationship oversight is distributed, and each organization
appointing liaison managers is responsible for oversight of its own
liaison relationships.

The reader should note that the role of a liaison manager in both
IEEE 802 and IETF is not to "speak for" the appointing organization.
A liaison manager is most helpful in ensuring that neither
organization is surprised by what's happening in the other
organization, helping to identify the right people to be talking to

   in each organization, and making sure that formal liaison statements
   don't "get lost" between the two organizations. The IAB's guidance
   to liaison managers is available in [RFC4691]. IEEE 802
   organizations appointing each liaison manager also provide guidance
   to those liaison managers. There is no global guidance for all IEEE
   802 liaison managers.

5.1. Liaison Managers

   The IAB appoints IETF liaison managers using the process described in
   [BCP102]. The current list of the IETF's liaison relationships and
   the liaison managers responsible for each of these relationships is
   available at <http://www.ietf.org/liaison/managers.html>.

   IEEE liaison managers are selected by the organizations they
   represent, either in an election or by Working Group or Task Group
   Chair appointment. The current list of IEEE 802's liaison
   relationships and the liaison managers responsible for each of these
   relationships is available at
   <http://www.ieee802.org/liaisons.shtml>.

5.2. Liaison Statements

   The IEEE 802 procedure for sending and receiving liaison statements
   is defined by the Procedure for Coordination with Other Standards
   Bodies in the IEEE 802 LMSC Operations Manual
   (<http://ieee802.org/devdocs.shtml>).

   The IETF process for sending and receiving liaison statements is
   defined in [BCP103].

6. Protocol Parameter Allocation

   Both IEEE 802 and IETF maintain registries of assigned protocol
   parameters, and some protocol parameters assigned in one organization
   are of interest to the other organization. This section describes
   the way each organization registers protocol parameters.

6.1. IANA

   The IETF uses the Internet Assigned Numbers Authority (IANA) as a
   central authority that administers registries for most protocol
   parameter allocations. The overarching document describing this is
   [BCP26]. [BCP141] discusses use of IEEE 802-specific IANA parameters
   in IETF protocols and specifies IANA considerations for allocation of
   code points under the IANA OUI (Organizationally Unique Identifier).

   Requests for protocol parameter allocations from IANA are subject to
   assignment policies, and these policies vary from registry to
   registry. A variety of well-known policies are described in [BCP26],
   but registries are not limited to one of the well-known choices.

   The purpose of these allocations is to manage a namespace
   appropriately, so unless a registry has a policy that allows
   something like first come, first served ("FCFS") for a namespace that
   is effectively unbounded, requests for protocol parameter allocation
   will require some level of review. "Standards Action" is at the
   other extreme (an approved Standards Track RFC is required in order
   to obtain an allocation). Some registries require that a request for
   allocation pass "Expert Review" -- review by someone knowledgeable in
   the technology domain, appointed by the IESG and given specific
   criteria to use when reviewing requests.

6.2. IEEE Registration Authority

   The IEEE Standards Association uses the IEEE Registration Authority
   as a central authority administering registries. The IEEE
   Registration Authority Committee (IEEE RAC) provides technical
   oversight for the IEEE Registration Authority.

   The list of Registries administered by the IEEE Registration
   Authority can be found on the IEEE RAC web site, at
   <http://standards.ieee.org/develop/regauth/general.html>.

   Regarding Ethertype allocation:
   Some IETF protocol specifications make use of Ethertypes. Ethertypes
   are a fairly scarce resource so allocation has the following
   requirements. All Ethertype requests are subject to review by a
   consultant to the IEEE RA, followed by IEEE RAC confirmation.

   The IEEE RAC will not assign a new Ethertype to a new IETF protocol
   specification until the IESG has approved the protocol specification
   for publication as an RFC. In exceptional cases, the IEEE RA will
   consider "early allocation" of an Ethertype for an IETF protocol that
   is still under development when the request comes from, and has been
   vetted by, the IESG.

   Note that "playpen" Ethertypes have been assigned in IEEE 802
   [ARCH802] for use during protocol development and experimentation.

   While a fee is normally charged by the IEEE Registration Authority
   Committee (RAC) for the allocation of an Ethertype, the IEEE RAC will
   consider waiving the fee for allocations relating to an IETF
   Standards Track document, based on a request from the IESG.

6.3. IEEE 802 Registration at the Working Group Level

   Each IEEE 802 Working Group has a registry of identifier values and a
   mechanism to allocate identifier values in its standards and approved
   amendments. This includes items such as Object Identifiers for
   managed objects and assignment for protocols defined by that Working
   Group, such as OpCodes. Contact the IEEE 802 Working Group Chair for
   the details of a given Working Group registry.

6.4. Joint-Use Registries

   Because some registries are "joint-use" between IEEE 802 and IETF, it
   is necessary for each organization to review usage of registries
   maintained by the other organization as part of the review and
   approval process for standards.

   If an IEEE 802 document refers to IANA registries, those references
   should be checked prior to Sponsor balloting. If an IETF document
   refers to IEEE 802 registries, those references should be checked as
   part of IANA Review during IETF Last Call.

7. Security Considerations

   This document describes cooperation procedures and has no direct
   Internet security implications.

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9. Acknowledgments

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Appendix A. Current Examples of IEEE 802 and IETF Cooperation

A.1. MIB Review

   Historically, the MIB modules for IEEE 802.1 and IEEE 802.3 were
   developed in the IETF Bridge MIB and Hub MIB Working Groups,
   respectively. With travel budgets under pressure, it has become
   increasingly difficult for companies to fund employees to attend both
   IEEE 802 and IETF meetings.

   As a result, an alternative was found to past arrangements that
   involved chartering MIB work items within an IETF WG. Instead, the
   work was transferred to IEEE 802 with expert support for MIB review
   from the IETF. The process of transfer of the MIB work from the IETF
   Bridge MIB WG to IEEE 802.1 WG is documented in [RFC4663].

   By standardizing IEEE 802 MIBs only within IEEE 802 while utilizing
   the IETF SNMP quality control process, the IETF and IEEE 802 seek to
   ensure quality while decreasing overhead. In order to encourage
   wider review of MIBs developed by IEEE 802 WGs, it is recommended
   that MIB modules developed in IEEE 802 follow the MIB guidelines
   [BCP111]. An IEEE 802 group may request assignment of a "MIB Doctor"
   to assist in a MIB review by contacting the IETF Operations and
   Management Area Director.

A.2. AAA Review

   IEEE 802 WGs requiring new AAA applications should send a liaison
   request to the IETF. Where new attribute definitions are sufficient,
   rather than defining new authentication, authorization, and
   accounting logic and procedures, an Internet-Draft can be submitted
   and review can be requested from AAA-related WGs such as the RADEXT
   or DIME WGs.

   In addition to the RADEXT and DIME WGs, a "AAA doctors" team
   (directorate) is currently active in the OPS Area and can be
   consulted for more general advice on AAA issues that cross the limits
   of one or the other of the RADIUS or Diameter protocols, or are more
   generic in nature.

   For attributes of general utility, particularly those useful in
   multiple potential applications, allocation from the IETF standard
   attribute space is preferred to creation of IEEE 802 Vendor-Specific
   Attributes (VSAs). As noted in [RFC3575]: "RADIUS defines a
   mechanism for Vendor-Specific extensions (Attribute 26) for functions
   specific only to one vendor's implementation of RADIUS, where no

interoperability is deemed useful. For functions specific only to
one vendor's implementation of RADIUS, the use of that should be
encouraged instead of the allocation of global attribute types."

Where allocation of VSAs are required, it is recommended that IEEE
802 create a uniform format for all of IEEE 802, rather than having
each IEEE 802 Working Group create their own VSA format. The VSA
format defined in [IEEE80211F] is inappropriate for this, since the
Type field is only a single octet, allowing for only 255 attributes.
It is recommended that IEEE 802 Working Groups read and follow the
recommendations in "RADIUS Design Guidelines" [BCP158] and "Protocol
Extensions" [RFC6929] when designing and reviewing new extensions and
attributes.

"Diameter Applications Design Guidelines" [DADG] explains and
clarifies the rules to extend the Diameter base protocol [RFC6733].
Extending Diameter can mean either the definition of a completely new
Diameter application or the reuse of commands, Attribute-Value Pairs
(AVPs), and AVP values in any combination for the purpose of
inheriting the features of an existing Diameter application. The
recommendation for reusing existing applications as much as possible
is meaningful as most of the requirements defined for a new
application are likely already fulfilled by existing applications.
It is recommended that IEEE 802 Working Groups read and follow the
recommendations in [DADG] when defining and reviewing new extensions
and attributes.

A.3. EAP Review

The Extensible Authentication Protocol (EAP), defined in [RFC3748],
provides a framework within which authentication mechanisms, known as
methods, can be defined. In addition to supporting authentication,
EAP also provides for key derivation as described in [RFC5247].
State machines for EAP are described in [RFC4137].

As noted in [BCP132] and [RFC5247], security issues can arise in
integration of EAP within lower layers. Therefore, it is recommended
that IEEE 802 WGs looking to incorporate support for EAP send a
liaison request to the IETF, requesting assistance in carrying out a
security review. As an example, a security review of IEEE 802.16 was
carried out by the EAP WG, at the request of IEEE 802.16
[IEEE-802.16-Liaison1] [IEEE-802.16-Liaison2]. Where development of
new EAP authentication methods is sufficient, an Internet-Draft can
be submitted and review can be requested from WGs such as the EAP
Method Update (EMU) WG.

Appendix B. Pointers to Additional Information

   This section provides pointers to additional useful information for
   participants in IEEE 802 and IETF.

B.1. IEEE 802 Information

   IEEE 802 Home Page: <http://ieee802.org/>

   IEEE 802 policies and procedures:
   <http://ieee802.org/devdocs.shtml>

   The IEEE 802 WG and TAG main page URLs follow this convention: They
   have the one- or two-digit numerical designation for the WG or TAG
   appended after <http://ieee802.org/>. For example the IEEE 802.1
   main web page is at <http://ieee802.org/1>, while the IEEE 802.11
   main web page is at <http://ieee802.org/11>.

B.2. IETF Information

   Information on IETF procedures may be found in the documents in the
   informative references and at the URLs below.

   Note: RFCs do not change after they are published. Rather, they are
   either obsoleted or updated by other RFCs. Such updates are tracked
   in the rfc-index.txt file.

   Current list and status of all RFCs:
   <http://www.rfc-editor.org/rfc-index.html>

   Current list and description of all IETF Internet-Drafts:
   <ftp://ftp.ietf.org/internet-drafts/1id-abstracts.txt>

   Current list of IETF Working Groups and their Charters:
   <http://datatracker.ietf.org/wg/> (includes Area Directors and chair
   contacts, mailing list information, etc.)

   Current list of requested BOFs:
   <http://trac.tools.ietf.org/bof/trac/>

   RFC Editor pages about publishing RFCs:
   <http://www.rfc-editor.org> (including available tools and guidance)
   <http://www.rfc-editor.org/pubprocess.html> is particularly helpful.

   Current list of liaison statements:
   <https://datatracker.ietf.org/liaison/>

IETF Intellectual Property Rights Policy and Notices:
<http://www.ietf.org/ipr/>

The Tao of the IETF: <http://www.ietf.org/tao.html> (A Novice's Guide
to the Internet Engineering Task Force)

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