UPnP Certification Testing

Salim AbiEzzi, Ph.D., Microsoft Corp., Steering Committee Chair

The UPnP certification program is a pillar for the overall success of the UPnP initiative. The program involves the objective testing of devices in relation to final standard device descriptions. Devices that pass the test are certified and granted the right to use the UPnP logo. The logo indicates to the consumer that the device supports the core UPnP protocols and that different devices of the same UPnP type are interchangeable with respect to that type.

The scope of the UPnP certification program includes UPnP simulation and the wire protocol generated by a device–not the physical mechanisms of the device. For example, certification testing of a Heating Ventilation and Air Conditioning (HVAC) device checks the network messages coming from the device and their adherence to the UPnP protocols, but it does not verify that the HVAC device correctly raises the temperature to a requested level, which is left to the device vendor to test.

Furthermore, UPnP certification says nothing about the networking physical media (i.e., Ethernet, phone wire, wireless) to which a device might be connected. UPnP certification confirms that the UPnP networking functionality of a device is correct, but does not confirm all aspects of a device, such as output quality of a printer, rewind speed in a VCR or other functionality.

UPnP certification testing includes three components:

- **Protocol testing** is derived from the UPnP device architecture and includes the device generic protocols such as addressing and discovery.
- **Syntax testing** is derived from both the device architecture and the standard device description. This includes testing from a syntactic point of view of the device description document, of responses to actions, and of responses to event subscriptions.
- **Semantic testing** is device-type specific and is derived from semantic test requirements as specified by the respective working committee. Semantic testing goes beyond the protocol and syntax and into the logical behavior of the device. For example, a Play action on a DVD player that is not loaded should generate a "device empty" error.

To a large extent, UPnP certification testing is automated:

1. A device is connected to a network with a test node.
2. The test node automatically discovers the device and identifies its type.
3. The test node then bombards the device with the required tests in a systematic fashion.
4. The node records the results and responses in a log, makes the log tamper proof, and ships the test log to the certification agency for validation and issuance of the certificate.

Welcome New Forum Members Since June 2001

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Celsian Technologies, Inc.
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dynamicsoft, Inc.
ESS Technology
Gemplus
Lanergy Ltd.
Linn Products Ltd.
LiveDevices Ltd.
MUSICMATCH, Inc.
Open Source Asia
ReplayTV, Inc.
Sensory Science
SK Access Devices Ltd.
SnapStream Media
Software 2000
Stellar One Corp.
Tality UK Ltd.
UAT
XAVi Technologies Corp.

For a complete list of UPnP Forum members, please visit **www.upnp.org/ forum/members.htm**.

This list was accurate as of Aug. 28, 2001, bringing total Forum membership to 375 companies. ◆

inside...

Fifth UPnP Forum Summit Re-scheduled for November 29-30, 2001

Arlene Binuya Murray, Microsoft Corp, Forum Project Manager

Mark your calendars for the Fifth UPnP Forum Summit, now scheduled for Nov. 29-30, 2001. Microsoft will host the event at the Microsoft Conference Center in Redmond, Washington. The event was initially scheduled for October, but is now set for November.

The UPnP Forum leadership anticipates having several approved standards at that time. Internet Gateway Device, Lighting, and Heating Ventilation and Air Conditioning (HVAC) are the strongest contenders.

The primary purpose of the event will be to provide opportunities for Forum members to broaden and deepen their understanding of UPnP technology for use in product development and planning. Attendees also find these events valuable for connecting with other UPnP Forum member companies on potential business opportunities.

We expect the event will showcase some of the tools available to accelerate product development incorporating UPnP technology, along with UPnP products targeted for availability this holiday season and in 2002. We also expect to be able to highlight the UPnP Certification Program at this Summit.

If you have ideas for a speaking session, please email **upnpevnt@ microsoft.com** with your abstract submission of 100 words or fewer. Please include a session title, as well as a brief speaker biography. ◆

UPnP Logo Unveiled

Mark Lee, Microsoft Corp., Marketing Committee Chair

The Marketing Committee, Steering Committee and the UPnP Implementers Corp. (UIC) team are pleased to report the unveiling of a new UPnP logo to signify UPnP-compliant products. The Forum also has made available versions of this logo that represent the Forum itself, member organizations and the UPnP Implementers Corp.

ety of alternate approaches were created and considered. The Marketing Committee, which has driven the logo development process on behalf of the Steering Committee, sought a design that would feature clearly the "UPnP" text and would connote connectivity of a variety of devices.

The logo had to meet both creative goals and trademark scrutiny to ensure

The new logo will be used in communications vehicles, such as this quarterly newsletter, the Forum Web site and on the Forum presentation template. In addition, member organizations immediately can begin using the UPnP Forum Member artwork to indicate participation in the Forum. As the initial set of logo compliance tests are finalized later in 2001, organizations that have successfully tested a product meeting the UPnP certification process will be able to display the UPnP logo on compliant-product materials, such as packaging, Web sites and brochures.

The artwork selected for the logo is the result of a long process in which a vari-

unencumbered use of the logo internationally. We hope you like the logo–the first official logo for the UPnP effort.

The Marketing Committee has created a logo usage guidelines document to explain how each of the UPnP logo artwork executions is to be used. The guideline document is posted on the Forum site. All members of the Forum are encouraged to review this document and begin using the new UPnP Forum Member logo on member organization Web sites, in booths at industry events, and in other relevant places, in accordance with the logo usage guidelines at **www.upnp.org/logo.htm**. ◆

First Devices Pass Test Tool

Karen Stash, Microsoft Corp., Program Manager, Device Certification

Various sample implementations of the Internet gateway device have passed the UPnP Test Tool. These implementations are from Alcatel Telecom, Broadcom Corp., Intel Corp., Linksys Inc., Microsoft Corp. and Sony Corp. The UPnP Test Tool has been made available in a prerelease form by Microsoft.

In September, the sample implementations, along with the proposed gateway standard, began their 45-day Forum-wide review period.

Following consideration of Forum member comments during the review period, the Steering Committee is expected to grant approval of the proposed gateway standard, thus completing the Internet gateway device standard. Gateway devices can then be built based on this standard and become UPnP certified. ◆

Device and Service Versioning in SSDP

Toby Nixon, Microsoft Corp., Technical Committee Chair

The UPnP Forum Technical Committee recently concluded work on an important issue related to advertising and discovery of multiple versions of devices and services. The resolution of the issue involves a technical change to the Simple Service Discovery Protocol (SSDP) and how it is used. Specifically, devices receiving an M-SEARCH request must respond if the ST header value is a prefix of or equal to a supported device or service type; previously, an exact match on the entire string was required. Control points are encouraged to search for devices and services without including a specific version, terminating the ST header search string with a colon. This way, all versions of the desired device or service will respond, and the control point can examine the results using application-specific logic. For more information, visit www.upnp.org/newsletters/newsletter_09_2001_tech.asp ◆

UPnP Device Certification

Karen Stash, Microsoft Corp., Program Manager, Device Certification

Certification Process

The UPnP Device Certification Process outlines the steps vendors need to follow in order to certify a device as UPnP-compliant and to obtain the UPnP logo. We anticipate certification beginning in the second half of 2001, so products bearing the UPnP logo can be on the market by the 2001 holiday season.

Meaning of Certification

Certification means the device exhibits the behaviors specified in the device description, in accordance with the UPnP Device Architecture version 1.0. Certification implies that devices from two different vendors that support the same standard device description are interchangeable with respect to that description. For example, a vendor can manufacture a user control point (e.g., a PC) for a UPnP-certified printer independent of the specific printer manufacturer.

UPnP Implementers Corp.

UPnP Implementers Corp. (UIC) is the nonprofit corporation that administers the certification process and owns the UPnP logo. The membership package is being finalized now. Intent-to-use applications for the certification marks-the logo and the UPnP word mark-have been filed in the United States. Filing in other countries will occur in late 2001 or 2002.

Overview

The steps required to certify a device are as follows:

1. A vendor first must become a member of the UPnP Forum as well as the UIC. The UIC membership package includes the test license agreement and certification mark agreement.
2. The vendor downloads the test from the UIC Web site.
3. The vendor runs the test.
4. The vendor submits the test logs and registration form and fee to the UIC for review and certification.
5. The UIC reviews the test results and provides feedback to the vendor about whether the device has passed the review.
6. After a successful test, the vendor's device is certified and added to the Certified Device Database.

If the test was unsuccessful, the vendor is notified, no certificate is issued and the vendor may not market the device as UPnP-certified. The vendor chooses whether to alter the device and retest.

Types of Testing Facilities

Two types of testing facilities will be allowed for certification: self testing (i.e., the manufacturer tests the device) and third-party testing (i.e., an independent lab). Both of these facilities must follow

NETGEAR to Integrate UPnP Technology Into Networking Products

Stefan Offermann, NETGEAR Inc., Forum Member

NETGEAR, a leading provider of award-winning networking solutions for homes and small businesses worldwide, will add support for UPnP technology to its family of routers, firewalls, VPNs, gateways, wireless networking, network server and network adapter products. The company will be shipping products with XP support as soon as Windows® XP is made available in the market.

NETGEAR will integrate the UPnP technology into its products to provide home and business customers with "zero configuration" for easier setup and operation. The result will give customers a hassle-free experience with networking.

NETGEAR's networking products, highly rated for superior quality and reliability, enable customers to readily participate in gaming, video-conferencing and other peer-to-peer applications and services. Customers gain the networking benefits of sharing a broadband Internet connection, digital content, peripherals and entertainment with PCs and other Internet-enabled devices. UPnP technology is accepted by the industry as providing users with a seamless way to participate in broadband services.

NETGEAR markets and sells its products through a global network of resellers, including more than 4,500 retail stores, mail order catalogs and online retailers and over 1,500 value-added resellers. Additionally, NETGEAR offers customers free support 24 hours a day, seven days a week. For more information, please visit **www.netgear.com.** ◆

Home Automation and Security Working Committee

Hans J. Langels, Siemens, Home Automation and Security, Working Committee Chair

This quarter, the Home Automation and Security Working Committee has brought additional service and device descriptions to Template Design Complete (TDC) status, including the following:

- TwoWayMotionMotor
- SolarProtectionBlind
- ExtendedDeviceInformation
- HouseStatus

Service and device descriptions for Blinds/Shutters/Motor Control were finalized. The TwoWayMotionMotor service supports the SolarProtectionBlind device and also lends itself to applications for garage doors, motorized gates, windows and doors. The author of these documents has done excellent work–congratulations to Serge Neuman at Somfy!

The committee also has created an ExtendedDeviceInformation service, which provides device location and variable project-specific information. Any UPnP device can use the output from this service.

The new HouseStatus service indicates house occupancy and current operational mode. This service can be used to influence the state of UPnP devices that depend on whether people are in the house.

The PowerSystem service and device descriptions are expected to reach TDC status next, with SecurityAccessControl documents following soon after. The committee has identified a need for authentication, authorization and encryption for SecurityAccessControl services, and has provided application scenarios and detailed input to the Technical Committee, which is addressing these issues.

Apart from designing the services and devices, members of the Home Automation and Security Working Committee are actively implementing them. The first implementations of Digital Security Camera and Lighting Control were successfully tested at the Forum-wide Plug Fest in June.

With so many controls at TDC, there are still many opportunities for test implementers. Step forward if your company is working on any of the items mentioned above. Express your intention and reap the benefits as a first implementer–test your UPnP stack and design implementation against peers and the UPnP test tool at our committee's next Plug Fest. ◆

Internet Gateway Working Committee

Prakash Iyer, Intel Corp., Internet Gateway Working Committee Chair

The Internet Gateway Working Committee has made excellent progress towards its goal of moving the Device Control Protocol (DCP) to version 1.0 status. Six companies–Alcatel Telecom, Broadcom Corp., Intel Corp., Linksys Inc., Microsoft Corp., and Sony Corp.–have signed on as sample implementers. Significant progress was made on sample implementations over the past two months, including Intel's hosting of an Internet Gateway Device-specific Plug Fest. All of the sample implementations have successfully passed the syntax and protocol test suite provided by Microsoft as of Sept. 10, 2001.

The final set of sample implementer logs, 45-day signoff sheets and the DCP specification, now updated to v0.99, will be posted on the UPnP Forum website. The 45-day Forum review process began Sept. 13, 2001.

This is an exciting phase and a culmination of over a year's worth of dedication and hard work from member companies. The committee expects the review process to be smooth, creating the first approved UPnP DCP specification before year's end and paving the way for product announcements. ◆

Audio/Video Working Committee

Jean Moonen, Philips Electronics N.V., Audio/Video Working Committee Chair

This quarter, the Audio/Video (AV) Working Committee has been moving toward its first Plug Fest, which will be held in October 2001. The focus of this Plug Fest will be the testing of control points and devices dealing with audio, video and pictures. A variety of vendors are providing prototypes that implement one or more of the following services:

- ContentDirectory: browsing and searching meta information about content accessible from the device
- AVTransport: controlling playback navigation and recording of content
- ConnectionManager: checking protocol and format compatibility and the set-up and removal of connections between streaming devices

Some AV devices act as network content servers, implementing the MediaServer device template, while other devices act as network content players, implementing the MediaRenderer device template.

The October Plug Fest will focus on MP3 streaming via HTTP, although the services also have been designed to accommodate other protocols such as 1394 and RTSP/RTP and media types such as video and pictures. Sample implementations will use both device-integrated control points and stand-alone control points.

After incorporating feedback from the Plug Fest, the committee expects to move the MediaServer and MediaRenderer device definitions to Template Design Complete (TDC) status in November 2001. ◆

Imaging Working Committee

Shivaun Albright, Hewlett-Packard Co., Imaging Working Committee Chair

Over the past year, the Print Subcommittee has been focused on two service templates: PrintBasic:90 and PrintEnhancedLayout:09. The committee

recently moved the PrintBasic:90 to Template Design Complete (TDC) status and will have a Plug Fest for PrintBasic:90 on Sept. 24-25, 2001, in Redmond, Washington. The objective for the Plug Fest is to move the PrintBasic:90 service template to Approved Standard status. This process requires at least three sample implementations to pass the Certification Tool tests, as well as demonstrating all capabilities required of the PrintBasic:90 service template.

The Scanner Subcommittee has released version .71 of the Scanner Device, Scanner Service, Feeder Service and External Activity Service templates. These templates should move quickly to version .9, Template Design Complete, after the Imaging Plug Fest in September 2001.

The Imaging Committee met in Toronto, Canada, on July 31, 2001. At this meeting, several key decisions were made. The committee moved the XHTML-Print document to "last call" and mandated that XHTML-Print support be enabled in every UPnP printer to ensure printing interoperability between devices and clients. The committee also voted to require JPEG imaging support in all UPnP printers for interoperability reasons, along with at least two methods for transferring JPEG files. The first transfer method allows the reference to out-of-band JPEG files from XHTML-Print and the second transfer method allows the inclusion of JPEG support in the XHTML-Print file using multipart mimetypes (see IETF Draft document **search.ietf.org/internet-drafts/draft-herriot-application-multiplexed-03.txt** for more information).

The next meeting of the Imaging Working Committee will be held Oct. 23, 2001, in Austin, Texas, to close any issues found during the Plug Fest and to discuss next steps for the PrintEnhancedLayout service template. ◆

Security Working Committee

Vic Lortz, Intel Corp., Security Working Committee Chair

The Steering Committee has recently approved the formation of the new Security Working Committee, which will define security solutions for the UPnP architecture. The founding member companies of this new committee are IBM Corp., Intel Corp., Microsoft Corp. and Siemens AG. Interested Forum member companies are encouraged to join the Security Working Committee and to participate in the committee's mail list.

Security has been a high-priority work item for the Technical Committee throughout 2001. The Technical Committee has produced a Security Scenarios document and a Security Requirements document, which define the scope of the new committee's work.

The Security Working Committee will strive to make rapid progress in finding solutions to the most important security issues identified in these documents, developing robust and practical solutions that interoperate to the greatest degree possible with UPnP version 1.0 devices.

Initial work items for this committee will address authentication and access control for the UPnP control phase. More specifically, the committee will develop solutions for the following:

- Specifying universally unique identifiers for control points
- Supporting locally-defined names for control points and devices to facilitate the creation of access control policy
- Performing key management
- Developing mechanisms for specifying and enforcing access control policy for individual devices
- Creating mechanisms for delegating access privileges
- Possibly developing end-to-end confidentiality for information hiding

An archived mail list (**security@forum.upnp.org**) has been established for the committee, in addition to scheduled weekly teleconferences. All Forum members are welcome to join the committee's mail list. To do so, visit **forum.upnp.org/archives/SECURITY.html** and follow the "Join or leave the list" link. ◆

Marketing Committee

Mark Lee, Microsoft Corp., Marketing Committee Chair

Marketing efforts during this time frame have focused on completing the logo usage guideline document and securing its approval, as noted in a related article in this issue. In addition, there has been considerable progress on a variety of UPnP Forum collateral material, as well as a Web site that incorporates the new logo.

The near-term effort for the Marketing Committee will focus on preparation for the upcoming UPnP Forum Summit event scheduled for November 29-30, in Redmond, Washington, on the Microsoft campus. ◆

the test licensed from the UIC. The UIC will review both types of testing equally.

Conclusion

The goal of the certification process is to greatly enhance the probability of device interoperability, thus increasing consumer satisfaction with UPnP devices and bringing greater value to the marketplace. ◆

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