EXHIBIT 18

Battle of the Androids: Google Android vs. Samsung Android

posted by Alexey Eromenko on Fri 1st Feb 2013 21:52 UTC

Many people think that all Androids are equal and it's a race to the bottom where the cheapest vendor wins. This could not be farther from the truth. For me, it all began half-a-year ago, when I bought the Samsung Galaxy S III and was absolutely stunned by it, then exploring and comparing it with other Androids. Now that Google has fired a shot across the bow with its low pricing for the unlocked Nexus 4, where does that leave Samsung and its flagship handset?

For Samsung, it all began years ago when, like many Android hardware vendors, Samsung started to build custom icon sets & themes on top of Android, and over time it expanded into other areas. It turns out that Samsung took Google's Android code and applied a ton of patches on top, creating a new variant. Something I'll call the "Samsung Android" operating system.

Differences between Samsung Android 4.0 (i9300 Galaxy S-III) and vanilla Google Android 4.0 (as found on the Galaxy Nexus or many Chinese phones) are many and varied. There's also a difference between the improvements that Samsung has made to Android and the poorly-implemented improvements that other vendors have made, which have indeed given vendor-modified Android variants a bad reputation. In this article, I'll focus on the Samsung variant specifically.

[Each feature will also receive a number of bonus points reflecting the effect of a particular feature on total handset value]

NOTE: Each feature's value is subjective, so a huge feature of tremendous value for you may have little value for me and vice-versa, so feel free to come up with a similar list and put your value on each and share which features you like (or dislike) the most.

Software killer features:

Samsung Smart Stay - phone looks at you, and does not shutdown screen as long as it detects your face, and it basically saves battery power. I bet it may be useful on future laptops too. Genius ! Killer feature ! Worth at least +10 of the total handset cost. [+10]

Video Pop up play - lets me browse the web + see video clips at the same time. (A limited form of multi-tasking)

In video clips, the main focus is music, not the video, so I focus on the Internet, while putting only half-eye on the video clip.

This is available on PCs since Windows 98, yet missing on every other smartphone ! Killer feature ! [+5]

Two-Window-Multi-tasking - Two applications run side-by-side (on Samsung Android 4.1.2+) !

[+5]

...and a long-long list of smaller "nice-to-have" software features:

Each feature by itself doesn't change the picture, but combined together, they significantly increase the value of Samsung Android products.

- Shortcut to screen brightness in 2 clicks (this is simple to implement, very small, yet super-useful feature, as I tend to change screen brightness very often, and this is super-easy with the S III)vWhy hasn't Google done it? Because Samsung UI team does a better job of human User eXperience (UX) testing. This is why I value it so highly, and can easily justify another $20 or so on this feature alone. [+4]
- Better icons (TouchWiz UI theme) [+3]
- Launcher: Samsung clearly divides between applications and widgets. Much easier to navigate and start applications (than vanilla Google Android 4.0). [+3]
- Samsung gestures (screen-shot, double tap, ...) [+3]
- I can swipe my hand over Galaxy S III screen, like a scanner, and it will take a screenshot. This is very cool!
- Extra codecs : *. wma, *. wmv (Microsoft Windows Media Audio/Video; I'm surprised, that Samsung intervened so deeply in the OS. Sadly none of the Androids support the older MPEG2 format, *.mpeg) [+3]

Why doesn't Google include every codec imaginable?

This is simple: Google tries to avoid patent payments, especially to Microsoft. Each codec costs about $1 per device, so for high-end devices it's not a hardship for Samsung, but encumbering the freely-distributed OS with royalties would be unworkable for Google.

(Same patent reason probably applies to their avoidance of the exFAT patent and MicroSD slot on any recent Nexus series.)

It makes sense for Google to lower the overall "patent tax" on the Android ecosystem, but for hardware vendors, it makes sense to differentiate by adding value.

Surely advanced users can re-code audio/video into any format, but this is not an option for the majority, or on the go.

I do recode the majority of my personal media collection to free codecs at home, such as Ogg Vorbis audio and WebM video, which Android happily plays, but I still stumble across wma/wmv often-times, and am grateful to Samsung for providing me this extra option. I really don't want to recode anything when travelling.

Note, that Google still pays patent royalties for other non-free codecs, including MP3, AAC, MPEG4, H.264 (AVC), etc...

Camera: Burst shot -- this is super-useful for shaky hands... the phone makes 8 shots quickly in one second and selects the best-focused shot automatically, based on clever math and Signal-to-noise ratio (SNR), then asks user for confirmation and saves the choice, after which it deletes the other 7 candidates. This is the "smart" part of the smart-phone. With shaky hands, what would result in blurry pictures on other phones magically becomes laser-focused and crystal-clear image on the S III. [+2]

(There are more camera niceties in the S III, but this one is my favorite)

S Beam - I call it "The Kiss of the Galaxy!" It allows transferring pictures, videos and music between Galaxy S III phones simply by touching them, in several seconds. It starts sync via NFC, then transfers the actual data over WiFi direct (peer-to-peer). I would value this feature much higher, if it were an open-standard and would work with non-Samsung phones, but sadly it is not. I personally believe that software ecosystems and networking protocols should be open. For most Androids (including the S III), you can use standards-based Bluetooth File Transfer to achieve the same goal, but the S Beam is so much easier to use and a lot faster. This idea is so useful and revolutionary that I value it positively until an open standard emerges to replace it. [+2]

Long-term, for Samsung it is beneficial to use open network protocols, because if it does not, an open alternative will be developed (either by Google or by the Open-Source community) and the whole ecosystem will migrate to it. Better to develop an open protocol and sell the first implementation of it. Either way, Samsung wins time vs. the competition. Better to create user value, than user lock-in. Freedom and Open-platform is the primary reason for many users choosing Android vs. the competition.

Better Music Player app - can list all music, or take music from directory/folder filesystem. [+1]

Assistive Flashlight widget -- this is much easier to use as than other flashlight applications, via single-click. Typical flashlight applications may require 3 or 4 clicks. I often use it at night when returning home. [+1]

Much improved lock-screen with water effects, and ability to slide-unlock in any direction [+1]

(Stock Google Android 4.0 and some other OSes unlock only across)

Better Clock app: has smart alarm, which slowly increasing volume in the morning, so I don't need a hammer to silence my phone, plus has timer, stopper, and world clock (multi-timezone). Everything integrated with one GUI. [+1]

S-Voice (cloud service) Similar to the iPhone's "Siri," this allows the user to speak to the phone itself. "Hi Galaxy!". Because of voice recognition accuracy is not always top and limited "intelligence," this is just a "nice to have" feature now, but as the technology improves it will surely become a necessity. [+1]

Dropbox 50 GB for free for 2 years (cloud service; Note: this is carrier dependent.) [+1]

Android Updates - All of the Nexus series have an advantage here: faster Android updates, which account for maybe +5 value for me. And -5 for the S III. [-5]

Samsung does update its flagship Androids, with a few months of delay from the Nexus, which is necessary to port its massive patch-set and test it. Samsung also provides security, bugfix and feature updates in minor releases, without changing the Android version.

By comparison, many vendors lack Android updates at all, so I would value them at -20 on this test. (Meaning, that most Chinese hardware starts at substantial deficit for me vs compared to Google's offering. Basically I would pay less for their phones, due to lack of support.)

[Not yet valued features:]

- S Memo/S Note
- S Planner
- -ChatON

AllShare Cast/AllShare Play (remote desktop/video streaming) - with Samsung Smart TV. (Note to those of us, who chosen Android because it is open, that the Galaxy S III also supports standards-based DLNA, but I haven't tried either. Samsung adds some proprietary features, but also keeps open foundations of Google)

Security: Samsung anti-theft protection

Printing - unlike vanilla Android 4.0, that lacks a printing API, Samsung Android allows printing from the Android browser and from image gallery, but only to Samsung Printers.

The weak point in software (in both Google and Samsung is the Android keyboard; I had to buy the "SwiftKey" keyboard to hugely improve my input experience)

After adding up all the points, I believe, that Samsung Android is worth a substantial premium vs. vanilla Google Android on the same hardware. By my own measurement, that would mean that I'd be willing to pay 40-50% more for a Samsung device over stock Android, and even more over an Android handset from another vendor. You can judge the value of the added functionality for yourself.

My recommendation: If you don't believe me, just use the Samsung Galaxy S III for a month, then try the vanilla Google Android for a few days. You will understand the difference very quickly. You will not want to go vanilla.

Now that we've looked at the software, let's take a look at the hardware:
(Keep in mind that I'm referencing the Galaxy Nexus here, and not the newer Nexus 4, which still isn't widely available)

MicroSD slot +20 (I put 64 GB of extra storage, used for full-length HD videos -- my use case is to convert the S III into an HDTV in my pocket and watch it in bus or parks). A secondary use case for MicroSD is to transfer files between phones.

If the Nexus had 64 GB of internal memory, my use case of MicroSD would reduce to a small advantage, like +5 for the S III.

Bigger Battery +5 (2100 vs 1750 mAh) (again, for traveling reasons, I take 3 batteries when on long travels. Would have to take 4, if I were using a Nexus.

Replacing the battery is just a 1 min inconvenience on my Galaxy S III. For normal workdays the S III battery is good enough, and I still have ~20% at the end of the day.) When actively browsing the Internet over 3G, it lasts about 6 to 7 hours, depending on screen brightness.

Note that the Galaxy S III has 3rd party replaceable batteries, such as Hyperion-4200 and Mugen-4600, that doubles your work time and replaces the back cover, but also doubles the thickness of the smartphone and adds some weight. It adds up to about 12 hours of active usage or 2 days of normal usage with a single battery charge. Also make sure to check for NFC, because some

cheaper 3rd party batteries do not support NFC, so no S-Beam for you.

CPU Quad-core +1 (potential of HEVC/WebM2 decoding, future-proof)

Both Nexus and the Galaxy S III are fast in day to day tasks.

Camera (8 mp vs. 5 mp) +0 (I don't care too much, because 5 MP is "good enough" for me, and sensor quality matters more than pixel density anyway. Do any camera experts care to weigh in on the relative quality of the camera hardware?)

Screen:

The screen is amazing at 4.8" with Super AMOLED technology at 306 PPI and HD 720p quality, and easily one of the killer features of the Galaxy S III. G-Nexus sports a similar screen at 4.65" also at 720p so I won't add points here. My eyes absolutely cannot distinguish between individual pixels at that pixel density, making for ideal picture quality.

Screen Glass:

One thing to mention is that Galaxy S III screen uses Corning Gorilla Glass which makes it *hugely* better than cheap Chinese plastic screens. The feeling is much more sleek and very touch-friendly and it is (mostly) scratch resistant. After 6 months of heavy use, I have only 3 scratches on my Galaxy S III (unprotected) Corning Gorilla Glass screen vs. 100+ scratches in two-weeks time during my use of Chinese phones. Chinese phone screens are not nice to touch. And I can tell a cheap plastic screen even during a blind test.

I won't add points for it vs the Galaxy Nexus, because the Nexus has pretty good glass too (not Gorilla), but it is a killer feature compared to cheap phones that easily justifies another +20 premium of the total handset costs vs. cheap Chinese plastic screens.

Here is a great video on the Corning Gorilla Glass, explaining it's manufacturing process: Why Glass Breaks? (by Corning)

Ideas for hardware vendors:

Which other hardware features might users be interested in paying for?

- For me, being a water traveler in a hot country, a waterproof phone will definitely add value. I wish I could buy a waterproof Galaxy S III, but it doesn't exist. So I bought a water-proof case for the S III. But I would gladly pay for +20% more for a water-proof version of the S III or another high-end Android, because a case is sort of a compromise.
- For others (in cold countries) a gloves-friendly touch-oriented smart-phone may prove to be a killer feature in winter (like the Nokia Lumia 920 with its super-sensitive touch screen, that works with normal, non-touch-capacitive gloves, according to their marketing).
- Alternative for the Android users would be buying "capacitive gloves" (aka "gloves for smartphone").
- Dual SIM phones are popular in some countries (like China), but not here.
- Some people want a vandal-proof phone, with extra strength, so you can throw it on walls or drop it with no effects. "Extra durable".
- Other possible differentiating factor would be a physical QWERTY keyboard, like on BlackBerry and older Nokia phones, as some users seems to prefer it (Not me. I type very quickly on a quality virtual keyboard, such as the latest "SwiftKey Flow" and I love it).

Software alone, as mentioned earlier, worth a substantial premium for the S III. Total S III value (hardware + software combined) is worth even more.

A word to Google: Please please please - either allow MicroSD on your Nexus series (4, 7, 10) -or- offer 64 GB variants for heavy multimedia users.

Economics:

The actual hardware costs, material usage, bill-of-materials (BOM), and manufacturing complexity is probably close.

Producing the Galaxy S III hardware costs Samsung a little more over producing the Galaxy Nexus (my rough estimate is around $220 vs $210 per handset), plus a few bucks more for MS patents, such as the exFAT filesystem (required for the MicroSD slot), Windows Media Video (VC-1) codec, etc, that Samsung buys for the S III. But they can easily charge +50% extra for it. Easy profit.

Nearly every component of the S III is made by Samsung itself, ranging from the CPU (Samsung Exynos) to display to flash memory to battery to headset (earphones). This enables Samsung to keep manufacturing costs down.

How much does the actual development of Samsung Android cost (above the Google Android code, that they get for free)? I don't really know, but anything from tens of millions of dollars to hundreds of millions would be my wild guess. Good engineers aren't cheap.

Bottom line:

Google is pricing the Nexus 4 very aggressively, at $299 for the 8GB and $349 for the 16GB (if you can get one, since supply isn't keeping up with demand) but they've set a very difficult threshold for handset vendors who aren't subsidized by a search advertising business model. So the big question is, how can Samsung compete with that? I think that Samsung has a superior product, and I expect Samsung to keep on improving software in Galaxy S4 into the future, and keep charging a premium over the other Android vendors.

The Galaxy S3 (Unlocked) has a street value of $560-600, a 55-60% premium over the cost of a Nexus 4 in the US. However, the Samsung Galaxy S III is one of those rare gems, that even after huge marketing spending, still delivers a great bang-for-the-buck, and I can easily justify the premium. And I rarely buy marketed computers. (and yes, the Galaxy S III feels like a pocket laptop with regards to its feature set, not like a phone.)

The other vendors will have a hard time competing with Samsung, unless they start working on the *software* part, improving Android too, because 40-50% price difference is bigger than the typical profit margin of the average hardware vendor.

The verdict is:

Google Android (Nexus) is good, but Samsung Android (S III) is excellent.

P.S.: Arguably Samsung Android 4.0 is better not only than Google Android 4.0, but also wins vs. Google Android 4.2 in most areas, and on tablets Samsung's advantage is even greater, due to the introduction of world's first window manager for Android, allowing you to have multiple windows floating around, just like on MS Windows desktops. Just look at Samsung Galaxy Tabs and you will understand what I mean.


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