

Why Standards Matter?

IEEE Standards Development Initiative in India

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In today's world every citizen, every human being comes across standards developed by the IEEE one way or the other. In the connected world that we are living today, the usage of WiFi™ (IEEE 802.11™) is ubiquitous. There are millions or WiFi connected devices that are shipped each and every day. The growth of Internet of Things and the convergence of several emerging technologies (Artificial Intelligence, Machine Learning, Software Defined Networks, 5G, Electric Mobility, ...) and the automation it brings to each individual's personal and professional lives means that systems are becoming more complex. In today's world driven through millions of sensors constantly collecting data and software algorithms processing the data to make decisions its very important that each individual component or a system are able to interconnect and interoperate with each other within a bigger system to deliver the full value and potential to the users. The importance of non-functional requirements are also becoming critical in today's systems where there needs to be serious considerations cybersecurity, data privacy, data integrity, to name a few.

IEEE Standards Association (IEEE-SA), the standards development body of the IEEE, is a global SDO with over 900 standards in active publication and more than 400 standards in active development across various technical societies. These standards are developed by over 20000 volunteers globally, and 300 corporate members. The IEEE-SA is an independent organization where participants (volunteers) come together to develop standards independent of any government organization and is governed by volunteers.

Before discussing IEEE-SA's engagement in India, it will be important to understand about standards and its importance. What are Standards? Standards are published documents that establish specifications and procedures designed to ensure the reliability of the materials, products, methods, and/or services people use every day and they form the fundamental building blocks for product development by establishing consistent protocols that can be universally understood and adopted. In today's market where systems are made of sub-systems and the complexities of the systems are increasing, Standards establish compatibility, interconnectivity, interoperability, simplify product development, and enables faster time-to-market. Apart from product developers, there is also a significant benefit that standards bring to the consumers and end users. Standards makes it easier to understand the features of a product and also thus enables customers to compare competing products in the market. Standards developments also bring economic benefits to countries as when these standards are globally adopted and applied in many markets, they also help with international trade. It helps government and regulatory agencies to set appropriate procurement process and also there are number of standards that establish safety norms for the public which are critical as technologies are being adopted and used ubiquitously. IEEE understands the critical role that standards play and through the IEEE-SA bring the expert community together and provides a consensus based platform for world-class standards to be developed and used by the community.

From a regional context within India, IEEE-SA recognizes India and its growing R&D engineers as a key community to work with as part of its global standards development program and started a focused engagement in 2012 in line with the increasing commitment of IEEE-SA to the Indian market. The growth of new standards working groups with leadership in India has been steadily growing and the technical expert community recognises the importance of standards development, driving standards development in core emerging areas. IEEE-SA is also actively forging partnerships in the region with government institutions, corporates and industries, R&D labs, academia and other relevant stakeholders important to the standards development activity in India. This focused engagement will not only enable a 2-way dialog between IEEE and the Indian entities with regards to standards requirements including regulation and policy, but also disseminate IEEE's vast experience in standards development with key stakeholders and most importantly encourage development of future global standards from India. A good standard provides a balanced blend of technical alternatives, economic needs and ensures that the standards are able to be adopted across regions and countries globally. I would like to highlight that the only way that standards can become global and global standards be relevant for India is for the Indian engineering community to participate actively in standards working groups and contribute to the development of these standards providing their expertise, guidance that addresses the requirements of the global as well as local markets. This will enable engineers to understand the evolution and growth of various technologies and also ensure that the standards capture the Indian requirements adequately.

There are several use cases and example where IEEE Standards are playing a critical role both from a global perspective as well regional and Indian perspective. For example, in the area of Smart Grid, IEEE-SA with over 100 standards and standards-in-development spanning the entire Smart Grid spectrum is playing the role of an ecosystem facilitator in India investing in awareness and education initiatives as well. IEEE-SA also collaborates with other key standards and research organisations around the world in developing harmonised standards and frameworks. Also, IEEE-SA, as a lead standards

developing organization participated in the development of the “US NIST framework of standards and protocols for the Smart Grid”. More standards are in the pipeline in these areas with advent of new DC technologies, wireless charging, security standards, utility automation, new technologies on battery and advent of renewables, providing among the most comprehensive, globally accepted and validated set of standards that enable better interoperability, connection, communication and management of the various elements that go into a Smart Grid system. Smart grid ecosystems mean different viewpoints for different communities. For example in some regions the primarily focus of smart grid implementation is focused around Advanced Metering Infrastructure – AMI which is integrated system of smart meters, 2-way communication networks and data management systems including the software applications. The focus of AMI can be around demand response (DR), enabling appropriate management of the loads amongst other things. In some regions the primary focus is around distribution automation (SCADA). Renewables play a critical role in smart grid systems and the integration of renewable energy such as wind or power is becoming an integral part of the overall power distribution network. Managing these complex systems and its individual components, including the interface of different technology perspectives such as fundamental power T&D networks, with 2-way communication protocols along with software is driven through key standards development activities such as IEEE 2030 (Smart Grid Interoperability Standards) and IEEE 1547 (Interconnection standards that define the interconnection of distributed resources to the electric power supply) series of standards to name a few.

The impact of the IEEE standards is already being experienced through WiFi™ (IEEE 802.11™). Today every citizen connected to ICT experiences WiFi™ and the impact it has had on ICT, connectivity and human behaviour has been tremendous. In this context, I would like to mention another important standard IEEE 802.3™ and its impact and how new applications, industry verticals see the importance of these standards and have contributed significantly to the roadmap and development of standards development activities. Every new revision of the IEEE 802.3™ standard which is also known as the ethernet standards addresses new requirements driven by specific industry needs. The first 6 “speed revisions” of the standard took 27 years and the next 6 speed revisions have taken just 5 years. Ethernet standards were originally established to drive high speed data through twisted pair and the primary focus on the earlier revisions was focused on driving higher data rates driven by the requirements of data centers, Enterprise and carrier ethernet. However more recently other industries have started using ethernet technologies such as Automotive as well as Industrial systems focused on factory automation. With new industry verticals, there has been multiple focus areas within IEEE 802.3™ which has resulted in several physical (PHY) options to address different speeds. For example, for automotive industry one of the primary focus is on the weight of the overall vehicle rather than very high speed that is required for data centres. Hence a single twisted pair PHY with appropriate speed requirements are being established for the automotive sector under the IEEE 802.3™ standards development activity. One of the other more recent focus areas for ethernet is what is termed as “Power Over Ethernet” (PoE) where power can also be driven along with data. The IEEE Std 802.3bt-2018™ 4 pair PoE can drive upto 90W of power at the power sourcing equipment (PSE). This highlights the evolution of standards and the impact of different industry verticals and their inputs in shaping the future of these standards.

I would like to thank the IEEE India Council for providing me an opportunity to write about IEEE-SA’s standards programs and include couple of use cases which highlight the importance of standards and why they matter and to provide me an opportunity to engage into a discussion with the IEEE members and technical experts in India. Please feel free to reach out to me at sri.chandra@ieee.org if you have any queries, or comments.

About the author



Sri has been associated with the IEEE Standards Association and the IEEE India office for the past 6 plus years as a Sr Director, with focus on the emerging technology programs within the IEEE-SA and driving strategic standards engagements in India and the region. Currently Sri is leading the IoT & Infrastructure Practice as part of the Global Business and Strategic Intelligence department within IEEE-SA. In this strategic role, Sri drives the industry & standards related initiatives focused on IoT, Sensors, & Blockchain and also engages with the Indian engineering communities to drive regional standards initiatives. Sri also manages IEEE Blended Learning Program (BLP), an IEEE training platform, focused on training and skills development for students as well as professionals.

Prior to joining IEEE, Sri was associated with Freescale Semiconductor Inc. (formerly Motorola Inc.) for 18 years, managing a global Electronic Design Automation R&D team focused on modelling of mixed signal designs and Electro-magnetic compliance for Freescale products. Sri received the Accellera Technical Excellence Award in 2009 for his leadership and contributions to design automation standardisation activities. Sri holds a Bachelor of Science degree in Physics from Madras University, India and a Post Graduation degree in Electrical Communication from Indian Institute of Science, Bangalore, India.