



## New Trends on Mobile Cloud Computing

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**Abstracts:** Mobile cloud computing is emerging technology and it's growing day by day. This research is concentrating on "New Trends on Mobile Cloud Computing". Study describing about different types of mobile applications like Native application, Web application, and Hybrid application. Its underlining advantages, disadvantages and utility of Native, Web and Hybrid application. Compression of these applications is done which helps develops to select best application type. Market share analysis of mobile & tablet operating system is done to get new trends of mobile operating system. Market share analysis of social networking sites used over the mobile & tablets is done to identify influence of different social networking sites on mobile cloud computing. Market share analysis of Mobile & Tablet Venders is done to identify the venders which are popular among the people by providing better mobile cloud computing features in gadgets.

**Keywords:** Native Application, Web Application, Hybrid Application, Mobile & Tablet Operating System, Social Networking Sites, Mobile and Tablet Vender

### I. INTRODUCTION

Mobile cloud computing is emerging technology. The number of mobile cloud computing subscribers is grown rapidly in last five years and it's going to extend multiple times in future years. According to the latest study & Research, Cloud-based mobile market will generate annual revenue of \$9.5 billion in 2014 from \$400 million in 2009, at an average annual increase of 88%. It appears that in the near future, there will be more growth for both traditional, device-based apps and mobile cloud-based apps. Mobile apps have simplified life and the way we do business, do shopping, travel or even communicate and network creating an encouraging platform for mobile app developers to take up new challenges and play with different app ideas. HTML5 is dramatic and revolutionary core language used to create the web. HTML5 is next generation standard for next version web markup language. One of the primary things mobile app developers need to consider before initiating an app development process is Application Design, irrespective of whether we use a framework or not. Also, designing an app for the iPhone is different than designing one for Android – besides the UI and UX conventions being different, the touch points and menus work in diverse ways. Now a days mobile applications are categories in three category that is Native Application, Web/HTML5 Application, and Hybrid Application.

### II. RESEARCH ELABORATIONS

HTML5 is dramatic and revolutionary core language used to create the web. HTML5 is next generation standard for next version web markup language. The cloud-based apps are providing improved offline data caching, where the apps will still work even if Internet connection is down. HTML5-enabled apps also reduce server load demand which will make cloud-based mobile connectivity as a means to improve access of nations and locales with poor coverage.

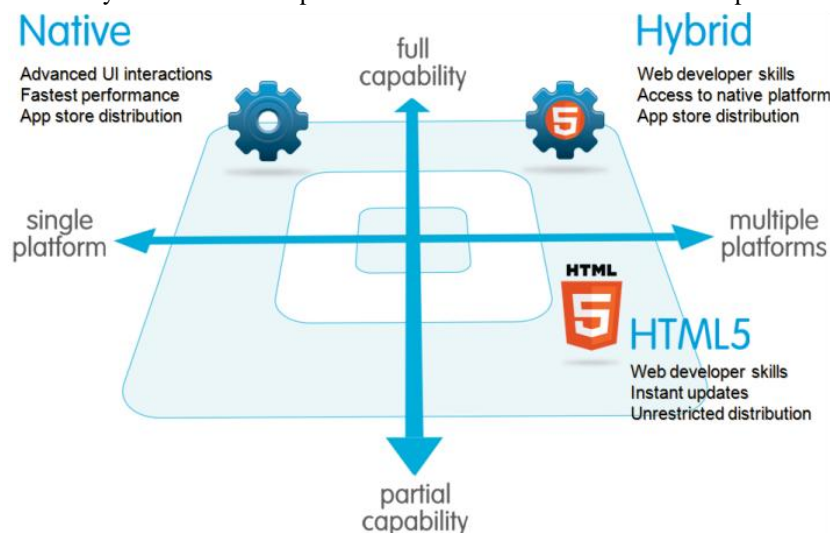


Fig.1: Mobile Application

Mobile apps are basically little and independent programs, used to enhance existing functionality, in a simple and more user-friendly way. Today's modern smartphones come with powerful web browsers, using which we can do most of the work which can be done on a desktop computer. Programs that run on mobile devices, such as Smartphones or Tablet Computers are referred to as Apps. There are thousands of apps from different categories available. Nowadays there seems to be an app for everything. Whether it's checking up on breaking news, weather, chatting via social networking, performing multimedia operations or even booking last minute holidays there's an app out there to help. Most applications work alone, but some cooperate with tools in other media. For example, a website may have a variety of apps for mobile devices, allowing communication between the phone and the website itself, allowing the user to sync data using the Internet. Some applications help to navigate maps using internet and GPS systems. Some apps can be used to control digital video recorders to set shows to record or play, while still others link to cable or satellite systems and allow premium television content to be played through the phone.

Mobile apps are moving away from the integrated software systems generally found on PCs. Instead, each app provides limited and isolated functionality such as game, calculator or mobile web browsing. Mobile apps become more robust. A more sophisticated approach involves developing specifically for the mobile environment, taking advantage of both its limitations and advantages. For example; Apps that use location-based features are inherently built from the ground up with an eye to mobile given that we don't have the same concept of location on a PC. There are different types of Apps: Native App, Web App, and Hybrid App

#### **A. NATIVE APP**

Native applications are machine language executable programs for the hardware platform it is running in. A native application has been compiled into the machine language of the CPU. Native Apps are developed to use on a particular platform or device. Smartphone applications that are coded in a specific programming language, such as Objective C for iOS and Java for Android operating systems are Native Apps. These apps are providing fast performance and a high degree of reliability. They also have access to a phone's various resources. They are developed specifically for one platform, and can take full advantage of all the device features, they can use the camera, the GPS, the accelerometer, the compass, the list of contacts, and so on. Native apps can use the device's notification system and can work offline. This type of app is expensive to develop because it is tied to one type of operating system, forcing the company that creates the app to make duplicate versions that work on other platforms. Most video games are native mobile apps.

Native apps are accessed through icons on the device home screen. These apps are live on the device and Native apps can be found from application stores such as Google Play or Apple's App Store or Microsoft App Store.

At the initial age of the Smartphone market, most apps were customized to the iPhone. But cross-platform functionality became an issue as the market share of Android phones grew.

Pro: Native apps have the best performance and use the last available hardware resource to improve performance.

- Applications can work in offline mode.
- The apps are distributed through platforms App store providing better visibility to the prospective users.
- Application will have access to the latest API's, releases on that platform.
- The apps are built in languages the platform supports and so, has access to IDEs which provide the best tools to develop, debug the project fast. iOS app can be built in Objective C on XCode which has all the tools to debug, design the interface, and check the performance using Instruments etc.

Cons: Huge budgets are required to support all the platforms that have considerable markets. One team per platform or multiple teams for maintenance are required to support different platforms. So basically each team will replicate the same functionality in their platform.

- App updates need to be downloaded by users and so we end up maintaining several versions of Apps on our web server if not properly designed.
- Availability of developers for ramping up is another concern. When Objective C suddenly revived after the release of iPhones, there were not enough good developers ready. Maybe the developers can be trained, but it is not feasible for small and medium head count companies and even in bigger companies where the training is feasible, the developers trained are not going to be at the same level of expertise they were on the technologies they are working on.

#### **B. WEB APP**

Web App stored on a remote server and can be accessed over the internet through a browser. Web apps are not real applications; they are really websites that, in many ways, look and feel like native applications. They are run by a browser and typically written in HTML5. These can be accessed as any web page. Navigated special URL can be installed on their home screen by creating a bookmark to that page.

Web browser of mobile device runs these programs and web app is software that uses technologies such as JavaScript or HTML5 to provide interaction, navigation, or customization capabilities. This means they are not separate programs that get stored on the user's mobile device, they're delivered via the internet. Web apps became really popular when HTML5 came around and people realized that they can obtain native-like functionality in the browser. Today, as more and more sites use HTML5, the distinction between web apps and regular web pages has become blurry.

Pro: HTML5 mobile app is similar to a normal web app, except that they are designed to work at smaller screens.

- The distribution of these apps is very easy. Developers just deploy the web app on web server and users access it from their browsers.

- There are some very good mobile UI frameworks like JQuery Mobile, Sencha Touch and mgwt which provides several widgets for mobile.
- These apps can probably reach out all platforms since they run on browsers and all the modern smart phones have a browser.
- The development and testing of these apps is easier as they are similar to normal web apps where we have tooling support.  
Cons: These apps don't have access to the native functionality.
- Performance doesn't match with native apps.
- These apps don't work in offline. Actually works in offline mode, but that doesn't match what native apps provide.

### C. HYBRID APP

Hybrid Apps are similar to native apps, run on the device, and are written with web technologies like HTML5, jQuery, CSS and JavaScript. Hybrid apps run inside a native container, and power the device's browser engine to render the HTML and process the JavaScript locally. A web-to-native abstraction layer enables access to device capabilities that are not accessible in Mobile Web applications, such as the camera and local storage.

Hybrid, by definition is anything derived from heterogeneous sources, or composed of elements of different or incongruous kinds. A hybrid apps are written with the same technology used for websites and mobile web implementations, and that is hosted or runs inside a native container on a mobile device. It is the marriage of web technology and native execution.

Often, companies build hybrid apps as package for an existing web page; in that way, they hope to get a presence in the app store, without spending significant effort for developing a different app. Hybrid apps are also popular because they allow cross-platform development: that is, the same HTML code components can be reused on different mobile operating systems, reducing significantly the development costs. Tools such as PhoneGap and Sencha Touch allow people to design and code across platforms, using the power of HTML.



Fig.2: Web App

Pro: Hybrid apps are faster to develop saves development time and cost since most of the development is done is web technologies which are cross platform and do very small amount of native coding, only when access to native layers is required. So only small portion of the code needs to be re-implemented for other platforms so developers can concentrate on developing new features rather than replicating the same features on each platform.

- 'Write Once, Run Anywhere', that made Java such a dominant force.
- Applications can be deployed in platform specific app stores.
- Hybrid apps provide good and bad of both native apps and HTML5 web apps.
- Can access the native layers.
- Hybrid apps can work in offline mode.
- As Future forecast by 2016 more than 50% of the apps deployed will be Hybrid apps.

Cons: The tools for building Hybrid apps are not mature enough as compared to native app development tools. The situation is changing rapidly and soon there can be some good tools which support development of cross platform Hybrid apps.

- Hybrid apps, even though are packaged natively are not native apps. They execute on the platforms web engine, Webkit in case of Android and iOS which is another layer between the user and the application and so the performance can't match the native apps.
- Since Hybrid apps are normally built using standard web technologies, there will be huge pool of developers available for ramping up. This is not the case with native apps.

### III. COMPRESSION OF NATIVE, WEB AND HYBRID APP

Table A: Comparison

	<i>Native</i>	<i>Web / HTML5</i>	<i>Hybrid</i>
<b>App Features</b>			
<i>Graphics</i>	Native APIs	HTML, Canvas, SVG	HTML, Canvas, SVG
<i>Performance</i>	Fast	Slow	Slow
<i>Native look and feel</i>	Native	Emulated	Emulated
<i>Distribution</i>	Appstore	Web	Appstore
<b>Device Access</b>			
<i>Camera</i>	Yes	No	Yes
<i>Notifications</i>	Yes	No	Yes
<i>Contacts, calendar</i>	Yes	No	Yes
<i>Offline storage</i>	Secure file storage	Shared SQL	Secure file system, shared SQL
<i>Relocation</i>	Yes	Yes	Yes
<b>Gestures</b>			
<i>Swipe</i>	Yes	Yes	Yes
<i>Pinch, spread</i>	Yes	No	Yes
<b>Connectivity</b>	Online and offline	Mostly online	Online and offline
<b>Development skills</b>	ObjectiveC, Java	HTML5, CSS, Javascript	HTML5, CSS, Javascript

One of the primary things mobile app developers need to consider before initiating an app development process is Application Design, irrespective of whether we use a framework or not. Also, designing an app for the iPhone is different than designing one for Android – besides the UI and UX conventions being different, the touch points and menus work in diverse ways. Mobile applications are categorized in three categories that are Native Application, Web/HTML5 Application, and Hybrid Application. The best choice depends on the type of application being developed. For instance, animation-intensive apps such as games would favor native apps, while hybrid applications may be better suited for enterprise mobile apps because they provide multi-platform support. Just for starters, the following issues must be considered when choosing a development path:

**Application Complexity:** Complex applications which require quick accesses to a database or Web service for some data to display can be kept simple, and a mobile Web app may suffice. However, for a mobile/field worker type of applications that support mission-critical functionality, hybrid or native applications are typically needed.

**Performance:** For instance, for real-time look-up of data over the network, mobile app performance depends on network latency and server infrastructure capabilities. If consistent performance is required, data would typically need to be cached, which is supported on hybrid or native applications only.

**Device-Services Access:** If an app needs to access local device services, such as the camera, contacts app, accelerometer, etc., then choices are limited to native or hybrid applications.

**Connectivity and Availability:** What sort of connectivity will the application require? Does the app require Web access all the time in order to always retrieve the latest data from the server? Or do the requirements dictate offline support? While native and hybrid apps can be built to operate offline, Web mobile apps require Web connectivity.

**Offline functioning:** A native app is best if the app must work in both connected and not connected modes. In-browser caching is available in HTML5, but it's limited in the case of a Web app, so native is a good choice.

**Discoverability:** Web apps win the prize on discoverability. Content is a lot more discoverable on the web than in an app: When people have a question or an information need, they go to a search engine, type in their query, and choose a page from the search results. They do not go to the app store, search for an app, download it, and then try to find their answer within the app. Although there are app aficionados who may fish for apps in app stores, most users don't like installing and maintaining apps (and also wasting space on their device), and will install an app only if they expect to use it often.

**Speed:** Native apps win the speed competition. In 2012 Mark Zuckerberg declared that Facebook's biggest mistake had been betting on the mobile web and not going native. Up to that point, the Facebook app had been a hybrid app with an HTML core; in 2012 it was replaced with a truly native app. Responsiveness is key to usability.

**Installation:** Installing a native or hybrid app is a hassle for users: They need to be really motivated to justify the effort. "Installing" a web app involves creating a bookmark on the home screen; this process, while arguably simpler than downloading a new app from an app store, is less familiar to users, as people don't use bookmarks that much on mobile.

**Maintenance:** Maintaining a native app can be complicated not only for users, but also for developers (especially if they have to deal with multiple versions of the same information on different platforms): Changes have to be packaged in a new version and placed in the app store. On the other hand, maintaining a web app or a hybrid app is as simple as maintaining a web page, and it can be done as often or as frequently as needed.

**Richness of User Interactivity:** What type of user experience is required for the application? Mobile browser-based apps that are optimized for mobile UI may suffice for quick lookup or productivity-type applications. However, hybrid/native applications would typically be required to deliver highly interactive user experiences needed for field-worker-type applications. For example, interactive BI charts/graphs, maps, voice/email integration, etc. In the most extreme case like

gaming applications, native applications may be necessary to deliver the highly animated and graphically intensive user experience.

**Multi-platform Requirements:** The terms “consumerization of IT” and BYOD (bring your own device) effectively mean that the line between the consumer and the enterprise devices have become blurred. Employees are bringing their personal mobile devices to work and are often expecting that they work in the corporate network and access back-office applications. Even if companies restrict access to the big dogs: (iPad, iPhone, Android phones and tablets, possibly Windows Phone and tablets), trying to support each platform natively will require increasing resources and domain expertise with each new language/platform. And let’s not forget the maintenance costs, involved in upgrading new versions of each platform. Where multi-platform support is needed, Web mobile or hybrid apps probably have the advantage. Going native, and trying to support multiple operating systems may be cost prohibitive with existing resources and developer skills.

**Fragmentation:** Apple controls Apple iOS and the only concern is what version iOS is running on any given device. Not so android, which is open source. There are many, many versions and variants of Android running on different devices, which can be a nightmare for app developers trying to support different devices running different flavors of Android. (Is it an Amazon Kindle Fire? a Samsung Galaxy? A Barnes & Noble Nook?) This is a nightmare scenario for native apps—on the other hand, a mobile Web or hybrid app, when properly designed, can shield from these complexities because they are based on common frameworks.

**Resources:** How many developers can dedicate to building and supporting mobile application development? What are their existing skills sets? If considering native application development due to the complexity of the application under development, factor the costs of becoming proficient on an each platform’s OS and programming language. Add another platform, and that’s another language, another SDK. On the other side of the equation, Web mobile or hybrid applications are simpler to make, and readily support more platforms, but there may be performance trade-offs. Device features:

Although web apps can take advantage of some features, native apps (and the native components of the hybrid apps) have access to the full paraphernalia of device-specific features, including GPS, camera, gestures, and notifications.

**Platform independence:** While different browsers may support different versions of HTML5, if platform independence is important, definitely have a better chance of achieving it with web apps and hybrid apps than with native apps. As discussed before, at least parts of the code can be reused when creating hybrid or web apps.

**Content restrictions, approval process, and fees:** Dealing with a third party that imposes rules on your content and design can be taxing both in terms of time and money. Native and hybrid apps must pass approval processes and content restrictions imposed by app stores, whereas the web is free for all. Not surprisingly, the first web apps came from publications such as Playboy, who wanted to escape Apple’s prudish content censure. And buying a subscription within an iOS app means that 30% of that subscription cost goes to Apple, a big dent in the publishers’ budget.

**Development Cost:** It’s arguably cheaper to develop hybrid and web apps, as these require skills that build up on previous experience with the web. NN/g clients often find that going fully native is a lot more expensive, as it requires more specialized talent. But, on the other hand, HTML5 is fairly new, and good knowledge of it, as well as a good understanding of developing for the mobile web and hybrid apps are also fairly advanced skills.

**User Interface:** Last but not least, if one of your priorities is providing a user experience that is consistent with the operating system and with the majority of the other apps available on that platform, then native apps are the way to go. That doesn’t mean that you cannot provide a good user experience with a web app or a hybrid app—it just means that the graphics and the visuals will not be exactly the same as those with which users may be already accustomed.

#### IV. MARKETSHARE ANALYSIS

##### A. MOBILE & TABLET OPERATING SYSTEM

Market share analysis of mobile & tablet operating system is done to get new trends of mobile operating system. “Table B” is showing Data for Market Share of top Mobile & Tablet Operating System in India for Quarter-4 2013 to Quarter-3 2014. “Fig. 3” represents trend analysis of the Market Share of top Mobile & Tablet Operating System in India for Quarter-4 2013 to Quarter-3 2014. Trend line of Android, Series 40, Samsung, and SymbianOS are showing future forecast for next quarter. This Mobile & Tablet Operating System analysis shows that only android is operating system is going higher, other operating systems are losing their market share. “Fig. 4” is showing Market Share of different Mobile & Tablet Operating System in India for the month of October 2014. Android is covering almost 50% of market share. Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It’s the largest installed base of any mobile platform and growing fast every day another million users are using adding in this region. “Table C” is showing Data for Market Share of different Mobile & Tablet Operating System in India for the month October 2014. Android is still leading with 48.73% of market share. Series 40 which is provided by Nokia is on 19.91%. Other operating systems are trying to make there space in market.

Table B: Data for Market Share of Mobile & Tablet O/S in India (Q4 2013 - Q3 2014)

Date	Android	Series 40	Samsung	Unknown	SymbianOS	Linux	iOS	Nokia Unknown	Windows Phone	Sony Ericsson	bada	LG	BlackBerry OS	Win Vista	WinXP	JAVA	Other

Q4-13	30.5	28.2	14.3	8.0	9.4	3.4	1.7	1.1	1.3	0.7	0.6	0.5	0.3	0.1	0.0	0.1	0.0
Q1-14	36.9	24.9	13.1	8.8	7.5	1.5	1.9	1.8	1.5	0.6	0.6	0.4	0.3	0.1	0.0	0.0	0.0
Q2-14	41.2	22.6	11.8	9.2	6.4	1.5	1.9	2.1	1.5	0.6	0.5	0.4	0.3	0.1	0.0	0.0	0.0
Q3-14	47.2	19.4	10.0	9.3	5.4	1.5	2.0	2.1	1.5	0.5	0.4	0.3	0.3	0.1	0.0	0.0	0.0

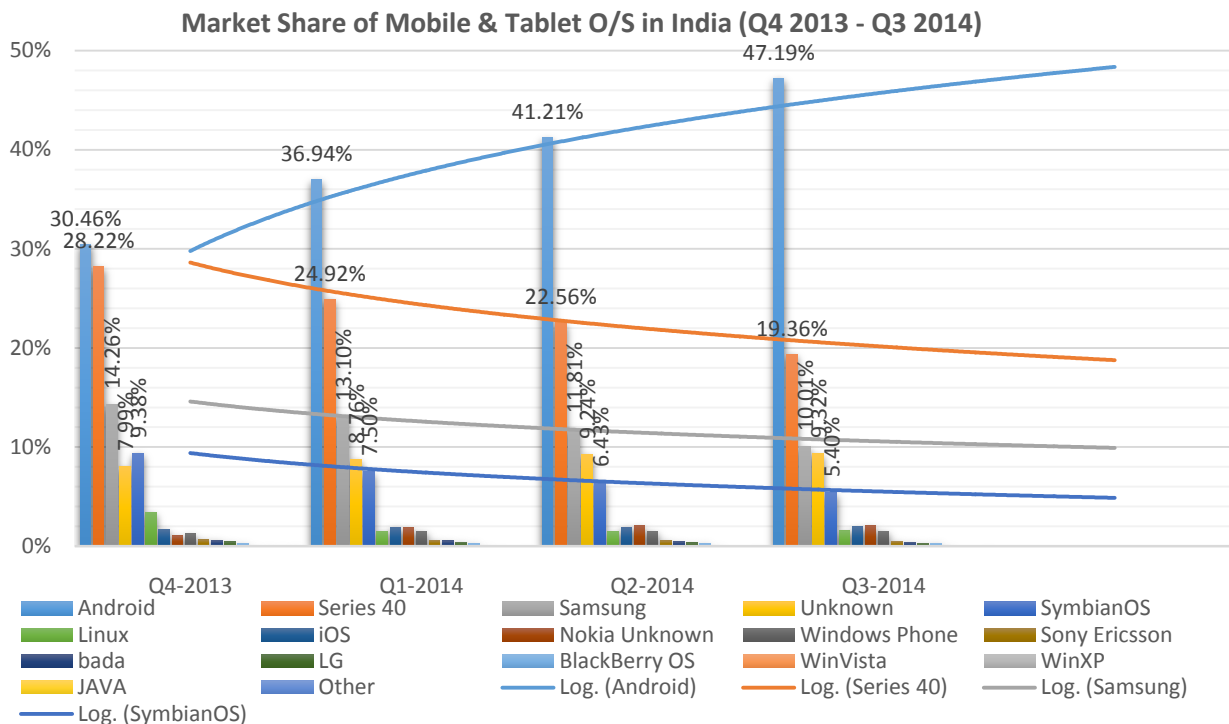
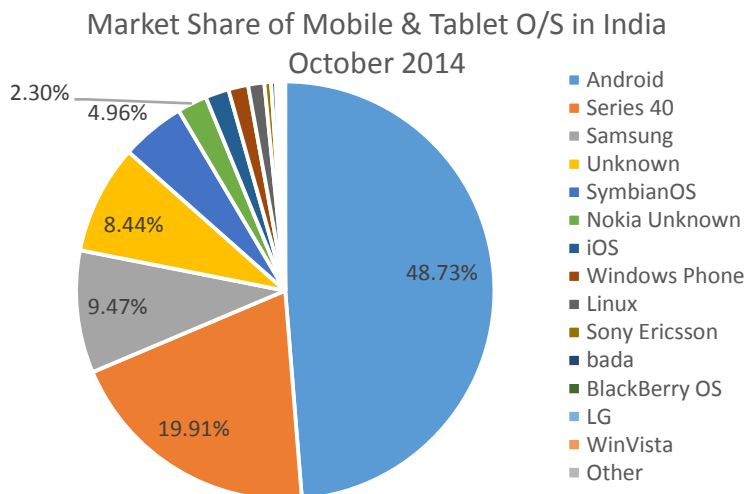


Fig.3: Market Share of Mobile & Tablet O/S in India (Q4 2013 - Q3 2014)

Table C: Data for Market Share of Mobile & Tablet O/S in India October 2014



O/S	Percent
Android	48.73%
Series 40	19.91%
Samsung	9.47%
Unknown	8.44%
SymbianOS	4.96%
Nokia Unknown	2.30%
iOS	1.82%
Windows Phone	1.53%
Linux	1.25%
Sony Ericsson	0.52%
bada	0.37%
BlackBerry OS	0.30%
LG	0.30%
WinVista	0.08%
Other	0.03%

Fig. 4: Market Share of Mobile & Tablet O/S in India October 2014

Android is very popular. How did it become so popular? It's a very interesting question. Android is a Linux based operating system created for touch screen mobile phones. Its open source operating system, which allows it to be used and customized by major companies like Samsung, Motorola, Mocomax, HTC and more. Android has a storehouse of application called Google Play Store which is one-stop-shop for its wider audience. What does a smartphone with the Android operating system do? The question should rather be, what does it not do? There is million applications for various task like social networking, movies, games, e-books, ability to edit pictures and videos, ability to video streaming to watch videos off the internet on phone all are available in this single store. There is no limit to the applications that can be included in the play store, unlike it competitor apple. There is infinite opportunities this operating system has in the future. Android gives everything need to build best-in-class app experiences. It gives a single application model that lets us deploy apps broadly to hundreds of millions of users across a wide range of devices from phones to tablets and beyond. It's also gives tools for creating apps that look great and take advantage of the hardware capabilities available on each devices.



**B. SOCIAL NETWORKING SITES OVER ON MOBILE & TABLET**

Market share analysis of social networking sites used over the mobile & tablets is done to identify influence of different social networking sites on mobile cloud computing. "Table D" is showing Data for Market Share of Social Networking Sites over on Mobile & Tablet in India for Quarter-4 2013 to Quarter-3 2014. "Fig. 5" is showing Market Share of Social Networking Sites over on Mobile & Tablet in India for Quarter-4 2013 to Quarter-3 2014. Trend line of Twitter, YouTube, Google+, and Facebook is showing trend of their market share. As per data Facebook is dominating social networking site in India. Bar for Facebook is shown in secondary Y axis because of its high percentage market share. "Fig. 6" is showing market share of social networking sites in India for the month of October 2014. Facebook is covering almost 97% of market share. "Table E" is showing data for market share of social networking sites in India for the month of October 2014. Facebook is still leading with 96.94% of market share. Twitter is having only 1.43%, Google+ is on only 0.20%, and YouTube is on only 0.18%.

Table D: Data for Market Share of Social Networking Sites in India (Q4 2013 - Q3 2014)

Date	Facebook	Twitter	Tumblr	Pinterest	Stumble Upon	YouTube	Google+	reddit	NowPublic	Vimeo	LinkedIn	Other
Q4-2013	88.34	5.80	1.27	1.46	1.11	0.96	0.27	0.07	0.63	0.02	0.04	0.03
Q1-2014	89.45	4.46	2.09	1.82	0.79	0.79	0.33	0.18	0.00	0.02	0.04	0.02
Q2-2014	89.46	3.95	2.29	1.95	0.87	0.71	0.43	0.25	0.00	0.04	0.03	0.01
Q3-2014	94.78	2.06	1.22	0.97	0.33	0.26	0.23	0.09	0.00	0.02	0.01	0.01

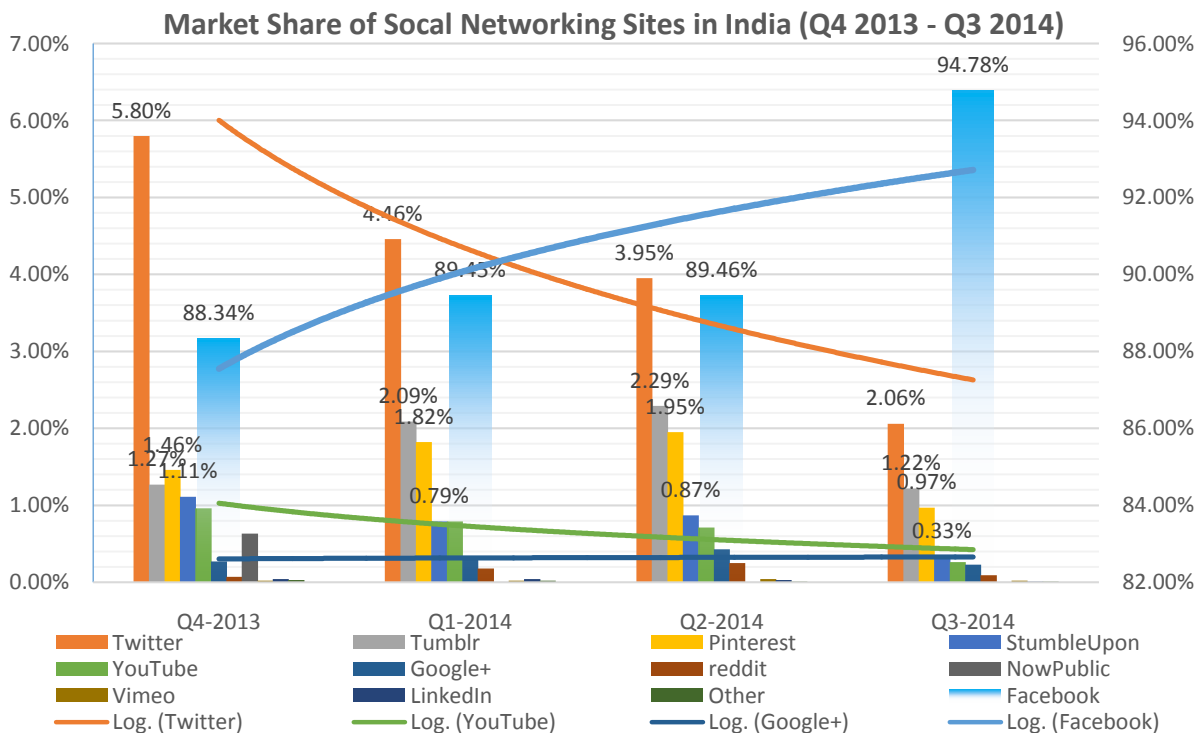
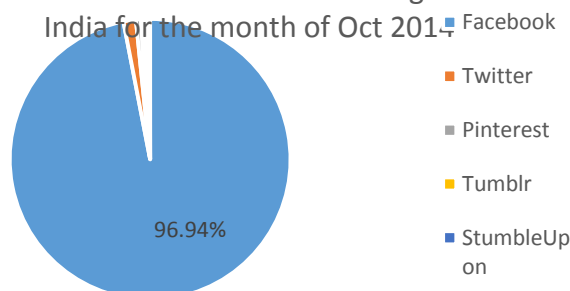


Fig. 5: Market Share of Social Networking Sites in India (Q4 2013 - Q3 2014)

Table E: Data for Market Share of Social Networking Sites in India for the month of Oct 2014

Market Share of Social Networking Sites in India for the month of Oct 2014



Social Networking	October 2014
Facebook	96.94%
Twitter	1.43%
Pinterest	0.57%
Tumblr	0.42%
StumbleUpon	0.17%
Google+	0.20%
YouTube	0.18%
reddit	0.06%
LinkedIn	0.01%
Other	0.01%

Fig.6: Market Share of Social Networking Sites in India for the month of Oct'14

Facebook is very user-friendly most recognized and preferred social networking website among all other networking site. It is a very straightforward way to keep track of and communicate with friends and co-workers. Facebook apps development which has turned out to be vogue, it has encouraged various small and big organization to promote their brand on Facebook, and this has increased the level of interest in miscellaneous applications among every business owners. Facebook is most powerful social networking website, more than 500 million active users access Facebook through desktop and mobile devices. An application is most worth asset of Facebook, it helps every business no matter big or small in order to promote to create customized Facebook application. Facebook tries to eliminate anonymity on the web, which in turns makes it appear safe and more inviting to people from around the world. Only people who have verified that they are in your same network (School, company, or region) can see profile. Facebook’s News Feed feature, released in September of 2006, gives users quick and easy access to interesting information about their friends from the home page.

**C. MOBILE & TABLET VENDER**

Market share analysis of Mobile & Tablet Venders is done to identify the venders which are popular among the people by providing better mobile cloud computing features in gadgets. “Table F” is showing Data for Market Share of Mobile & Tablet Vender in India for Quarter-4 2013 to Quarter-3 2014. “Fig. 7” is showing Market Share of Mobile & Tablet Vender in India for Quarter-4 2013 to Quarter-3 2014. Trend line of Sony Ericsson, Nokia, Samsung, Unknown, Micromax, and Apple is showing trend of their market share. As per data Samsung, Micromax, Sony Ericsson, and other companies who provides Android Operating System is growing in Indian market. Nokia, Apple and some other companies is losing its market hold. Bar for Nokia, Samsung, Unknown, and Micromax is shown in secondary Y axis because of its high market share percent. “Fig. 8” is showing market share of mobile & tablet vender in India for the month of October 2014. Samsung is leading with 31.92% of market share. “Table G” is showing data for market share of mobile & tablet vender in India for the month of October 2014. Samsung is leading with 31.92% of market share. Nokia is having only 28.82%, Unknown companies (no branded) are on 16.97% with big market share, and Micromax is on 10.35%.

Table F: Data for Market Share of Mobile & Tablet Vender in India (Q4 2013 - Q3 2014)

Date	Nokia	Samsung	Unknown	Micromax	Sony Ericsson	Apple	Spice	HTC	LG	Lenovo	RIM	Alcatel
Q4-2013	39.58	27.69	19.83	5.78	1.41	1.72	0.63	0.87	0.86	0.49	0.34	0.34
Q1-2014	35.45	30.68	18.38	6.97	1.88	1.92	1.15	0.94	0.83	0.50	0.33	0.34
Q2-2014	32.47	32.39	17.32	8.16	2.58	1.92	1.21	0.97	0.76	0.60	0.33	0.33
Q3-2014	28.56	32.80	17.66	9.68	2.75	1.95	1.30	1.09	0.74	0.66	0.36	0.32
Motorola	Google	Huawei	Acer	ZTE	woPad	Sony	Lava	Asus	Coolpad	Dell	K-Touch	Other
0.04	0.11	0.09	0.06	0.09	0.05	0.00	0.00	0.00	0.00	0.01	0.00	0.03
0.07	0.17	0.11	0.06	0.08	0.07	0.00	0.00	0.01	0.01	0.01	0.00	0.03
0.24	0.24	0.13	0.13	0.07	0.08	0.01	0.00	0.01	0.02	0.01	0.01	0.04
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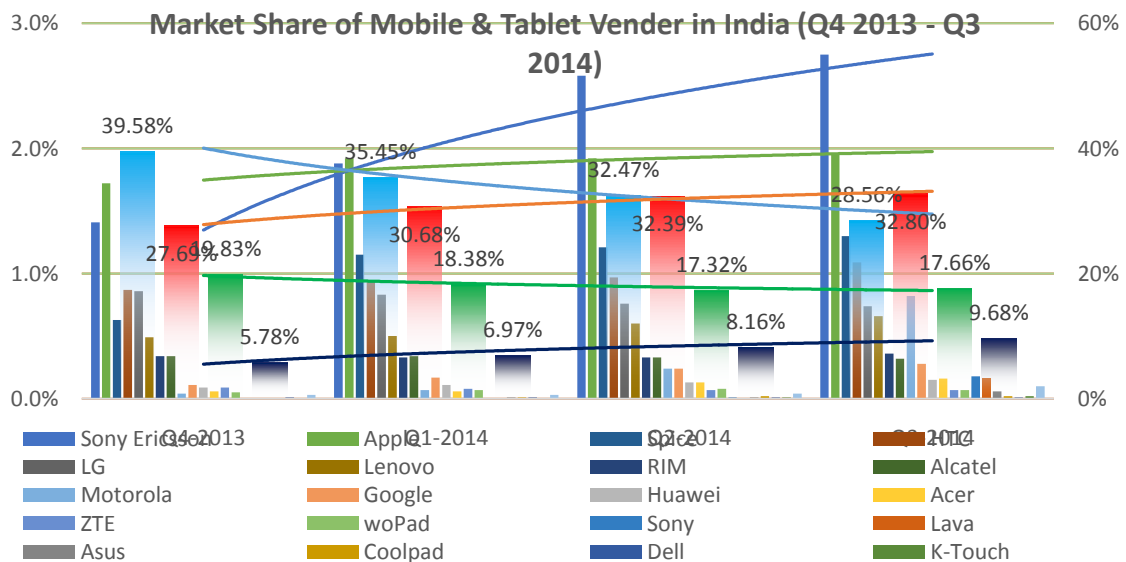


Fig. 7: Market Share of Mobile & Tablet Vender in India (Q4 2013 - Q3 2014)



Market Share of Mobile & Tablet Vender in India for October 2014

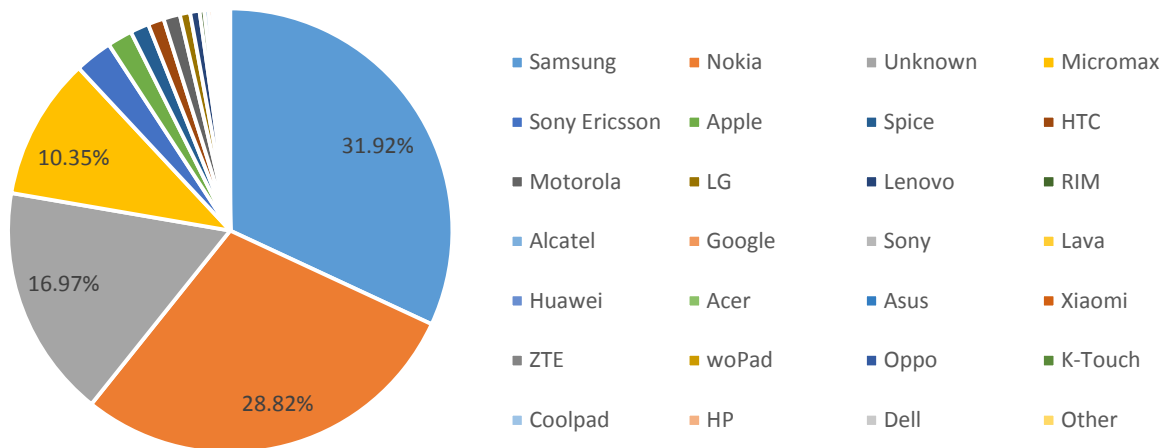


Fig. 8: Market Share of Mobile & Tablet Vender in India for October 2014

Table G: Data for Market Share of Mobile & Tablet Vender in India for Oct 2014

Vendor	Samsung	Nokia	Unknown	Micromax	Sony Ericsson	Apple	Spice	HTC	Motorola	LG	Lenovo	RIM	Alcatel	Google
Oct-14 (%)	31.92	28.82	16.97	10.35	2.74	1.82	1.36	1.17	1.20	0.75	0.69	0.34	0.31	0.29
Vendor	Sony	Lava	Huawei	Acer	Asus	Xiaomi	ZTE	woPad	Oppo	K-Touch	Coolpad	HP	Dell	Other
Oct-14 (%)	0.25	0.17	0.16	0.15	0.11	0.14	0.07	0.07	0.03	0.03	0.02	0.02	0.02	0.03

#### D. MOBILE, DESKTOP, AND TABLET

Share of Mobile, Desktop, and Tablet is showing that Mobile is new trend of using application. Market share of Mobile is very high in both cases with 98.2 and 72.22 percent. Tablet is trying to make space in market.

Date	Mobile	Tablet	Graph	Mobile	Desktop	Tablet	Graph
Oct-14	98.2	1.8		72.22	26.45	1.33	

Fig.9: Mobile, Desktop, and Tablet Market Share

#### V. CONCLUSION

Each types of apps has their advantages and disadvantages. Hybrid apps are best for building productivity apps, Utility apps or Enterprise apps. For building games or photos, videos related app Native apps are the way to go. If apps need to work in real time, which doesn't need access to the native layer and is not performance stressed, then mobile web apps are the way to go. Native apps, hybrid apps, or web apps are all ways to cater to the needs of the mobile user. There is no unique best solution: each of these has their strengths and weaknesses. The choice of one versus the other depends on unique needs.

Android is most popular mobile operating system based on the Linux kernel. The O/S uses touch inputs that loosely correspond to real-world actions like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. Its open source operating system, which allows it to be used and customized by major companies like Samsung, Motorola, Micromax, HTC and more. It's popular with technology companies which require a ready-made, low-cost and customizable operation system for high-tech devices. Facebook is most powerful social networking website, more than 500 million active users access Facebook through desktop and mobile devices. Facebook beats the other social networking sites by long shot, too. Twitter is second most used social network, is most popular among younger users in India. Samsung, Micromax, Sony Ericsson, and other companies who provides Android Operating System is growing in Indian market. Nokia, Apple and some other companies is losing its market hold. Smartphones are used for multipurpose, Gaming is dominates mobile usage with 32% of time spent on iOS and Android devices, while Facebook remained a strong second with 17% of time spent on mobile.

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