Software's Future: Melding the Web and the Desktop

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It's been a busy few weeks for the big technology companies. On October 1, Adobe Systems announced an agreement to buy Virtual Ubiquity, a company that has created a web-based word processor built on Adobe's next generation software development platform. One day earlier, Microsoft outlined its plans for Microsoft Office Live Workspace, a service that will combine Microsoft Office and web capabilitiesso that documents can be shared online. Recently,Google introduced a technology called "Gears" that allows developers to create web applications that can also work offline. The common thread between the recent moves of these technology titans: Each company is placing a bet on a new vision of software's future, one which combines the features of web-based applications with desktop software to create a hybrid model that may offer the best of both worlds.

Even smaller companies are introducing products to support this hybrid model that bridges the divide between web and desktop software. For instance, the Mozilla Foundation -- the organization behind the Firefox browser (a major rival of Microsoft's Internet Explorer) -- said on October 25 that it was launching an initiative called "Prism." According to Mozilla, a non-profit group that develops open source software, Prism allows web applications to run outside the browser and behave more like desktop software.

"Over time, the current dominance of desktop-only applications, or even predominantly desktop-based apps, will decrease," predicts Wharton information and operations management professor Kartik Hosanagar. "But I don't expect desktop apps to completely disappear anytime soon. I see the future as a hybrid with basic apps on the desktop and several apps being downloaded over the web."

Until recently, most software ran entirely on the user's computer. This so-called "desktop" software -- which includes everything from Adobe Photoshop and Microsoft Office to computer games --relies on the processing power of the individual user's PC and provides the ability to store files locally on the user's hard drive. While desktop software still dominates, the web has given rise to a new breed of application -- exemplified by products like Google Docs, the company's online word processor, spreadsheet and presentation software, and Salesforce.com's enterprise sales-support products -- that runs within a web browser. These "webtop" applications use the local computer only to run the web browser and a few basic extensions (like Adobe's Flash Player) and use the processing power and storage of banks of computers accessed remotely over the Internet.

But as this drive toward hybrid desktop/webtop software illustrates, there are limits to both approaches, and the future for software may be a blend of the best features of both.

Indeed, for Kendall Whitehouse, senior director of information technology at Wharton, the big question isn't whether this desktop/webtop hybrid is the future. That, he says, is a "virtual certainty." The question is which company -- Microsoft, Adobe or Google -- will provide the best platform for developing this next generation of software. The blueprint for this hybrid software model is still being drawn and, while all the major players have moved toward merging features of the desktop with the web, the details of each company's approach are quite different.

For example, Microsoft sees a world where customers still rely on desktop software, such as Word, Excel and PowerPoint, and use web-based services, like Microsoft's planned Office Live Workspace, as a supplement to traditional desktop software. Adobe is developing software tools that allow web-based applications to run on the desktop as equal partners to traditional desktop software and take advantage of

the full capabilities of the user's PC. And Google sees a world where most software is web-based and yet can use the local PC as a resource for temporary offline storage.

The most likely outcome is a hybrid future where desktop and web-based software and services become intertwined to the point where users won't know the difference between the two, suggest experts at Wharton and elsewhere. "We believe that the future of technology at work will be a combination of local software on PCs, along with services," said Jeff Raikes, president of Microsoft's Business Division, in a question and answer session at the announcement of Office Live Workspace on September 30. "Think of it as a continuum, ranging from pure software to pure services approaches. Most customers will be somewhere in the middle."

The Players, and Possible Winners

How does each of the major software companies see the future integration of the web and desktop? Here are respective blueprints from Adobe, Microsoft and Google.

- Adobe recently launched the second "beta" (test) version of the Adobe Integrated Runtime (AIR, formerly known as "Apollo"), a software development platform that allows developers to use web programming languages to create applications that can run as desktop software programs and will work on any of the major PC operating systems: Windows, Mac OS and, in the future, Linux. AIR applications can run both online or offline and can read and write files to the local PC just like desktop software. Some of the companies that have demonstrated AIR applications include AOL, eBay, Nickelodeon, Nasdaq and Salesforce.com.
- Microsoft also has a vision of the hybrid future with a strategy heavily reliant on desktop software that it calls "software *and* services" in contrast to the more web-centric view of "software *as a* service" frequently espoused by companies like Salesforce.com. The embodiment of Microsoft's approach is its Office Live Workspace, a web-based supplement for Microsoft Office that allows Office customers to store documents on the web, view them online through a web browser and share them with others. Microsoft sees Office Live Workspace as an extension to, not a replacement for, its Office desktop software. According to the company's plans announced on September 30, users without Microsoft's desktop software will only be able to view and comment on -- but not edit -- the online versions of Office documents. Microsoft's goal appears to be to protect its lucrative desktop software franchise while hedging its bet against the rise of advertising- and subscription-based web services.
- In contrast to Microsoft's desktop-oriented view, Google is placing its bet on a primarily web-centric vision of software delivery. Google Docs (formerly known as Google Docs and Spreadsheets), provides online versions of tools for word-processing, spreadsheets and presentations. These applications run entirely in the web browser and currently depend on Internet connectivity and remote file storage, although the company's Google Gears could allow web-based applications to run offline in the future. Matthew Glotzbach, product management director of Google Enterprise, said at the Interop 2007 Conference in New York on October 24 that Google runs its own productivity suite internally and is confident that web-based software is the future. "The game is changing the current set of productivity tools thatwere created for personal productivity. We've moved to this networked world where everything being online all the time is a huge advantage."

According to experts at Wharton, it's too early to determine which architecture will win. Microsoft's strategy -- designed to preserve the software giant's desktop application dominance -- makes sense, says Wharton information and operations management professor Eric Clemons. "Microsoft's desktop-focused architecture has some merit. There are so many advantages to avoiding sending huge files across the web. Some have to do with performance and some have to do with security."

Krishnan Anand, also a professor of operations and information management at Wharton, similarly favors Microsoft's model. "Desktop applications will be used a lot with some supplementation from web services," says Anand. "Microsoft sees desktop software with web services as a supplement. Microsoft puts its finger in every pie."

Andrea Matwyshyn, a professor of legal studies and business ethics at Wharton, suggests that in the long run, Google's model of always connected software is a likely winner. "There will be an increased direction towards entirely services-based. Google is a harbinger of where the industry is going."

Whitehouse argues that Adobe's approach provides the best of both worlds. "Architecturally, Adobe is in the sweet spot," he says, noting that its AIR platform blends the best features of the web and the desktop. Meanwhile, Adobe's software authoring tools -- such as Flash, Dreamweaver and Photoshop -- are well known to developers and creative professionals. That familiarity may help to bootstrap the development of these new hybrid applications. "The Microsoft [approach] will endure for long time, but Adobe has an architecture for the next generation of software applications," says Whitehouse.

Microsoft, for its part, shows signs of addressing the threat from Adobe through both direct competition and counter positioning. As Adobe's Flash became more dominant on the web and grew to become the video format of choice for popular web sites like YouTube and MySpace, Microsoft introduced its own browser plug-in for rich media, called Silverlight, to address the Flash challenge head on. "We think there's a lot of opportunity for innovation. Adobe's done a good job on some of the rich media stuff. We think there's a long way to go," said Microsoft CEO Steve Ballmer at the Web 2.0 conference in San Francisco on October 18. But Microsoft doesn't have a direct analog to Adobe's AIR, choosing instead to promote its own strategy of desktop applications that connect to the web rather than embracing the cross-platform, hybrid applications Adobe sees as the future.

The Hybrid Software Future: A Realistic Choice

Experts at Wharton decline to put a timeline on this software evolution. Google's vision of purely web-based, hosted software isn't likely to play out for years. For that reason, the hybrid software model looks appealing to many.

According to Hosanagar, this model is likely to develop in two phases. "In the first phase, applications will provide essentially the same features as a desktop application, only you will now be able to access them from anywhere. Current web-based apps are good examples of this." For example, Yahoo Mail looks a lot like Microsoft's Outlook email program. Google Docs and Adobe's Buzzword mimic Microsoft Word and add perks like the ability to access your documents from any computer.

In this phase, occurring today, Hosanagar says desktop applications will offer more features than web-based software, but over time that advantage will erode.

In the second phase of this hybrid model, web applications and desktop software will co-mingle, says Hosanagar. "What's likely to be more exciting is the next phase, where these web-based applications can interact and share data with each other and become platforms [that developers can use to build more software]. Facebook has already become one such platform, as has Salesforce.com on the enterprise side. In the next phase, far more interesting things will happen as these web apps start talking to each other."

Clemons notes that another critical factor for the evolution of software will be mobile applications. "My bet is that desktop software will be used for home operations, and webtop software will be used for mobile applications," says Clemons. The key will be synchronizing desktop and web software wherever a person goes. "None of us has a good idea what these mobile applications will be, but they may provide real value."

Show Me the Money

No matter how software's hybrid future develops, there is no shortage of possible business models, says Whitehouse. But, as with the issue of which architecture is best, which approach to generating revenue will be the most successful in the future remains to be seen.

Google is generating considerable revenue selling advertising on its free web-based applications. In addition, Google Apps Premier Edition is available for an annual per-user fee. Adobe intends to profit from selling software development tools used to create both web-based and hybrid applications. Microsoft hopes to blend desktop software licensing and subscriptions with advertising. "There doesn't seem to be any lack of options regarding monetization schemes," notes Whitehouse.

Following Google's success, many software vendors are pursuing advertising for their current generation of web-based services. On October 24, Microsoft spent $240 million for a 1.6% stake in social networking site Facebook. The move gives Microsoft a high-profile customer on its adCenter advertising network. Microsoft also paid $6 billion for online advertising firm aQuantive in May. The plan: Become a large advertising player so it can monetize its web sites and online services to protect against potential future trends away from its traditional revenue streams of PC operating systems and desktop software.

"We're aiming to become one of the major players in the online advertising space, and we are pleased by the progress we are making in putting the building blocks in place," said Microsoft chief financial officer Christopher Liddell on October 25 after the company reported fiscal first quarter earnings.

Google is advertising throughout its web-based applications, but offers this software ad-free for a fee. In addition to its advertising-supportededition of Google Docs, Google also provides a Premier Edition that offers more storage and support for $50 a year per user. Other companies, such as Salesforce.com, rely primarily on subscription-based revenue.

Adobe's business plan for the hybrid future is an extension of its current revenue model. Adobe CEO Bruce Chizen addressed monetizing the company's AIR platform in an analyst briefing on October 1. "The guaranteed way we are going to make money on AIR is the same way we make money today," said Chizen. "We sell tools and applications solutions that leverage our file formats -- PDF and Flash -- and clients of the Adobe Reader and Flash Player."

Anand says another model that's likely to emerge is one that is based on usage. In this model, a person who used a program infrequently could employ the web-based version for free or a small fee. Heavy users would pay more based on usage. In this model, which would apply to both web-based and desktop software, Anand likens software providers to electric utilities. "The notion is you can charge different prices based on levels of usage," he says.

But for these hybrid models to develop further, a series of challenges will have to be overcome.

One of the larger challenges will be security, says Matwyshyn, noting that web applications aren't necessarily less secure than desktop applications. In fact, web-based services can be more secure since they can automatically update themselves to prevent attacks. However, security risks will increase as web-based applications mesh with desktop software because there will be more points for hackers to attack. "Security is only as good as the weakest point," she says. "The attack surface increases as more applications rely on other applications."

Data is another concern since, with web-based services, individuals will increasingly store their information on servers run by external companies. In the end, says Matwyshyn, every individual and company will have to assess the potential security risks with hosting data online versus on their desktops or on servers inside their company's firewall.

Hosanagar agrees, noting that previous web services efforts, such as Microsoft's Hailstorm in 2001, failed because "large corporations, like financial institutions, didn't want their customer data managed by someone else." In the long run, however, Hosanagar says these security issues will be overcome.

While experts at Wharton predict that any gap between web and desktop software will narrow in the future, one wild card is how well hybrid webtop/desktop applications will match the features of their desktop cousins. "Creating a cross-platform application that 'feels right' to individual users of Windows, Mac and Linux platforms is a tricky task," notes Whitehouse. "But I'm sure the industry will get there. I have little doubt that this is where the future of software is headed."

Anand underscores the importance of this evolution by pointing to the limitations of today's web applications. He likes to tailor his PC desktop to his own tastes -- something that can be more difficult

with hosted online services. In addition, Anand has lingering reliability fears. "Reliability is critical for many of us. Even now, networks crash and I can't access files. I still have to make sure I have a copy on desktop. Until that changes, I don't see an advantage to web-based applications."

Anand is not alone in these concerns, which is why software companies are looking for ways to address the limitations of purely web-based applications by developing a new type of hybrid software -- one that melds the best features of desktop and webtop into a single, seamless environment.