

Has Gmail Become Gfail?

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Gmail is a highly popular free email service offered by Google. It is the third most popular email service (after Yahoo! and Hotmail) with about 100 million subscribers. Gmail launched in April, 2004, as an invitation-only beta release and became available to the general public in February, 2007.

Gmail's business model is advertising instead of user subscription fees. Gmail scans incoming email and posts textual advertising messages related to the email's content.

In January, 2009, Google added an experimental offline email feature that allows users to read and respond offline to email that they previously downloaded. Gmail will resynchronize when the user is once again online.

Gmail is a component of Google Apps, which is an ad-supported free suite of useful collaboration, messaging, and office productivity services. Google offers ad-free Apps Premier for a subscription price of \$50 per user account. Apps Premier carries a service-level agreement in which Google agrees to give its customers credits if it does not meet a monthly availability of 99.9% (72 minutes of downtime per month). This SLA does not apply to Gmail or Google Apps users who take the free service.

Google's Miserable Gmail Availability History

Some might say, "You get what you pay for." This certainly has not been the experience with Google in general, though Google declared the entire Internet as malware for an hour on January 31, 2009.¹ Google's search engine has by itself made the Worldwide Web immensely useful to all.

However, Google's Gmail has not lived up to this standard. Over the last eight months, Gmail has experienced six significant outages:

- July 16, 2008 – Users received a "502 server error" message when they tried to log in.
- August 6, 2008 – An outage locked out Gmail users and Google Apps customers for 15 hours.
- August 11, 2008 – A problem with Google's "contacts system" caused Gmail access to go offline for a "couple of hours." Individual accounts and Google Apps customers were again affected.
- August 15, 2008 – An outage once again locked out some users for a day, returning the 502 error message upon login.

¹ "Google Declares Itself to be Malware," *More Never Agains II, Availability Digest*, February, 2009.

- October 16, 2008 – Users went without Gmail access for thirty hours.
- February 24, 2009 – The topic of this article, a two and a half hour outage again affected almost all Gmail and Apps Premier customers.

Though Google claims an availability of its Gmail services of 99.9%, or three 9s availability, the above experience would indicate an availability of 99% or so over eight months, about ten times worse. The last time we saw a persistent two 9s availability was in the early days of transistorized computers.

Gmail's Latest Outage

Google's latest Gmail outage occurred on Tuesday, February 24. It started around 9:30 AM GMT, and lasted for two and a half hours until noontime GMT. Users trying to login to Gmail received the onerous "502 server error" message. For users in the U.K. and Europe, this was the worst time for an outage as it was the beginning of their work day. For users in North America, most were still in bed when the service went out and were saved the frustration of not being able to get onto email.

This was the first time that Gmail was down since Google had announced offline email support the previous month. Users who had started to use Google's offline email services could read whatever emails they had previously downloaded; and they could prepare responses to those emails. However, the responses could not be sent until Gmail was back online.

Google's services to send and receive email via devices such as the iPhone were unaffected.

The news of the outage spread rapidly over Twitter. The term "Gfail" soon rose into the top Twitter search terms.

Google later explained that the cause was a new feature that they had installed to keep email geographically close its owner. During the maintenance of one of their European data centers, its traffic was routed to another nearby data center. This inadvertently overloaded that data center, which caused a cascading effect from one data center to another.

Google's Apology

Google apologized for the outage and noted in blogs that it shared the pain since its staff uses Gmail as well.

Google's SLA for Apps Premier customers calls for availability of 99.9% for each month. For each month that availability falls below 99.9% but is above 99%, a customer will receive a credit of three days. If availability falls below 99%, a credit of fifteen days is given instead.

The two and a half hour outage resulted in an availability in February of 99.6%, qualifying Apps Premier customers to get a three-day credit. However, Google granted the higher credit – fifteen days – as a further apology.

At \$50 per year per user account, a three-day credit amounts to \$0.41 per user. A fifteen-day credit is the equivalent of \$2.05 per user account. This may not seem much when compared to the cost of the inconvenience to the users and to the users' companies. However, note that if Gmail availability should fall below 99% every month of the year, Google will sacrifice 50% of its Apps Premier revenue.

Google's Superb User Communication

A common thread in our Never Again stories is that web site providers are often notoriously poor at keeping their users informed when their sites go down. This has led to some serious customer backlashes.

On the contrary, Google worked very hard via blogs and its web site to keep users informed as to the status of the outage and, eventually, the cause of the outage. When the problem first occurred, Google posted the following message:

"We're aware of a problem with Gmail affecting a small subset of users. The affected users are unable to access Gmail. We will provide an update by February 24, 2009, 6:30 AM PST, detailing when we expect to resolve the problem. Please note that this resolution time is an estimate and may change."

As it turned out, it was not a "small subset of users;" but the problem was resolved by 4 AM PST.

A subsequent Gmail post stated:

"If you've tried to access your Gmail account today, you are probably aware by now that we're having some problems. Shortly after 9:30 AM GMT, our monitoring systems alerted us that Gmail consumer and business accounts worldwide could not get access to their email. We're working very hard to solve the problem, and we're really sorry for the inconvenience. Those users in the US and UK who have enabled Gmail offline through Gmail Labs should be able to access their Inbox, although they won't be able to send or receive emails. We're posting updates to the Gmail Help Centre ... Thanks for bearing with us while we sort this out. We'll report back as we make progress."

Most important, in response to this extended outage, Google launched the very next day its Google Apps Status Dashboard,² which shows the status of each component of Google Apps.

The screenshot shows the Google Apps Status Dashboard. At the top, it says "Google Apps Status Dashboard". Below that, there is a disclaimer: "This page offers performance information for Google Apps services. Unless otherwise noted, this status information applies to consumer services as well as services for organizations using Google Apps." It also includes a link to "Google Apps Help Centers".

Today's Status		2/26/09	2/25/09	2/24/09	2/23/09	2/22/09	2/21/09
Google Mail	✓ No Issues	✓	✓	ⓘ	✓	✓	✓
Google Calendar	✓ No Issues	ⓘ	✓	✓	✓	✓	✓
Google Talk	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Docs List	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Documents	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Spreadsheets	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Presentations	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Sites	✓ No Issues	✓	✓	✓	✓	✓	✓
Google Video for business	✓ No Issues	✓	✓	✓	✓	✓	✓
Admin control panel	✓ No Issues	✓	✓	✓	✓	✓	✓

At the bottom of the table, there is a link "Older »". Below the table, there is a legend: "The following symbols signify the most severe issue (if any) encountered during that day. Click a symbol in the table above to view detailed information." and an "RSS Feed" link. The legend includes: ✓ No issues, ✖ Service disruption, ✖ Service outage, ⓘ Information available.

² <http://www.google.com/appsstatus#>




Clicking on an icon that indicates that information is available provides the sequence of status updates that have been made since an outage. Doing this for Gmail results in the following:




This page offers performance information for Google Apps services. Unless otherwise noted, this status information applies to consumer services as well as services for organizations using Google Apps.




Check back here any time to view the current status of the services listed below. For all other information or to report a problem, please visit the [Google Apps Help Centers](#).

Google Mail 2/24/09

Time	Description
6:55 PM	 An incident report has been posted here .
9:09 AM	 The problem with Google Mail should be resolved. We apologize for the inconvenience and thank you for your patience and continued support. Please rest assured that system reliability is a top priority at Google, and we are making continuous improvements to make our systems better.
5:30 AM	 We're aware of a problem with Google Mail affecting a significant number of users. The affected users are unable to access Google Mail. We will provide an update by February 24, 2009 9:30:00 AM UTC-5 detailing when we expect to resolve the problem. Please note that this resolution time is an estimate and may change.

The following symbols signify the most severe issue (if any) encountered during this day.

 [RSS Feed](#)

 Service disruption  Service outage  Information available

The 6:55 PM post provides a link to a detailed incident report. Going to the incident report, we find Google's description of the incident:³

"Google's software is designed to allow maintenance work to be done in data centers without affecting users. User traffic that could potentially be impacted by a maintenance event is directed towards another instance of the service. On Tuesday, February 24, 2009, an unexpected service disruption occurred during a routine maintenance event in a data center. In this particular case, users were directed towards an alternate data center in preparation for the maintenance tasks; but the new software that optimizes the location of user data had the unexpected side effect of triggering a latent bug in the Gmail code. The bug caused the destination data center to become overloaded when users were directed to it and which in turn caused multiple downstream overload conditions as user traffic was automatically shifted in response to the failures. Google engineers acted quickly to rebalance load across data centers to restore user access. This process took some time to complete."

Google went on to list some improvement actions that resulted from the outage:

- In recognition of the fact that Google has no maintenance window, innovate on the technology and process fronts to make its systems as self-healing and as self-managing as possible.
- Proactively communicate with customers when outages do occur. This drove the launching of the Google Apps Status Dashboard the next day.
- Prevent long outages by building resiliency into everything that it develops.

³ <http://www.google.com/appsstatus/ir/1nsexcr2jnrj1d6.pdf>

Lessons Learned

There are many things that Google does correctly to minimize or contain the effects of an outage:

- Its data centers back each other up. In the event of either planned or unplanned downtime, user services can be quickly and seamlessly switched to surviving centers. As reported in many of our Never Again articles, this does not seem to be a standard practice yet in cloud computing.
- Google makes great efforts to communicate frequently and effectively with its customers, including being forthright in explaining the reasons for its outages. Its launching of the Apps Status Dashboard is an excellent example of this effort.

Google's outage frequency is aggravated by its rapid and continual introduction of new features and new services. However, it is gratifying to see the support that users provide to Google during these crises, as evidenced by the blog traffic that sprang up in response to this outage. We attribute this to the excellent communication efforts that Google makes with its customers.

References

Information for this article was taken from the February, 2009, issues of The Washington Post, PC World, Information Week, Computerworld, CNet, Betanews, Venture Beat, Techtree, and Search Engine Journal.

The Wikipedia Gmail entry contributed to this article.