Multi-protocol Home Networking Applet for HTML5

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Home Networking Goal for Cable Television

- Support distribution of commercial and personal media content to any capable device in the home
- Support other networked services as opportunities emerge (e.g. home security, energy management, home health and fitness, etc.)

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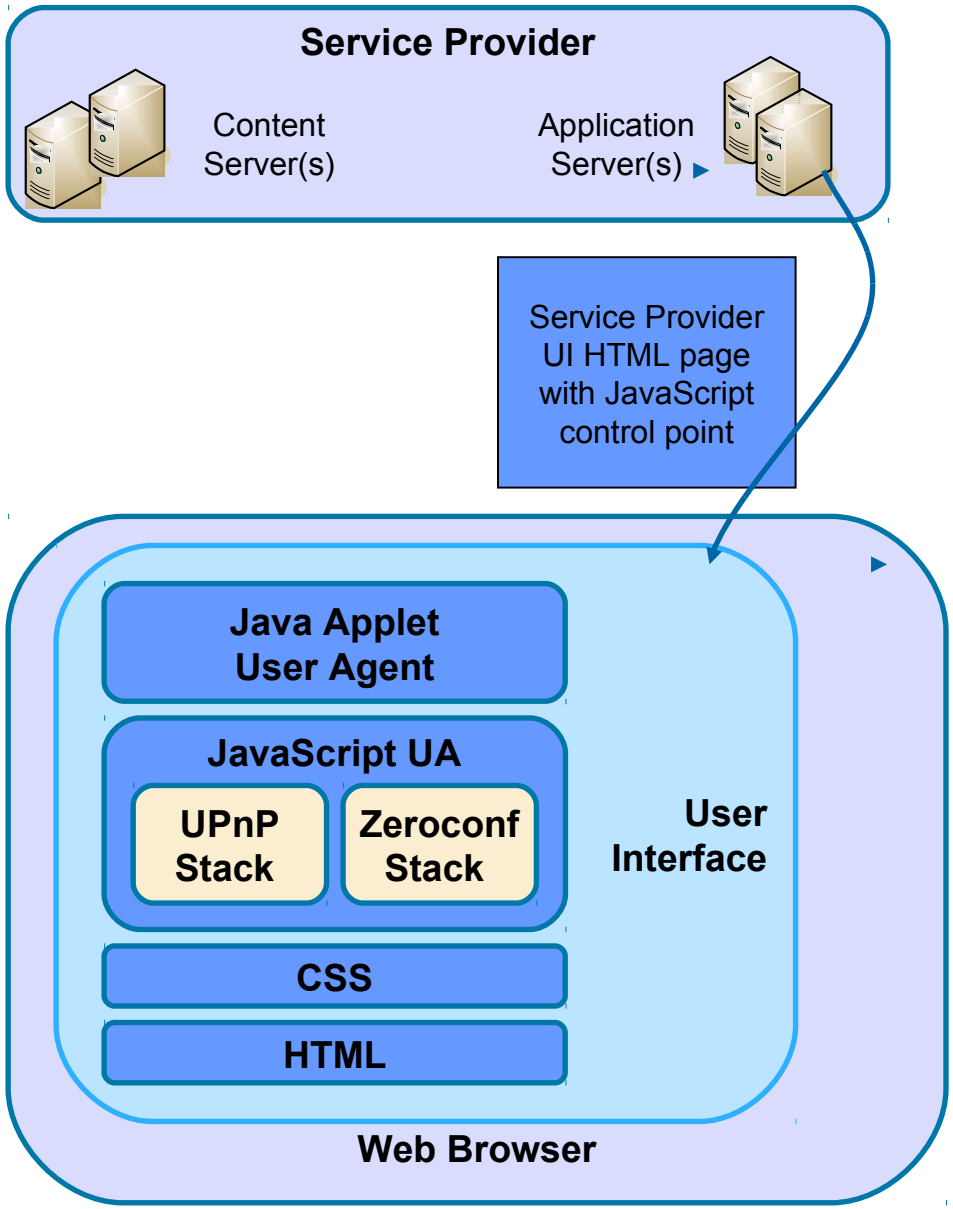
Home Networking Requirements

- Support existing home networking protocols (e.g. DLNA/UPnP, Zeroconf, etc.)
  - Control interface can be loaded from the Internet
  - Discovery of devices and services on the home network
  - Messaging between the control interface and the home networked devices and services
  - Support asynchronous events
  - Security is key (user can choose what to make accessible)

CableLabs' Prototype Implementation

- Low-level API in signed Java Applet
- Home networking stacks and user interface code in JavaScript
- User Interface template in CSS
- Remainder of user interface in HTML with JavaScript APIs for interaction with devices and services on the home network



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Demonstration

- HTML, CSS web page user interface
- User agent written as a signed Java Applet
  - Applet allows for cross domain interaction
- UPnP and Zeroconf stacks written in JavaScript and calling generic APIs in the User Agent Applet
- User authorizes access for each discovered device

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Discovery

- discoveryControl(JSONString protocols) //start discovery
  - Protocols = '{
    "upnp":"upnpDiscoveryCallback",
    "zeroconf":"zeroconfDiscoveryCallback"
    }'
- upnpDiscoveryCallback(jsonObject) {}
  - JavaScript routine that is called whenever a UPnP device is discovered or lost
- zeroconfDiscoveryCallback(jsonObject) {}
  - JavaScript routine that is called whenever a Zeroconf service is discovered or lost

Messaging and Events

- sendRequest(jsonString, upnpCallback)
  - jsonString = '{
    "protocol":"upnp",
    "serviceType":"urn:schemas-upnp-org:service:AVTransport:1",
    "uuid":"00000000-0000-1010-8000-5442499C2FE3",
    "action":"#PLAY",
    "body":"…UPNP SOAP Command…"
    }'
- upnpCallback(jsonObject) {}
  - jsonObject = {
    "protocol":"upnp",
    "serviceType":"urn:schemas-upnp-org:service:AVTransport:1",
    "uuid":"00000000-0000-1010-8000-5442499C2FE3",
    "friendlyName":"BRAVIA XBR-52LX900",
    "response":"…UPnP SOAP Response…",
    "responseCode":"200"
    };

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Security

- User must authorize user agent to run (signed Java Applet)
- User must authorize access for any discovered device or service
- User agent may implement additional security and control measures
  - Authorize high-value content
  - Require link protection for sending content between devices
  - Verify that user has a subscription and the type of subscription
  - Verify that selected content can play on selected device or select an appropriate content format

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Revised API with Opera

- Since developing and implementing the described API, CableLabs has worked with Opera to develop a joint API proposal
- That proposal is now ready for public review and will shortly be submitted to the DAP WG
- The CableLabs messaging API has been replaced with existing and WIP messaging in HTML5 (e.g. XMLHTTPRequest with cross domain functionality)
- CableLabs has implemented this API in a Java Applet implementation as well and will soon release it for use in developing HTML5 support for home networking

Next Steps

- Work with W3C on standardization and with browser vendors on implementation
  - Opera and CableLabs will formally submit their joint API to the DAP WG and will work as editors of the document
  - CableLabs is providing design information and source code it has created for the applet implementation