Runtime Environment for eGovFramework Device API

Outline

With the runtime environment for eGovFramework Device API, you can develop the hybrid applications by a handful of basic functions required for implementation and execution of them. These functions include Device API, Javascript Framework, Hybrid Framework and SW structures that helps device application implemented and executed based upon web resources.

The open source eGovFramework Device API allows user discretion to customize the development process and is compatible with UX/UI using both web- and mobile-based runtime environment that efficiently interworks with eGovFramework Server Application (Interface API).
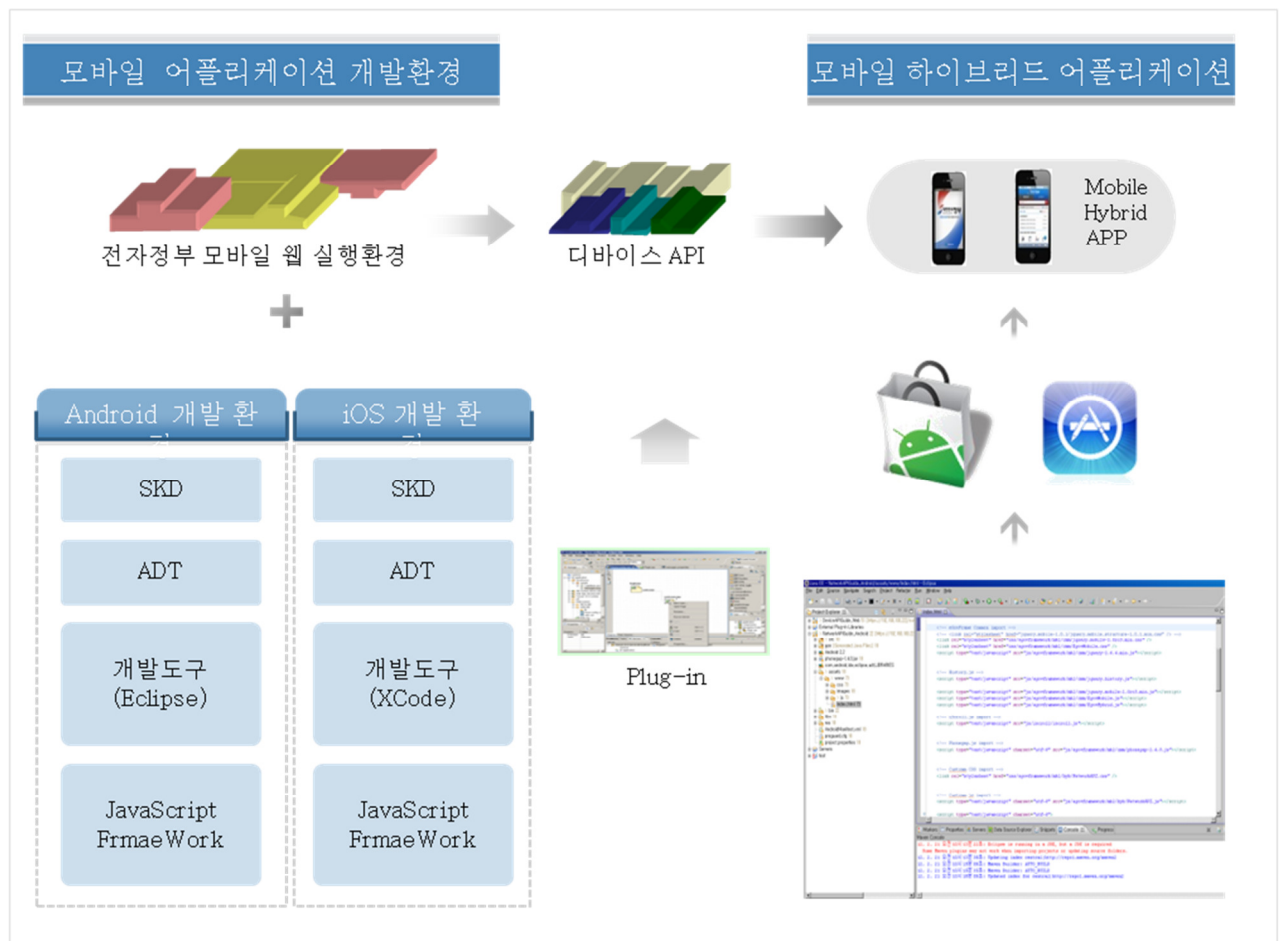
Objectives

The runtime environment for eGovFramework API provides you with the mobile device   API development environment equally in both desktop and mobile environment, for:

- Provision of Device API Guide Program for implementation of public service utilizing the mobile device function;
- Provision of the interface device API that allows the hybrid app interworking with the standard framework in the runtime environment of eGovFramework Device API;
- Provision of the open source PKI Device API available for mobile devices; and
- Optimization of development patterns, codes and guideances for both Android and iOS platforms for developers of the mobile device API.

Background

In line with the intent of eGovFramework, the runtime environment of eGovFramework provides the developers with the runtime environment for mobile web.
Like that, eGovFramework overcomes what the conventional mobile web development struggles with, by loading web resource URLs in the server application, hindering unrestricted use of in-device functions (such as phone camera and contact list).
eGovFramework offers the developers an opportunity to develop Hybrid Applications, allowing the in-device functions to be called via web resources. These are part of the Korean government's effort to improve eGovFramework services and informatization overall.

Feature

The runtime environment for eGovFramework Device API has been developed to meet the system requirements by eGovFramework and allow hybrid applications development, open source-based, by analyzing the existing hybrid framework.
In doing so, the runtime environment for eGovFramework Device API has been built based upon PhoneGap, a qualified opensource framework for implementation of web resouces and interworking necessary.
To use the in-device functions, PhoneGap has further been optimized as part of the runtime environment for eGovFramework Device API.
Also available is Device API Guide Program that helps the developers interwork with the application software and learn the developmental structures unique to eGovFramework Device API.

- With eGovFramework Device API, you can also enjoy the hybrid framework, JavaScript Framework Device API and Device API Guide Program that helpimplement the hybrid application in device.
- The open source software optimized for eGov Project – Runtime environment for eGovFramework Device API has been chosen by eGov Project as the most optimized and standardized means of hybrid application development.
- With that, eGovFramework Device API allows use of in-device functions such as Accelorator, Compass, Camera, Media, File Read/Write, Device, Vibrator, Network, GPS and Contact, as well as NPKI API and Interface API that are optimized for eGov Services.
- In support of the application software implemented via the older editions, eGovFramework supports standardized structure that allows inter-service rest communication with Spring-based services.

Major Open Sources

NO	Service Group	Services	Open Source	Expansion and Development

1	UX	UI/UX Library	jQuery Mobile	
2	Runtime Environment for Device API	A Mobile Hybrid Framework	PhoneGap	Cordova

Architecture of Runtime Environment for Device API

Runtime environment for eGovFramework Device API supports implementation of the hybrid application comprising HTML, CSS and JavaScript, as well as in-platform SDK that helps JavaScript-type Device API and native codes for platform, permitting use of in-device functions.
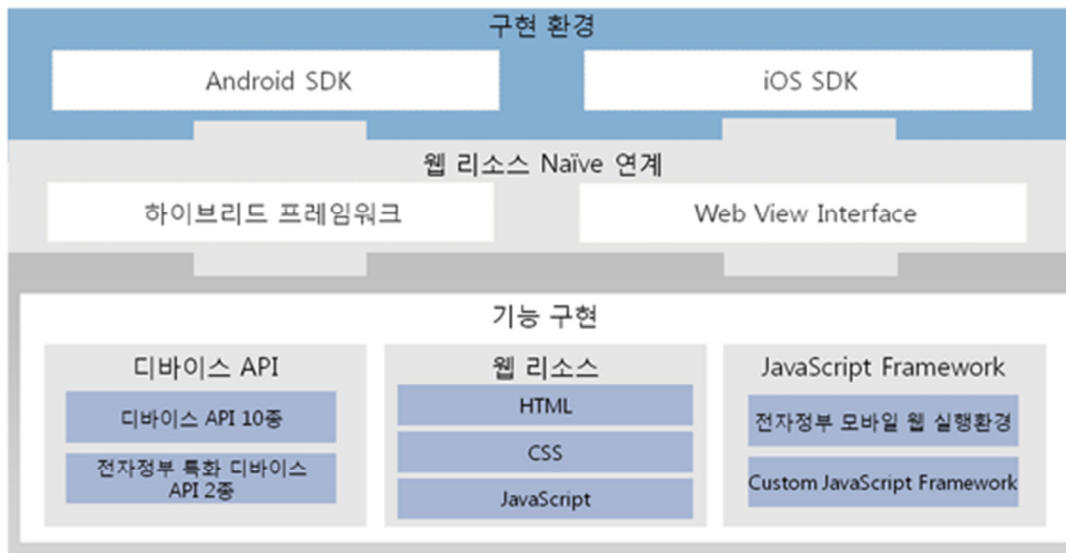
SDK

Runtime environment for eGovFramework Device API supports mobile platforms of iOS and Android. See the following for how Android SDK is made of:

- Linux kernel : Controls hardware driver, process and memory control, security, network, power control, etc.
- Libraries : Supports C/C++ core libraries such as Android libc and SSL that are compiled to support the a number of hardwares. You can find the library installed in the device by the hardware manufacturer.
- Android Runtime : Comprises Core Libraries and Dalvik Virtual Machine. Comprises Dalvik, VM and Core Library and made of Kernels.
- Application Framework : Supports functions to be made to develop Android Application. Administers applications.
- Application : Top-tier Android Architecture Diagram. Execution of application is made equal level.

See the following for how iOS SDK is made of:

- iOS Kernel : Mach-based. Same with Mac OS X.
- Core OS and Core Services : Basic iOS Interfaces. Data types, Bonjour and Network Socket.
- Media Layer : 2D/3D, audio, video and other base functions. OpenGL ES, Quartz Core Audio and Core Animation.
- Cocoa Touch Layer : Objective-C-based. Offers the fundamental infrastructure to generate application program using various framework.

Hybrid Framework

The runtime environment for eGovFramework Device API includes the open source-based hybrid framework for interworking with web resources and native modules.
Being the open source hybrid framework, PhoneGap comprises the native-dependent Device API and the platform-independent application and runs the application using Web-view Client.

- The Hybrid Application is implemented by way of HTML5, Javascript and CSS and is not compiled when building the application.
- When application is executed, the device API web-view performs rendition by way of interpreting.

Web-view Interface

Both web resources and SDKs serve as interfaces.
Web-view Interface is implemented using Web Kit stored in the device platform.

- As a bridge, the Interface allows the user to call the hybrid application device API as a web-based Tool Kit that contains the browser function.
- The Interface also generates Web-View that SDK inherits, loading the sources in Web-View and uses Native API.

Device API

In implementation of Mobile Hybrid Application, the runtime environment of eGovFramework Device API uses the object Javascript and provides API to access the device. Web Application accesses the device resource by way of Web App.

- For hybrid application, Web Apps are developed in native-dependent language.
- Device-dependent functions that are not developed under HTML5 and Javascript standard codes can also be implemented using customized library.

Category	Function
Contacts	Accesses Contact DB in the device (create contact, search, etc.)
GPS	Accesses device GPS sensor (location, etc.)
Accelerometer	Accesses motion sensor (acceleration information, etc.)
Compass	Processes device pointing orientation
Camera	Accesses device camera application
Vibrator	Provides visual and audial information and vibration notification. (Generates alert, confirm, beep and vibrate)
Media	Allows the device to store and write audio files

File Read Write	Reads, writes and explores file system layer
Device	Accesses device H/W and S/W information (title of device, version of platform, etc.)
Network	Accesses device network information
PKI	Interlocks with NPKI Module
Interface	Interlocks with Web Server Application for eGovFramework

Web Resources

A Phonegap Project utilizes the commonly available web resources (HTML5, CSS3, JavaScript) in implementation of mobile hybrid applications. The web resources are reusable regardless of type of the device.

- You can add files such as HTML, CSS, Image and js, all reusable regardless of type of the device.
- Once the platform container (iOS, Android, etc.) is established, you can develop the web resources using HTML, JavaScript, CSS, etc.
- In the runtime environment for eGovFramework Device API, you can implement the web resources compatible with HTML5 and CSS3.

JavaScript Framework

In eGovFramework Device API, you can add JavaScript Framework, such as JS, in the Device SDK for developmental purpose.
Javascript frameworks supported in eGovFramework Device API are as follows:

- Web-based Runtime Environment for eGovFramework Mobile
- JQuery
- iScroll

eGov Hybrid Application

eGov Hybrid Application implemented using the runtime environment for eGovFramework Device API is built under Spring-based eGovFramework and Interface API.
The composition of eGov Hybrid Application inclusive of Device API Guide Program is as follows:
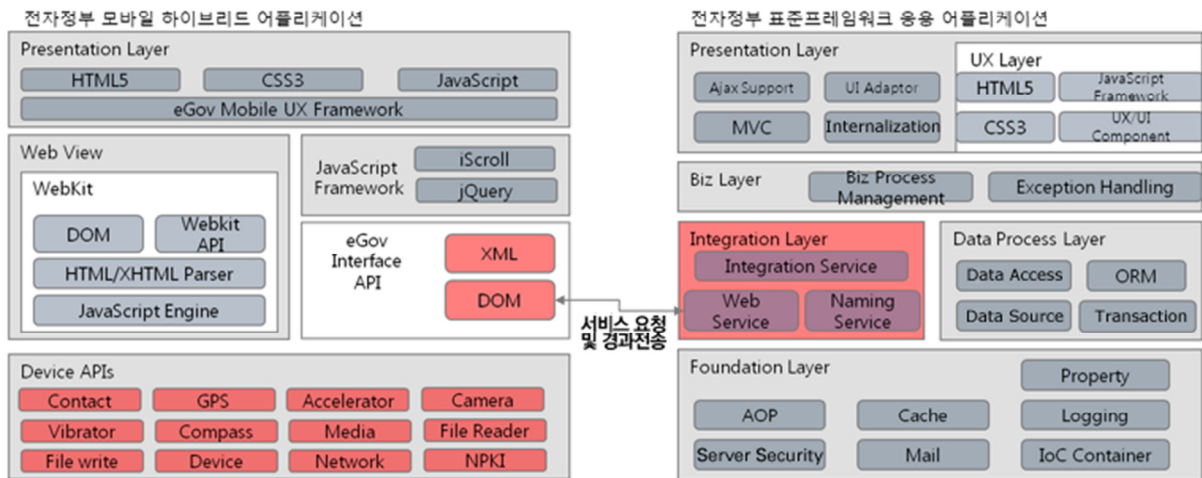
Runtime Environment Structure for Device API

The composition of eGovFramework Device API provided for each platform is as follows. The runtime environment for eGovFramework Device API supports the runtime environment library without any trouble:

How to import Device API Runtime Environment

```
<!-- Phonegap.js import -->
<script type="text/javascript" charset="utf-8" src="js/egovframework/mbl/cmm/cordova.js"></script>

<!-- eGovFrame Common import -->
<link rel="stylesheet" href="css/egovframework/mbl/cmm/jquery.mobile-1.4.5.css" />
<link rel="stylesheet" href="css/egovframework/mbl/cmm/theme-1.1.1.css" />
<link rel="stylesheet" href="css/egovframework/mbl/cmm/EgovMobile-1.4.5.css" />

<script type="text/javascript" src="js/egovframework/mbl/cmm/jquery-1.11.2.min.js"></script>
<script>
            $(document).on("pageinit", function(){
                        $.mobile.defaultPageTransition = 'none';
                        });
</script>
<script type="text/javascript" src="js/egovframework/mbl/cmm/jquery.mobile-1.4.5.min.js"></script>
<script type="text/javascript" src="js/egovframework/mbl/cmm/modernizr-2.0.4.js"></script>
<script type="text/javascript" src="js/egovframework/mbl/cmm/EgovMobile-1.4.5.js"></script>
<script type="text/javascript" src="js/egovframework/mbl/cmm/EgovHybrid.js"></script>

<script type="text/javascript" src="js/egovframework/mbl/cmm/jquery.validate.min.js"></script>
```

```
<script type="text/javascript" src="js/egovframework/mbl/cmm/json2.js"></script>

<!-- iScroll.js import -->
<script type="text/javascript" src="js/iscroll/iscroll.js"></script>
```

Android Directory Structure for Device API Runtime Environment

Directory	File	Remark
assets/www		
css		
egovframework		
mbl		
cmm		
	EgovMobile-1.4.5css	Common CSS for Mobile Runtime Environment
	jquery.mobile-1.4.5.css	Common CSS for jQuery Mobile
	theme.css	Themes for f, g
hyb	DeviceAPI.css	CSS for Device API Guide
js		
egovframework		
mbl		
cmm	EgovMobile-1.4.5.js	Common JS for Mobile Runtime Environment
	jquery.mobile-1.4.5.min.js	JS for jQuery Mobile
	jquery-1.11.2.min.js	JS for jQuery
	modernizr-2.0.4.js	Common JS for verification of Device API
	cordova.js	JS for Cordova
hyb	DeviceAPI.js	JS for Device API Guide
	index.html	
libs	cordova.jar	Wrapper Class for PhoneGap
res		Folder that administers resources
	AndroidManiFest.xml	Descriptor file for Android Application

iOS Directory Structure for Device API Runtime Environment

Directory				File	Remark
www					
	css				
		egovframework			
		mbl			
			cmm		
				EgovMobile-1.4.5.css	Common CSS for Mobile Runtime Environment
				jquery.mobile-1.4.5.min.css	Common CSS for jQuery Mobile
				theme.css	Themes for f, g
			hyb	DeviceAPI.css	CSS for Device API Guide
	js				
		egovframework			
		mbl			
			cmm	EgovMobile-1.4.5.js	Common JS for Mobile Runtime Environment
				jquery.mobile-1.4.5.min.js	JS for jQuery Mobile
				jquery-1.11.2.min.js	JS for jQuery
				modernizr-2.0.4.js	Common JS for verification of Device API
				cordova.js	JS for Cordova
			hyb	DeviceAPI.js	JS for Device API Guide
				index.html	
{Project_Name}					
	Resources				

	icons	Icon.png	Icon File for device background For iPhone 3 G/3GS only
		Icon@2x.png	Icon File for device background For iPhone 4 or better
		Icon-72.png	Icon for App Store search
	splash	Default.png	Splash file that appears when app runs iPhone 3G/3GS device
		Default@2x.png	Splash file that appears when app runs For iPhone 4 or better
Plugins			Destination folder for plugs-in added
Supporting Files		config.xml	Configuration file for App-Web communication
CordovaLib.xcodeproj			Sub-project where PhoneGap Framework is located