UPnP
The Open Standard for IoT
About UPnP Forum

UPnP Forum is an industry initiative whose goals are to allow devices to connect seamlessly and to simplify network implementation in the home and corporate environments. A member-based Steering Committee provides Forum leadership and business direction, while several technical working committees identify and define UPnP services, device control protocols (DCPs) and usage scenarios. UPnP Forum members include more than 1000 leading companies in connected devices. These companies are providing products in computing, printing, networking, consumer electronics, home appliances, automation, control, security, and mobile products. Since its establishment in 1999, UPnP Forum has managed these impressive accomplishments:

- The world’s leading standard (ISO/IEC 29341) defining device interoperability interfaces
- Billions of installed devices
  - Every home router and media NAS
  - Every PS3 and Xbox 360
  - Most connected TVs, Blu-ray players, and smart phones
  - Every Windows PC since Windows ME
  - Every Wi-Fi device with Wi-Fi Protected Setup
- More than 1000 members; basic membership is free

Steering Committee Members
About UPnP Technology

The UPnP architecture offers **pervasive peer-to-peer network connectivity** between PCs of all form factors, intelligent appliances, and wireless devices. The UPnP architecture is a distributed, open networking architecture that leverages TCP/IP and the Web to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and everywhere in between.

UPnP technology targets home networks, proximity networks and networks in small businesses and commercial buildings. It enables data communication between any two devices under the command of any control device on the network. **UPnP technology is independent of any particular operating system, programming language, or network technology.**

UPnP+ enhances the UPnP experience so that any device can securely interact anywhere. UPnP+ will be backwards compatible with previous UPnP, but will enable additional features including IPv6, cloud based sharing, mandatory device security, and a number of other improvements.

The UPnP architecture supports zero-configuration and automatic discovery whereby a device can dynamically join a network; obtain an IP address; announce its name; convey its capabilities upon request; learn about the presence and capabilities of other devices; and leave a network smoothly and automatically without leaving any unwanted state information behind.

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**Innovate on established Internet standards**
- XML, UDP/TCP/IP, SOAP

**Create open, flexible architecture for service discovery and control**
- Simple Service Discovery Protocol (SSDP)
- Generic Event Notification Architecture (GENA)
- Service Control Protocol Description (SCPD/DDD)

**UPnP Device Architecture (UDA)**
- Addressing: IP assignment on any network (AutoIP)
- Discovery: Of services/devices (SSDP)
- Description: Syntax for devices/services (SCPD/DDD)
- Control: Of device services (SOAP)
- Eventing: Updates of variables (GENA)
- Presentation: Access to device HTML page

**Device Control Protocols (DCPs)**
- APIs for various device functionality
- Described using SCPD syntax and UDA protocols
UPnP+ Initiative

Evolution
- Full integration of IPv6 with seamless backwards compatibility to IPv4
- Improved interoperability baseline incorporating the latest specifications, including AV, Device Protection, and Energy Management

Revolution
- Discovery of cloud services and content as well as secure sharing of devices across the Internet
- Data-based definition of new devices
- Expandable protocol bridging using REST based methodologies—Support for connecting non-IP sensors & actuators
- Features that drive UPnP devices to the core of the Internet of Things
- Enabling Social Media interactions

UPnP Forum’s new UPnP+ certification program uses new and existing UPnP device control protocols (DCPs) and UPnP architecture enhancements to provide UPnP protocols focused on delivering new technical capabilities enhancing functionality and increase customer satisfaction in today’s ever-changing market of always-on connectivity. UPnP+ technology is an evolution of previous UPnP capabilities that will assist devices trying to integrate new paradigms like mobile connected computing, cloud-based service delivery, smartphone content sharing, and the Internet of Things.

Key areas UPnP+ will address include:
- Interoperability
- Security
- Evolving standards (HTML5, IPv6, etc.)
- Cloud-based features
- New services

UPnP+ supports a wide range of functions, ensuring future connectivity and makes new services possible, in areas such as health and fitness, energy management, security and sustainability. UPnP+ allows devices from different manufacturers to work together seamlessly, based on a single underlying technology, which is backwards-compatible with existing products and easy to deploy.

“UPnP Forum is now stretching its step toward expanding the ecosystem with the UPnP+ initiative and leading the emerging market by covering the Cloud and bridging distinct protocols.”
— Jinpil Kim, the Team Leader at Standard Technology and Development Team, LG Electronics
UPnP+, the Cloud and IOT

UPnP+ Cloud is built on mature technology (UPnP, Internet Protocols, XMPP...) that caters to tomorrow’s connectivity requirements, removing boundaries and enabling full device and network compatibility. UPnP Forum’s latest activities accommodate ‘Cloud’ developments and bridge distinct protocols.

UPnP+ provides a solid, future-proof basis for integration of Cloud content and services. One important and fast-growing user requirement is accessing devices 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, UPnP Cloud standards have this built in, along with access control configurability.

UPnP Forum has created a strategy around using new and existing UPnP device control protocols (DCPs) and UPnP architecture enhancements in order to provide UPnP protocols specifically for IoT applications. UPnP core technology provides a base for IoT, creating bridges to both wide-area networks and non-IP devices. The Forum has already produced DCPs for lights, thermostats, automatic blinds and security cameras, and is now developing support for new IoT devices, specifically those with constrained resources.

The UPnP bridging concept allows different local networks to interact. This includes existing device network protocols such as Bluetooth or Zigbee. Entirely new domains, introduced as a result of the rise of the Internet of Things and Cloud computing, which couldn’t previously have been accommodated within UPnP are now enabled with UPnP+ IOT extensions.

In summary, UPnP+ Cloud and IoT:

- Builds upon UPnP core technology that already provides a base for IoT (billions of devices deployed!)
- Uses commonly used web technologies to create secure communication between devices.
- Bridges local UPnP networks together through the Internet
- Supports simple, data-based device descriptions to include resource constrained devices
- Enables existing UPnP specifications & devices to be Cloud-capable
- Provides a path for low-risk, rapid implementation of UPnP Cloud solutions
- Enables device and service discovery through the Cloud
- Combines UPnP and XMPP ecosystems to enable new IoT possibilities

“UPnP+ provides an improved, seamless experience for the consumer and creates new values and opportunities for manufacturers, developers and integrators. We’re leveraging existing UPnP protocols, taking them into the Cloud to bridge the IoT while continuing to support legacy UPnP devices.”

— Scott Lofgren, Intel President, UPnP Forum
QR Codes for Protocols Required
UPnP+ Certification:

- UPnP+ (includes IPv6 and Cloud Annexes)
- Device Protection V1.0
- FriendlyInfoUpdate V1.0
- EnergyManagement V1.0
- Device Management V2.0
- Internet Gateway Device V2.0
- Quality of Service V3.0
- SensorManagement V1.0
- ISO/IEC 29341 published UPnP specifications

UPnP® Certification

UPnP certification is a prerequisite for several other organization certifications. It allows a company to use the UPnP® Certification Mark in conjunction with certified devices, informing consumers that the device meets UPnP Forum standards. The process for certifying a device with UPnP Forum is simple and straight-forward.

Six steps to Certification:

1. Become a UPnP Forum Implementer Member ($5000 annually).
2. Access the certification test tool
3. Run the test tool at your own facility or at a 3rd party test house.
4. Submit the test logs, along with Web-based device registration form to upnpadmin@forum.upnp.com.
5. Once you have submitted the test logs and device registration forms, the Test Reviewer reviews the test logs and contacts you with testing results. The review may require up to five (5) working days; however, 2 working days is our goal.
6. If the device passes, your company receives a certificate of conformity for that particular device. The certificate authorizes your company to use the certification mark on the certified device and in associated marketing material.

Check out the list of over 1,200 UPnP® Certified Devices on our website*
* Does not include those devices that companies choose to keep confidential
UPnP Forum has three membership levels that offer companies benefit options for participating in, implementing, and directing UPnP technology. Below is a breakdown these benefits by membership level:

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<thead>
<tr>
<th>Benefit</th>
<th>BASIC</th>
<th>IMPLEMENTER</th>
<th>STEERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>License to implement UPnP technology *</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Participation in Working Committee Activities (e.g. spec development, plugfesting, face-to-face meetings, mail lists, propose new standards)</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Access UPnP Certification Test Tool for pre-testing purposes</td>
<td>●</td>
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<td>●</td>
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<tr>
<td>Ability to certify UPnP products and have them listed on the public website (unlimited number)</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>License to the UPnP® Certification Mark for display on certified products and associated marketing material</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Ability to include your company’s certified devices in the online listing of certified devices</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Participation in Technical Subcommittees of the Steering Committee (i.e. Compliance, Technical)</td>
<td></td>
<td>●</td>
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<tr>
<td>Oversee the governance and operation of UPnP Forum</td>
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<tr>
<td>Identify device priorities for UPnP Forum’s focus, based on market readiness and practical considerations such as bringing value to customers in a timely fashion</td>
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<tr>
<td>Form Working Committees and appoint Chairpersons to these Committees to lead the technical design work of DCPs and DCPFs</td>
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<tr>
<td>Oversee the review process of DCPs and DCPFs and their confirmation as standards, including submission as International Standards</td>
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<tr>
<td>Design and oversee the test qualification and logo programs for device certification.</td>
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<tr>
<td>Approve any communications to the general public and other organizations regarding UPnP Forum activities</td>
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<td>●</td>
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<tr>
<td>Approve amendments to the UPnP Forum Membership Agreement</td>
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<td>●</td>
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* Ability to certify products and obtain a license to use the UPnP® Certification Mark is only available to Implementer members.
Contact Us

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