

## What a Tangled Web We Weave

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Regardless of when the Internet was invented or who invented it, the Web as we know it today went mainstream about five years ago. Largely a network of static HTML pages, for the first time, Web data transfers surpassed FTP. XML was released in 1998 as a Web standard, and today we struggle to understand dozens of companion World Wide Web consortium standards. Instead of three basic platforms (PC, Mac, and various UNIX workstations) we now face a gaggle of delivery hardware. Even Java-smart refrigerators threaten to get into the Web act with the possibility of scanning our milk cartons and re-ordering for us so we'll answer correctly when asked "Got Milk?" How will the increasingly tangled Web affect multimedia producers and ecommerce? There are no crystal-clear answers, but here are our views and some coping strategies.

At XML World 2000 in Boston, Simon Phipps, formerly IBM's XML evangelist and now Sun Microsystems' chief software evangelist, gave us his views. He said that in the near term, we should watch for a new industry initiative called the Universal Description Discovery and Integration initiative (UDDI) to broaden Web-based business services. Soon, he said, we'll also see a companion XML standard called the Web Services Description Language (WSDL) defining standard ways for describing these services. Three serious competitors, IBM, Sun, and Microsoft, have actually joined forces to develop and promote what could become a Web yellow pages. For consumers with Web-enabled wireless devices, Phipps suggested this scenario: "I want to buy an airline flight, and which one best meets my requirements? I don't have to go search a Web site; the trading communities will respond with several alternatives." Since your location is always known when you use wireless devices, local businesses would surely bid higher for your purchase if geography made a difference in the deal.

After this, Phipps envisions a world of swarms and avatars. Customers will have personal avatars representing their interests. Unlike autonomous agents, avatars will actually be applications program interfaces to groups of devices ("swarms"), usually wireless. In the above airline example, "the result of airline queries might be delivered to my Palm Pilot, and the bulk of purchase transactions might be on my cell phone. Nonetheless it will be the swarm of software, devices, and networks around me interacting on the Internet." Instead of Web sites, businesses will need application interfaces to interact with these swarms of devices.

Traditional desktop PCs, interactive Web-connected television, wireless devices (like Webpads), automobile web devices, handheld products (like Palm organizers and Pocket PCs), and even hybrids like the recently announced Motorola-Palm device will play roles, if only because so many vendors are developing so many products. One barrier to widespread adoption is competing standards. Without getting into the acronym soup of these standards, let's just say there is a browser for each standard and each browser can process only its standard. Still, there seems to be a convergence of support for the Extensible Hypertext Markup Language XHTML, possibly in 2001, essentially HTML but following XML rules and with the promise of flexibility.

As if the wireless browser hodgepodge weren't barrier enough, there's also bandwidth, now way under the 28.8KB found in outdated consumer modems. With the twin barriers of cell browser wars and low bandwidth, does Web-delivered multimedia stand a chance? To answer that, consider multimedia's components: Text, sound, graphics, and video.

Text is the least demanding, and XHTML makes browser design simpler (paving the way for more XML companion benefits such as on-the-fly customizations and specialized markup). Even matchbox-sized screens can present some text. MP3 and various streaming sound formats have shown how sound can be made bandwidth-friendly, especially if you're willing to compromise some quality. Text-to-speech delivery, perhaps akin to voice menus today but providing simple voice answers to menu queries, could work via wireless. The Open eBook standard, based on a subset of XHTML, has built-in support on

several readers including Microsoft's Reader. Available initially on Pocket PCs, Microsoft's licensing of technology to synchronize audio with text can let each book be a talking book.

Vector-based graphics are designed for fast delivery, and even raster images can be slimmed down at the expense of quality. For Web video, RealNetworks' and Microsoft's Explorer 5.5 support the W3C XML-based streaming multimedia standard (SMIL). Streaming video requires more processing power than will be available on most wireless devices for several years, but if you stick with the standard and maybe compromise on quality, next-generation wireless devices--with increasingly high bandwidth, perhaps over 100KB--might be able to cope. Real's audio player will even be bundled into an upcoming line of Nokia phones. Still, getting consumers to upgrade to the new systems will take time.

The common denominator running through most content issues continues to be XML, and yet most Web content remains undisciplined HTML. The W3C's HTML-to-XML bridge strategy is XHTML, and Web tools are beginning to support XHTML. However, don't think you can just batch-convert all HTML content to XHTML. Especially for the new generation of devices, you must plan content strategies even before you cross the XHTML bridge: Separate content from its presentation. By doing so you'll increasingly position your business to deliver onto a range of devices and be ready for the swarms of Web devices--except maybe those refrigerators.