



To accelerate growth of IoT application development, developers need to collaborate with other field experts and proceed collectively rather than individually, overcoming vertical industry barriers and share disparate resources horizontally to create more application possibilities.

The Internet of Things (IoT) inspired numerous application concepts, but very few were put into effective practice. The main culprit of this is due to the vast amount of different protocol standards scattered across the industry, creating communication barriers that greatly delay the development of IoT. Only by adopting an attitude towards open innovation can the protocol barriers be overcome.

Early IoT applications were developed in silos. Businesses across different industries worked towards their own interest and goals; even businesses within the same industry operated within their own circle with their own preference of the type of industrial protocols and architecture to employ for IoT solutions. The lack of a horizontal collaboration platform gave rise to obstacles against technology exchange.

Alex Perng, General Manager of NEXCOM's IoT Business Unit, points out that to push growth of IoT application development, developers need to collaborate with other field experts and proceed collectively, rather than individually. The ability to overcome industry barriers and share disparate resources horizontally from different sectors such as energy, petrochemical, transportation, lighting and building management, will enable the birth of more application possibilities.

In order to unify disparate systems and communication standards, a complete system overhaul is required. But without a collaboration platform where hands-on experience and knowledge can be stored, copied and shared among different field experts, a great amount of effort is needed for the redesign. This creates higher barriers to entry for IoT application development. As such, many potential innovations have been buried away. In addition, since most current devices have

yet to provide the connectivity envisioned by IoT, the development of IoT applications has been slow to come.

## Cross-Platform and Cross-Protocol Technology in IoT: Not Exactly Rocket Science

Perng believes that the key to clearing the obstacle for IoT application development is open innovation. Open innovation provides a pool of technology platforms, hardware components and software tools readily at disposal, allowing developers to quickly gather the resources required to bring their creative designs into fruition with the least amount of effort. More importantly, these resource tools are based on a unified standard as opposed to being industry-specific, and therefore are not bound to any proprietary protocol. Developers can rest assured that their products will not become orphaned.

Fortunately, a few disruptive technology trends beneficial to the open innovation are on the rise, and the first of which is cross-platform IoT technology.

As mentioned previously, due to the silo mentality and exclusive nature of early industry development, many industry-specific technologies were introduced. As a result, to overcome integration barriers and synchronize the different technologies across different fields, extra programming, such as using C, Java, PHP and SQL, was required. However, this was often a time-consuming process. In contrast, new open source tools such as Node-RED allow developers to develop applications in a browser with simple drag-and-drop actions and flowchart-like visuals. Additional programming is no longer needed to connect edge devices with cloud service platforms, effectively bridging the last mile connection of IoT applications.

As cross-platform and cross-protocol technology gradually replace early proprietary solutions, not only this will accelerate cross-industry knowledge exchange, but also bring in new technology and perspective from different industries, instigating a new wave of disruptive innovation.

## Unified Standard and Open Source Tools: Creative Fuels to Innovations

The second trend is the technological breakthrough of open platforms. Currently, there are hundred thousands of network protocols contending for the position as the mainstream IoT protocol. Any protocol incompatibility will prevent cross-industry knowledge exchange. As a result, protocol integration is inevitable. Furthermore, through open source code and emerging open innovation communities like GitHub, Intel Developer Zone and even NEXCOM's All IoT Cloud ([www.alliotcloud.com](http://www.alliotcloud.com)), developers can quickly acquire IoT-relevant tools and resources, interact and exchange knowledge with experts across different fields, and leverage collective

wisdom to overcome any IoT development obstacle previously encountered.

Another trend worth noting is the IoT progression to a unified standard. An example of this is the formation of the Open Connectivity Foundation (OCF). The OCF has created a unified and open standard to provide innovators and entrepreneurs infinite business opportunities, and to attract more people to join the ranks of IoT application development. In addition, with a unified standard and open source tools being made publicly available, the open innovation platform can enable more makers, system integrators and startups alike to swiftly enter the world of IoT.

Take NEXCOM's All IoT Cloud for example, which is based on the creative ideas of open innovation. It aims to serve as an online IoT marketplace that provides various kinds of open source tools free to download, offering participants an easy way to acquire the needed tool kits for development, and ultimately becoming a B2B and O2O marketplace for IoT supply chain.



The Intelligent Systems

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Founded in 1992, NEXCOM integrates its capabilities and operates six global businesses, which are IoT Automation Solutions, Intelligent Digital Security, Internet of Things, Interactive Signage Platform, Mobile Computing Solutions, and Network and Communication Solutions. NEXCOM serves its customers worldwide through its subsidiaries in five major industrial countries. Under the IoT megatrend, NEXCOM expands its offerings with solutions in emerging applications including IoT, robot, connected cars, Industry 4.0, and industrial security.

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