MAKING THE SMART HOME SMARTER WITH UPnP® TECHNOLOGIES

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UPnP® TECHNOLOGIES AND THE CONNECTED HOME

The connected “smart” home has become somewhat of a battleground for device manufacturers, network suppliers, and service providers, all wanting a piece of the action. This is something that continues to grow as even more products become fully connected. Consumers have more options than ever to connect with, interact with, and enjoy digital content from within the home or from mobile devices – all without physical boundaries. It is crucial that the industry works together to create an interoperable ecosystem, be it within the home or on the road, which ensures simplified and secure network connectivity with seamless device-to-device communication – and at the same time doing it with a platform that manufacturers and the development community are willing to embrace.

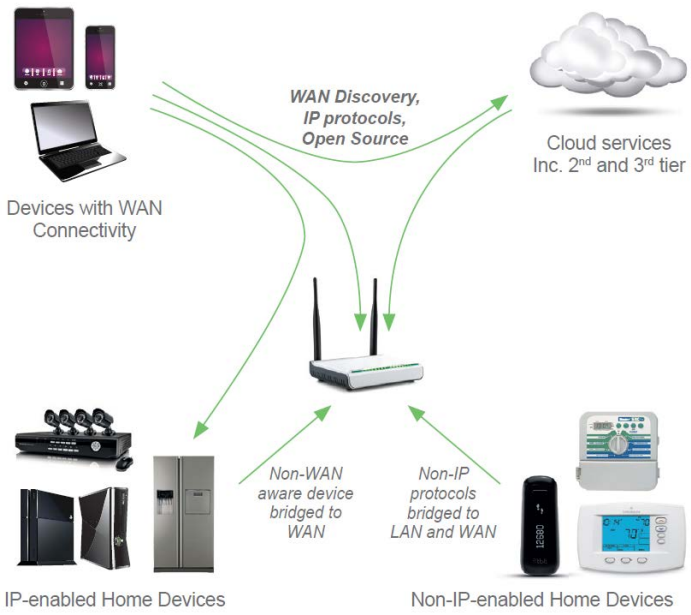
The entire industry needs to work together to ensure reliable interoperability with useful enhancements to the consumer experience. Consumers expect a set of standards to be in place. They want any new devices they purchase to integrate with what they already have. They want it to all work together. They want everything to be easy to use. They also want useful information to help guide them through the buying process. These desires encourage the industry to view the connected home as a single and cohesive market entity.

With the surge of new technologies and platforms for mobile, roaming, and wearable connected devices hitting the market at an astonishing rate, the world is moving rapidly from Islands of Things to the Internet of Things (IoT). This opens up a plethora of issues concerning interoperability, security, accessibility, usability, and reliability. UPnP technologies allow for the development of future-proof interoperable solutions targeted at overcoming many of these issues.

UPnP Forum℠ has solved these problems by creating a strategy around using new and existing UPnP Device Control Protocols (DCPs) and UPnP architecture enhancements to provide UPnP protocols specifically for IoT applications. New specifications ratified by UPnP Forum provide a base for IoT by integrating with non-IP connected devices while adding enhanced security, richer audio/video features, and the UPnP®+ Cloud Architecture for virtualizing and enabling secure sharing of devices and content over the Internet. UPnP Forum has already produced DCPs for lights, thermostats, automatic blinds, and security cameras. In addition, support for any device with a combination of sensors and/or actuators can be added easily thanks to the use of extensible data models. Development is now ongoing to provide improved support for new IoT devices, specifically those with constrained resources.

The concept of a “smart home” takes advantage of what technologies are in place already, but expands the scope by adding new usage scenarios. Additionally, Home Automation (HA) in one form or another has been around for years, but IoT is bringing it into a personality of its own – and in a more efficient and standardized way.

UPnP TECHNOLOGIES ARE AT THE HEART OF A SMART HOME



The connected “smart” home has the potential to change many aspects of daily life dramatically as more and more devices and sensors connect to the home network while the next-generation of home and consumer services continue to proliferate. However, reality shows that the design and configuration of a home network and any associated devices connecting to it are beyond the scope of most people. Fortunately, UPnP technologies greatly simplify this daunting task by providing devices with easy access to each other and to other UPnP sources of content and information. However, UPnP technologies are not a single solution. They are enablers that incorporate many well-vetted industry standard mechanisms providing secure discovery, service advertisement, control of devices, and eventing. UPnP technologies allow digital products from multiple vendors and developers to interoperate and share digital content and information, making it easier for consumers to connect and communicate with anything on the IP network, whether in the home, in the car, at a friend’s house, or across the Internet.

Many consumer electronics vendors already have invested in UPnP technologies as a core component of their products, taking advantage of UPnP Forum testing and

certification in addition to third party open source development tools. Manufacturers can take advantage of the fact that processes for interoperability testing and certification are well-established and that UPnP protocols provide a neutral platform for facilitating interoperability. Additionally, UPnP certification and compliance gives manufacturers confidence in the interoperability capabilities of their products.

UPnP TECHNOLOGIES ENABLE NEW USAGE SCENARIOS

UPnP technologies support the implementation of standardized IP networking, web browser controls, and XML-based device and service descriptions for a wide range of functions, ensuring future-proof connectivity and making new services possible in areas such as health and fitness, security, energy management, and remote accessibility.

The new **UPnP+®** certification program targets IoT and the connected home providing a solid, future-proof basis for integration of cloud-based content and services. One important and fast-growing user requirement is accessing devices or media from remote locations, often using a mobile device. Home connectivity from outside the home (or workplace) allows for the development of new integrated capabilities, use cases, and business models. Security is a vital element in the design of such applications and UPnP Cloud standards have this built in, along with user or group-level access control configurability. A free test tool and open source sample implementation is available today to anyone incorporating this new level of sophistication using UPnP technologies.

SOCIAL MEDIA INTEGRATION

UPnP technologies already allow someone to find and display content from a media server in the home, present an overview or background information about it, and play back a selected video on a TV, tablet, or phone. Imagine that a user now has the ability to securely invite one or more users in different locations to a “virtual room” and play that same video back for friends and family on their devices, over the Internet. The owner has complete control to configure each participant using role-based access rights including read, write, or full control levels. This level of group interaction is possible using the UPnP+ Cloud Architecture, which incorporates the industry standard Extensible Messaging and Presence Protocol (XMPP), a communications protocol for message-oriented middleware based on Extensible Markup Language (XML). In conjunction with XMPP, UPnP devices and services that can share content are now available securely in the cloud. Through the user of XMPP, the UPnP+ Cloud Architecture melds the concept of social media and group communications with content and services normally limited to home-based consumption.

COHESIVE DEVICE INTERACTION AND CONTROL

There is a deluge of connected devices and sensors hitting the market every day. Many use proprietary connectivity protocols and radios or rely on non-IP based communications or wireless technologies. This lack of universal integration causes frustration and confusion for the average homeowner. It does not matter how innovative a particular product or technology is, it is difficult, if not impossible, to interact with it if it cannot communicate with the rest of the devices in the home or if it requires a specialty application for controlling or monitoring it. Usually, even those products based on manufacturer-specific, de facto, or even open industry standards lock a user into a specific vendor or product line because they cannot communicate with all of the other IP-based devices connected to the home network. Users need a simpler, standardized, and universal solution.

UPnP+ solves this problem by providing bridging to other networks (Bluetooth, ZigBee, Z-Wave, CoAP, etc.) using a UPnP SensorManagement bridge with a north-facing UPnP interface. Home Automation hub vendors have the ability to incorporate UPnP SensorManagement services into their gateway products or centralized hub products. A single web-based control point interface now can interact bidirectionally with not only UPnP devices and services, but also those solutions from vendors providing non IP-based products. It allows the user to have a single window into their connected home and all of the smart sensors, devices, content servers, and appliances, be it through a TV, tablet, phone, or custom controller.

DEVICE MODELING

Previously, when manufacturers wanted to bring a new device or sensor to market, they would either develop a vendor-specific implementation or have to define the product's particular characteristics, get that information certified through some technology-specific entity, and wait for approval as part of a certain platform selected to support it. The UPnP ecosystem now provides a framework by which a developer or manufacturer can model the characteristics of a device or even a new appliance as a certain class of device with a given set of attributes. Manufacturers have the freedom to create their own data model or SensorTypes while maintaining complete interoperability and manageability of those characteristics.

IN SUMMARY

UPnP technologies provide

- The confidence of proven security, superior interoperability, and new features that make it the most complete and open solution for the connected smart home
- The simplest and most complete way to share devices and content securely within the home or across the Internet
- A certification program that is inexpensive with open source solutions that can validate implementations for free
- Product, device, and service development tools and certification that is available today

UPnP: Promoting Interconnectivity

UPnP Forum, established in 1999, is an impartial global industry standards body that has paved the way for seamless connectivity between more than a billion devices. Its 1000+ companies and organizations work together to enable device-to-device interoperability in addition to facilitating easier and better home networking. UPnP Forum promotes adoption of uniform technical device interconnectivity standards and certifies devices conforming to these, thus paving the way for seamless connectivity between more than a billion devices in the home running above the IP layer.

UPnP Forum has widened its scope to encompass the cloud, including integration for content and services, as well as bridging to non-UPnP networks (ZigBee, Z-Wave, Bluetooth, ANT+...). This enables a broad range of applications including health and fitness, energy management, and home automation.

Contact:

Scott Lofgren
President and Chairman UPnP Forum
+1 503-619-5223
upnpadmin@forum.upnp.org

CONTACT US

UPnP FORUM
3855 SW 153rd Drive
Beaverton, OR 97003 USA
www.UPnP.org

E: upnpadmin@forum.upnp.org
T: +1 503-619-5223
F: +1 503-644-6708