A Study on KaiOS Technology

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Abstract

Today many people use the Internet on their mobile devices, but others could not able to do because Internet browsing on the mobile devices fell short of the desktop experience and for most of the people on the emerging market mobile device, where they need simple and powerful tool to access the Internet. KaiOS is a web-based mobile operating system that enables a new category of smart feature phones. KaiOS is forked from Boot to Gecko, a successor of the discontinued Firefox OS.

Keywords— *GPS (Global Positioning System), API (Application Program Interface), HTML (Hyper Text Markup Language), CSS (Cascading Style Sheet), UI (User Interface) and Wi-Fi (Wireless Fidelity).*

I. INTRODUCTION

Life is designed for users in emerging markets that previously did not have reliable access to the digital tools and information they need. Today many people use the Internet on their mobile devices, but others could not able to do because Internet browsing on the mobile devices fell short of the desktop experience and for most of the people on the emerging market mobile device would be their first gadget, where they need simple and powerful tool to access the Internet.

Over the last few years, Web technology has come to be of central prominence. Developing Web related applications is seen as a crucial skill in today's IT world. Welcome to the world of services to suit everyone's needs. When Mozilla announced the end of Firefox OS as a Mozilla-run project, the B2G source code has found its way into a surprising number of commercial products. In fact since Mozilla moved on from Firefox OS, its derivatives have shipped on an order of magnitude more devices than during its entire time under Mozilla's leadership and it has gone on to form the basis of the third largest and fastest growing mobile operating system in the world.

KaiOS is a web-based mobile operating system that is based on Linux [1]. KaiOS brings support of 4G/LTE, GPS, and Wi-Fi, as well as HTML5-based apps and longer battery life, to non-touch devices. It has an optimized user interface for smart feature phones, needs little memory, and consumes less energy than other operating systems. It also comes with the KaiStore, which enables users to download applications in categories like social media, games, navigation, and streaming entertainment.

KaiOS applications depend on web technologies – HTML5, CSS, and JavaScript and are controlled by Gecko runtime. The working framework is nearly lightweight on equipment asset use, and can keep running on gadgets with only 256 MB of memory [2]. In piece of the pie think about outcomes declared in May 2018, KaiOS beat Apple's IOS for second spot in India, while Android rules with 71%, yet somewhere near 9%. KaiOS development is as a rule generally ascribed to prevalence of the intensely valued JioPhone [3]. The working framework originally showed up in 2017 and is created by KaiOS Technologies Inc., a San Diego, California-based organization headed by CEO Sebastien Codeville with workplaces in different nations [3]. In June 2018, Google put US$22 million in the working framework [4].

KaiOS is an electronic portable working framework that empowers another classification of brilliant component telephones. It has a streamlined UI for brilliant element telephones, needs little memory, and expends less vitality than other working frameworks. It likewise accompanies the KaiStore, which empowers clients to download applications in classes like internet based life, amusements, route, and gushing stimulation.

A few years back the Mozilla Community created B2G OS (Boot to Gecko), a standalone operating system. That project was discontinued but being created by Mozilla, all its code was open source. From that open source code starts the story of KaiOS. KaiOS started its takeover of the mobile operating system market with a fork. In GitHub (a software development platform) a fork is the copy of a repository. Thus, a discontinued project became the foundation for

KaiOS. Today KaiOS has become the operating system of former "dumb phones" (so-called feature phones) that this mobile operating system transforms into smart phones.

II. ARCHITECTURE

KaiOS applications depend on web advancements. Rendering is finished by parsing HTML/CSS and painted utilizing realistic APIs.

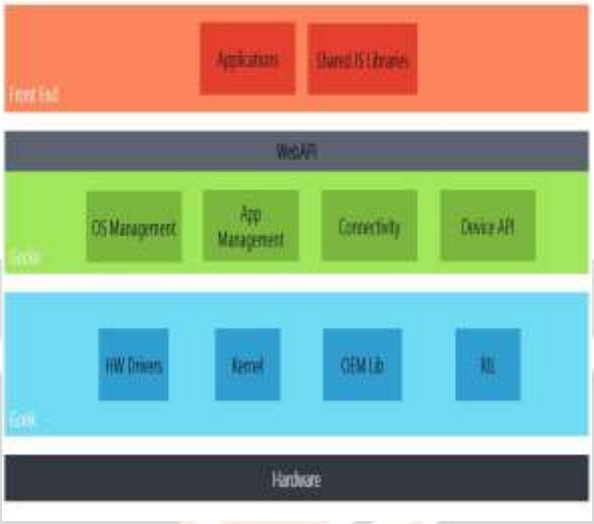

Fig. 1. KaiOS Architecture

JavaScript are executed by the JS motor Spider Monkey and associated with C++ parts by XPConnect and WebIDL ties. Applications and the center procedure impart just through IPC conventions characterized by IPDL [5].

A. Gaia

Gaia is the UI of the KaiOS stage. Anything drawn on the screen once KaiOS has propelled is a result of the Gaia layer. Gaia actualizes the lock screen, home screen, and all the standard applications you expect on a savvy highlight telephone. Gaia on KaiOS is executed utilizing HTML, CSS, and JavaScript. Its solitary interfaces to the hidden working framework are through open Web APIs, which are actualized by the Gecko layer. Outsider applications can be introduced nearby the Gaia layer [5].

Gaia is the center web application of the gadget and UI layer, all written in HTML5, CSS and JavaScript, with various presented APIs to permit the UI code to collaborate with the telephone equipment and Gecko usefulness.

B. Gecko

Gecko frames the KaiOS application runtime; that is, the layer that gives the majority of the help to the trifecta of open gauges: HTML, CSS, and JavaScript. It ensures those APIs function admirably on each working framework Gecko underpins. This implies Gecko incorporates, in addition to other things, a systems administration stack, designs stack, format motor, a JavaScript virtual machine, and porting layers.

Gecko is the web motor and introduction layer in KaiOS that associates equipment to HTML by filling in as the interface between web content and the fundamental gadget. Gecko gives a HTML5 parsing and rendering motor, automatic access to equipment usefulness by means of secure web APIs, a far reaching security structure, update the board, and other center administrations [5].

C. Gonk

Gonk is the lower level working arrangement of the KaiOS stage, comprising of a Linux part (in light of the Android Open Source Project (AOSP)) and a client space Hardware Abstraction Layer (HAL). The part and a few of the

client space libraries are normal open-source ventures: Linux, libusb, bluez, etc. A portion of different pieces of the HAL are imparted to the AOSP: GPS, camera, and others.

You could state that Gonk is a basic Linux dissemination. Gonk is a porting focus of Gecko; that is, there's a port of Gecko to Gonk, much the same as there's a port of Gecko to OS X, Windows, and Android. Since the KaiOS venture has full authority over Gonk, we can open interfaces to Gecko that can't be uncovered on other working frameworks. For instance, Gecko has direct access to the full communication stack and show outline cushion on Gonk, however doesn't have this entrance on some other working framework.

Gonk is the bit dimension segment in the KaiOS stack that fills in as the interface among Gecko and the hidden equipment. Gonk controls the hidden equipment and opens equipment abilities to Web APIs actualized in Gecko. Gonk can be viewed as the "black box" that does all the unpredictable, point by point work in the background to control the cell phone by establishing demands at the equipment level [5].

D. WebAxn Architecture

WebAxn is the mobile application platform designed using client/server based architecture. WebAxn abstracts the mobile device complexity from the application developer and provide standard development environment to develop new applications. These applications can be delivered over the following bearers/channels with little customization for each channel:

- Downloadable Client (WebAxn Client) on Android, iPhone, J2ME, Blackberry, Windows Phone
- USSD and SMS
- Exposed interface for other bearers or applications

Fig. 2. WebAxn Architecture

- WebAxn Server

WebAxn Server is a scalable platform on which services are deployed at run time. It has the ability to integrate with the mobile network node such as SMSC, USSD Gateway, and Billing System and so on.

The below diagram captures the high level architecture of the WebAxn Server:

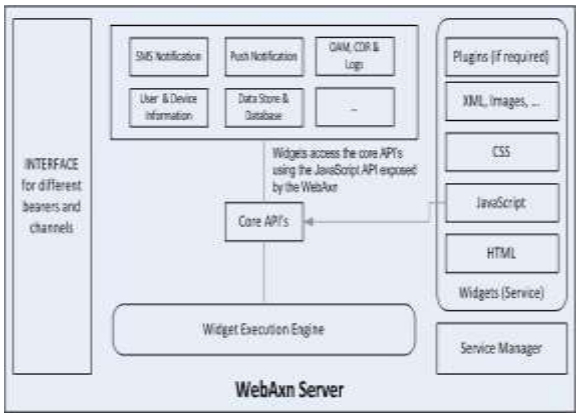

Fig. 3. WebAxn Server

WebAxn Server manages all the services/widgets that are installed on the server. Widgets are developed using HTML, JavaScript and styles are controlled through CSS and images. Subsequent section in this document explains how widget's can be designed and developed.

WebAxn Server exposes certain core API's that can be used by the widget. These API's are accessible by the Widget using the JavaScript. Please refer the JavaScript API section for the list of API's available.

- WebAxn Client

WebAxn Client is the native application that is downloaded on to the specific mobile device, which connects to the WebAxn Server to retrieve the display information. WebAxn Server shall execute the widget and sends the display information as per the platform. WebAxn Client integrates with the other core mobile device features such as call, Sms and also customized user interface.

III. DESIGN

Fig. 4. User Interface Design for KaiOS

User interface design isn't just about visuals. It's about making sure users get the best possible experience when navigating an application. We accomplish this by letting the user be guided by motion and color, delighted by imagery, influenced by typefaces, and pushed forward through intelligent layout structures [6].

This visual style guide serves as a resource for designers and developers, to help define the visual style for your KaiOS applications. The following components will help you incorporate the modern visual style of KaiOS into your applications.

KaiOS UI design resource sketch file is here for you to explore and design your first KaiOS app. The resource file requires Sketch 51 or higher version [6] and User Interface design for KaiOS is shown in Fig2. But acceleration readings can also be taken from smart-phones).

- Launcher Icon
- Action Icon
- UI Component
- Basic Navigation
- Key
- Typography
- Marketing Banner
- Hosted App

Widgets are small single purpose applications, built using standard WEB technologies that help enhance the user's access and experience content and services from operators, partners or the open Web in a simple and easy manner.

A web gadget is a website page or web application that is inserted as a component of a host site page however which is considerably autonomous of the host page, having restricted or no association with the host. [6]

A web gadget generally gives clients of the host page access to assets from another site, content that the host page might be kept from getting to itself by the program's equivalent source approach or the substance supplier's CORS arrangement. Some web gadgets however fill in as client selectable customizations of the host page itself.

A Mobile Web gadget has a similar reason and capacity as a web gadget, however it is made for use on a cell phone, for example, cell phone or tablet. Interestingly, a web gadget is on a PC or PC figure.

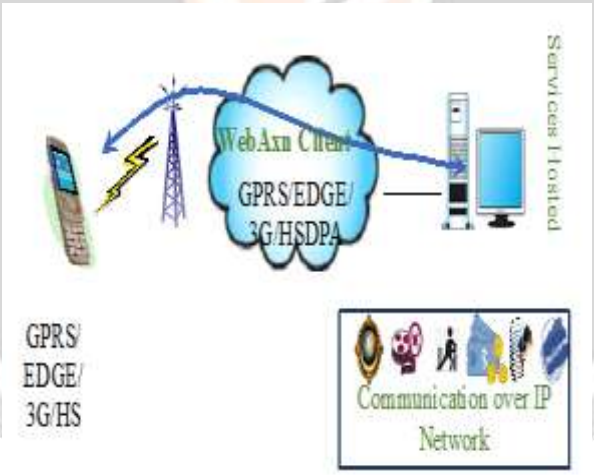

Fig. 5. Overview of WebAxn Framework

WebAxn is the customer server based versatile application stage. WebAxn abstracts the cell phone intricacy from the application designer and give WEB component to grow new applications.

WebAxn Client recovers the screen data from the server and does not have any fixed data as a major aspect of the customer. This empowers the application to carry on diversely dependent on the substance got from the server. The correspondence between the customer and server is utilizing WBXML format. The substance data must be rendered on the customer according to the gadget capacities.

The content information has to be rendered on the client as per the device capabilities. WebAxn is the client-server based mobile application platform. WebAxn abstracts the mobile device complexity from the application developer and provide WEB mechanism to develop new applications.

IV. CONCLUSION

Technology is everything in today's world. With each day there are new technologies. The future of mobile operating system is completely dependent on web based operating system.

KaiOS apps are based on web technologies – HTML, CSS, and JavaScript and are run by Gecko runtime. KaiOS brings support of 4G/LTE, GPS, and Wi-Fi, as well as HTML5-based apps and longer battery life, to non-touch devices.

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