Google Apps in the Enterprise: A Promotion-Enhancing or Career-Limiting Move for Enterprise Architects?

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TECHNOLOGY THREAD:

Content Management

Conclusion

Google has caught the attention of enterprises with its inexpensive Google Apps Premier Edition (GAPE) product: available at $50 per user per year. However, the seductive price can spell trouble for enterprise architects and their companies if they don't do their homework: the solution's rudimentary feature set means that enterprises need to pick carefully and implement slowly. While Google's entrance is adding momentum to using software as a service (SaaS) for communication, collaboration, and content management, it's unclear at this point whether Google will be able to capitalize on the trends that it's accelerating.
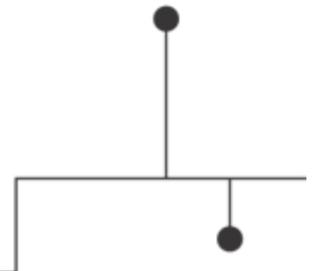
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Synopsis

In February 2007, Google announced Google Apps Premier Edition (GAPE), a collaboration and communication solution offered as software as a service (SaaS). Initially combining a portal, e-mail, instant messaging (IM), calendars, document sharing, and concurrent document creation—all for the price of $50 per user per year—the solution rapidly caught enterprises' imaginations.

Unfortunately, quickly adopting GAPE without understanding its quirks or looking at other alternatives is likely to become a career-limiting move. Happily, looking at the larger picture—studying a variety of SaaS-based collaboration and content solutions—is a career-enhancing move.

Companies looking at GAPE need to get comfortable with three main areas before moving ahead: the SaaS delivery model, the capabilities of the solution, and Google as a company.

Over the past five years, SaaS-based solutions have proven themselves in the market. However, a SaaS-based solution can still be a challenge for certain companies. For example, some SaaS solutions assume that an Internet connection is always available; financial institutions prefer that corporate information be stored behind the corporate firewall; and support via a website can be a shock to companies used to frequent face-to-face meetings with suppliers.

GAPE initially came out of Google's consumer product line. This accounts for the product's clean, easy-to-use interface. Unfortunately, it also accounts for the product's gaps in functionality, such as the lack of user roles, no departmental categories, and minimal records management capabilities. While Google will probably address these shortcomings over time, it highlights the Google enterprise applications division's difficulty at creating enterprise-centric solutions within a company that gets 99% of its revenue from consumer-focused services.

Finally, Google itself can take some getting used to. The company has a history of releasing incomplete products, calling them beta software, and issuing updates on a "known only to Google" schedule. Furthermore, some companies are leery of entrusting their corporate documents to a company that makes its living from analyzing content and displaying it to the world. To these companies, keeping information secure seems at odds with Google's emphasis on information sharing. In many ways, Google marches to a different drummer, and at this stage it's not always in step with its enterprise customers.

To sum up, Google and its collaboration competitors (e.g., Cisco Systems, Microsoft, and Oracle) will continue to improve the available options, and smart companies will find value in waiting for the market to mature before making a decision.

Analysis

On February 22, 2007, Google announced Google Apps Premier Edition (GAPE) amid great fanfare in the general press; *The Boston Globe*, *The NewYork Times*, and *USA Today* all had articles covering the event. However, the public was not Google's target: the enterprise buyer was. With this announcement, Google made clear that it was moving beyond the enterprise beachhead it had established with the Google Search Appliance and was going after the enterprise as a whole.

However, does Google's strategy match up with the enterprise business agenda? Put another way, is encouraging its adoption a promotion-enhancing or career-limiting move? The answer is clear: Getting caught up in the publicity hoopla and quickly adopting GAPE without understanding its quirks or looking at other alternatives is a career-limiting move.

Rushing into a decision is typically a bad move when looking at any new system. But the GAPE decision is especially difficult because it demands that enterprises bet on a delivery model (software as a service [SaaS]), a product (Google Apps), and a company (Google) that are all less than a decade old. Furthermore, the offering is somewhat difficult to understand because its features are generic enough that it can function—in limited cases—as a replacement for Microsoft Office, as an enterprise content management (ECM) system, and as a collaboration and communications system.

In addition, the product is still evolving. It currently lacks features that allow users to be segmented by roles or assigned to departments, or that allow federated e-mail distribution lists and easy-to-implement records management capabilities. While Google will fix these deficiencies over time, the product is not as full-featured as other products available today. While the $50 per user per year price point is attractive, enterprises are not getting a lot for their money.

To help readers understand the products capabilities and deficiencies, the "Analysis" section of this report consists of the following subsections:

- "The Google Precepts": Google's way of looking at the world that shapes its products and attitude
- "Google Apps Premier Edition: What Is It?": A summary of the product's features
- "Is It "Office," ECM, or Collaboration?": Mapping the product's capabilities to three different application types
- "Design Assumptions": The design goals that foreshadow the solution's strengths and weaknesses
- "Product Strengths" *and* "Product Weaknesses": A short list of strengths and weaknesses
- "History Will Repeat Itself: But Which Story Will Replay?": Possible adoption scenarios for Google Apps and SaaS-based solutions in general
- "Probable Short-Term Scenarios": Burton Group's predictions of Google's product map in the near term
- "Where Is It Useful?": Specific scenarios where GAPE would be useful
- "Market Impact": The impact on the overall market and specific vendors
- "Recommendations": Burton Group recommendations for moving forward

The Google Precepts

Google has flourished by going against the status quo. The company startled Wall Street by distributing stock at its initial public offering (IPO) via a lottery; it continues to take the road less traveled by refusing to give market guidance on its future performance. Google has upstaged software stalwarts such as Microsoft and Oracle by using the combination of advertising revenues and SaaS to support triple-digit growth. Add in corporate pajama days, free food (cooked up by gourmet chefs in Google cafeterias) for employees, and engineers who spend 20% of their time on personal projects, and it's clear that Google is not your typical multibillion-dollar corporation.

In short, part of the Google mystique is taking the contrarian path—and then being wildly successful at it. Therefore, it is not surprising that when Google presents the business case for its enterprise applications, it does not follow the usual route of putting up a feature matrix and explaining how its product is better than the competition's. (This is partly due to its worldview, and perhaps partly due to the fact that it would suffer in the feature comparison.) Instead, it brands the pitch by painting a vision of a brave new world. In short, bold concepts trump implementation details.

It's important to understand these precepts, as they color both the architecture of Google's solutions as well as how the company deals with the world. Microsoft's programming heritage and IBM's reliance on professional services have an impact on their respective products and how they deal with customers; Google is no different. Some of the precepts that Google talks about are:[1]

- Great technology comes from the consumer sector
- Fast is better than slow
- Simple is better than complex
- Assume chaos and deal with it

Great Technology Comes from the Consumer Sector

Google points out that many innovative technologies are now coming from the consumer sector—from providers such as Amazon.com, Apple, Facebook.com, TiVo, and Google itself. This is a break from the past, when government-funded programs such as the Advanced Research Projects Agency Network (ARPANET; the precursor to the Internet) and Project Apollo (sending a man to the moon) fostered many technological breakthroughs.

When Google floats this observation within the context of enterprise software, the implication is that enterprises should rethink buying software from industry veterans—such as EMC Documentum, IBM, Microsoft, Open Text, Oracle, and SAP—that are wedded to the old ways of doing things. Yes, these companies have a long history of selling to enterprises, but as Google tells it, this is a weakness. Unlike Google, these vendors have not had to develop easy-to-use software for fickle consumers, who have short attention spans and refuse to read system documentation. Developing software that delights consumers goes a long way toward creating software that delights enterprises—software solutions that workers find easy to use and will adopt quickly.

While this argument rings true for interface design, it doesn't take into account the fact that enterprises are complex organizations and often have more complex data models and security and regulatory needs than consumers. Consumers are usually a world of one; if they band together, it is usually as loosely coupled groups. A person might be a member of a chess club, serve as town selectman, and live in Andover, Massachusetts—a set of non-overlapping affiliations. In contrast, employees inhabit overlapping roles (e.g., a worker might be a product manager, a member of research and development [R&D], and serve on the patent committee) and companies function in many jurisdictions and under different regulations. These complex role, location, and jurisdictional interactions mean that enterprise software must support different behavior based on the business context: for example, preventing underwriters as a group from seeing certain information or saving copies of certain documents for regulatory reasons. While out-of-the-box consumer software can personalize itself for a user, it rarely can customize itself sufficiently for the enterprise, which is a much more complex entity.

"Fast Is Better Than Slow"

"Fast is better than slow," the first of "three lessons from Google" that the company evangelizes in public speeches, argues that the pace of system change has picked up over the years, but that companies remain wedded to the old, slow ways of deployment. The "old style," as Google characterizes it, is to define system requirements, decide whether to buy from a vendor versus build it in-house, issue a request for proposal (RFP), select the vendor shortlist, have a competitive bakeoff, sign the contract, define the implementation plan, customize the application, train the users, and then implement the solution.

To better handle the rapid pace of change, Google recommends that companies forgo the "big bang" or waterfall approach, and instead aim for smaller, more iterative projects. This echoes the agile development view, which aims for high customer satisfaction by delivering valuable software early and often. In Google's eyes, reality often outruns careful planning; an initially valid requirement is often outmoded by the time the company installs the system. Better to fail quickly, learn from the failure, and change the system, than to waste time building an outmoded system. To accommodate this rapid cycle time, technology must be much simpler to implement and the platforms used must be able to handle constant change.

True, technology has often been a gating factor, blocking business requests with the commonly heard phrase, "Nope, sorry, the system can't do that." To enable information technology (IT) to quickly satisfy business requirements, technology must now be more nimble than in the past. This has been the driver behind developments such as service oriented architecture (SOA) technology and agile development principles. The risk is in letting the speed of technological change override business prudence. Just because an enterprise can quickly change system behavior doesn't mean it should. A "simple, quick change" can wreak havoc if the company doesn't think it through—if, in the rush to make the change, the enterprise doesn't consult the affected divisions or check the appropriate regulations. A more apt—and less dramatic—precept would be, "fast is better than slow, as long as implementation speed doesn't outrun the business need."

"Simple Is Better Than Complex"

This precept makes the point that, to quote a Google presenter, "current delivery models have insane complexity." [2] Using electronic mail as an example, Google points out that implementing e-mail in-house requires companies to make decisions about operating systems, e-mail servers, security servers, mobile delivery servers, spam filters, backup processes, and records management. Furthermore, IT wages an ongoing battle to keep all of the different systems up-to-date and compatible. Because it is getting harder and harder to perform these same tasks faster, enterprises need to rethink the problem, and therefore embrace new delivery models, such as appliances and SaaS.

While "simple is better than complex" has a nice ring to it, it can be construed as suggesting that simplistic solutions—those that ignore the intricacies of a problem—are acceptable. Ockham's razor offers a better interpretation, which is, "All things being equal, the simplest solution tends to be the best one." In other words, given the choice of two solutions that will solve a problem, the one to choose is the simpler one. A complex solution is fine for a complex problem, but the solution shouldn't be needlessly complex—or naively simplistic.

"Assume Chaos and Deal With It"

By this, Google means that spending time to categorize unstructured content is a hopeless task. To make its point, Google notes that the human editors participating in the Open Directory project were overwhelmed when they attempted to manually categorize content. It also invokes the image of workers spending hours putting e-mails into specific folders—and then still being unable to find the appropriate e-mail when they need it. According to Google, rather than attempting to tame the masses of content, enterprises should go with the flow: not throw anything away; encourage their employees to publish and share information; and use search to find content, whether categorized or not.

True, manually categorizing content can be a huge time sink, especially if the worker or enterprise never uses the information again. However, there are times when there is payback for doing the upfront categorization work, such as identifying important business records that should go into a records management system to satisfy regulators. Furthermore, at the very least, companies need to categorize documents for security purposes; for example, which documents can customers see, which documents are restricted to partners, and which documents are only for employees. So while Google is correct to say that businesses should avoid categorizing everything to the nth degree, there are times when categorization makes sense. "Proportional categorization" might be the better phrase to use: Enterprises should take the time to categorize important documents, while avoiding categorizing ephemera.

Google Apps Premier Edition: What Is It?

Google Apps Premier Edition (GAPE) is a SaaS-based solution; a member of the Google Apps family; a collection of applications, application programming interfaces (APIs), third-party applications, and support; and supplied by a company where historically selling to the enterprise has been a corporate sideline. This section is a summary; for more information see "The Details" section of this report.

A SaaS-Based Solution

First, GAPE is a SaaS-based solution—that is, Google hosts the application and users access it through a web browser. Unlike software, enterprises do not purchase a license, but rather subscribe to the service. Therefore, there are no up front costs such as purchasing the software license or buying server hardware. Instead, it's a pay-as-you-go model. A common feature of SaaS solutions—and true in this case—is that they're updated more frequently than software. If Google wants to correct a bug or upgrade a feature, it does so, and the subscribers instantly see the change. The downside to this approach is that the SaaS vendor, rather than the enterprise, is in control of the release schedule. With little or no warning, enterprises may receive a feature they don't want and can't turn off. In addition, user training is difficult to plan for, to the point where workers may be using the system incorrectly or not using the system to its full potential.

A Member of the Google Apps Family

GAPE is the third member of the four-member Google Apps family. All four versions include Gmail (e-mail), Google Talk (instant messaging [IM]), Google Calendar, Google Docs & Spreadsheets, Start Page (a portal homepage), Page Creator (webpage editor), and a Control Panel (for administering the solution). All four can be branded by adding an organization logo and altering the site colors. The differences between the versions are noted in Table 1.

Product name	Target users	E-mail storage per user	APIs included	Price/ads
Google Apps Standard Edition	Families and small groups	2 GB	No	Free, ads
Google Apps Education Edition	Colleges and universities	2 GB	Yes	Free, no ads
Google Apps Premier Edition	Enterprises	10 GB	Yes	$50 per user per year, no ads (default)
Google Apps Partner Edition	Internet service providers (ISPs) and portals	2 GB	Yes	Negotiated, no ads

Table 1: *Google Apps Packages*

Applications, APIs, Services, Third-Party Applications, and Help

The supplied applications are:

- **Control Panel:** Where system administrators create user accounts, manage domain settings, add or delete services, create website pages, and customize the look of the site.
- **Start Page:** The first page users and visitors see (i.e., the homepage) when they go to the Uniform Resource Locator (URL) of the service (see Figure 1).
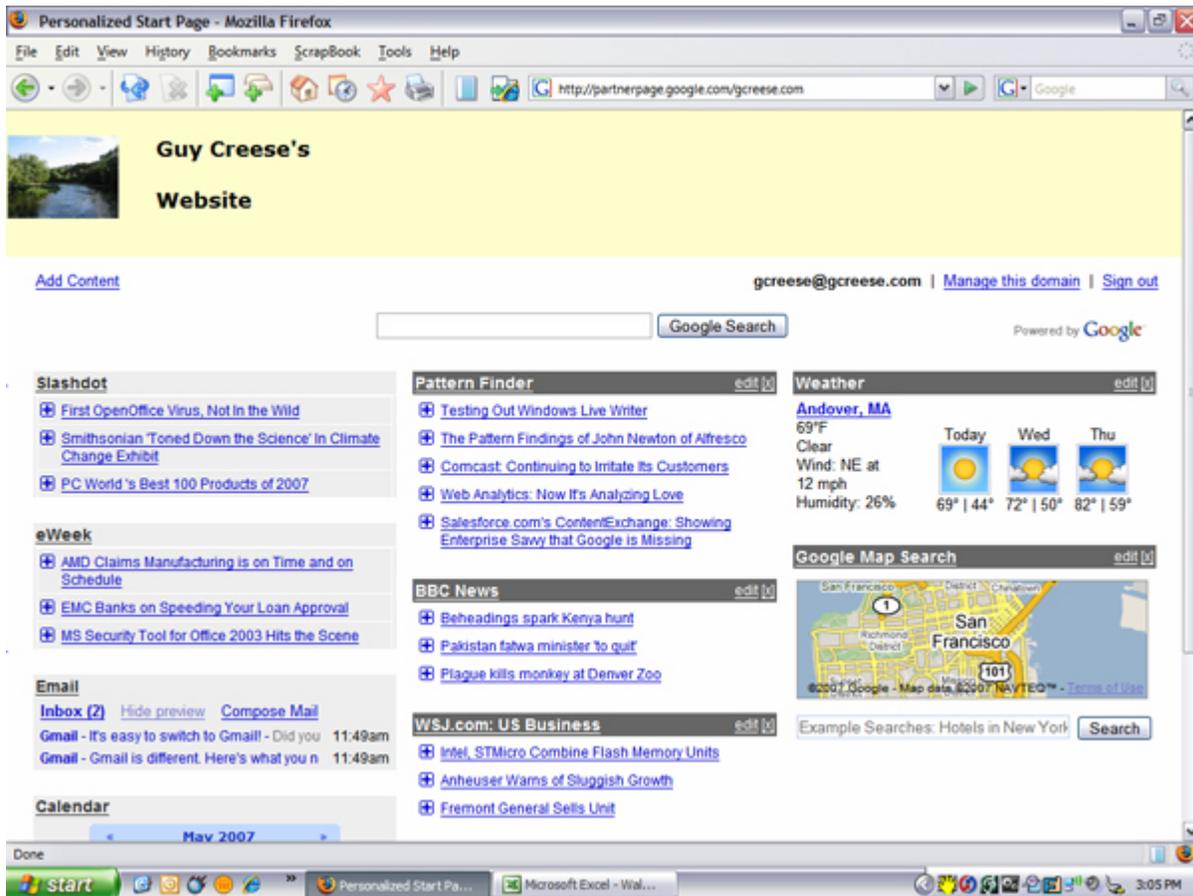
Figure 1: *GAPE Start Page*

- **Page Creator:** An online tool for creating webpages within the site, consisting of Page Manager (webpage listing) and Page Editor (webpage editor).
- **Gmail:** An application that enables users to send and organize e-mail, contacts, and chats.
- **Google Talk:** An IM service that lets users send text messages and make voice calls over the Internet to others. Because Google Talk is XMPP (Extensible Messaging and Presence Protocol)-based, rather than SIP/SIMPLE (Session Initiation Protocol/SIP for Instant Messaging and Presence Leveraging Extensions)-based, it does not integrate well with many unified communications initiatives or with solutions from vendors such as Avaya or Cisco.
- **Google Calendar:** A calendar application that can concurrently display multiple calendars.
- **Docs & Spreadsheets:** An application that creates and manages documents and spreadsheets (see Figure 2).

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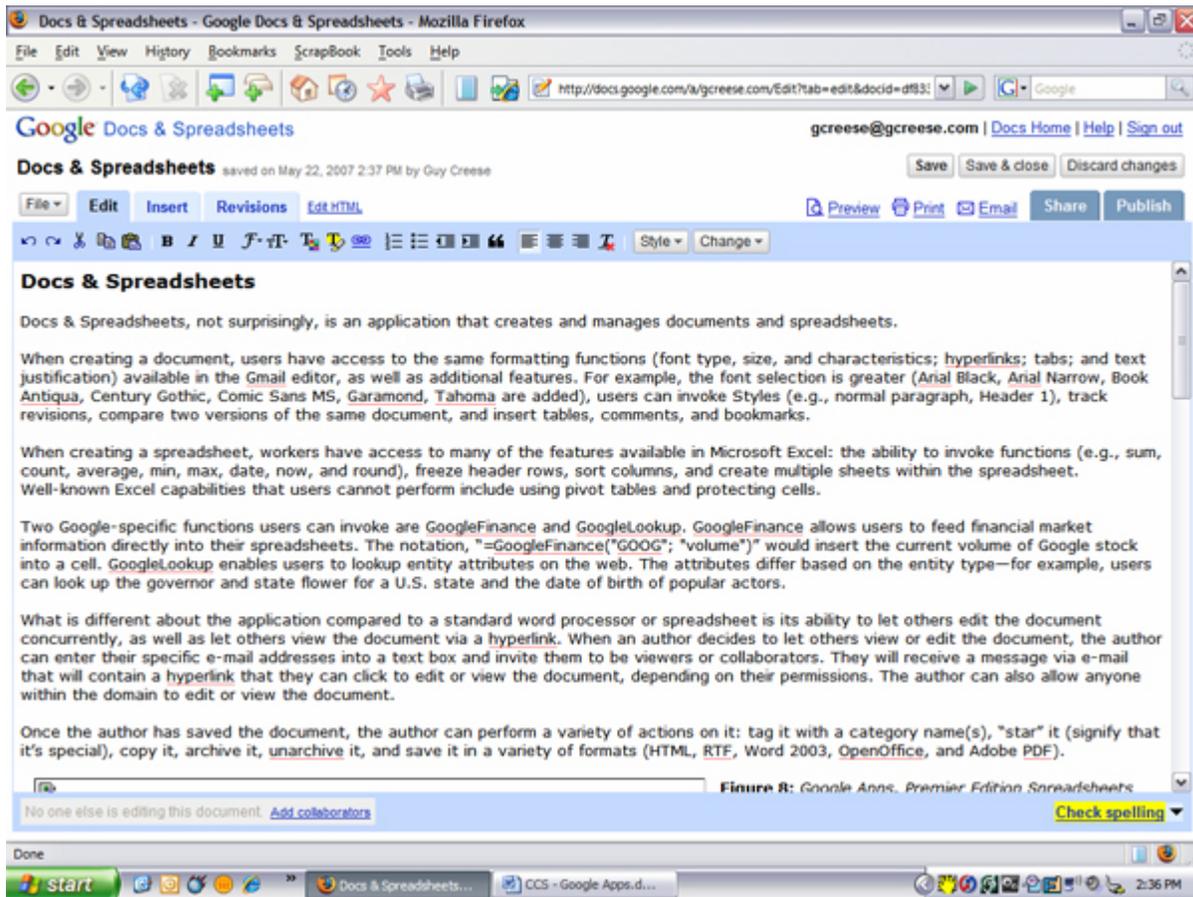
Figure 2: *GAPE Docs*

Developers can programmatically interact with the GAPE service via Google Apps APIs. These APIs let developers write programs that administer the system, copy data, and add service functionality. The supplied APIs are:

- **Provisioning API:** Allows developers to create, retrieve, and delete user accounts, nicknames, and e-mail lists.
- **Calendar Data API:** Lets developers view and update calendar events programmatically.
- **Spreadsheets Data API:** Enables programmers to retrieve, edit, and delete existing spreadsheet data. It's worth noting that developers cannot programmatically create a new spreadsheet. (At the moment there is no Docs Data API comparable to the Spreadsheets Data API, so developers cannot programmatically manipulate Docs data.)
- **Gadgets API:** A programmer creates a mini-application (called a "gadget") by putting an Extensible Markup Language (XML) file wrapper around a web application.

Two services that technical personnel can configure are:

- **Single Sign-On (SSO) Service for Google Apps:** The ability of Google Apps to work with a Security Assertion Markup Language (SAML) 2.0-compliant SSO service
- **E-Mail Gateway Interface:** The ability to route Gmail through an enterprise's own network, thereby letting it archive, filter, and monitor e-mail messages

Third-party applications that work with GAPE currently include a customer relationship management (CRM) add-on from Etelos, a hosted e-mail archiving solution from Postini (on July 9, 2007, Google announced that it planned to acquire Postini)[3], and a hosted SSO service from Sxip Identity.

Google offers a variety of support capabilities, including online help for administrators and users, a moderated user-to-user discussion group, support via e-mail, live telephone support for administrators for 17 hours a day, five days a week (17/5), and support via voicemail.

From a Company Where the Enterprise Has Been a Sideline

Google has long concentrated on search. Founded by two graduate students who focused on solving search problems while at Stanford University, the company offers web search, search advertising (Google AdWords), and enterprise search (via the Google Search Appliance). While the company now offers much more than search (e.g., Picasa for picture viewing and editing, Blogger for blogging, and Google Checkout for e-commerce), search remains the company's overriding strength. As the company says on its corporate philosophy webpage, "Google does search."

Furthermore, search advertising is 99% of its revenue stream.[4] Although the company has done well selling the Google Search Appliance, advertising revenue dwarfs its income from selling licenses to enterprises.

In short, selling non-search solutions to the enterprise has been a fringe activity at Google. Looking at it from an operations point of view, if Google executes poorly at selling and supporting GAPE—which may leave customers in a lurch—it will, at current sales levels, have a minimal short-term impact on Google's bottom line. However, Google has recently announced that it is moving Google apps from the edge to the center. At Google's annual meeting in 2007, CEO Eric Schmidt told shareholders, "Our next strategy evolution is to really think about three components: search, ads and apps."[5]

From an enterprise's point of view, this stated strategy of increasing the primacy of applications within the Google ecosystem is a good first step. However, a number of questions remain. First, "How quickly will this occur?" More specifically, when will applications become such a significant portion of Google's business that it will be financially impossible for Google to walk away from them? Within a year, within three years, or within five years? This is an important question to ask, given that Yahoo! closed its enterprise division—which was bringing in 10% of Yahoo!'s corporate revenue. Second, "When will the enterprise division start creating its own applications from scratch?" At the moment, Google hands consumer-oriented applications to the enterprise division with instructions to make them work for corporations. This "hand me down" approach leads to suboptimal design from an enterprise point of view, and to a lot of rework. Only if and when the enterprise division stands architecturally on its own will Google be able to compete head-to-head with competitors who have focused on the enterprise from the beginning.

Is It "Office," ECM, or Collaboration?

So what is this collection of SaaS-based applications, APIs, and third-party applications good for? Is it a replacement for Microsoft Office, is it an ECM system, and/or is it a collaboration suite?

Depending on the specific business scenario, GAPE can serve in all three situations, the strongest being as a collaboration package. However, in all three cases it would function as a "lite" solution: a product that could be fully functional for a specific situation but that would lose in a feature-by-feature comparison with best-of-breed packages from each area.

"Office"

GAPE could serve as a replacement for Microsoft Office, assuming that there are no power users, employees are always online, enterprises haven't built customized applications with Office, and there is no need for the less common Office applications such as InfoPath, Project, and Visio. In fact, Google says some small and medium-size businesses (SMBs) do adopt Google Apps as an Office replacement—but if they do, they're more inclined to go with the ad-supported free version rather than Premier Edition.

On a feature comparison basis, it's not surprising that Microsoft has a huge lead: Microsoft released the first version of Microsoft Office in 1988, 18 years ago (see Figure 3). Some areas in which Microsoft Office surpasses GAPE are:

- **Documents:** Google Docs does not support a table of contents, headers, footers, automatic creation of footnotes or endnotes, or more than 11 fonts.
- **Spreadsheets:** Google Spreadsheets does not support some of the more esoteric functions within formulas (e.g., database functions), and cannot hide rows or columns.
- **Presentations:** Google does not yet offer a presentation application, although it is in the process of developing one.
- **Customized applications:** Using Visual Studio Tools for Office, developers can create customized business applications that leverage capabilities in Microsoft Word and Excel, for example. While the Google APIs offer some programmatic control, they do not offer the broad level of capabilities that Microsoft does.
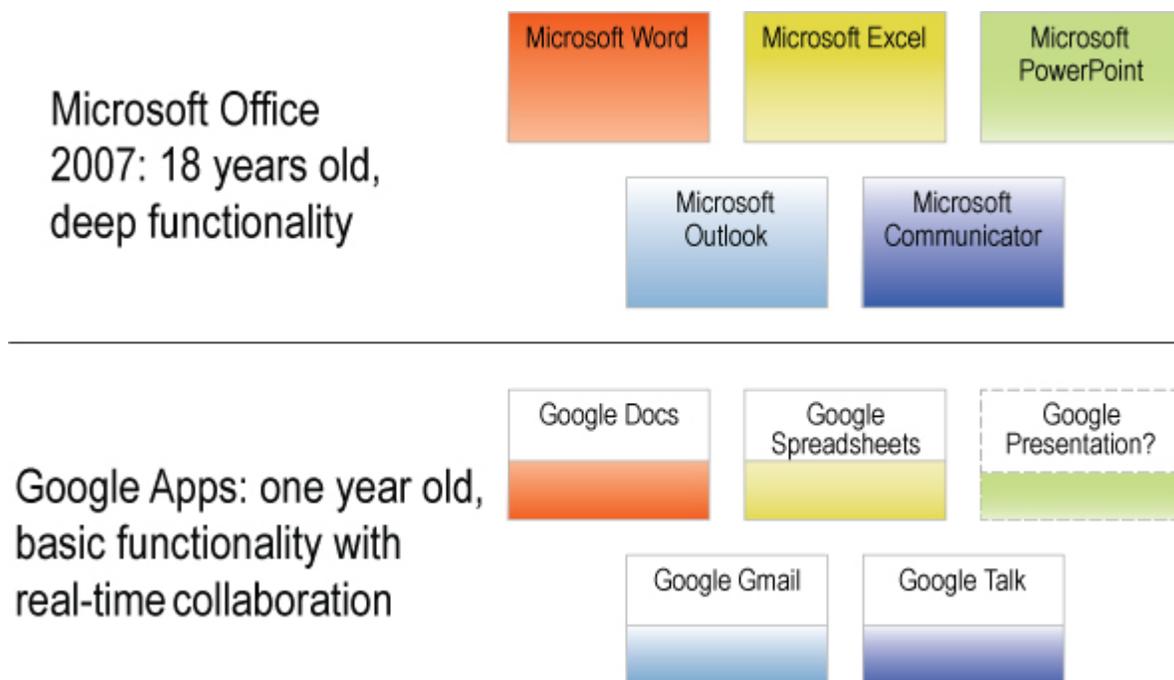
Figure 3: *Microsoft Office vs. GAPE*

That said, GAPE does offer features not available in Office, such as multiple users being able to concurrently edit the same document or spreadsheet (subject to network lag), and integrating IM conversations into e-mail history.

Enterprise Content Management

From a feature point of view, GAPE suffers in comparison to best-of-breed enterprise content management (ECM) packages (see Figure 4). It is strongest in the storage, distribution, and discovery steps, and weakest in the archiving and analytics steps:

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- **Creation:** While GAPE can create and control documents and spreadsheets, it doesn't offer deep functionality in those file types, and doesn't support content types such as scanned documents or electronic forms.
- **Storage:** GAPE stores documents, spreadsheets, e-mail, instant messages, and webpages from the portal, and certainly has very high storage limits. However, the types of files it can store are limited.
- **Distribution:** The solution is quite strong in distribution, in that it offers a portal and IM, as well as makes distribution outside the enterprise easy because of its SaaS architecture.
- **Discovery:** While GAPE certainly supports search, enterprises cannot tweak the underlying engine as they can with best-of-breed search solutions. In addition, the taxonomies are actually folksonomies; enterprise taxonomies are not enforced.
- **Archiving:** The solution does not have a built-in archiving or records management function, there is no way to execute a hold order (preventing valuable documents from being destroyed), and enterprises cannot easily batch copy Google-hosted documents to behind their own firewalls for archiving or electronic discovery purposes.
- **Analytics:** Surprisingly for a company that offers Google Analytics, the solution does not supply usage data to client enterprises, telling them how long it took to create a document or which documents are most popular.
- **Management:** While GAPE offers security and folksonomies, a coherent, enterprise-centric set of management capabilities (e.g., standard metadata and content policies) are missing.
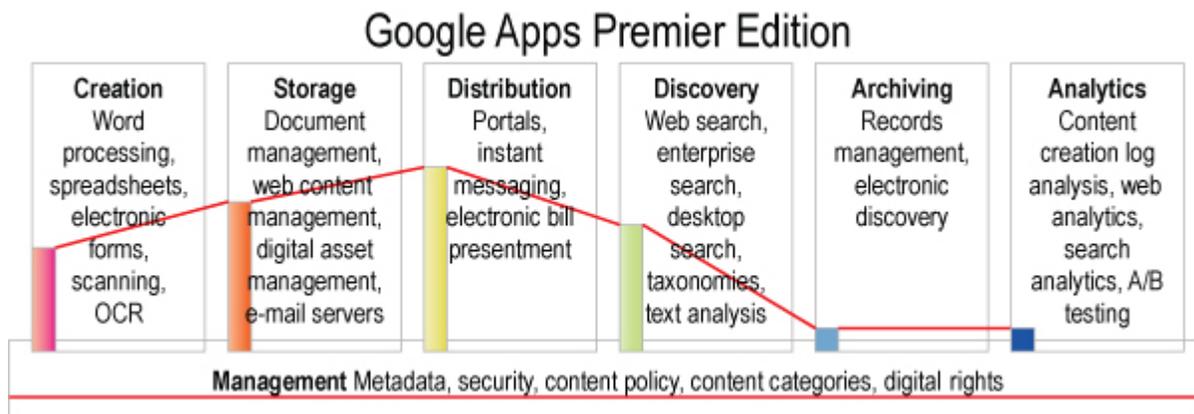
Figure 4: *GAPE vs. Best-of-Breed ECM Packages*

Although GAPE suffers in comparison to ECM packages, the fact is that many companies do not field any ECM system whatsoever, and instead allow employees to do their own thing on C drives and fileshares. When compared to the chaos that normally reigns, GAPE offers an inexpensive, serviceable system for companies that want to start performing some level of ECM without buying a six-figure package.

Collaboration and Communication

GAPE supports both asynchronous and synchronous collaboration and communication (see Figure 5):

- **Synchronous communication:** It supports IM and Voice over Internet Protocol (VoIP), but not audio/video chat or group web conferencing.
- **Asynchronous communication:** It offers e-mail, but no Really Simple Syndication (RSS) feeds (Google Reader is currently not included in GAPE).
- **Synchronous collaboration:** It supports real-time collaboration, but within a document; there is no real workspace per se.
- **Asynchronous collaboration:** Due to calendar support and because workers can upload documents and spreadsheets, it does support asynchronous collaboration, but it does not include features such as wikis or discussion forums.

As a result, although GAPE does support communication and collaboration, it does it in a "lite" sort of way. This could instantly change if Google rolled the functionality of Blogger (a Google acquisition in October 2006) into the solution. If the company did that, its collaboration functionality would expand significantly.
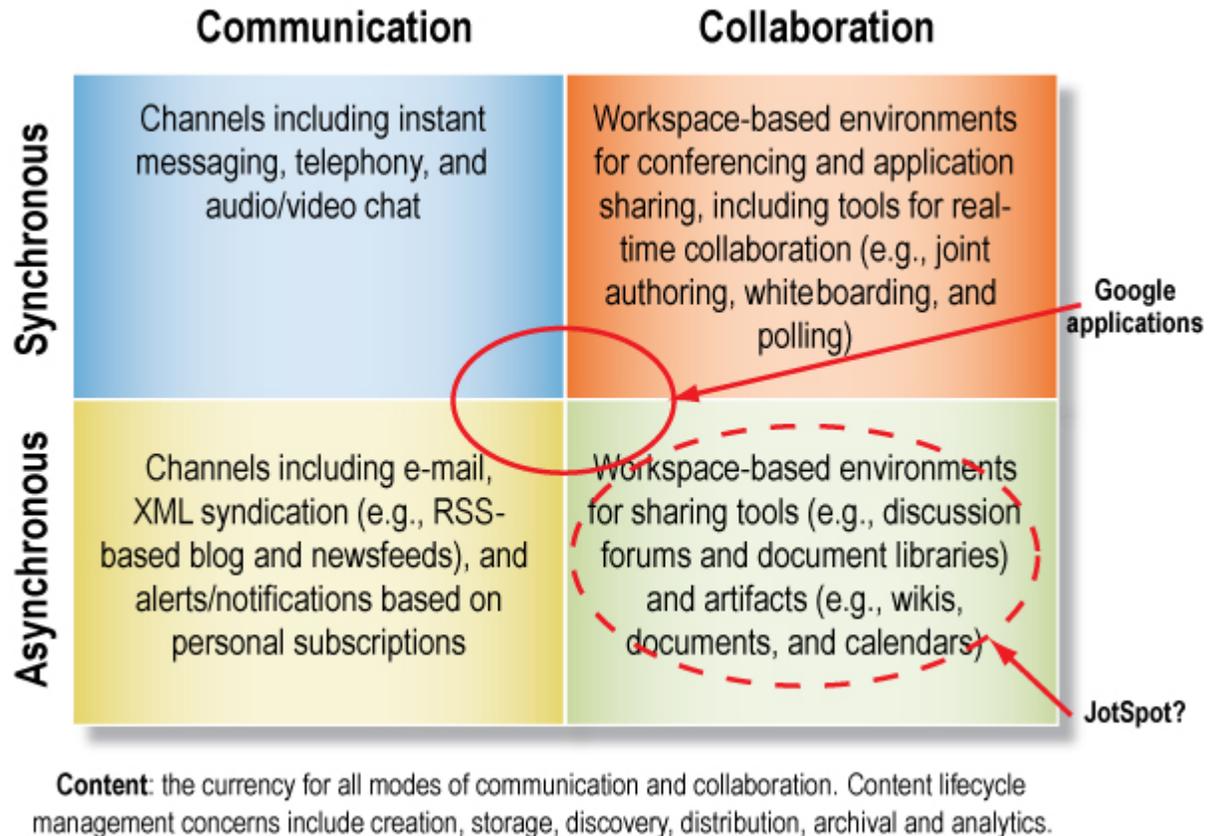
Figure 5: *GAPE in Collaboration and Communication*

Design Assumptions

There are some design assumptions that give GAPE its special flavor and help explain its specific strengths and weaknesses. These include:

- Don't waste time planning—instead, iterate quickly
- Not every user is a power user
- The default is to save all content
- Search and tagging finds everything
- Online connections are cheap and everywhere

Don't Waste Time Planning—Instead, Iterate Quickly

Google is justly proud of its ability to quickly respond to customer desires. A steady stream of products comes out of Google Labs, and the company tunes and adds features to these new products based on customer feedback. This ongoing developer/customer dialog is freeform and almost conversational, and stands in stark contrast to the historical software development model, which mimics the sequential plan/build process used in building construction: "We spent a lot of time creating the detailed specifications. If it's not in the specs, it won't be built—or it will be added at great cost."

While Google's rapid iteration model allows the product to morph quickly, it can also delay features if customers didn't ask for them initially. This is an issue in this case, as Google initially designed the individual products (e.g., Gmail and Docs & Spreadsheets) within GAPE for the consumer market. (For example, the e-mail autoreply function is named "vacation responder" rather than "out of the office.") Now it must tack on enterprise capabilities, rather than designing the system from the ground up for the enterprise market, as many of its competitors have done.

Not Every User Is a Power User

Google has a long history of offering easy-to-use products, whether for general consumers (search), enthusiasts (Picasa picture editor), or business people (Google Analytics). All are easy to learn without a manual and they do not overwhelm the user with features. They are not built for power users, and GAPE is no exception.

While this means that the package will not meet every worker's needs, it is appropriate for some workers. By optimizing for the vast universe of basic users and not aiming for the power user outliers, Google simplifies its development and support tasks as well as calls into question an enterprise's need to buy software that includes every bell and whistle. Why pay for full functionality for everyone, when most workers only use a small subset of features anyway?

The counterargument to this "simpler is better" attitude is the one that Microsoft makes: that while no one worker uses all of the sophisticated features within a product, it's common for a worker to use a couple. One worker might leverage mathematical symbols and notation while another depends on tables of content and footnotes—and it's difficult to predict which worker will use what feature. Therefore, rather than consigning many employees to being unable to do what they want, give them more than they need and let them pick what they want.

The Default Is to Save All Content

Google has designed GAPE to save all content by default. Users have to explicitly delete files and e-mails. For example, there are no records management capabilities for deleting content after a specified period of time, and if a user deletes an e-mail, Gmail takes the user back to the overview menu, rather than to the next e-mail.

This "save everything" strategy makes sense within the consumer space, as it prevents irate customers from calling up and demanding restoration of files they've inadvertently deleted. Furthermore, disk space is cheap.

However, as corporate lawyers perpetually point out, there are good business reasons for deleting content. While enterprises must save some records to satisfy regulators, they can delete the vast majority of unstructured content (e.g., e-mails, memos, and spreadsheets) after it has outlived its usefulness. Furthermore, it's worthwhile to do so, as regulators and adversaries will comb through company documents looking for "smoking guns" in the course of a legal discovery process. If the company has appropriately deleted the unnecessary content, there is less for adversaries to find. Therefore, the "save everything" inclination of Google Apps is at odds with corporate best practices.

Search and Tagging Finds Everything

Google places great faith in search, and views placing content in a hierarchy of folders to help workers find it later as a waste of time, under the rubric of, "assume chaos and deal with it." While taking time to categorize ephemeral content has minimal (if any) payback, categorization can help workers rapidly find important content—for example, going to a folder with the five documents for the current active project can be quicker than issuing a search each time. Granted, Google recognizes that categorization has a place: It allows workers to categorize, or "tag" e-mails within Gmail. However, if workers are more comfortable working with folders and subfolders, they're stuck—the names and number of folders within Gmail are fixed; users can't alter them.

The issue here is not that search and tagging don't work, but rather that they offer users a limited set of discovery capabilities. Furthermore, both search and tagging are "flat": Workers can take a shortcut to the information, but they get no sense of its hierarchy—that Project X is a Quarter 2 project, which would be clear if the Project X folder were a subfolder within the Quarter 2 folder, for example. Because different workers organize and find information differently—as the unique layout of every worker's physical desk attests—a limited set of "flat" discovery tools may inhibit the solution's adoption.

Online Connections Are Cheap and Everywhere

SaaS solutions assume that—at some point—users are Internet-connected. Some SaaS solutions handle offline work by caching it locally and then synchronizing the updates at reconnection time; others do not automatically support offline work. GAPE takes the latter, more limited approach, and while Google has announced Google Works (a Java-based API for saving online work offline), it has not yet implemented it within GAPE. If a wired enterprise assumes that its employees will share documents and collaborate only at work, then there is no issue. However, if it expects employees to work wherever they are—at home or on the road—then it may marginalize employees who do not have an Internet connection at home or be forced to reimburse employees for the cost of an Internet connection at home or while traveling.

Product Strengths

The above design assumptions bring with them some product strengths. These include:

- Don't need to pay for unnecessary power user licenses
- No software to install, and no continual updates
- Minimal, if any, training required
- Relatively easy to include workers outside the enterprise
- Online documents are not scattered on C drives or fileshares
- Integration of past application silos

Don't Need to Pay for Unnecessary Power User Licenses

GAPE, targeted at basic users, has a relatively low price; enterprises are paying for what they get. They are not paying a "functionality tax"—that is, paying for a rich set of features that individual employees rarely leverage to the fullest.

No Software to Install, and No Continual Updates

Because GAPE is a SaaS-based solution, there is no software to install. Instead, users access the product via a web browser, such as Apple Safari, Microsoft Internet Explorer, and Mozilla Firefox.

The solution also offers continual updates and feature upgrades. This is in contrast to traditional software products, where the frequency of the software release cycle is constrained by the need to bundle a group of features for media distribution. In other words, a software vendor issues a snapshot of the software at intervals. New versions of small software packages come out, on average, every nine to twelve months; complex software—such as operating systems and Microsoft's Office package—takes years to develop and release. In contrast, SaaS-based solutions are more like a motion picture: Because there's no need to wait for media distribution, the vendor can release incremental changes quickly. The downside to this capability is that an enterprise may gain features that it doesn't need or want.

While SaaS delivery of the solution makes continual updating possible, it is not a given: A SaaS provider could put up a solution version and never change it. However, Google has a history of continually updating its applications, some more frequently than others.

Minimal, If Any, Training Required

Google's expertise in creating solutions for the consumer market is a major help in creating applications that require minimal, if any, training. Anyone who has used Microsoft Word or Microsoft Excel can instantly begin using the Google Docs & Spreadsheets applications with no training whatsoever.

Perhaps the only exception to this is Gmail, which offers a different way to work with e-mail than competitive packages. For example, the names and number of folders is fixed, and after an e-mail is deleted, Gmail does not show the next entry, but rather pops the user out of reading e-mails to seeing the list of e-mails. For employees who would rather stick with a familiar interface, Gmail supports Post Office Protocol (POP)-based e-mail clients, and so employees used to Eudora or Microsoft Outlook can continue to use their favorite e-mail clients.

Relatively Easy to Include Workers Outside the Enterprise

Because there is minimal software to install (Google Talk Client)—and because of the way that Google invites applicants to participate in editing a document (by distributing a hyperlink)—it is relatively easy to include workers outside of the enterprise in the collaboration process. Partners and customers—assuming they have the appropriate access rights—are as much a member of the collaboration team as enterprise employees. This is in contrast to the early days of collaboration software, when the need to install complex products, such as the Lotus Notes client, on every participant's PC slowed adoption rates both within and outside the enterprise.

Online Documents Are Not Scattered on C Drives or Fileshares

While GAPE does not offer the same level of sophistication as best-of-breed ECM solutions, the fact is that very few companies have installed ECM to any significant degree. Certain departments, such as corporate legal departments and regulatory affairs divisions within pharmaceutical companies, typically use ECM solutions, but the vast majority of workers store and control their documents on local C drives and networked fileshares. The Google solution is a big improvement over the typical scenario of documents being e-mailed back and forth and ultimately stored in different locations by various users.

Integration of Past Application Silos

GAPE is not just the repackaging of standalone calendar, e-mail, IM, document, and spreadsheet applications. Google has added some integration twists that begin to unify these applications in ways that Microsoft Office 2007 does not. For example, if an e-mail thread wanders off into an IM thread, Google does not keep them separate: one thread for e-mail, the other for IM. Instead, Google brings them together, making it much easier for users to follow the business conversation without being disrupted by the technology underpinnings. Similarly, by scanning e-mails for references to meetings, the software lets the user schedule a meeting within the e-mail interface, rather than demanding that the user switch to the calendar program. Finally, Google Calendar makes it easy to juxtapose multiple calendars within the same interface, so that a worker can easily coordinate business meetings, family duties, and professional get-togethers without opening multiple calendar applications.

Product Weaknesses

The above design assumptions also bring with them some product weaknesses. These include:

- Power users and sophisticated documents are not supported
- Records management is difficult and requires extra work
- 99.9% uptime guarantee is for Gmail only
- Google is not liable for lost data, profits, or revenue
- Live telephone support is 17/5
- Difficult to plan for product capabilities and rollouts

Power Users and Sophisticated Documents Are Not Supported

The online documents in GAPE do not have sophisticated features; for example, Docs does not support headers, footers, tables of content, or footnotes; and Spreadsheets cannot hide columns. While workers can synchronously collaborate on basic documents within the service, they cannot synchronously collaborate on more detailed documents, such as those with footnotes at the bottom of each page. To get around this limitation, they must implement a two-part collaboration process: Initially, synchronously collaborate on the body of the document, save it to Microsoft Word or Excel, and then send it around via e-mail to put the finishing touches on it.

Records Management Is Difficult and Requires Extra Work

Although Google aims to store hundreds of gigabytes of information for enterprises at Google facilities, it does not offer an easy-to-use, automated way for enterprises to regularly delete such documents, issue a legal hold for specific documents, or bring copies of documents into the corporation.

This lack of records management capabilities can be an issue if an enterprise uses the service for several years and suddenly finds itself responding to an inquiry from the U.S. Securities and Exchange Commission (SEC) or a lawsuit from a competitor. To be specific: First, it may have to hand over incriminating documents stored on Google because it didn't delete them on a regular schedule; second, it will be unable to prevent employees from deleting important documents required for the court case; and third, it will take a lot of work to make local copies of the online documents.

For e-mail, Postini offers a SaaS-based e-mail archiving solution; enterprises can also route Gmail through a corporate server connected to an archiving solution. For documents and spreadsheets, workers will have to manually export each item to create a copy behind the firewall so that an enterprise can use its own electronic discovery package of choice. Alternatively, an enterprise programmer can use the Google APIs to automatically create copies of spreadsheets; that capability is not yet available for documents.

99.9% Uptime Guarantee Is for Gmail Only

The highly proclaimed 99.9% uptime guarantee is for Gmail only; Google does not make any legally binding claims for other parts of the service, such as Calendar and Docs & Spreadsheets. The fine print of the "Gmail Service Level Agreement" notes that downtime for a domain means more than a 5% user error rate, measured at the server. Furthermore, a "downtime period" means a period of ten consecutive minutes of downtime. Intermittent downtime for periods of less than 10 minutes (e.g., seven minutes down, two minutes up, five minutes down) will not count toward a downtime period. Downtime scheduled by Google (no more than twelve hours per calendar year) will not count toward a downtime period.

If downtime does occur, Google will add from 3 to 15 days of free Gmail service to the end of term of service, depending on the severity of the outage. However, the customer must request such a service credit within 30 days of being eligible to do so; otherwise, the customer forfeits the credit.

Google Is Not Liable for Lost Data, Profits, or Revenue

Within the "Limitation of Liability" section of the "Google Apps Premier Edition Agreement,"[6] Google states it will not be liable for lost data, lost profits, lost revenue, or the cost of buying substitute goods or services in the event the service fails. Under the "Warranty Disclaimer" section, it notes

THE SERVICE IS NOT FAULT-TOLERANT AND IS NOT DESIGNED OR INTENDED FOR USES SUCH AS THE OPERATION OF NUCLEAR FACILITIES, AIR TRAFFIC CONTROL OR LIFE SUPPORT SYSTEMS, WHERE THE FAILURE OF THE SERVICE COULD LEAD TO DEATH, PERSONAL INJURY, OR ENVIRONMENTAL DAMAGE.

While such boilerplate wording is common in many service contracts, it highlights the difference between running such a service in-house and hiring a company such as Google to do it. If the internally hosted calendar, e-mail, and collaboration system goes down for hours or days at a time, a company can buy more servers and fire its IT director. If Google Apps fails in a similar fashion, the company has little recourse other than retrieving its documents and finding a different service provider.

Live Telephone Support Is 17/5

Google offers a variety of support capabilities, including an online help center, a moderated user-to-user discussion group, and support via e-mail. However, unlike companies such as IBM, Microsoft, Oracle, and Salesforce.com, Google does not offer 24/7 telephone support, not even for an extra fee. Instead, live telephone support is available for administrators only from Monday through Friday, from 1:00 A.M. to 6:00 P.M. Pacific Time. Outside of those hours, the designated administrator must leave a voicemail, which Google will turnaround in less than an hour if it's deemed to be a "Priority 1" problem; otherwise, Google will reply on the next business day.

Difficult to Plan for Product Capabilities and Rollouts

Because Google owns the service, companies have minimal control over the timing of product rollouts or features. While companies can turn off sections of the service—for example, Gmail or Docs & Spreadsheets—they are stuck with the application capabilities that Google deploys.

This is in contrast to the software world, where enterprises strictly control which version of software they will install and when. This throttling of software features is often due to training issues and the company's perceived value of the features. For example, many companies are currently debating if and when to install Office 2007, due to its new interface and the affiliated training issues. While Google works hard to make the software easy to use, companies lose the ability to tweak the rollout schedule for their unique needs.

History Will Repeat Itself: But Which Story Will Replay?

Unfortunately, there is not a long track record on which to base a go/no-go decision: Buying GAPE means buying into a delivery model (SaaS), a product (Google Apps), and a company (Google)—all of which are less than a decade old. Inevitably, an enterprise will base part of its decision on how the company believes Google and the market will evolve.

While no one can predict the future with absolute certainty, there are some probable scenarios based on previous technology cycles, described in the "Previous High-Tech Revolutions" section of this report. They range from success, to muddling through, to disaster. These various scenarios help enterprises look at the wide spectrum of possibilities: making optimists admit that things could go wrong, and making pessimists admit that not all is doom and gloom.

Success Scenario: Bottom-Up Plan Wins, Just Like LANs

In the mid-1980's, IT groups running mainframes and minicomputers were dismayed to see the arrival of network operating systems (NOSs) that linked PCs together via local area networks (LANs). Initially, LANs were toys; security was rudimentary and LANs failed frequently. Yet business users loved the idea that they could get their computer work done without having to call IT all the time. The bottom-up adoption process, driven by users looking for ease of use and increased productivity, ultimately won out over controlling edicts from central IT. This occurred, in large part, because the NOS vendors quickly patched the initial product holes and were thus able to overcome IT's initial objections.

Ultimately, business users demanding productivity—what Google is trying to foster—won out over stultifying technology supplied by IT. Furthermore, this change occurred quickly, in less than a decade.

Muddling Through Scenario: Creating the Computing Grid

Electricity took at least 50 years (1880–1930) to evolve from the invention of the incandescent bulb to the power grid as we know it today. The shift to "electricity as a service" was key to making electricity ubiquitous. It was only when homes and businesses took to buying electricity from the utility company, rather than creating it themselves, that electricity became cheap and adoption soared.

So while the use of SaaS-based solutions will increase—certainly based on this scenario—it may take many years for the market to fully evolve.

Disaster Scenario: A Netscape-Like Meltdown

Within the space of five years, Netscape Communications went from media darling to high-tech shell. Founded in April 1994, the company first released a browser, capturing more than 60% of the then-nascent browser market within two months. Netscape was a maverick, utilizing rapid distribution capabilities and low prices to create a large and loyal customer base. However, flush with its success, the company moved beyond its consumer orientation and began moving into the enterprise e-mail and groupware space, taking on both IBM and Microsoft. Microsoft's strong reaction to this interloper, coupled with Netscape's reputation as an arrogant company, sealed Netscape's fate, and it eventually lost its identity when it was sold to AOL.

The parallels between Netscape and Google are eerie—initially consumer-focused, eventually going after the enterprise market, and being perceived as arrogant. The good news here is that Google has the Netscape story to learn from; the bad news is that it has already awakened the slumbering giant, Microsoft.

Probable Short-Term Scenarios

In contrast to the hard-to-forecast 5- to 50-year scenarios painted above, there are some short-term scenarios that in Burton Group's opinion have a good chance of taking place.

Google Products

Google will probably expand the breadth and depth of GAPE in a number of ways:

- **Already announced future capabilities:** Google has already announced that it will offer a presentation (i.e., web-centric PowerPoint-like) application, roles-based capabilities, and improved e-mail distribution lists.
- **24/7 phone support:** The reason Google has limited hours for phone-based support is that it has only two call centers: one based in , the other in . To be a viable enterprise solution provider, Google will have to move to 24-hour support, and so will probably create a third major call center, perhaps based in India or Australia.
- **Increased customization capabilities:** Over time, Google will probably expand the level of customization available in its solution. This will be a replay of what happened with SaaS-based web analytics solutions, where vendors tried to offer "take it or leave it" solutions and most enterprises left it—that is, refused to buy. The vendors eventually realized that all enterprises viewed themselves as unique and expected a basic level of customization. By expanding parameter-driven customization and/or including professional services time within the product price, SaaS-based web analytics providers were able to satisfy demand for non-me too installations. This small shift in customization capabilities significantly increased sales.
- **Embedded content analytics:** Although Google does not yet offer this feature, it will either recognize its value on its own or popular demand will force the issue. Content analytics is the discipline of understanding content creation costs and content consumption behavior as a way to deliver relevant content at a lower cost. (Content analytics is described in detail in the *Collaboration and Content Strategies* overview, "Content Analytics: Assessing the Value of Corporate Content.") By gathering statistics on how long it took workers to create content, tracking how much time workers spent reading the content, and then delivering reports to the enterprise documenting its investments in content, Google would help enterprises gain visibility into processes that are hard to track with the current set of software.
- **Automated offline support:** To increase the use of GAPE, Google will need to address this issue in some way. Google has announced Google Gears, an open source browser extension that lets developers insert calls in their web application so it can store application pages offline (LocalServer module), store data offline (Database module), and perform the necessary tasks to synchronize the online and offline data (WorkerPool module). It's highly probable that Google will use this mechanism to allow offline work in GAPE, although when it will make the modifications to GAPE is unclear. Another possibility is that Google will depend on solutions from others, such as the forecasted ability of Firefox 3 to support offline applications.

Google Partnerships

Burton Group believes Google will also expand its partnerships:

- **Expanded partner ecosystem:** Google will continue to expand its partner ecosystem, by signing up companies to code more add-ons and professional services organizations to perform integration work and suggest best practices. Google Gadget Ventures, announced in June 2007, funds development work on Google Gadgets and is just one example of the company's intent to increase partner involvement.
- **Working more closely with Salesforce.com:** Although Salesforce.com has announced it will offer a competing product, both companies want to expand their installed base in comparison to Microsoft. Therefore, it would not be surprising if each company resold each other's application or somehow partnered (for example, Salesforce.com taking over support duties for Google Apps) as a way to create a unified SaaS-enabled front.

- **Increasing use of open source:** Although Google itself leverages open source software in its development process, its key offerings are not open source: It prefers to keep its "secret sauce" proprietary. Where it has started to use open source is in peripheral offerings that benefit from a network effect. This trend will continue, as two recent events suggest. First, Google is moving toward using open source connectors to the Google Search Appliance: programs that enable the appliance to index content held in proprietary repositories such as Microsoft SharePoint and EMC/Documentum. Second, Google Gears, the Java-based API for storing online work offline, is an open source project. Another potential area is the file formats used for storing documents and spreadsheets within Google, as a way to alleviate corporate concerns about records management and to let them gracefully stop the service. If an enterprise suddenly wanted its own copy of its Google-held documents—whether due to electronic discovery requirements or because it was discontinuing the service—Google could securely File Transfer Protocol (FTP) the documents to the company and the company could read them via an open source viewer.

Where Is It Useful?

Because the solution is weak compared to best-of-breed point solutions, it will not displace many already installed applications. However, it will appeal to organizations that are comfortable with the SaaS delivery model and are looking for basic features and nothing more, as well as organizations making their first steps in trying out ECM and collaboration solutions. In addition, it will serve as a collaboration add-on to Microsoft Office, which is how Google uses it internally.

In Organizations Looking for a "Lite App"

GAPE can be useful for organizations looking for point solutions:

- **Rudimentary replacement for Microsoft Office:** Non-power users in SMBs or production workers needing basic capabilities (e.g., factory workers needing basic e-mail, word processor, and spreadsheet capabilities) can be candidates for using GAPE. In the first case, SMBs may be overpaying for the features they use within Microsoft Office, and the ability to run with a small IT staff can be appealing. In the second case, production workers are sometimes excluded from information worker applications. GAPE allows them to be included without breaking the bank.
- **ECM lite:** Given that many organizations—smaller companies, subsidiaries, departments—do not have ECM systems, GAPE allows them to move beyond the chaos of storing content on C drives and fileshares. In fact, the solution could serve as "ECM training wheels": the first step toward ascertaining whether a more robust ECM system would be useful in the long run.
- **Collaboration lite:** Just as many organizations have not implemented ECM on a large scale, many organizations have not implemented collaboration solutions on a broad scale. The Google solution can also serve as "collaboration training wheels," letting organizations and outside partners initially collaborate on individual documents. If, over time, organizations recognize they need more, then they may move up to a more robust solution that includes wikis and workspaces. They may also stay with the Google Apps solution, assuming that Google rolls in the wiki and workspace capabilities it gained from JotSpot.

In Organizations Looking for a "Lite Suite"

The solution can also be useful for organizations looking for a "lite suite":

- **SMBs looking for a basic office and collaboration suite:** Small startups and small businesses may find that GAPE gives them what they had been thinking of when they looked at Microsoft Office and SharePoint 2007 (SP2007), but with less cost and infrastructure.

- **Colleges and universities:** Institutions of higher education are custom made for the Google solution's capabilities: Offline work is not an issue, as the campus is typically wired for Internet access; colleges often have relatively small IT staffs; there is heavy IM usage among students; there are many calendars (e.g., student calendars, fraternity calendars, and event calendars); and a lot of the work is collaborative (e.g., writing and grading papers as well as supporting committee meetings). While graduate schools may need more robust capabilities (e.g., business schools needing Excel's depth), many undergraduate programs do not. This, coupled with the fact that Google Apps Education Edition is free for students, makes the education version of Google Apps very appealing to institutions of higher education.

Market Impact

Google's announcement of GAPE was just one of many major collaboration and content announcements in the first half of 2007. For example, within the first five months of 2007:

- IBM announced a new version of Lotus Notes at Lotusphere
- Salesforce.com bought Koral.com and announced its intent to offer SaaS-based content management
- Cisco bought WebEx Communications to bolster its position in the unified communications market
- Comcast engaged Zimbra to deliver applications to its customers
- Facebook announced Facebook Platform

Overall Market Impact

While Google's offering does not have the "big boom" seismic impact of Microsoft SP2007, it adds to the rumbles in the market that are unsettling both enterprises and vendors, and makes both constituencies question some long-held beliefs:

- Does a collaboration and content solution have to run locally?
- Does a collaboration and content solution have to be expensive?
- Why pay for features many employees don't use?
- Why pay for internal resources if you don't have to?

Does a Collaboration and Content Solution Have to Run Locally?

Google's entrance into the collaboration and content market validates the SaaS delivery model that Salesforce.com, WebEx, and others pioneered. In the past, SaaS-based collaboration and content solutions were from startups and/or focused on web-based content, such as web content management (WCM) or web analytics. While those solutions were useful and had buyers, the marketplace viewed them as at the edge of the market. Google's play legitimizes the idea that collaboration and content is the province of major SaaS players.

Does a Collaboration and Content Solution Have to Be Expensive?

Enterprises view Google's $50 per user per year fee as relatively inexpensive, and will no doubt cite it in price negotiations with other vendors. Google's attention-getting pricing will not only help drive solution prices down, but will also increase adoption. When fees were $500 per user, enterprises thought long and hard about who should get the software; at $50 per user, companies can afford to be benevolent.

Why Pay for Features Many Employees Don't Use?

Google's rudimentary online applications call into question the assumption that every employee needs a full-featured office solution. The business intelligence market has used power user/basic user tiering for years (e.g., model and query creators use full-featured fat client software, while report-reading employees use a simpler browser-based interface). However, this tiering of product capability has never caught on for general information worker use—Microsoft Works has been available for years, but virtually all enterprises still buy the more full-featured Microsoft Office. Microsoft says this is because different information workers use different feature sets, and it's hard to predict who will use which feature.

Nevertheless, not overpaying is attractive to enterprises. It's conceivable that by watching user behavior, Google could get to where it adjusts the fee based on feature use. For example, Bob behaves like a power user in June, and so is charged the higher fee, but reverts to being a basic user in July, and the fee drops accordingly. In the long run, SaaS-based solutions promise metering similar to what utility companies offer today: You pay for what you use and nothing more.

Why Pay for Internal Resources if You Don't Have To?

Traditional software solutions demand a level of internal investment—hardware and software purchases, personnel salaries, and time—that SaaS-based solutions do not require. Is it worthwhile to make that investment? Enterprises that are using Salesforce.com or a SaaS-based web analytics vendor have already asked that question in the domains of CRM and web analytics, and have decided it isn't worthwhile. GAPE brings that question to the domains of collaboration and content. Some companies—comfortable with using SaaS in other domains—will balk at using it to store confidential company e-mail, documents, spreadsheets, and calendars. Others will decide that hiring a multibillion-dollar company that does this on a massive scale and at a low cost—and thereby frees up cash for other corporate needs—is the right thing to do.

Vendor Impact

Google's entrance into the collaboration and content sector alters the overall makeup of the market, impacting different competitors in different ways. Google comes at this from offering mostly SaaS-based solutions to consumers, or the lower left quadrant as portrayed in Figure 6. Its competitors in the enterprise space have typically been strong in the upper left quadrant, which makes them strong in understanding the enterprise point of view, but weak in delivering SaaS. (These market diagrams, with the exception of those for Cisco Systems, Oracle, and Salesforce.com, are taken from the *Collaboration and Content Strategies* overview, "VantagePoint 2007: The Storm Before the Calm.")
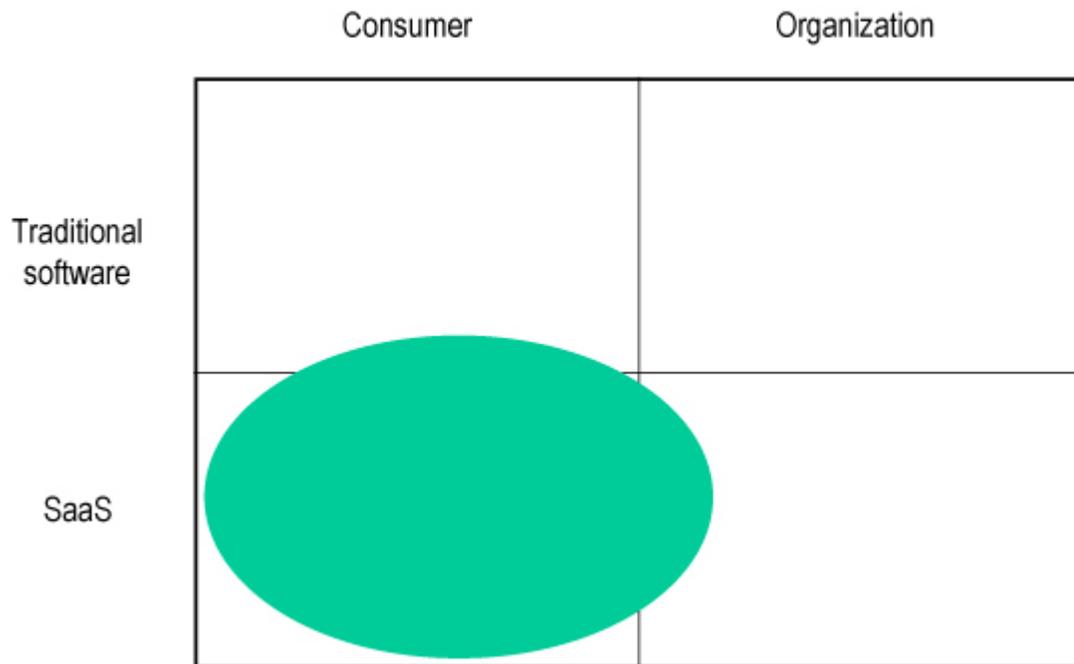
Figure 6: *Google Market Focus*

Microsoft Takes a Hit—and Probably Comes Out Stronger

GAPE offers a "just do it" alternative to Microsoft's more complex SP2007 and Groove 2007 products. While it competes with some of Microsoft's software offerings within the Microsoft Office Live product line, it also validates Microsoft investment in SaaS-based office solutions (see Figure 7).

Historically, Microsoft does not take kindly to encroachment upon its turf. When media darling Netscape did so seven years ago, Microsoft was initially slow to react, but ultimately surpassed Netscape. The same scenario may replay here.

At the moment, Microsoft talks about SaaS *and* software. It argues that rather than SaaS eliminating software, it augments it: Enterprises should be able to choose what works best for their specific situation. While Microsoft may take a perception hit from Google, especially in the SMB market, in the short run, it will no doubt regroup and come out stronger in the end.
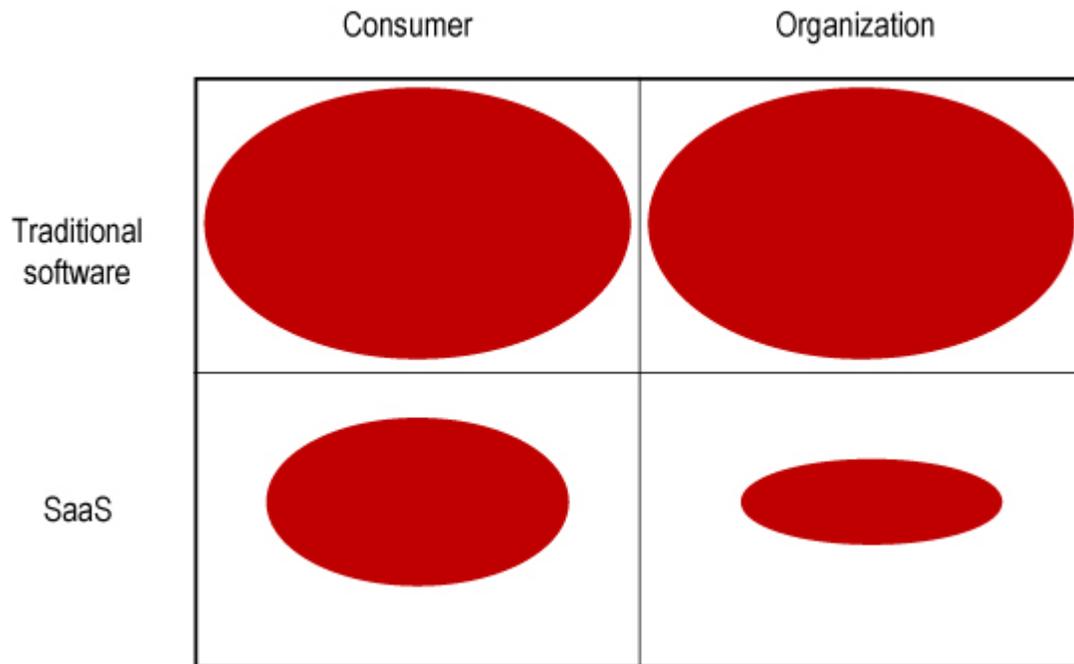
Figure 7: *Microsoft Market Focus*

IBM's "No SaaS Solution" Strategy Now Looks Weak

Many long-term Lotus Notes customers are now looking to migrate away from Notes. While they typically view SharePoint as the go-to solution, Google Apps is yet another alternative, albeit a weak one, given Notes' rich collaboration features.

More importantly, Google Apps highlights IBM's lack of a SaaS-based collaboration and content solution. With IBM increasingly targeting SMBs—who like the "pay as you go, no infrastructure" approach of SaaS solutions—its software-only approach is a big problem. Alliances with hosted providers such as Google and Yahoo! can only go so far. IBM needs to come up with a SaaS strategy and act on it quickly. This will be difficult for IBM to do, given the multiple billions of dollars it takes to build a robust data center network, and IBM's limited financial resources in comparison to Google, Microsoft, and Yahoo!. Otherwise, even with the recent improvements to Lotus Notes and its new Lotus Quickr offering, IBM will increasingly look like it's fixated on maintaining the current installed base with software tweaks rather than gaining new customers with SaaS initiatives.
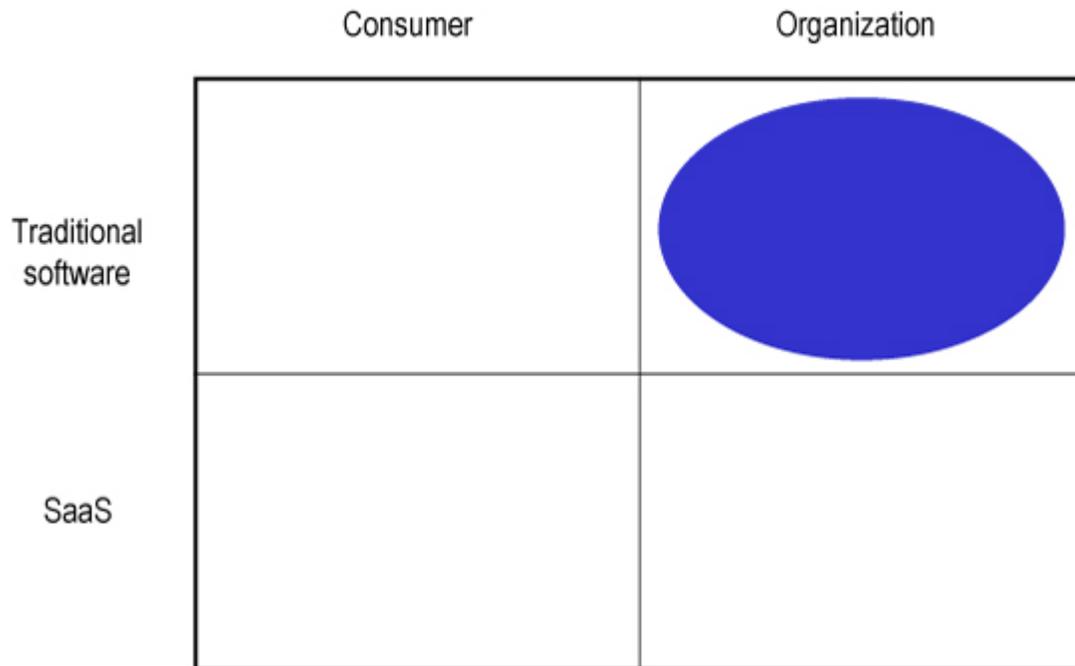
Figure 8: *IBM Market Focus*

Oracle Gets Lost in the Noise

Oracle has dabbled in collaboration and content for years. Its current products are Content DB, Oracle Collaboration Suite (OCS), and WebCenter. While Oracle doesn't have a large installed base for these products, they do offer solid functionality—a surprise for enterprises that still think that Oracle just does databases. Furthermore, Oracle does offer a SaaS-based service—known as Siebel CRM On Demand—to enterprises. However, with Oracle having difficulty being heard outside of its installed base, Google's entrance into the market will continue to divert attention away from Oracle.
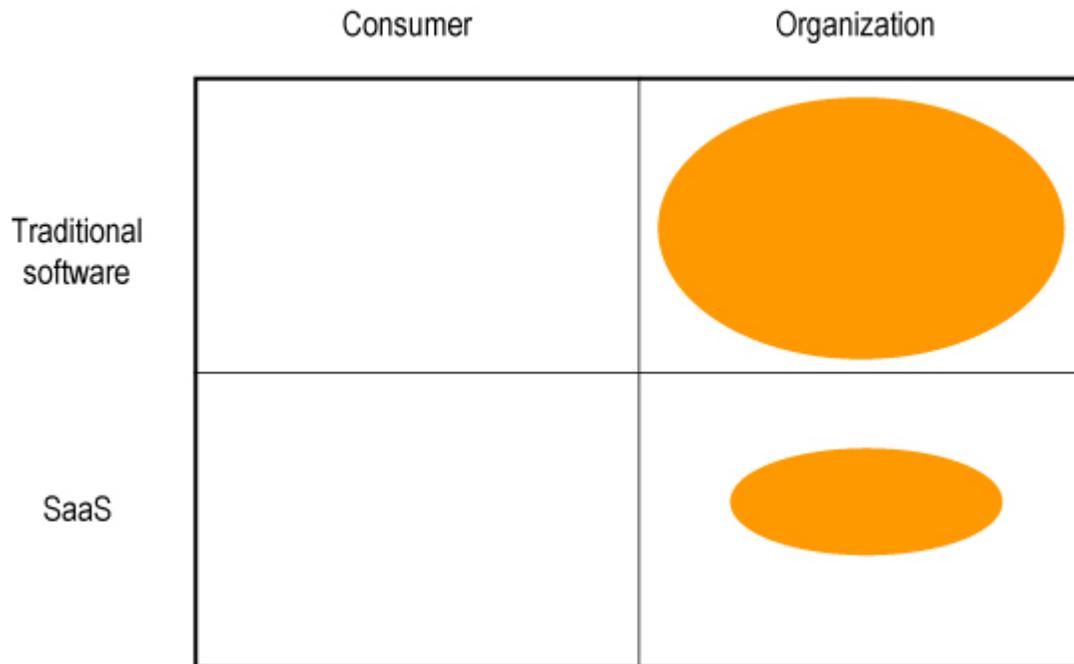
Figure 9: *Oracle Market Focus*

Salesforce.com Slipstreams Behind Google—and Overtakes It?

With Google notifying the market that a SaaS-based collaboration and content solution is now available from a major player, Salesforce.com has the opportunity to slipstream behind Google and eventually take the lead. Salesforce.com has a long history of supplying SaaS-based applications to Fortune 1000 enterprises. The company announced in April 2007 that it planned to offer ContentExchange, a SaaS-based collaboration and content solution that it derived from Koral.com, a recent acquisition. Furthermore, Salesforce.com has said enterprises do not need to purchase the standard CRM application to use ContentExchange—they can purchase just ContentExchange if they so desire. Although Salesforce.com has not yet announced the solution's price or when it will be available, the demonstrated functionality is currently much richer than Google's. For example, ContentExchange supplies content suggestions based on group usage, offers a sophisticated tagging interface, and supports offline/online capabilities. Burton Group believes that many enterprises will begin investigating SaaS-based collaboration and content due to the Google name, but will ultimately settle on more sophisticated offerings, such as those from Salesforce.com and Zimbra.
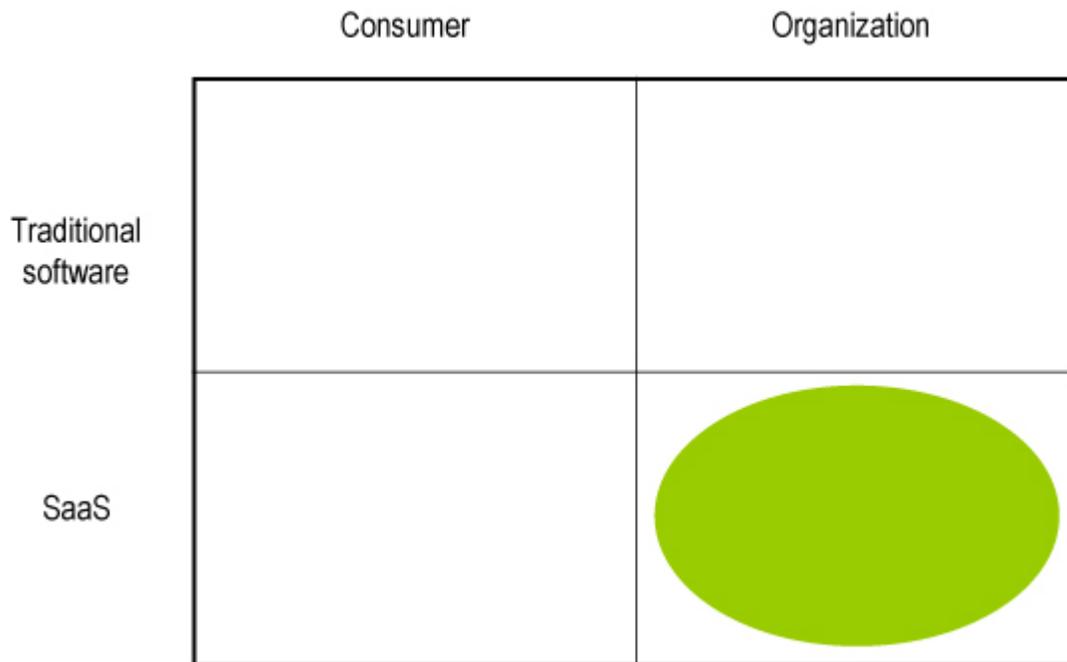
Figure 10: *Salesforce.com Market Focus*

Cisco/WebEx

Cisco Systems' acquisition of WebEx Communications makes Cisco a new but potentially huge competitor in this area. WebOffice by WebEx offers e-mail, calendar, light document management, task management, and other capabilities. When coupled with Cisco's deep pockets, support capabilities and the ability to call high within the organization, Cisco is capable of being a potent collaboration and content vendor.
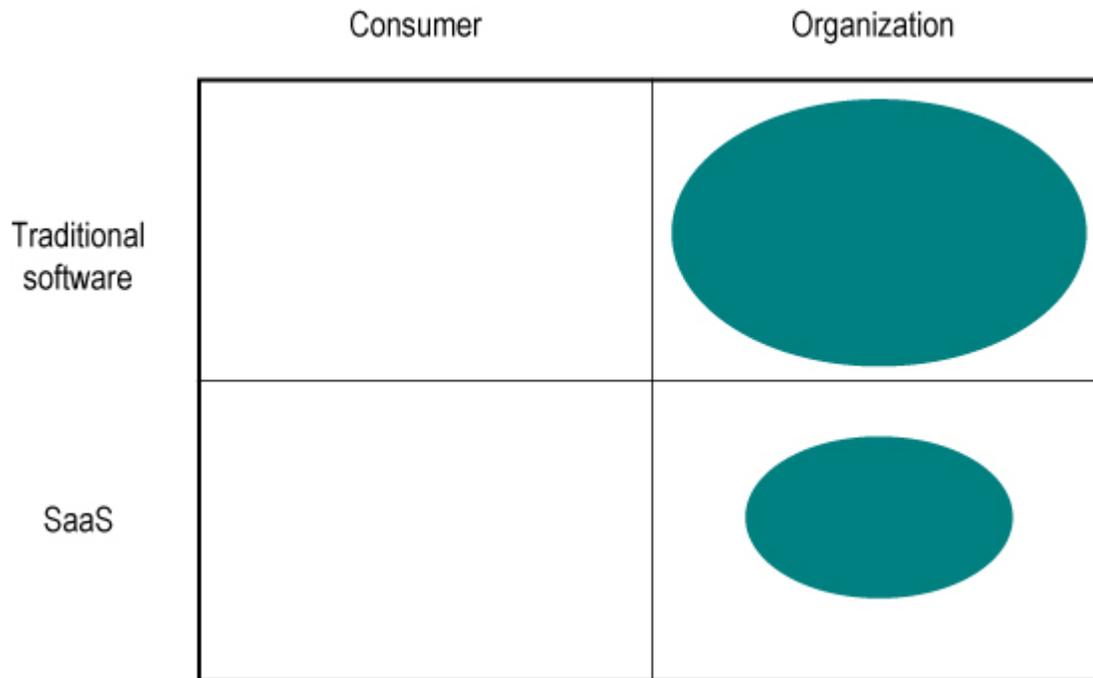
Figure 11: *Cisco/WebEx Market Focus*

Startups Look to Be Acquired

During the dotcom era, founders cashed out by doing an IPO—selling stock on the stock market for a company with hundreds of employees, a hundred loyal customers, and millions in revenue. Now, startups don't need to wait that long—companies acquire technology from startups that have less than 50 employees and a smattering of customers.

This is what JotSpot and Koral.com did, and the strategy worked just fine for their founders. At this point, small startups have little chance of competing in the market with large and deep-pocketed players such as Cisco, Google, Microsoft, Oracle, and Salesforce.com. However, they will find success in serving as incubators and acquisition fodder—inventing and demonstrating novel technologies and interfaces that larger players will eventually want and pay for. While the larger players will acquire most of the startups to gain incremental technology improvements, game changing acquisitions can still be made. For example, if Google, Oracle, or Salesforce.com acquired Zimbra and leveraged the technology and installed base intelligently, it would significantly boost the acquirer's offering.

Recommendations

The entrance of Google into the collaboration and content market disrupts the previously stable ecosystem of traditional software vendors. While some of the old rules may no longer apply—for example, that collaboration and content solutions can come only from traditional software vendors—not all of the old rules have been repealed. Companies must still buy solutions that make their workers more productive, and that don't expose the enterprise to unnecessary risks—all for a price that is not exorbitant. Before deciding whether the Google solution is appropriate for specific environments, companies need to:

• Reassess all collaboration and content options
• Use a SaaS-specific evaluation framework for evaluating fit
• Use a Google-specific evaluation framework for evaluating fit

- Go slow on making the decision and look at alternatives
- If you go forward, accept the new solution/vendor dynamics
- If you go forward, implement cautiously

Reassess All Collaboration and Content Options

This is a perfect time to reassess all collaboration and content options—as longtime solutions are becoming outmoded—for three reasons:

- Collaboration and content are becoming intertwined
- Selecting a collaboration and content solution is becoming an infrastructure decision
- There are many new products available

First, collaboration and content are becoming inexorably intertwined within products—certainly much more so than a decade ago, when the market thought of knowledge management and content management as two very distinct disciplines and products. One of the reasons that knowledge management failed as a category is that it artificially restricted the types and quantity of content employees could work with. Employees communicate and collaborate in the process of doing work; content is the currency of that communication and collaboration; and products are starting to reflect that reality.

Second, collaboration and content solutions are much more of an infrastructure play these days. Instead of being applications that are decoupled from their operating environment, they increasingly depend on infrastructure services, such as Microsoft Office SharePoint Server 2007 using Windows Workflow Foundation. Therefore, a collaboration and content solution decision is increasingly an infrastructure decision, and one with long-term ramifications.

Finally, there are many new solutions—and new versions of older solutions—available today. Software options include IBM Lotus Notes 8, Microsoft SP2007, Oracle WebCenter, and Zimbra Collaboration Suite. SaaS-based options include Cisco WebEx/WebOffice, GAPE, Microsoft Office Live, and Salesforce.com ContentExchange.

In short, a good collaboration and content decision made three years ago may be suboptimal at this point. While the availability of GAPE may have started the reassessment, it is incumbent upon enterprises to recognize it is not the only game in town.

Use a SaaS-Specific Evaluation Framework for Evaluating Fit

Because GAPE is SaaS-based, it's important to initially evaluate whether *any* SaaS solution would be appropriate for the enterprise. Questions to ask include:

- **Users:** Are all users online? If the majority are not, or if the important users are often offline, then a SaaS solution that does not elegantly handle offline use would be inappropriate.
- **Information lifecycle:** This includes questions such as, "What's the mix between online and offline work?" and "Is records management required?" As a group, current SaaS-based solutions typically give records management short shrift, often making it difficult to put a hold order on specific documents or to move copies in-house so they can be analyzed via an in-house electronic discovery package.
- **Security:** Is the enterprise willing to store corporate documents and schedules outside the firewall? This is a deal breaker for some businesses. Also, are the security practices of the SaaS provider (e.g., physical security, file encryption, employee background checks, and auditing capabilities) at least as strong as those of the enterprise itself?
- **System integration:** What applications will the SaaS solution need to work with? These can range from infrastructure (e.g., SSO systems and Lightweight Directory Access Protocol [LDAP] directories) to horizontal applications (e.g., e-mail server and document management) to vertical applications (e.g., enterprise resource planning [ERP] or CRM).

- **Cost:** Will there be required infrastructure costs? For example, will the enterprise need to purchase PCs for some workers or reimburse workers for at-home broadband use?

Use a Google-Specific Evaluation Framework for Evaluating Fit

If the enterprise is amenable to using a SaaS-based solution, then the next step is to decide whether GAPE is appropriate for the business problem. Questions to ask include:

- **Users:** What is the ratio of basic to power users? If the users are overwhelmingly basic users, then using GAPE does not present a problem. However, if power users want to use the service as well within the same workflow, then the collaboration will become disjointed due to the need to import/export online documents.
- **Content:** What content types do employees collaborate on? Google Apps is appropriate for content such as calendars, documents, and spreadsheets. However, since Google Apps cannot store files in binary format online, it's an inappropriate solution for items such as pictures or Visio diagrams. Also, what's the ratio of draft to final content? Google Apps is targeted at collaboration to create current content (due to its flat organization and user-defined tagging), rather than storing thousands of final versions in .PDF format within an official corporate taxonomy.
- **Information lifecycle:** Will there be extensive importing and exporting of documents, due to working with a lot of power users or those outside of the system? If so, the power of the application diminishes considerably. How will users work if the system goes down and workers can't access their e-mail, calendar, or documents? What are the contingency plans, and are they acceptable to the business?
- **Security:** Is Google's current "flat" security model (i.e., assigning security rights on a user-by-user basis, rather than by role) appropriate?
- **Cost:** What third-party add-ons will be required, and will they meet the organization's requirements?
- **Trust:** Is the corporation willing to trust its content to Google? This can be a major hurdle for some enterprises. A number of enterprises have told Burton Group that they are nervous about Google's text analysis capabilities being applied to their private content. The reasoning is that Google characterizes text all the time in its search business, and that if Google continues to do so in its applications business, it may gain an unfair advantage when selling to its customers by peeking at confidential customer memos. For example, Google—or any other SaaS vendor storing customer documents, for that matter—could secretly read memos to glean the names of competitors it's going against and figure out the enterprise's spending thresholds. While Google says it will not, not being able to verify Google's procedures with their own eyes makes some companies nervous.

Go Slow on Making the Decision and Look at Alternatives

This entire market sector is a work in process—there will be many more features available nine months from now. As of May 2007, Google is on record saying it will deliver e-mail groups, role support, and presentation application capabilities in the future. At the same time, competing solutions—Cisco's WebEx/WebOffice, Microsoft's Office Live, Salesforce.com's ContentExchange, and Zimbra's Collaboration Suite—will all rapidly evolve as well.

Furthermore, the competing solutions are both strong and have specific strengths: Google is not the only game in town. Microsoft is in the early stages of its SaaS-based solution, and promises to fight long and hard for market share. ContentExchange's sophisticated interface shows off the developers' longtime work in the content management market (Documentum and Alfresco). Zimbra's solution is especially context-aware and works in a variety of environments, and as such is another take on the problem. Put simply, enterprises will be doing themselves a disservice if they do not investigate the alternatives.

Therefore, while there is business value in implementing a collaboration and content solution sooner rather than later, there is also value in not being too quick about it.

If You Go Forward, Accept the New Solution/Vendor Dynamics

Dealing with a commodity-oriented SaaS solution vendor that communicates with customers via a website can be a huge culture shock for software customers used to high-touch vendor staff. For example, a longtime IBM customer who has IBM employees working onsite alongside company employees will not receive the same level of service from Google.

Therefore, companies need to explicitly accept this new way of doing things—that it's difficult to get hold of a throat to choke, that communication is at arms length—if they're to be successful with the new solution. This will be less of a shock to companies that are already using other SaaS-based solutions, such as Salesforce.com for CRM or WebSideStory for WCM and web analytics.

If You Go Forward, Implement Cautiously

Compared to traditional software products, SaaS-based solutions have a low entrance cost (no upfront license fees or hardware purchases). If a company decides to stop using a SaaS solution, it is out the fees paid, but not a huge upfront investment. Nevertheless, SaaS solutions can still be "sticky": Employees may have gotten used to them (even if they're suboptimal), and it may be difficult to transfer corporate data out to another system. Therefore, implement the solution cautiously to see if it really does meet the enterprise's needs. Things to watch include:

- How are employees adopting the solution? Are they encouraging others to use it or are they abandoning it after a month or two?
- What are the "gotchas" that arise in real world use? Are they crippling or are there workarounds?
- Does it lead to increased productivity? If so, what other processes could it be applied to?
- Is the quality of support acceptable? Historically, Google has done poorly at supporting impatient corporate users, as can be seen by reading its online support forums. Because so much support is offered online, companies can easily gauge whether the quality of support is improving or declining.

If, after an initial trial, the solution does not work, cancel it and try another collaboration and content solution. It's important not to give up. Burton Group believes the future of collaboration and content solutions, for most organizations, will include a blend of traditional software products and SaaS, so it's imperative to exploit the new opportunities represented by offerings such as GAPE.

The Details

This section discusses the characteristics of Google Apps Premier Edition (GAPE): that it's a software as a service (SaaS)-based solution, a member of the Google Apps family, and consists of a variety of products, application programming interfaces (APIs), and third-party applications. It also includes a short history of Google, as well as a description of some previous high-tech revolutions that offer hints on how Google Apps and SaaS-based solutions may evolve.

A SaaS Solution

GAPE is a software as a service (SaaS)-based solution—Google hosts the application and users access it through a web browser. Initially, this delivery model was known as application service provider (ASP); however, the term "software as a service" is more common today.

SaaS is different from software in that rather than purchasing a license, enterprises subscribe to the service on a pay-as-you-go basis. Chief financial officers (CFOs) especially like this feature because they can classify the fees as an operating expense, rather than as assets burning a hole in the balance sheet. However, while enterprises don't shoulder the burden of purchasing software licenses or buying server hardware, the SaaS solution is inclined to be more expensive than software over the long run. In many SaaS applications, the three-year subscription fee exceeds the one-time license cost of similar software.

Because there is no software to install, SaaS solutions are usually adopted more quickly and by a wider user audience than comparable software solutions. The need to coordinate the installation of a specific version of software on a user's PC goes away, making SaaS solutions especially popular for applications used by various constituencies (e.g., employees, partners, and customers).

SaaS solutions also differ from software in that they're usually updated more frequently than software. When the SaaS provider wants to correct a bug or upgrade a feature, it does so, and the subscribers instantly see the change. Therefore, SaaS solutions are continuously improved and updated, rather than updated every nine to twelve months, as is typically the case with software.

A Member of the Google Apps Family

GAPE is the third member of the four-member Google Apps family. All four versions include Gmail (e-mail), Google Talk (instant messaging [IM] and presence), Google Calendar, Google Docs & Spreadsheets, Start Page (a portal homepage), Page Creator (webpage editor), and a Control Panel (for administering the solution). All four can be branded by adding an organization logo and altering the site colors. The differences are:

- **Google Apps Standard Edition:** Announced on August 28, 2006, Standard Edition targets families and small groups. It is free and includes ads.
- **Google Apps Education Edition:** Announced on October 10, 2006, Education Edition is now used by hundreds of colleges and universities. It is free and does not include ads. (In the future, Google may discriminate between students, administrators, and alumni, and charge for non-student usage.) It also includes some APIs and offers e-mail storage of up to 2 GB per user.
- **Google Apps Premier Edition (GAPE):** Announced on February 22, 2007, Premier Edition costs $50 per user per year. By default, it does not include ads, but businesses can turn them on if they desire. (Any profit earned from clickthroughs goes to Google, not the business.) It includes the APIs available within Education Edition and offers e-mail storage of up to 10 GB per user.
- **Google Apps Partner Edition:** Announced on May 18, 2007, Partner Edition allows Internet service providers (ISPs) and other service providers to offer Google Apps as a branded service. Pricing is negotiated on a case-by-case basis.

The Products Within GAPE

GAPE consists of the following products:[7]

• Control Panel
• Start Page
• Page Creator
• Gmail
• Google Talk
• Google Calendar
• Docs & Spreadsheets

Ancillary capabilities include:

• Google Apps APIs
• Help and Support
• Third-Party Applications

When creating a GAPE account, the creator user must either own a domain name or sign up for one via a Google partner. Once the creator signs up for an account, Google verifies domain ownership. Although Google warns that the process may take up to 48 hours, in Burton Group testing it typically finished in an hour or so.

Control Panel

The Control Panel (see Figure 12) is where Google Apps system administrators add, modify, and remove user accounts, manage domain settings (e.g., verify ownership of the domain and modify MX records to point to Google's mail servers), add or delete services (e.g., e-mail, calendar, and Blogger), create website webpages, and customize the look of the site (e.g., add the organization name and logo, and alter the color of the sign-in pages).
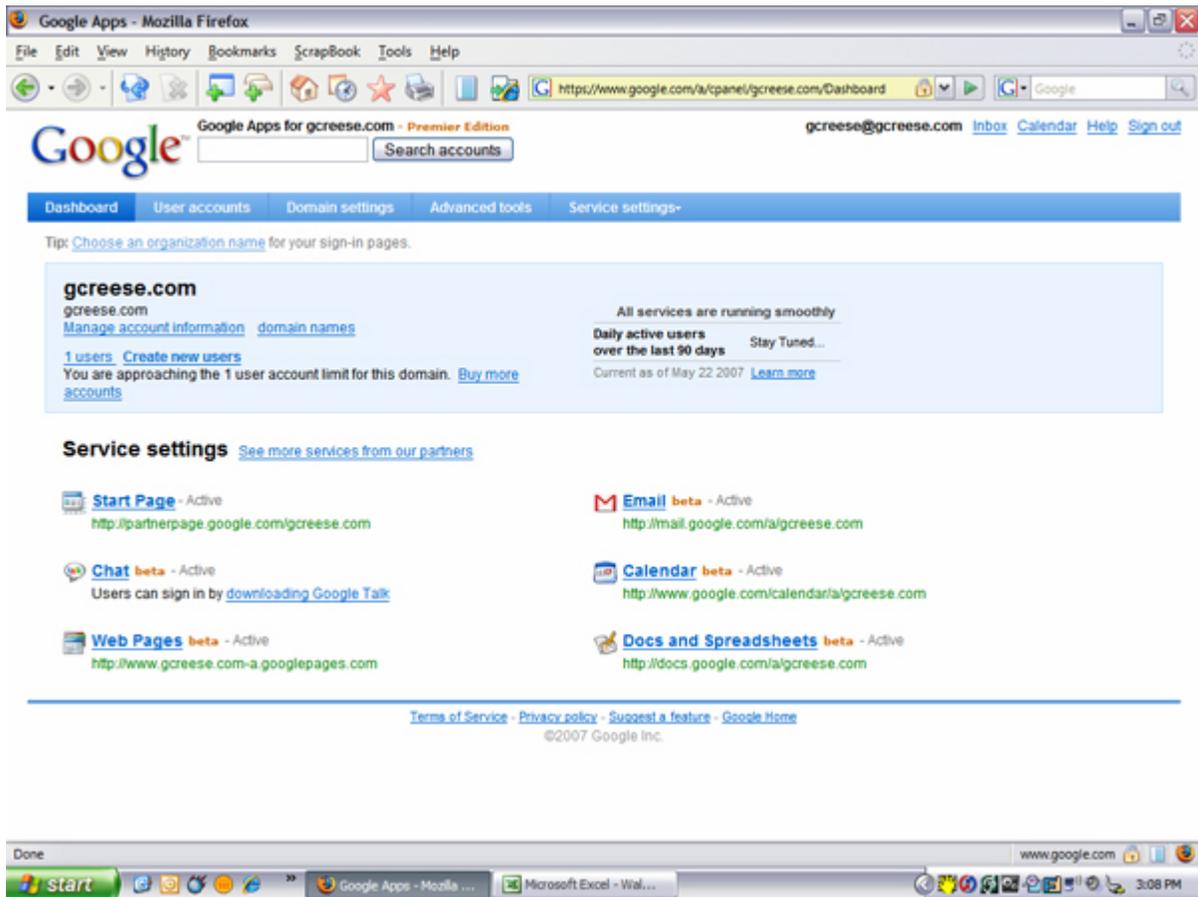
Figure 12: *GAPE Control Panel*

Start Page

Start Page (see Figure 13) is the Google Apps name for the portal page: The first page that users and visitors see when they go to the Uniform Resource Locator (URL) of the service. Administrators can control the site template—that is, they can customize the overall look and feel of the site—via the Control Panel. They can modify the page's color scheme, layout, and header information. They can also modify the page's default content, adding hardcoded text, Really Simple Syndication (RSS) feeds, and Personalized Homepage modules (mini-applications somewhat similar to Yahoo! Widgets or Microsoft Gadgets).

Within the constraints imposed by the administrator, users can customize their own Start Page to better match what information they want and the layout they prefer. However, there are only two levels of customization: At the site level and the personal level, there is no intervening departmental level of customization.
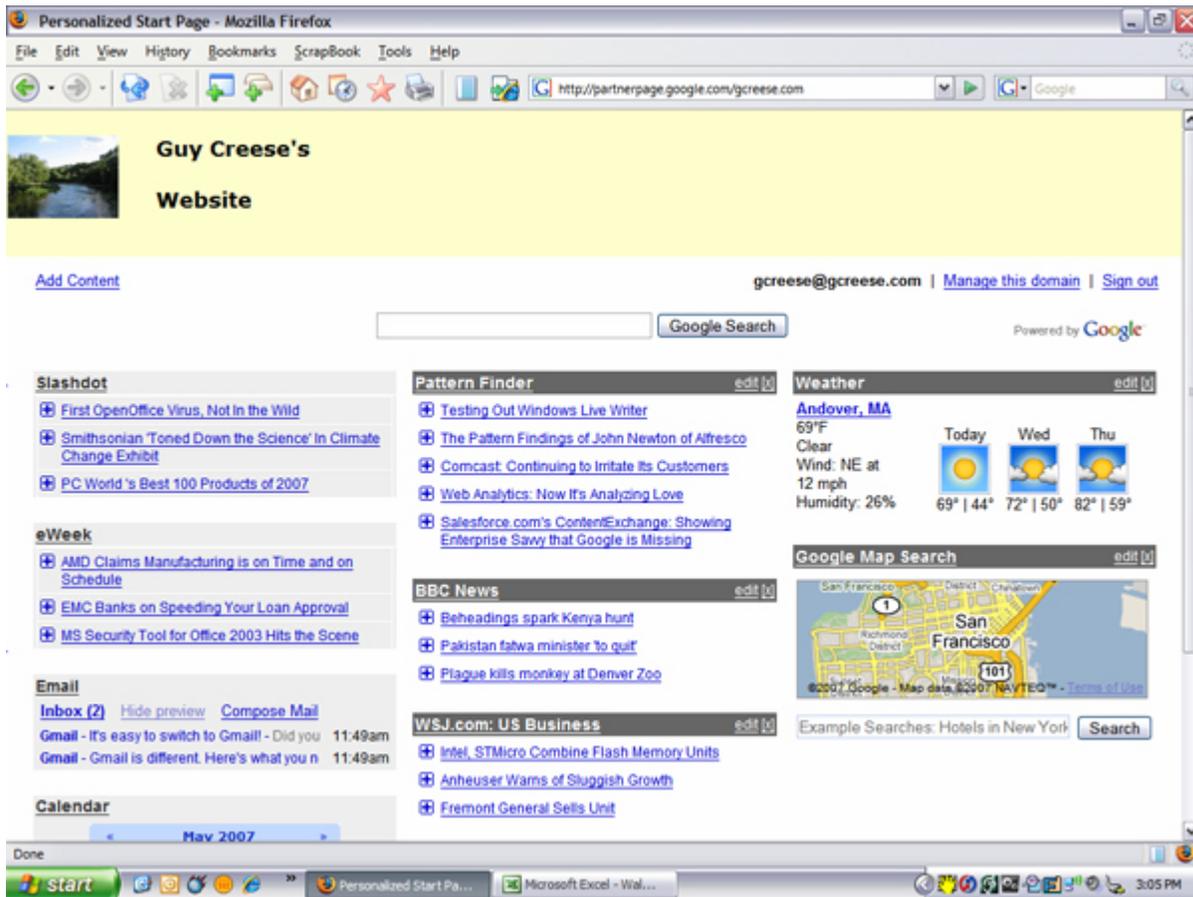
Figure 13: *GAPE Start Page*

Page Creator

Page Creator (see Figure 14) is an online tool for creating webpages within the site. It consists of two tools: Page Manager, which manages the list of pages on the site by letting users view available pages within a grid or list format; and Page Editor, which enables a user to edit an individual page by offering more than 40 color templates, four layout templates, and the ability to add links and images as well as format text and edit images. Page Creator automatically creates mobile versions of the webpages, so visitors accessing the site from a mobile phone or personal digital assistant (PDA) will see pages optimized for small screen real estate.

The look of Page Creator is spare; its functionality is spare as well. For example, Page Creator does not support a deep hierarchy of pages in the form of an inverted tree, with some pages at level two, children of those pages residing at level three, and the grandchildren residing at level four. Instead, the system supports only two levels: The homepage is at level one, and every other page on the site resides on level two. Furthermore, Page Editor does not support common headers and footers or webpage mechanisms such as JavaScript, Cascading Style Sheets (CSS), and uploading pages created offline via File Transfer Protocol (FTP). Though Page Creator's functionality is perfectly acceptable for a site focused on document creation and sharing, it does not support the level of site customization offered by software products such as Adobe Dreamweaver or Microsoft Expression Interactive Designer. Enterprises looking to create a highly customized look and feel for their Google Apps site will be disappointed.
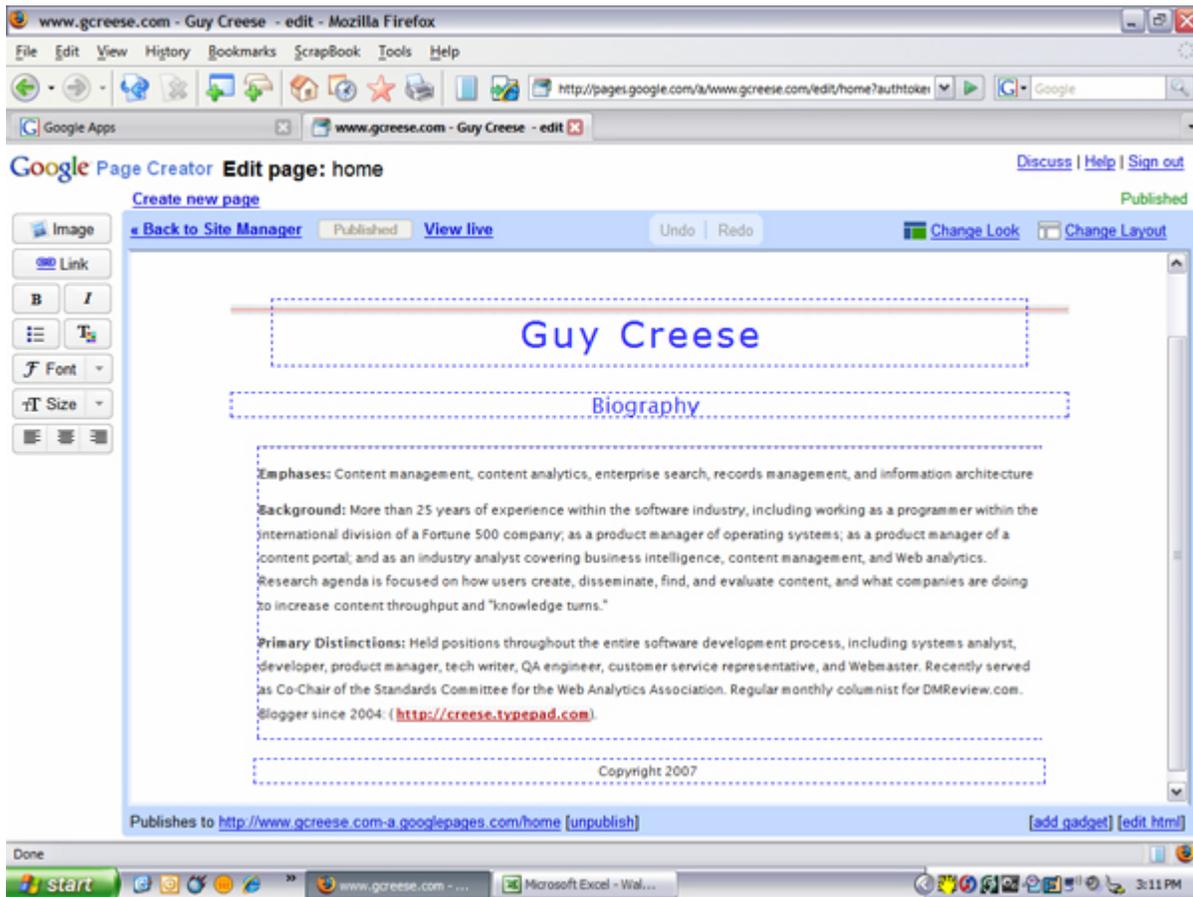
Figure 14: *GAPE Page Creator*

Gmail

Google Gmail enables users to send and organize e-mail, contacts, and chat (see Figure 15).

Within the e-mail interface, the service lists eight hardcoded folders: Inbox, Starred, Chats, Sent Mail, Drafts, All Mail, Spam, and Trash. Users cannot create new folders. When creating an e-mail, users can select fonts (Normal, Arial, Times New Roman, Courier New, Georgia, Trebuchet, and Verdana), as well as their size (small, normal, large, and huge) and characteristics (bold, italics, underline, color, and highlight). Users can also insert hyperlinks, numbered and bulleted lists, alter tabs, and select text justification (left, center, and right), as well as select a button to check their spelling.

The system supports distribution lists made up of user e-mail addresses, but limits the number of recipients per distribution list to 1,000.
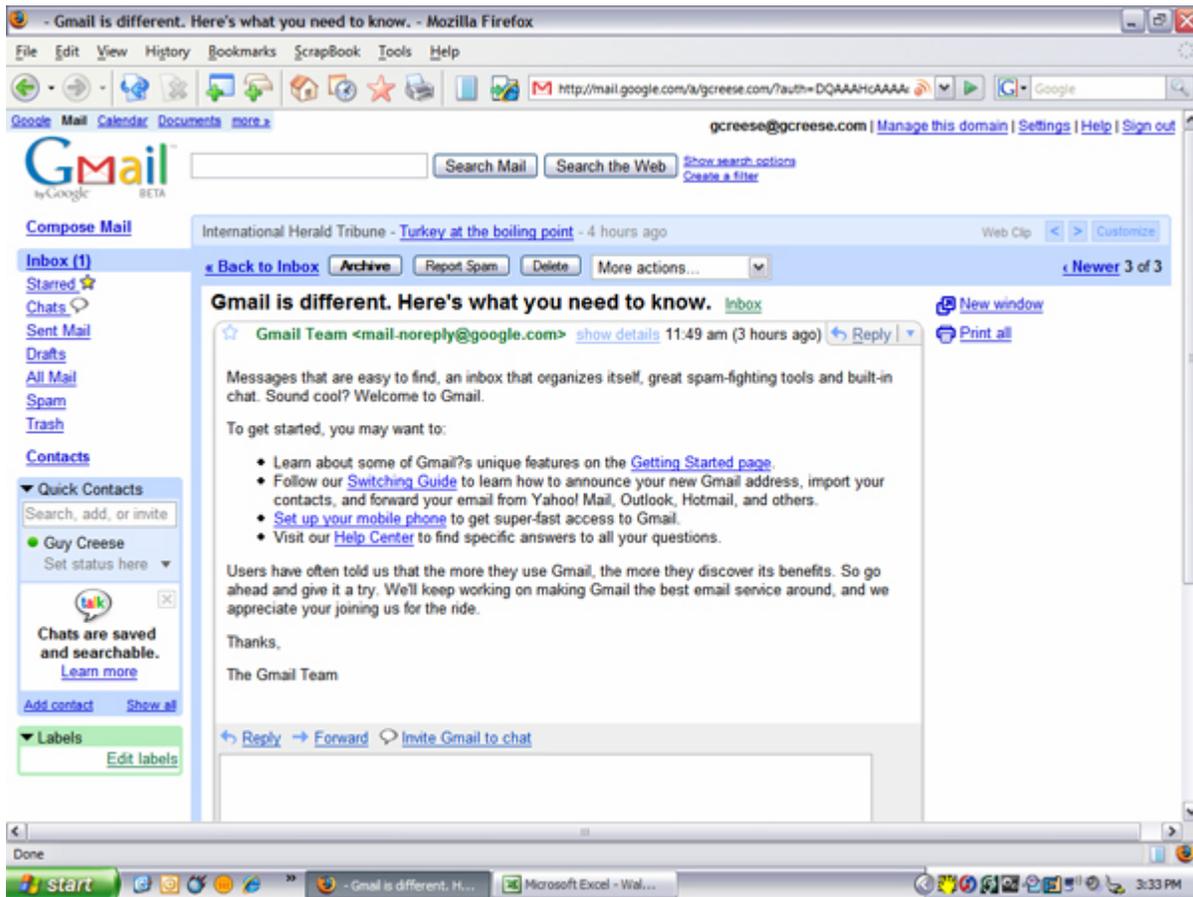
Figure 15: *GAPE Gmail*

By using distribution lists, employees can send e-mails to a large number of recipients concurrently, a capability needed when sending out a corporate newsletter, for example. However, Google enforces a restriction within the To: field of the web interface: Each e-mail account can send e-mails to only up to 500 unique recipients per day. (A distribution list counts as one recipient.) If a user attempts to send more, Google interprets that as attempting to send spam, and will temporarily suspend that account.

In June 2007, Google added support for migrating e-mail from an Internet Message Access Protocol (IMAP) server (e.g., Microsoft Exchange Server and Novell Groupwise) to Gmail. After migration, e-mail messages display the original sender, recipient, and date, and the old folder structure is translated to Gmail labels.

General e-mail settings that users have control over include language, page size (number of conversations per page), pictures, personal level indicators (whether to signify by arrows whether messages came from a mailing list or were sent only to the user), whether to use a predefined signature, whether to show only the message title or the title and a message snippet, whether to turn the vacation responder (called Out of Office Assistant in Microsoft Outlook) on or off, and outgoing message encoding (default text or 8-bit Unicode Transformation Format [UTF-8]). Other settings enable users to gather e-mail from other accounts via Post Office Protocol version 3 (POP3), forward a copy of each message to a different e-mail address, and configure the system to work with other e-mail clients such as Apple Mail, Eudora, Microsoft Outlook 2003 and earlier, Outlook Express, Thunderbird, and BlackBerry devices.

Chat settings include whether or not to keep chat history, how many contacts to show in Quick Contacts (0, 5, 10, 15, 20, 40), whether to let others see when the user is online, and whether or not to play a sound when a new chat message arrives.

Google Contacts, at a minimum, helps users track the names and primary e-mail addresses of people they work with. Additional contact information that users can add includes E-mail, IM, Phone, Mobile, Pager, Fax, Company, Title, Other, and Notes. The usefulness of this limited number of fields is expanded by grouping different instances of them under different "Sections"; for example, Gmail defaults to "Personal" and "Work," but users could add others, such as "College." In this example, a user could track three different phone numbers for a contact (personal, work, and college).

Users can import contacts from other systems, but they must use a comma-delimited file (comma-separated values [CSV]) to do so. Furthermore, there is a limit of 3,000 contacts per CSV file.

Google Talk

Google Talk is Google's IM service. Workers can use either the Google Talk Client (a Windows download) or the Google Talk Gadget (no download, but requires Adobe Flash Player 8.0 or greater) to send text messages to others. Google Talk users can also make voice calls over the Internet (Voice over Internet Protocol [VoIP]) as long as they have a microphone, a speaker (or a headset combining the two functions), and an Internet connection.

Based on the Extensible Messaging and Presence Protocol (XMPP; sometimes referred to as the Jabber protocol) Google Talk works with other XMPP-based IM systems using the same protocol underpinnings. The client can also interoperate with other multi-headed IM clients that support XMPP, including Adium, iChat, Kopete, Miranda IM, Pidgin, Psi, and Trillian Pro, as documented at http://www.google.com/talk/otherclients.html. Google Talk does not directly work with IM clients such as AOL Instant Messenger (AIM), AIM Pro, I Seek You (ICQ), MSN, or Windows Messenger, but could via an IM and presence gateway. For example, Google Talk can interoperate with Lotus Sametime 7.5 if the Lotus Sametime Gateway is properly configured to the Google network.

Google Calendar

Google Calendar is a calendar application with an uncluttered interface (see Figure 16).
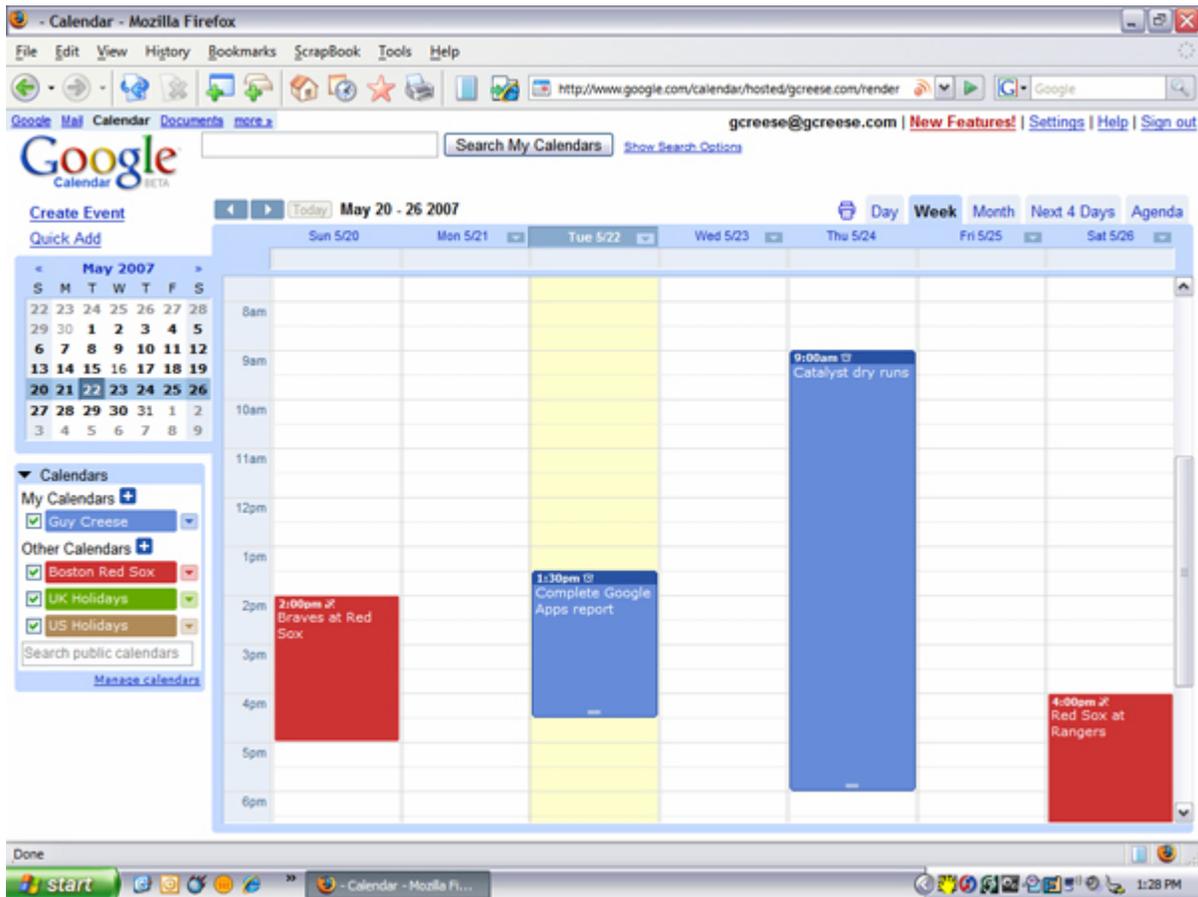
Figure 16: *GAPE Calendar*

Users can view their calendar by:

• **Day:** Time intervals (hour, half hour) are rows down the screen
• **Next [user-defined number] Days:** Each day is a column
• **Week:** Each day is a column
• **Month:** Grid view, with days as columns and weeks as rows
• **Agenda:** A list view of events

Users can use the search function within the Calendar application, as well as access help capabilities. Help features include topics categorized under "Getting Started," "Features," "Calendar Publisher," and "Troubleshooting." Users can search the help text, see a list of the top five most popular questions, and participate in the Google Calendar Help group.

Calendar settings that users have control over include language, country, time zone, date format, time format, start day of the week, custom view (e.g., next two, three, or seven days), Celsius or Fahrenheit (for displaying weather information), whether to show declined events, and whether to automatically add invitations to the calendar.

Users can copy events from another calendar (e.g., Apple iCal, Microsoft Outlook, and Yahoo! Calendar) by exporting the other calendar to a file and then importing that file into Google Calendar. Users can also view a Google Calendar in read-only mode via any application that supports iCal or Extensible Markup Language (XML) files, such as Google Reader or Apple iCal.

Docs and Spreadsheets

Docs & Spreadsheets, not surprisingly, is an application that creates and manages documents (see Figure 17) and spreadsheets (see Figure 18).
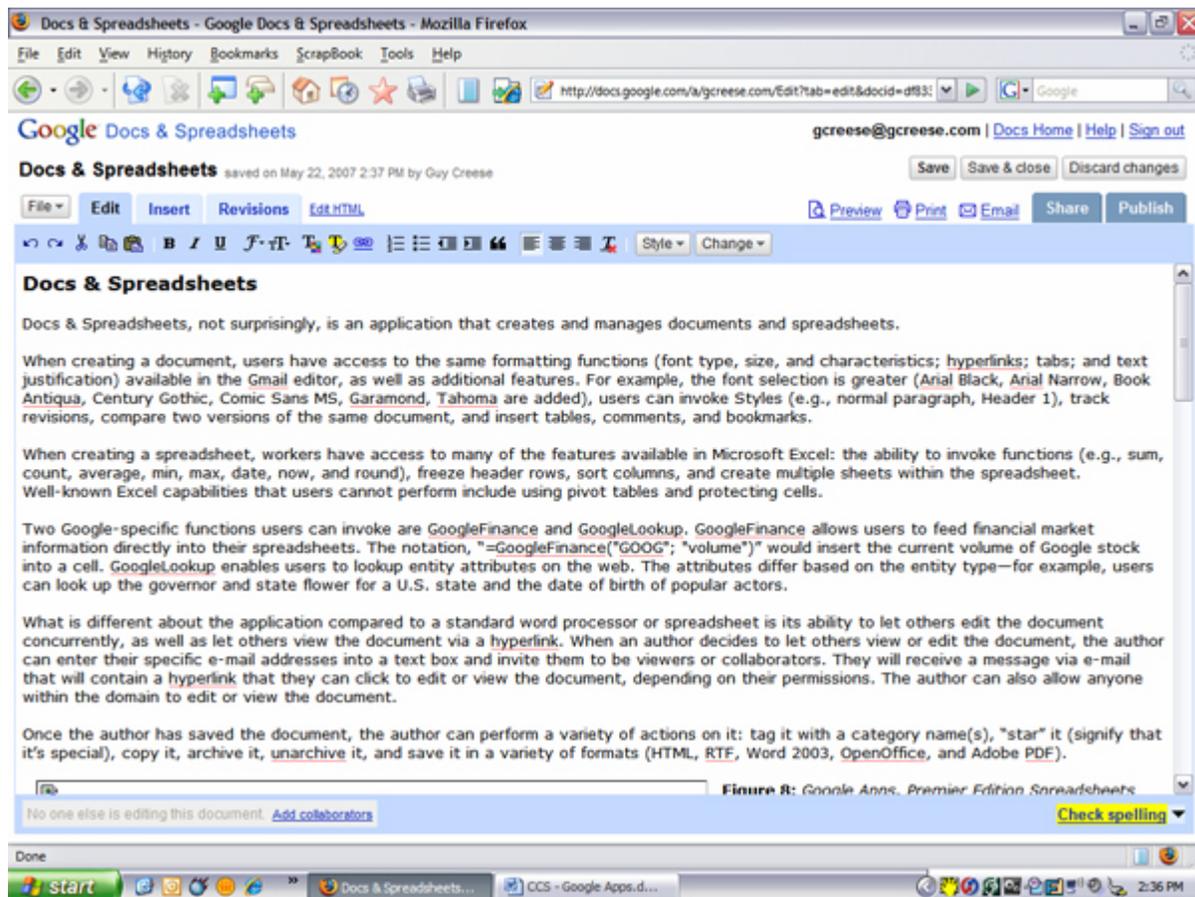
Figure 17: *GAPE Documents*

When creating a document, users have access to the same formatting functions (font type, size, and characteristics; hyperlinks; tabs; and text justification) available in the Gmail editor, as well as additional features. For example, the font selection is greater (Arial Black, Arial Narrow, Book Antiqua, Century Gothic, Comic Sans MS, Garamond, and Tahoma are added), users can invoke Styles (e.g., normal paragraph and Header 1), track revisions, compare two versions of the same document, and insert tables, comments, and bookmarks. Users can also import content smaller than 500 K from the following formats: Hypertext Markup Language (HTML), .TXT, .DOC (Microsoft Word), .RTF, and .ODT (OpenOffice).
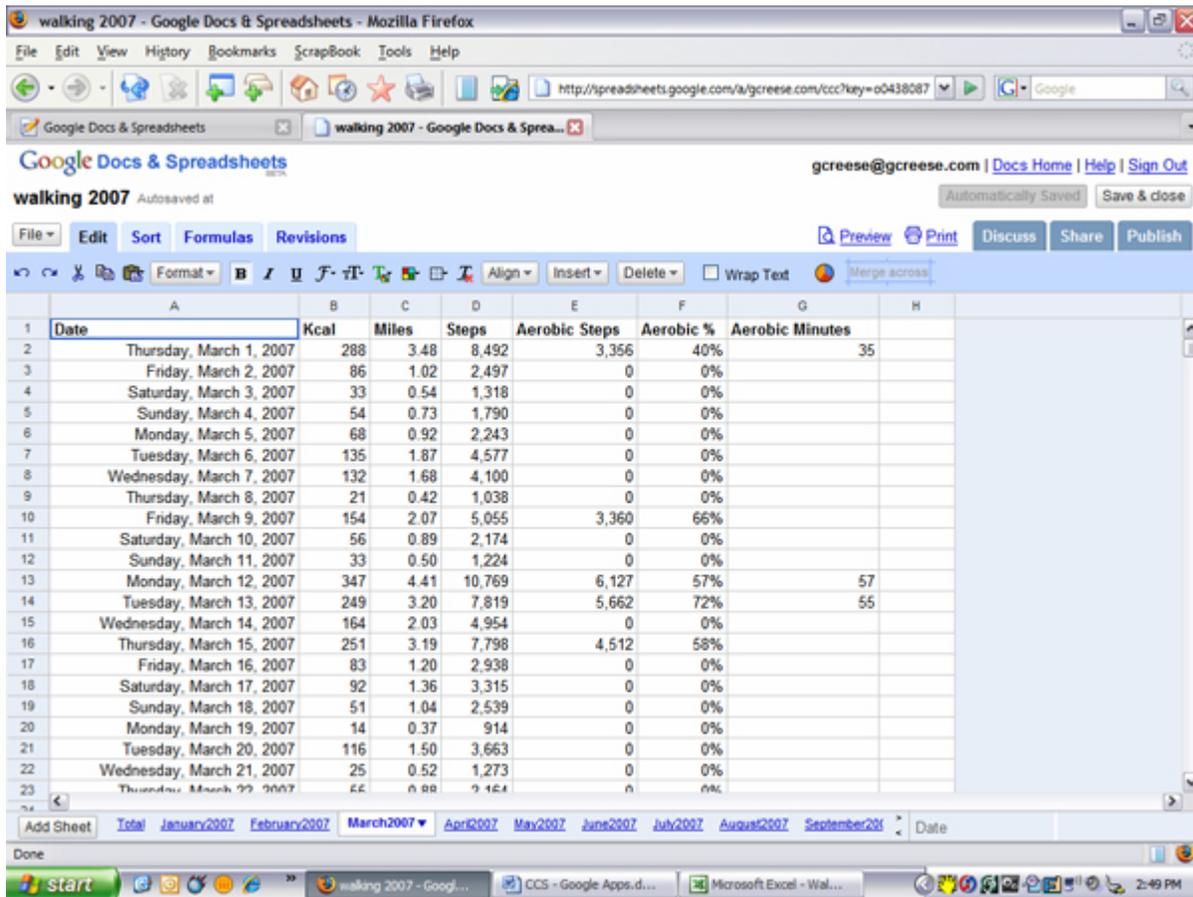
Figure 18: *GAPE Spreadsheets*

When creating a spreadsheet, workers have access to many of the features available in Microsoft Excel: the ability to invoke functions (e.g., sum, count, average, min, max, date, now, and round), freeze header rows, sort columns, and create multiple sheets within the spreadsheet. Rather than creating a spreadsheet from scratch, users can import a spreadsheet from the following file formats: .XLS, .ODS, and .CSV. Well-known Excel capabilities that users cannot perform include using pivot tables and protecting cells.

Two Google-specific functions users can invoke are Google Finance and GoogleLookup. Google Finance allows users to feed financial market information directly into their spreadsheets. The notation, "=GoogleFinance("GOOG"; "volume")" would insert the current volume of Google stock into a cell. GoogleLookup enables users to lookup entity attributes on the Web. The attributes differ based on the entity type; for example, users can look up the governor and state flower for a U.S. state and the date of birth of popular actors.

What is different about the application compared to a standard word processor or spreadsheet is its ability to let others edit the document concurrently, as well as let others view the document via a hyperlink. When an author decides to let others view or edit the document, the author can enter their specific e-mail addresses into a text box and invite them to be viewers or collaborators. They will receive a message via e-mail that will contain a hyperlink that they can click to edit or view the document, depending on their permissions. The author can also allow anyone within the domain to edit or view the document.

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Once the author has saved the document, the author can perform a variety of actions on it: tag it with a category name(s), "star" it (signify that it's special), copy it, archive it, unarchive it, and save it in a variety of formats (HTML, Rich Text Format [RTF], Word 2003, OpenOffice, and Adobe Portable Document Format [PDF]).

Google Apps APIs

Developers can programmatically interact with the GAPE service via Google Apps APIs. These APIs help developers write programs that administer the system (e.g., create user accounts), copy data (e.g., make local copies of online spreadsheets), and add service functionality (e.g., code a Google Gadget that can inhabit the Start Page).

Some of the APIs—the Provisioning API, the Calendar Data API, and the Spreadsheets Data API—are a class of API that Google calls a Google Data API, or GData API. GData is based on the Atom 1.0 and RSS 2.0 syndication formats, as well as the Atom Publishing Protocol. Because Atom and RSS do not handle queries—they're designed for the one-way exporting of data—GData uses an Atom extension mechanism to make the communication with an external application two-way. When acquiring information from a Google service via GData, a third-party application sends a Hypertext Transfer Protocol (HTTP) GET request, and the service returns the results in an Atom or RSS feed. When updating information via GData, the third-party application sends an HTTP PUT request. As such, GData is an example of the Representational State Transfer (REST) style of software architecture.

The Google Apps APIs that work with GAPE are a small subset of the rich universe of Google APIs. An overview of the different Google API types is available at http://code.google.com/apis/.

Provisioning API

The Provisioning API allows developers to create, retrieve, and delete user accounts, nicknames, and e-mail lists. Developers can also update user accounts (e.g., update a user's name). If they want to update nicknames or e-mail lists, they must delete the current entry and replace it with an updated entry. Google documents the format of the API calls in the "Google Apps Provisioning API V2.0 Reference."

Single Sign-On (SSO) Service for Google Apps

Google Apps uses Security Assertion Markup Language (SAML), an XML standard for exchanging user authentication and authorization data, to let an online identity provider authenticate users of the Google Apps service. Use of a SSO service is not required when using Google Apps, but it does simplify the process for enterprise workers who log on to multiple online services during their workday and want to logon only once. To use SSO with Google Apps, an enterprise must provide the URL of its SSO service to Google, as well as a public key that Google will use in its interactions with the SSO service. Google points to a list of SSO services that are SAML 2.0 compliant, and hence work with Google Apps.

Developers looking to implement SSO for Google Apps need to read and understand the sample SAML code provided by Google, install it, modify the login method to call the enterprise's code for authenticating a user, and test the resulting application in the Google-supplied psosamldemo.net domain. The company also needs to generate an RSA (Rivest, Shamir, & Adleman) or Digital Signature Algorithm (DSA) key, upload the key to Google Apps using the Admin Console, and enter the URL of the SSO service that the enterprise is using. After updating the application so that it goes against the enterprise's domain (rather than psosamldemo.net) and SSO provider, the enterprise completes the process by testing the application again. Google describes the process at SAML Single Sign-On (SSO) Service for Google Apps.

E-Mail Gateway Interface

Google's e-mail gateway enables enterprises to route e-mail through their own network. By doing so, companies can archive, filter, and monitor e-mail messages. This routing capability also enables migration to Google Apps over time, as companies can deliver e-mail to both Gmail and the original mail system for a specific period, and then eventually wean employees off the original mail system over time. Administrators enable this feature via a Services setting with the Control Panel.

Calendar Data API

The Calendar Data API enables developers to programmatically view and update calendar events. Example tasks include getting a list of a user's calendars, creating a single-occurrence event, and creating a recurring event. When the programmer requests calendar information, the API returns it in the form of a feed. Developers can select what to include in the feed by setting visibility values (e.g., public or private) and projection values (e.g., full, free-busy, or basic), and gain a full list of events or information about a single event. Developers can use these capabilities in various ways, such as adding different events to user calendars based on their interests, and counting how many meetings each employee attended each week. Google documents the API's syntax and behavior in the "Google Calendar Data API Overview."

Spreadsheets Data API

Programmers can use the Google Spreadsheets Data API to retrieve, edit, and delete existing spreadsheet data. Example tasks include getting a list of a user's spreadsheets, getting a list of worksheets within a specific spreadsheet, retrieving the rows within a worksheet, and adding a row to the end of a spreadsheet. Developers can use these capabilities to make a local copy of every spreadsheet put up, thereby creating a basic records management capability. Google describes the details of the API in the "Google Spreadsheets Data API Overview."

Gadgets API

A Google Gadget is a mini-application that runs on a webpage or within Google Desktop, such as a map showing weather or traffic patterns within a metropolitan area. A programmer creates a gadget by putting an XML file wrapper around a web application. Google describes the process in the "Google Gadgets API Developer Guide."

An administrator can add the newly created Google Gadget—or a preexisting Gadget—to the Google Apps Start Page by referencing the gadget's URL.

Help and Support

Google offers a variety of support capabilities, including an online help center for administrators, an online help center for users, a moderated user-to-user discussion group, and support via e-mail.

Live telephone support is available for administrators only from Monday to Friday, from 1:00 A.M. to 6:00 P.M. Pacific Time. Outside of those hours, the designated administrator must leave a voicemail, which Google will turnaround in less than an hour if it's deemed to be a "Priority 1" problem; otherwise, Google will reply on the next business day.

While there are several third-party books on the Google APIs, they're inclined to concentrate on non-Google Apps services, such as Google AdSense, Google Maps, and the Google search engine. Unlike Microsoft developers, who can draw from an extensive library of hundreds of third-party books, Google developers are restricted to discussion groups and Google-supplied documentation.

Third-Party Applications

Third parties offer add-on applications and planning and implementation assistance for Google Apps. Initial applications include:

- CompanionLink**:** Calendar migration and synchronization utilities
- **Etelos CRM for Google Apps:** A customer relationship management (CRM) add-on for Google Apps
- Postini Compliance Services for Google Apps**:** An online archiving solution for Gmail
- Sxip Access for Google**:** An online SSO service

Implementation partners include Appirio, Avaya, DecisionOne, Definition 6, LimitNone, LTech Consulting, Microcost, Milagro, and SADA Systems.

Google lists its Google Apps partners at http://www.google.com/enterprise/gep/directory_apps.html.

Google Corporate Background

Google has been an amazing success story. Founded by two graduate students less than a decade ago, the Google brand is now the highest ranked brand in the world. Google's rapid growth and contrarian views (to quote from the company's S-1 filing, "Google is not a conventional company. We do not intend to become one.") give Google's products and workings a unique flavor. Some companies find it refreshing; others find it infuriating.

The Company

Flush with an investment of $100,000 from Andy Bechtolsheim, a founder of Sun Microsystems, Larry Page and Sergey Brin incorporated Google on September 7, 1998. Stanford University graduate students in computer science, the two had collaborated on a project called BackRub, which crawled the Web to discover which sites linked to a specific webpage. This project gave birth to the PageRank algorithm, which deduced the relative importance of a page based on the quality of pages linking to it, an idea derived from academic citation analysis.

It quickly became clear that prioritizing the importance of a page would be useful in ranking search results, so Google became a search company. Initially averse to mixing search with advertising, Google eventually introduced AdWords in 2000 to compete with Overture's paid search model. The income from letting companies bid for ads that appeared when users typed in specific keywords became Google's economic engine. In 2002, Google's year-over-year revenues grew 409%; in 2003, 234%. Revenue numbers after Google's initial public offering (IPO) in August 2004 continued to climb: from $3.2 billion in 2004 to $6.1 billion in 2005, then to $10.6 billion in 2006.[8]

Near the end of 1999, Google had 39 employees[9]; less than seven years later, as of June 30, 2006, Google had 7,942 employees[10]; by the end of 2006, it had approximately 10,000 employees.[11]

Enterprise Applications Division

The enterprise applications division at Google is small, compared to the rest of the company. The revenue it brings in is listed as "licensing & other revenues" on Google's income statement, which is 1% of Google's 2006 revenue. At the end of 2006, it had 300 employees, making it 3% of Google's 10,000 person workforce. However, it is expecting to approximately double in size in 2007, hiring five people a week (compared to the company at large hiring 100 people a week).[12]

The enterprise applications division is responsible for Google's enterprise focused offerings. SaaS-delivered solutions include Gmail, Google Talk, Google Calendar, Start Page, Google Docs & Spreadsheets, Page Creator, and the affiliated APIs. The division also owns development of the Google Search Appliance, the Google Mini, and Google Desktop.

Previous High-Tech Revolutions

Since the Industrial Revolution, cultures have been absorbing new technologies with varying degrees of speed and success. The rate of technology absorption depends on several things: the power of the technology (whether it delivers new capabilities or capabilities that are faster/cheaper than current alternatives), the availability of the logistical and organizational infrastructure needed to deliver it, and public opinion (whether the technology and companies delivering it are seen as helpful or dangerous). Following are three technology adoption stories that serve as three different archetypes for how Google Apps and SaaS-based solutions may be adopted.

1880–1930: Electricity

Electricity was a parlor trick in late eighteenth century: People would gather in salons to watch demonstrations of static electricity making hair stand on end. It took decades to transform a parlor trick into the basic infrastructure that we're familiar with today.

Thomas Edison invented the first long-lasting incandescent lamp in 1880 and electricity quickly caught the public's imagination within the next several years. Merchants quickly embraced electric lights because, unlike gas lights, they didn't give off smoke and fumes that harmed fabrics and fogged store windows. Families liked the powerful, steady light provided by electric lamps because it made it easier to read and work at night.

However, enthusiasm for the technology was hampered by cultural indecision on how to deliver it, with all the attendant inefficiencies. Some households and factories used direct current (DC), while others used alternating current (AC). Two early pioneers in electricity exacerbated this market split: Thomas Edison was behind DC current while George Westinghouse promoted AC current. Large utility companies were nonexistent. Rich homeowners had their own generators, some cities set up electric companies, while in other cases entrepreneurs did the work. Furthermore, the conversion to electricity was often incremental. Many factories set up their own generators, supplanting the water power and steam engines they'd used in the past but keeping in place the system of gears and shafts that delivered power to the machinery on the shop floor.

By 1910, this era of logistical experimentation began to wane. AC, which was easier to transmit over long distances, eventually won out over DC. Holding companies, such as Samuel Insull's Commonwealth Edison, began to buy up smaller utilities and treat electricity as a commodity, delivering it to factories and households. The key to this change was the electric utilities' invention of the "load curve," which showed the peaks and valleys of power consumption. Because electricity couldn't be stored, the utilities couldn't use inventory to buffer themselves from swings in electricity consumption. Instead, they smoothed out consumption by supplying electricity to users with different consumption patterns (e.g., households and factories in varied locations) and by offering incentives such as lower prices at off-peak hours.[13]

With the necessary generation and consumption metrics in place, utility companies began to excel at delivering electricity at a lower cost than individual households and factories could attain, and electricity consumption rose accordingly. In 1905, less than 10% of U.S. industrial power was electric; by 1930, it was 80% electric. 10% of U.S. households were electrified in 1910; by 1930, 70% were.[14]

Today's service oriented architectures (SOAs) and SaaS solutions offer a similar migration path, away from on-premise, do-it-yourself solutions toward infrastructure-oriented, component-based services. For companies such as Google, the lesson is to concentrate on economies of scale and being able to serve a variety of users (e.g., consumers and enterprises).

1983–1995: LANs

The invention of the PC in the mid-1970's was a boon to businesspeople looking to be liberated from the tyranny of information technology (IT). In those days, IT departments using mainframes and minicomputers owned the corporation's computing power. Departments wanting a new system or for some reports to be modified went begging to the IT department, often only to be told, "We'll get to it—if we're lucky—in six months." The ability to total up a row of numbers in VisiCalc without getting programmers involved was liberating to many CFOs and business managers. However, as departments bought more PCs for their employees, those employees increasingly needed to share documents, printers, and expensive disk drives, to both keep costs down and to increase productivity.

Companies such as Banyan Systems and Novell invented network operating systems (NOSs) that connected PCs and peripherals via local area networks (LANs) for just that purpose. For example, LANs connected a group of PCs together so that two employees 80 feet away could print to the same high-speed laser printer, rather than each use a daisy wheel printer connected to their own PC. In the early days of LANs—the mid-1980's—business users loved the freedom of LANs while IT groups hated them. IT viewed LANs as a synonym for chaos. Early LANs went up and down like yo-yos, and security was minimal. Furthermore, LANs from different vendors used different network protocols, network interface cards (NICs), and cabling, making it difficult for different departments to communicate and share resources. At the time, mainframes and minicomputers offered a much more coherent, robust, and secure computing environment than LANs. To many IT professionals, the rudimentary capabilities of LANs looked like a step backward rather than a step forward.

However, over time, the upstart LAN technology matured and filled in the missing features. Furthermore, IT ultimately wrested the control of LANs away from the business units. What had been a maverick form of computing became the norm over the course of twenty years. At this point, LAN capabilities are no longer NOS-supplied, but rather included in PC operating systems.

Once again, SaaS-based services offer the promise of freeing businesspeople from the tyranny of IT. After moving from mainframes, to minicomputers, to LANS (all of which internal IT groups eventually took over) businesses are now moving to escape IT control again—by giving the business to an outside agent.

1994–1998: Netscape

Netscape Communications was founded in April 1994 by Jim Clark, the founder of Silicon Graphics, and Marc Andreessen, who had helped develop the Mosaic browser while a student at the National Center for Supercomputing Applications (NCSA) at the University of Illinois. Their goal was to capitalize on the Web and the larger networked world, where easy access to information no matter where it resided would help users perform research, buy products, and create far-flung communities.

Netscape's first product was a browser, Netscape Navigator, released to beta on October 13, 1994, and commercially released on December 15, 1994. Within two months, Netscape had captured more than 60% of the fractured browser market and by early 1996 almost 90% of it. Netscape fought against and triumphed over its software competitors in two ways. First, it developed software quickly and allowed customers to download it over the Internet, thereby avoiding the delay and cost of distributing shrink-wrapped product through distributors. Second, partly because it was able to avoid the Mosaic browser licensing fees that its competitors had to pay ($100,000 up front, and then $5 a copy), Netscape offered its products at a lot cost, a pricing strategy it called, "free, but not free." The Netscape browser was free for students and educational institutions, available for free on a 90-day trial basis for everyone else, and then $49 a copy once the trial period was over.

Netscape's rapid distribution capabilities and low prices for a product that few competitors were delivering captivated the market. Netscape had $80 million in revenue in its first full year; by 1996, it had reached a valuation of $7 billion. However, flush with early success, the company began to lose its way. Rather than being satisfied with filling a market vacuum, Netscape started going after areas of the market that IBM and Microsoft owned—e-mail and groupware—with its Messaging, Calendar, and Collabra Servers. Furthermore, Netscape began to make a point of claiming that Microsoft's products were outdated and irrelevant. For example, Marc Andreessen said Microsoft's operating system would soon become "a mundane collection of not entirely debugged device drivers." Customers, partners, and even employees noted that they often viewed Netscape as arrogant.

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While initially slow to respond to the new competitive threat, Microsoft eventually came back with a vengeance. Bill Gates issued an internal memo within Microsoft in May 1995, noting, "The Internet is a tidal wave. It changes the rules. It is an incredible opportunity as well as [an] incredible challenge."[15] On December 7, 1995, Microsoft hosted an "Internet day" for the press, announcing it would "embrace and extend" the Internet, integrating Transmission Control Protocol/Internet Protocol (TCP/IP) and an Internet browser into Microsoft Windows in a deep way. Netscape's valuation fell by 28% over the next five days.

In its slow and calculating way, Microsoft did exactly what it said it was going to do over the next several years. It stole customers (e.g., Chevron and KPMG) and partners (e.g., Apple, Intuit, and MCI) from Netscape, doing so by transforming the Internet from geeky technology into the sort of thing that nontechnical baby boomers could use in their daily lives. On November 28, 1998, AOL announced it was buying Netscape Communications for $4.2 billion.[16]

At this point, Google may end up playing the Netscape part: highlighting the value of a new technology to the world but then falling prey to Microsoft, which is able to adopt and adapt the technology so it's less threatening to the mainstream.

References on the Google Website

It's not always easy to find the relevant page about a specific Google Apps topic, given the conversational nature of the Google Apps subsite. (For example, as of mid-July 2007, the page entitled, "Want simple, powerful communication and collaboration tools for your organization without the usual hassle and cost?" leads to "Google innovation. Powerful solutions. Low cost.," which leads to "Google Apps has what you need to power up your organization," and so on.) Therefore, following is a site map organized by topic.

Features

Descriptions of product features:

- **Data sheet:** http://www.google.com/a/help/intl/en/admins/pdf/18434_google_apps_premier_edition_ds_022007_ry.pdf
- **Administrator features:** http://www.google.com/a/help/intl/en/admins/admin_features.html
- **User features:** http://www.google.com/a/help/intl/en/users/user_features.html
- **Google Apps for Administrators:** http://www.google.com/support/a/

APIs

API documentation:

- **Google Apps APIs:** http://code.google.com/apis/apps/index.html
- **Google Data APIs (Beta) Developer's Guide:** http://code.google.com/apis/gdata/index.html
- **"Google Calendar Data API Overview":** http://code.google.com/apis/calendar/overview.html
- **"Google Spreadsheets Data API Overview":** http://code.google.com/apis/spreadsheets/overview.html
- **Google Talk for Developers:** http://code.google.com/apis/talk/talk_developers_home.html

Support

Support pages:

- **Support overview:** http://www.google.com/a/help/intl/en/admins/support.html
- **Online help for administrators:** http://www.google.com/support/a/?hl=en

- **Online help for users:** http://google.com/support/a/users/?hl=en
- **Google Apps Discussion group:** http://groups.google.com/group/hosted

Contractual Information

The service level agreement (SLA) and contract:

- **SLA:** http://www.google.com/a/help/intl/en/admins/sla.html
- **Contract:** http://www.google.com/a/help/intl/en/admins/premier_terms.html

Conclusion

Google has caught the attention of enterprises with its inexpensive Google Apps Premier Edition (GAPE) product: available at $50 per user per year. However, the seductive price can spell trouble for enterprise architects and their companies if they don't do their homework: the solution's rudimentary feature set means that enterprises need to pick carefully and implement slowly.

While Google's entrance is adding momentum to using software as a service (SaaS) for communication, collaboration, and content management, it's unclear at this point whether Google will be able to capitalize on the trends that it's accelerating.

Notes

[1] These four precepts are taken from public speeches made by Google employees. All four sayings were discussed by two different speakers speaking to large audiences on two separate occasions six weeks apart, so it's safe to assume that these precepts are official Google statements. (In addition, "fast is better than slow" is referenced on the Google corporate philosophy webpage.) The two occasions were:

- Michael Lock. "Google@Work." Boston, MA: Boston Marriott Long Wharf. 1 Mar 2007.
- David Berkowitz. "Google Enterprise SuperSession: Searching for a Better Way to Manage Content." Boston, MA: AIIM Expo. 18 Apr 2007.

[2] David Berkowitz. "Google Enterprise SuperSession: Searching for a Better Way to Manage Content." Boston, MA: AIIM Expo. 18 Apr 2007.

[3] "Google to Acquire Postini." *Google, Inc.* 9 Jul 2007. http://www.google.com/intl/en/press/pressrel/postini_20070709.html.

[4] "Financial Tables." *Google, Inc*. 2007. http://investor.google.com/fin_data.html.

[5] Miguel Helft. "Out of Chaos, Order. Or So Google Says." *The New York Times*. 11 May 2007. http://www.nytimes.com/2007/05/11/technology/11google.html?ex=1181534400&en=04dfad8879ca6307&ei=5070.

[6] "Google Apps Standard Edition Disclaimer." *Google, Inc*. 2007. http://www.google.com/a/help/intl/en/admins/premier_terms.html.

[7] "Google Apps Premier Edition." *Google, Inc*. 2007. http://www.google.com/a/help/intl/en/admins/pdf/18434_google_apps_premier_edition_ds_022007_ry.pdf.

[8] "Financial Tables." *Google*. http://investor.google.com/fin_data.html.

[9] John Battelle. *The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture*. New York, NY: Portfolio, 2005.

[10] "Quick Profile." *Google Inc*. http://www.google.com/corporate/facts.html.

[11] "Corporate Information/Google Management." *Google, Inc*. 2007. http://www.google.com/corporate/execs.html. Michael Lock. "Google@Work." Boston, MA: Boston Marriott Long Wharf. 1 Mar 2007.

[12] Michael Lock. "Google@Work." Boston, MA: Boston Marriott Long Wharf. 1 Mar 2007.

[13] Thomas P. Hughes. *American Genesis: A Century of Invention and Technological Enthusiasm, 1870–1970*. New York, NY: Viking, 1989. 229–238.

[14] David E. Nye. *Electrifying America: Social Meanings of a New Technology, 1880–1940*. Cambridge, MA: The MIT Press, 1990. 13, 16.

[15] Bill Gates. "The Internet Tidal Wave." 26 May 1995. http://www.usdoj.gov/atr/cases/exhibits/20.pdf.

[16] The "1994–1998: Netscape" section is drawn from chapters one through three of Michael A. Cusumano, David B. Yoffie. *Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft*. New York, NY: The Free Press, 1998.

Related Research and Recommended Reading

John Battelle. *The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture*. New York, NY: Portfolio, 2005.

Guy Creese. "Content Analytics: Assessing the Value of Corporate Content." *Burton Group*. 2 Oct 2006. http://www.burtongroup.com/Client/Research/Document.aspx?cid=965.

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Primary Distinctions: Held positions throughout the entire software development process, including systems analyst, developer, product manager, tech writer, QA engineer, customer service representative, and Webmaster. Recently served as Co-Chair of the Standards Committee for the Web Analytics Association. Regular monthly columnist for DMReview.com. Blogger since 2004: (http://creese.typepad.com).