

**Testimony of Alissa Cooper,
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**Before the Subcommittee on Research & Technology of
the House Science, Space, & Technology Committee**

**Setting the Standards: Strengthening U.S. Leadership in Technical Standards
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Introduction

Chairwoman Stevens, Ranking Member Feenstra, and members of this subcommittee, thank you for the invitation to speak with you about strengthening U.S. leadership in technical standards. My name is Alissa Cooper, and I am Vice President and Chief Technology Officer for Technology Policy and a Fellow at Cisco Systems. I have been an active participant in global technology standards in the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C) since 2008. From 2017 to 2021, I served as the Chair of the IETF, the world's premier Internet standards organization. In 2020, I established Cisco's Global Technology Standards team, which coordinates and supports Cisco's participation in standards development organizations (SDOs) across the tech sector. And I currently serve as the chair of the Standards Policy Committee of the Information Technology Industry Council (ITI).

Cisco is a Fortune 100 technology company that is the worldwide leader in technology that powers the Internet. We deliver innovative networking, cloud, collaboration, applications, and security solutions across the nation and around the world. We are based in San Jose, California and employ more than 35,000 people across the U.S., with a major presence in Research Triangle Park, North Carolina. Our corporate mission is to power an inclusive future for all.

Cisco has been a leader in technical standards development since the dawn of the Internet. As part of our \$6 billion annual investment in R&D, hundreds of Cisco technical experts participate in more than 120 standards development organizations each year. We employ recognized global leaders in standards related to Wi-Fi, security, voice and video, Internet protocols, optics, software-defined networking, and numerous other technologies. All the major product families that we offer in the market utilize standards-based functionality.

Technology standards are the largely invisible fabric that underlies all of today's most widely used digital products and services. Standards are an important driver of both innovation and competitiveness on a global scale. The current standardization system has benefitted from a concerted effort by the U.S. government to foster innovation, competition, and market access. These efforts have bolstered U.S. technology developers and national economic security. The resulting standardization system in which U.S. industry engages today is worth appreciating and preserving.

Effectuating a sound standards policy framework is critical to the ability of the U.S. technology sector to succeed globally. We at Cisco appreciate the subcommittee's attention to this issue and look forward to discussing how to reinforce U.S. participation and leadership in standards. In recent years, perceived risks associated with the open, industry-led standardization system have propelled calls for the exclusion of entities of concern from standards development. But shutting out selected participants from the system undercuts much of the value it delivers to U.S. industry. Instead of seeking to exclude entities from participating in the global system, policymakers should be working to strengthen U.S. participation and the system itself.

In my testimony, I will: (1) provide an overview of what standards are, how they are developed, and how they factor into the innovation process at Cisco and within the industry; (2) compare and contrast standardization systems around the world, showing how the U.S.-backed system has created tremendous value globally and domestically—particularly when U.S. technology developers actively participate alongside foreign participants; (3) explain the existing standardization system's inherent defenses against undue influence; (4) describe the complexity of measuring impact and influence in standardization; and (5) offer suggestions for how the U.S. government can help enhance U.S. engagement in standards development.

Understanding Technical Standards

Technical standards are documents that technology designers use to build products and services that interoperate with products and services offered by other organizations. The most important goal of standardization is this interoperability, which allows web browsers to reach websites, laptops to connect to Wi-Fi, and mobile phones to make calls even though the technology that facilitates each of those connections is provided by many different companies. Products and services that run on different platforms, are written in different programming languages, and operate under different regulatory regimes can all connect and interoperate when

they implement the same standards. Without standards, there would be no Internet, web, or cellular service as we know them today.

Technical standards are ubiquitous and diverse. The act of loading a single web page—for example, by typing “<https://science.house.gov/>” into a web browser—may involve hundreds of standards produced by different SDOs that cover everything from network connectivity to the routing of Internet traffic to the visual display of the web page in the browser. Viewing the tech sector as a whole, there are thousands of SDOs worldwide developing standards with the involvement of tens of thousands of engineers, architects, researchers, and other experts from the private and public sectors.

SDOs vary in terms of their governance, participation, outputs, and decision-making procedures. Some SDOs are more formal, rely on one-nation-one-vote rules, or are government-driven—all of which can create challenges for the industry to contribute and influence outcomes. Others are industry-led, support open membership, and make decisions by consensus. While the “big three” formal SDOs—the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO), and the International Telecommunication Union (ITU)—often garner attention in standards policy discussions, the vast global ecosystem of private sector-led SDOs and consortia fuel the bulk of the standards development work happening at the cutting edge of technological innovation today.

This ecosystem supports not just the writing of technical specifications, but the interoperability testing, software development, and certification schemes needed to ensure that standards are successfully adopted in the marketplace. With long-standing support from the U.S. government for the private sector-led model of standardization, U.S. industry has secured the strongest presence worldwide in the creation of technology standards.

Standards development is an intensive long-term investment. Any given SDO may have dozens or hundreds of standards projects in flight simultaneously. A single standard often requires years of work from inception to final publication, during which time standards participants are refining their technical designs, leveraging new research results, negotiating engineering trade-offs, aligning with other existing standards documents, and conducting interoperability and feasibility testing. Participants meet throughout this process in person and online, exchange drafts and email, and collaborate on coding and testing. Any given standard is typically the

result of collaboration among numerous individuals from a variety of different organizations and geographies.

Companies in the technology industry treat standards development as one component of their broader innovation strategies, which also include research and development, academic partnerships, open-source development, and intellectual property protection. Each of these areas requires strategic decisions about sustained investment, resourcing, and objectives. A winning corporate innovation strategy weaves all of these components together and finds junctures for mutual reinforcement, for example by involving academic partners in standardization activities or by aligning open-source contributions to draft standards in development.

Cisco prioritizes engagement in standards that have the greatest impact on the technical ecosystems in which we deliver products and services. That drives us to largely focus on standards development activities occurring within organizations characterized by open participation and global scope. While retaining our long-standing commitment to key global SDOs such as the IETF, the Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA), and the 3rd Generation Partnership Project (3GPP), we also continue to evolve our standards engagements as our portfolio evolves—with more attention in recent years on the O-RAN Alliance, the Confidential Computing Consortium, the Alliance for Open Media, and many other newer organizations.

Standardization Systems Around the Globe

It has been the official policy of the U.S. government since the 1990s to support voluntary, consensus-based standards driven by private sector organizations and not by governmental or intergovernmental mandate.¹ This policy set the stage for hundreds of open-membership SDOs and consortia to be incorporated in the U.S. and globally, producing tens of thousands of standards that the \$2-trillion U.S. tech sector—and the global economy—now rely on. This system is a vital lever of competitiveness for U.S. industry, and it requires ongoing support from the U.S. government to ensure that the sector can continue to reap its benefits.

The combination of open participation, industry leadership, and consensus that characterizes the U.S.-backed system delivers unique advantages. The system promotes bottom-up innovation, with good ideas flowing in from any interested

¹ See *National Technology Transfer and Advancement Act of 1995*, Public Law 104-113.

party. It positions the actors driving innovation in the market to funnel their advances into the standardization process. It leverages rules-based governance and consensus to protect against the dominance of any single actor. The global nature of the U.S.-backed standards development system creates advantages for U.S.-based multinational companies because it promotes the openness of markets to standards-compliant technologies. Based on its immense success, this system should continue to be promoted and defended everywhere.

Historically, this system has stood in contrast to other approaches around the world. The EU has long had a strong interlock between regulation and standardization, leading to the promotion of the three European Standards Organizations (ESOs) as the key venues for the development of standards required for regulatory compliance in the EU. Although in the past the EU helpfully sought alignment between European and international standards and promoted the global nature of standardization, recent proposals from the European Commission may indicate a shift towards a more government-directed approach that limits the role of the industry—whether foreign or domestic—in shaping standardization outcomes.²

Historically, China’s standardization system has maintained a greater degree of government involvement and has been more closed to foreign participation. For many years, the development of “China-unique” domestic standards has created market access problems for U.S. companies. Many organizations—including the U.S. government—have funded and participated in decades of capacity-building events and education programs to convince Chinese government agencies, research institutions, and the industry of the value of engaging in established international standardization bodies rather than focusing on unique domestic standards. Having heeded this advice, Chinese entities are now involved in most major global SDOs. The last five years have also brought several changes to the Chinese legal framework that governs standardization, encouraging the potential adoption of industry-led standards developed in so-called “social organizations” and encouraging firms to engage in international standardization.

Decades of global experience in standardization teach us that the open, industry-led, consensus-based model of standardization yields the most innovative and pro-competitive outcomes. The U.S. public and private sectors should continue working together to bolster this model. However, the model is potentially at risk if U.S.-based

² See *An EU Strategy on Standardisation*, February 2022, <https://ec.europa.eu/docsroom/documents/48598>.

technology innovators are unable to robustly participate in global standards-setting efforts with participants from other nations, including China.

Defenses Built into the Existing Standardization System

In recent years, we have seen a rising number of attempts to use government policy to exclude certain entities from participating in international standardization. While these moves may be based on legitimate concerns about the influence of Chinese or other entities on technological innovation, they have the unintended consequence of undermining the successful industry-led standardization system, fragmenting standards development into silos, and diminishing the influence of U.S. companies in global organizations.

For example, in 2019, the Department of Commerce Bureau of Industry and Security (BIS) extended U.S. export control-related restrictions to standards development activities following the addition of Huawei to the Entity List. While intended to exclude Huawei and other listed entities from standards participation, this policy instead spurred the creation of competing foreign SDOs, sidelined U.S. participants, and harmed the credibility of U.S.-based entities within global standards organizations. Although BIS attempted to mitigate this issue in publishing an Interim Final Rule (IFR) in 2020, the IFR did not fully resolve ongoing concerns about the implications for U.S. industry. Instead of seeking to exclude entities from participating in the global standardization system, policymakers should aim to boost U.S. engagement and defend open participation while championing the system's inherent defenses.

Standards organizations thrive on rules. Any given standards development process may have rules about how to join, how and when to submit standards contributions for consideration, how decisions about advancing a standard are made, how the leadership is selected, how existing rules can be changed, and many other matters. Rules are critical to maintaining the competitiveness, transparency, and rigorousness of the standards process. There is no one-size-fits-all rule set to suit every SDO, as organizations with different objectives across different markets will have varying needs when it comes to the rules of the game. But all SDOs share a need for rigorous enforcement of their own rules to ensure that all interested parties have an opportunity to contribute and influence the outcome.

Encouraging all entities to participate in international SDOs and relying on participants to enforce the rules provides the accountability needed to counter undue influence from any single party. Everyone participating can observe what is happening, and

open participation means there will be more eyes scrutinizing decisions and outcomes. When participants recognize a need to change the rules or governance structure of a particular SDO, those changes can best be made by the participants in the organization—those who know how it works and what would make it work better—rather than through blanket policy mandates seeking to change all SDO governance with a broad brush.

Supporting open participation of all interested parties is particularly important to avoid fragmentation in the market. China has demonstrated its interest and ability to stand up parallel SDOs to develop domestic standards that are duplicative and non-interoperable with standards developed in global SDOs, for example with the recent development of the Open Link Alliance in the Internet of Things (IoT) arena. The more that U.S. and other Western policymakers press to exclude Chinese entities from international standardization, the more likely it becomes that the global standardization system will split into silos, which would create an opening for the proliferation of Chinese-led standards across markets.

The public nature of standardization processes also mitigates concerns about national security threats related to technical information sharing. Participation in a standards process is not an opportunity for anyone to learn secrets. The goal of making a contribution to a standard is for that contribution to be made public, and final standards must be published for them to usefully serve as the basis for interoperability. Once a technology has been contributed, it becomes visible to competitors, customers, and suppliers who also participate in the standards development process. Within individual companies, standards participants—in particular those that plan to implement standards in their products and services—regularly discuss and decide where to draw the line between technology features to offer for standardization and those to be kept proprietary to serve as the basis of value-added services and products.

Measuring Influence in Standardization

Assessing the amount of influence that any single nation or entity has over the entirety of technical standards is a complex task that does not lend itself to simple quantitative measurement. Many recent analyses have focused on the per-country distribution of SDO participants, leadership positions, contributions, or patents. While quantitative metrics are interesting to track, they are no substitute for the kind of multi-dimensional analysis that would be needed to understand any entity's influence over a single SDO or standard, let alone the entirety of technology standardization.

In consensus-based bodies, for example, one company sending many participants to standards meetings is typically not sufficient to garner adoption of that company's standards proposals. In many SDOs, those in leadership roles may be able to influence a standards group's agenda, but when it comes to deciding outcomes, the leaders are expected to remain neutral. Focusing on the number of contributions ignores the question of whether those contributions get adopted into the final standard and whether the final standard itself gets adopted in the marketplace. As these examples demonstrate, the key to understanding influence over standardization is to analyze outcomes, not inputs. Assessing outcomes in the marketplace is much less straightforward than counting SDO participants or contributions, but it is required as the basis for crafting sound standards policy.

In passing the 2021 National Defense Authorization Act, Congress tasked the National Institute of Standards and Technology (NIST) with commissioning a study about Chinese participation in international standardization. Late last year, NIST issued a Request for Information (RFI) to inform the study's conclusions. The 40 RFI responses received demonstrate widespread consensus concerning the nuance and difficulty of correlating the behavior of Chinese entities in standardization to influence over market outcomes. Cisco looks forward to the publication of the study, which we hope will take a multi-dimensional approach to the research questions posed. We are also hopeful that Congress can use the study's results to better inform future standards policy.

How the US Government Can Help

The federal government has many tools at its disposal to help strengthen U.S. participation and leadership in technical standardization. These include:

Continue to serve as the global flag-bearer for the open, market-driven standardization system. It is especially critical for the U.S. government to re-assert its role as the global champion of private sector-led standardization in light of the European Commission's recent proposals. The U.S. has numerous strategic multilateral engagements—the G7, the U.S.-EU Trade and Technology Council (TTC), and the Quadrilateral Security Dialogue, for example—that can be leveraged to shore up international support for the multistakeholder approach to standardization, which is advantageous for U.S. competition in the global technology marketplace.

Revise the BIS Entity List rules to appropriately address standardization. The tech industry has worked diligently with BIS and other agencies for nearly three years to effectuate a rule change that would stem the ongoing damage to standards development resulting from BIS' 2019 rule and 2020 Interim Final Rule. A carefully crafted rule change authorizing U.S. participation in standards development activities in the presence of any listed entity can protect national security while removing the current rule's unnecessary standards restrictions. Such a change is long overdue.

Support consistent, long-term standards participation among federal agency technical experts. Having U.S. government experts participate directly in standards processes is critical to ensure final standards reflect our nation's strategic priorities and interests. Yet, agency staff often struggle to justify the time and expense required for meaningful standards participation. To gain the experience and reputation needed to remain influential in standardization, they need support that lasts from one administration to the next.

Focus on ITU-T reform. Unlike most other standards organizations, the ITU Telecommunication Standardization Sector (ITU-T) is a government-led organization where private sector voices have limited input. Its governance is also in need of reforms to address issues of overreach well beyond the field of telecommunications. The State Department, together with the National Telecommunications and Information Administration (NTIA), should be given the support they need to develop a reform agenda, cooperate with like-minded governments, and build support for governance reforms.

Support greater coordination, with NIST as the focal point. With its technical expertise and deep knowledge of the standardization landscape, NIST very capably serves as the coordinator of federal government standards activity. It may be worthwhile to explore ways to enhance information sharing with the private sector concerning key technical areas of mutual interest—perhaps by having more regular touch points between private sector standards leaders, NIST, and federal agency standards participants.

Explore the possibility of standards-specific tax credits or incentives. Given the long-term, multi-million-dollar nature of most standards investments, properly structured tax credits or incentives may allow private sector entities to increase their standards footprints. Making such provisions standards-specific would avoid duplication with the existing R&D tax credit. In general, we find that tax provisions are preferable to grant programs because they obviate the need for the government to pick and

choose winners and losers among private sector entities vying for standards influence.

Incorporate standardization requirements into existing public funding programs for research and development. Academic researchers bring tremendous value to the standards process, but many lack the resources or awareness needed to channel their innovations into standards. For many years, the EU has made standardization an explicit requirement when allocating public funds for ICT research.³ We encourage the U.S. government to explore similar avenues, perhaps aligning to specific future technology priorities (e.g., quantum technologies, open radio access networking, or augmented and virtual reality).

Publicly celebrate US standards leaders. Nearly all standards leadership positions involve some “service” component, where the individual in the leadership role may spend time and resources for the greater good of the SDO, the standards community, or the industry rather than solely focusing on their employer’s specific objectives. Given how valuable strong leaders are to the smooth functioning of the standards system, policymakers should consider how to increase the visibility of these leaders—perhaps through an award or recognition program—which would help reinforce to company managers the need to maintain a full pipeline of future leaders.

Facilitate short-term visas for attendees at standards meetings. Historically, hosting standards meetings in the U.S. has proven frustrating for participants from certain countries that face challenges related to the time, complexity, and expense of obtaining U.S. visas. Some SDOs have strategically avoided meeting in the U.S., which puts U.S. participants at a disadvantage. Establishing a means for bona fide standards participants to obtain short-term visas for meeting purposes would help encourage more SDOs to meet in the U.S. and buoy the community of U.S. participants.

Conclusion

Technical standards work rarely captures flashy press headlines, yet without it, the digital technologies that we all enjoy and benefit from would be unrecognizable. The current U.S.-backed, open-membership system for standards development fosters innovation and competition, bringing significant benefits to the U.S. economy. I appreciate the subcommittee’s interest in exploring how to address national

³ See, for example, StandICT.eu, <https://standict.eu/>.

economic security concerns by strengthening U.S. participation and leadership in open, global standards-setting, and I look forward to working with you and colleagues across the public and private sectors to ensure that the industry-led, consensus-based model of standardization continues to thrive well into the future.