

The Ubiquity of Print

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Today: Printing and the Web

- **Printing has increased, not decreased, because of the Web**
- **The seemingly simple idea of printing a web page is, in many cases, impossible**
 - **Non-printable content**
 - **Text not flowed for paper size**
 - **Images not scaled for printing**
 - **Bad markup everywhere**
- **To make the Web ubiquitous, we must solve these and other problems.**

"There will be a paperless office when there is a paperless bathroom."

-- Wall Street Journal, 1985

What does the Ubiquitous Web Mean for Print?

- **Must the full function of a printing device be exposed?**
 - If not, what subset is necessary?
- **How should printing devices be modeled?**
 - As a web service?
 - As a single service or as an amalgam of services?
 - Is another model necessary for a service which delivers something physical?
- **Are printing devices modeled as “peers” to web clients, web servers, etc. or as “slaves” ??**

Tools in our Belts

- **XHTML-Print**
- **CSS Profile for Print**
- **Printer Working Group**
 - Internet Printing Protocol
 - Semantic Model of Printing
 - Print Services Interface
- **UPNP Enhanced Print & Bluetooth Basic Printing Profile**
- **Devices Profile for Web Services**
 - WS-Discovery
 - WS-Eventing
 - WS-Addressing
 - WS-Security
 - others

Problems to be Solved

- **Discovery**
- **Delivery**
- **Capabilities**
- **Security**

Discovery

- **How are printers discovered?**
 - **Broadcasts?**
 - **Directories?**
- **Which printers are “in range” in a ubiquitous web?**
 - **How can we distinguish “this” printer from “that” printer?**
- **Is selection by sub-net appropriate or sufficient?**
- **Is geographic positioning information needed?**

Delivery

- **How is the print job delivered to the device?**
 - Is it negotiated or mandated?
 - If it is mandated, should it be IPP or SOAP or HTTP PUT or something new?
- **Must the sender fully understand the capabilities of the device or are other solutions (e.g., XHTML-Print) sufficient?**
- **Are intermediate services needed (or supported) to transform content into a form usable by a specific printing device?**
- **If intermediate services are supported how do they bind to devices?**
 - How do clients bind to the intermediate services?

Capabilities

- **Are the attributes & value of the PWG Semantic Model sufficient or is a more complete negotiated capabilities model needed?**
- **How are those device capabilities delivered to the client seeking to use that device?**
 - **What protocol?**
 - **What format?**
- **Is the management of the capabilities and configuration of these devices appropriate for consideration as a part of this project?**

Security

- **Is the content being printed secured from interception?
From alteration?**
 - If so, how?
- **Does the client or the printer determine if and when security is needed?**
- **What security is needed for the printing device itself to protect it from “print spam” and other attacks?**
- **How is trust established between the client and the printer?**
 - How does the user know that the printer seen on the ubiquitous web is the printer it claims to be?

Path Forward

- 1. Develop specific use cases and needs for each of the various types of non-computer device classes (e.g., printers, cameras, scanners, and refrigerators).**
- 2. Examine in detail the architectures and models of similar or related efforts (e.g., UPnP) that have already been created. Understand their strengths and weaknesses.**
- 3. Develop the overarching model or architecture for non-computer devices for all classes for the ubiquitous web. Re-use existing technology when possible.**
- 4. Based on the architecture developed above, specific standards (or recommendations) must be developed to address the specific issues and needs of the use cases for each of the device classes.**

Thanks!!

QUESTIONS?