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Proyecto Seguridad informatica Auditoria aplicacion Uber

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1. Introducción

Desde los inicios de la red de la computacion, se quiso realizar un monitoreo de los paquetes que se envian dentro de una red, siendo una funcion de los Administradores de red de alguna empresa o establecimiento, para poder analizar los paquetes, donde puedan existir tipos de vulnerabilidades dentro de la red de la empresa. Se empezo a implementar seguridad en algunas empresas, para poder detectar y mitigar vulnerabilidades. Con el tiempo empezaron a aparecer empresas para prestar servicios de consultorias de seguridad. Pero lo que no se ha podido lograr a lo largo de la historia es poder mitigar completamente la vulnerabilidad de las redes, debido a que siempre existira un riesgo residual que se debera hacer cargo uno.

¿Que es el riesgo residual?

El riesgo residual se refiere al riesgo remanente luego de realizar un plan de seguridad que disminuyo el riesgo total de un proyecto o sistema. Este riesgo se apalanca mediante la aceptación del mismo o con terceros que asuman este riesgo, generalmente como un seguro. (Ejemplo: Entidades generadoras de certificados SSL).

En el presente proyecto se realizara una auditoria de una aplicacion mobile, donde se debera realizar una investigacion de sus tipos de vulnerabilidades que se encuentran dentro de sus codigos, para luego realizar ataques eticos para ver que tan vulnerables es esta.

Luego de haber documentado esta auditoria a la aplicación, se deberá reportar estos riesgos a la empresa que se le realizo la auditoria. Para que esta entidad pueda mitigar estos problemas de encontrados

2. Aplicacion escogida

La aplicacion escogida, es Uber, una de las empresas de transporte mas importante a nivel mundial. Esta empresa se origino en el año 2009 dos amigos Travis Kalanik y Garret M. Camp. Esta empresa cuenta con 6700 empleados, el rubro de esta empresa es el transporte privado.

Historia

Garret M. Camp, canadiense licenciado en ingeniería, se encontraba en La Ciudad de la Luz junto un amigo lejano, el californiano Travis Kalanik, para asistir a LeWeb, un congreso sobre los negocios del futuro y la innovación. Paradojas del destino, y esperando un taxi que no paraba o nunca llegaba, fue que a las puertas de este evento, unas cuantas maletas, mucha lluvia, y quizá, un poco de mal humor, a este par de amigos se les ocurrió la idea de uno de los negocios más revolucionarios de los últimos años. ¿Qué pasaría si con mi móvil pudiese llamar a un coche para que estuviese en el lugar adecuado en el momento adecuado? Con esta sencilla idea comenzó la verdadera tormenta en las cabezas de estos personajes.



Uber es una compañía norteamericana que está transformando la manera en que las personas se mueven en las ciudades. Conectándose a través de una aplicación, de manera simple, a conductores con usuarios que requieren un servicio de traslado.

Así, ayudan a que las ciudades sean más accesibles, al ofrecer más opciones para los usuarios y más oportunidades de generación de ingresos para socios conductores.

3. Objetivos

3.1. Objetivo general

1. Se deberá realizar una auditoria de seguridad haciendo distintos tipos de ataques éticos a la aplicación Uber, para detectar sus problemas y reportarlos.

3.2. Objetivos específicos

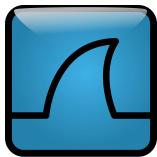
1. Estudiar la aplicación escogida
2. Buscar puntos de vulnerabilidad
3. Estudiar métodos de ataques

4. Marco Teórico

A continuación se detallan una serie de términos técnicos necesarios para el total entendimiento del presente proyecto:

4.1. Wireshark

Es una herramienta multiplataforma con interfaz grafica para el analisis de red, producto de la evolucion de Ethereal. Incluye la herramienta Tshark en modo consola para capturas, analisis de red, entre otras posibilidades. Este permite ver, aun nivel bajo y detallado, consultar todo lo que esta ocurriendo en la red. Es open source y multiplataforma. Se utiliza a menudo como mejor opcion al momento de auditar redes usualmente redes Ethernet y es compatible con algunas otras. es un analizador de protocolos de red. Permite capturar paquetes de datos desde una red en vivo, o leer los paquetes desde un archivo de captura previamente guardado, o imprimir un formulario descifrado los paquetes o escribir los paquetes en un archivo.



4.2. GitHub

Es una plataforma de desarrollo colaborativo para alojar proyectos utilizando el sistema de control de versiones Git. Utilizando el framework Ruby on rails por GitHub. El codigo se almacena de forma publica, aunque existe la opcion de almacenarlo de forma privada, pero para esto se debe crear una cuenta de pago.



4.3. Git

Es un software de control de versiones que fue diseñado por Linus Torvalds, pensando en la eficiencia y la confiabilidad del mantenimiento de versiones de aplicaciones cuando estas tienen un gran numero de archivos de código fuente. Git es utilizado para realizar respaldos de copia de seguridad de las versiones de las aplicaciones, para no dañar el código fuente o por si se daña o se borra, se puede realizar una recuperación del repositorio de Git.



4.4. MobSF

Mobile Security Framework es un marco automatizado de pen-testing capaz de realizar análisis estáticos y dinámicos, todo en uno, de aplicación móvil abierta (Android / iOS). Hemos estado dependiendo de múltiples herramientas para llevar a cabo la inversión, la decodificación, la depuración, la revisión de código y la prueba de pluma y este proceso requiere mucho esfuerzo y tiempo. Mobile Security Framework puede utilizarse para un análisis de seguridad eficaz y rápido de las aplicaciones de Android e iOS. Soporta binarios (APK - IPA) y código fuente comprimido.



4.5. Apktool

Una herramienta para la ingeniería inversa de terceros, cerrado, aplicaciones binarias de Android. Puede descifrar los recursos de forma casi original y reconstruirlos después de hacer algunas modificaciones. También facilita el trabajo con una aplicación debido al proyecto como la estructura de archivos y la automatización de algunas tareas repetitivas como la construcción de apk, etc.



5. Licencias Aplicacion

Acknowledgements

This application makes use of the following third party libraries:

Box

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This software is based in part on iGLU (http://www.opengl.org/documentation/specs/), an implementation of the OpenGL Utility Library (GLU) (http://www.opengl.org/documentation/specs/). iGLU is based on the GLU source included with Mesa 7.2 (http://mesa3d.sourceforge.net), which in turn derives from the SGI OpenGL Sample Implementations (http://oss.sgi.com/projects/ogl-sample). All code derived from SGI's source is licensed under the SGI Free Software License B version 2.0 (http://oss.sgi.com/projects/FreeB). All other code is licensed under the MIT license (http://www.opensource.org/licenses/mit-license.php).

(a) Licencia 13

(b) Licencia 14

6. Plan de accion

Que es un plan de accion?

Un plan de accion es una herramienta de planificacion de gestion y control de tareas en un proyecto. Este se basa en objetivos planteados que van a ir de manera incremental por cada entrega que se realiza. El plan de accion sirve para coordinar y comprender En el presente trabajo el plan de de accion a seguir van a ser variados metodos de accion a realizar, donde a la aplicacion se le realizara:

1. Modificar Codigo fuente de apps en smartphone
2. Simulacion de pago a Braintree
3. Ataque de DDoS
4. Inyeccion SQL a leveldb-library
- 5.

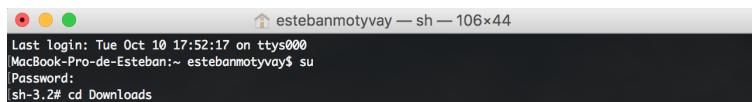
7. Desarrollo

7.1. Descompilacion

Para realizar la descompilacion de la APK de Uber, se debió realizar la instalación y actualización de algunos programas

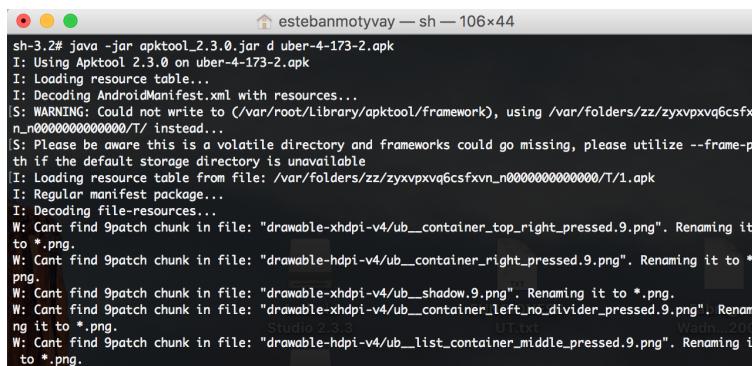
1. Java SDK y JRE
2. Android SDK
3. Apktool
4. uber.apk

Luego de haber instalado todos los programas necesarios, se debe abrir la terminal, donde se debe iniciar el Super Usuario (su) y se deberá ingresar la Pw correspondiente al super usuario. Luego se inicia todo el proceso de descompilacion de la Apps.



```
estebanmotyvay — sh — 106x44
Last login: Tue Oct 10 17:52:17 on ttys000
MacBook-Pro-de-Esteban:~ estebanmotyvay$ su
Password:
sh-3.2# cd Downloads
```

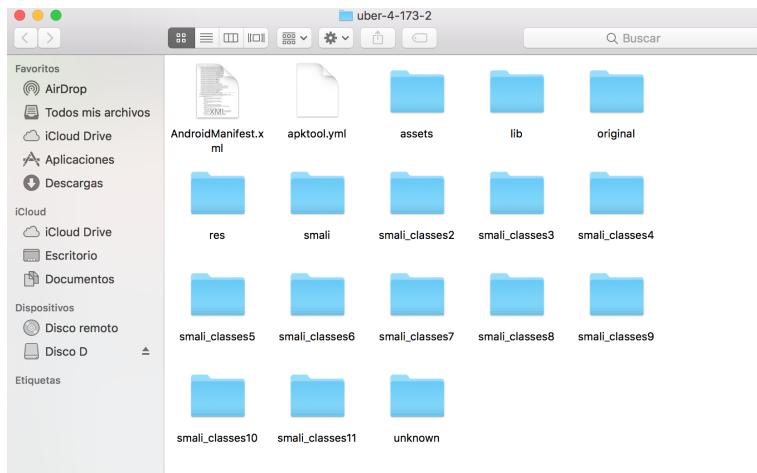
Luego de haber ejecutado el super usuario, se ejecuta la aplicacion Apktool.jar, este se busca por terminal y este se encuentra en descarga. Para poder ejecutarlo se ingresa el comando java -jar d nombredelaapk.apk. La d del comando significa descompilar.



```
estebanmotyvay — sh — 106x44
sh-3.2# java -jar apktool_2.3.0.jar d uber-4-173-2.apk
I: Using Apktool 2.3.0 on uber-4-173-2.apk
I: Loading resource table...
I: Decoding AndroidManifest.xml with resources...
[S: WARNING: Could not write to (/var/root/Library/apktool/framework), using /var/folders/zz/zxyvpxvq6csfxvn_n000000000000/T/ instead...
[S: Please be aware this is a volatile directory and frameworks could go missing, please utilize --framew...
I: Loading resource table from file: /var/folders/zz/zxyvpxvq6csfxvn_n000000000000/T/1.apk
I: Regular manifest package...
I: Decoding file-resources...
W: Can't find 9patch chunk in file: "drawable-xhdpi-v4/ub__container_top_right_pressed.9.png". Renaming it to *.png.
W: Can't find 9patch chunk in file: "drawable-hdpi-v4/ub__container_right_pressed.9.png". Renaming it to *.png.
W: Can't find 9patch chunk in file: "drawable-xhdpi-v4/ub__shadow.9.png". Renaming it to *.png.
W: Can't find 9patch chunk in file: "drawable-xhdpi-v4/ub__container_left_no_divider_pressed.9.png". Renami...
W: Can't find 9patch chunk in file: "drawable-hdpi-v4/ub__list_container_middle_pressed.9.png". Renaming it to *.png.
```

Luego de descompilar la aplicación, este genera los archivos de la aplicación donde se encontrara el .XML que sera donde estara el código de la aplicación y otros archivos complementarios para la aplicación. La aplicación al descompilar genero los siguientes archivos:

Analizado los códigos java y el archivo XLM que fueron generados al realizar ingeniería inversa al Apk, no fue posible detectar a simple vista ciertas fallas. Se requirió ayuda de ciertas aplicaciones de análisis de códigos para detectar vulnerabilidades, detectando que las únicas vulnerabilidades que contenía la aplicación, es mediante los



permisos que se requieren para instalar la aplicacion, como por ejemplo: Activar camara
Permitir Ubicacion Actual Permitir escribir en SD etc.

Utilizando la aplicación Android Studio, se detecto que esta utilizaba el metodo de
encriptacion de SHA1 y DSA

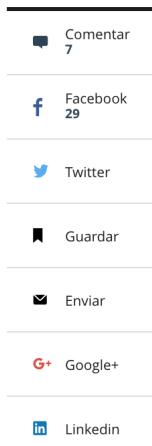
```
<!-- Signature Algorithms -->
<Algorithm URI="http://www.w3.org/2000/09/xmldsig#dsa-sha1"
           Description="Digital Signature Algorithm with SHA-1 message digest"
           AlgorithmClass="Signature"
           RequirementLevel="REQUIRED"
           JCEName="SHA1withDSA"/>
```

Uber al ser una aplicación tan grande y encontrarse ubicada en muchos países, esta cuenta con un nivel de seguridad muy alta en sus app y web. Como anteriormente Uber contó con unas vulnerabilidad, esta fue obligada por la comisión federal de comercio a tener una Auditoria de Seguridad permanente por 20 años.

Por ende, en este proyecto, no se basara en encontrar la vulnerabilidad y tratar de reventar esa vulnerabilidad, lo que se realizara sera tratar de realizar muchos métodos de ataque, y decir que tan segura es esta aplicación y porque.

Uber será auditada durante 20 años por violar privacidad de usuarios

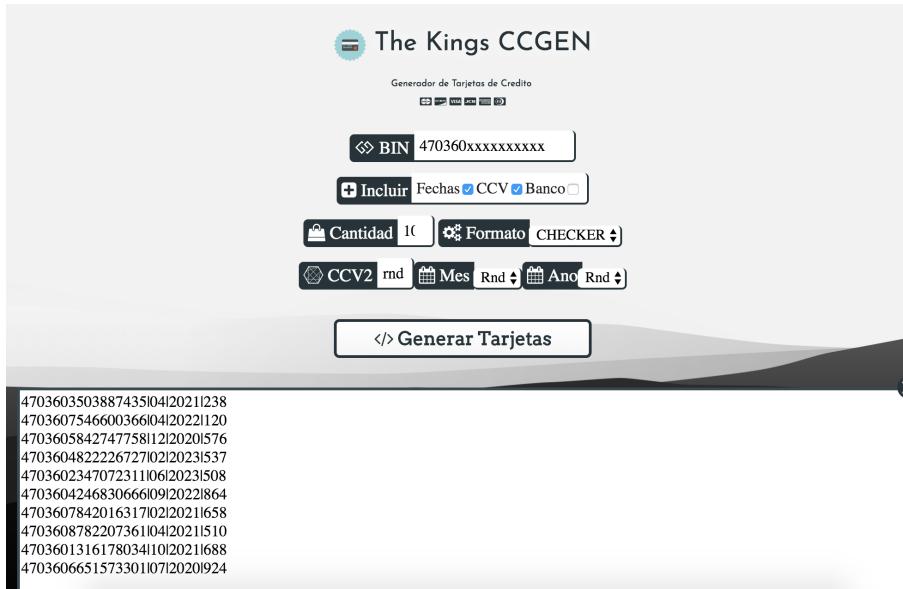
La compañía fue acusada de utilizar un software para monitorear desplazamientos.



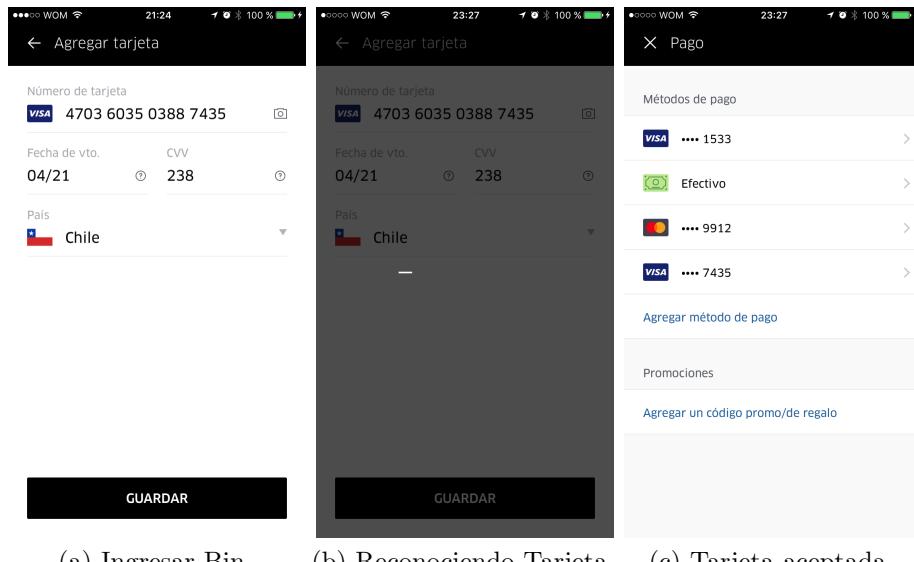
8. Pruebas

8.1. Bin Falso

Para iniciar las pruebas, se sabe que Uber su método de pago es en base a pago con tarjetas y efectivo, con un porcentaje de 60% y un 40% en efectivo. Por ende, se desea realizar un ingreso de Bin falso, de manera que este pase el sistema de verificación de Bin. Para esto se realizó una investigación sobre el funcionamiento de los Bin y mediante Internet, encontrar cuáles eran los bin falsos que se encontraban en funcionamiento. Que quiere decir que se encuentran en funcionamiento, con el tiempo la gente va investigando sobre las tarjetas de cada país, región, local, etc. Se busca los primeros 6 números de la tarjeta que encuentra accesible, esto funciona de manera que los primeros 4 dígitos de la tarjeta indican el banco, luego de que ya se sabe el banco, se empieza a trabajar en base a ese banco. Se encuentra luego el código de la sucursal que son los siguientes 4 dígitos, pero en este caso se utilizó los primeros 6 dígitos. ¿Por qué? Debido a que se escoge el banco si o si, luego los primeros dos dígitos asigna el rango de las sucursales, dando la posibilidad de encontrar alguna sucursal dentro de 99 posibilidades ya que son los siguientes 2 números que faltan. El resto de los dígitos, se le asigna al programa que los genere mediante números random pero cumpliendo algunos parámetros. Donde los 2 números siguientes vienen siendo los dígitos de control y los últimos 6 dígitos es el número de cuenta. Por ende los últimos 10 dígitos se dejan libre para que el generador se dedique a asignar la sucursal, los dígitos de control y el número de cuenta.



Se realiza la prueba de ingresar el fin generado a la plataforma de Uber.



Se puede apreciar en las imágenes, que el bin de la tarjeta fue aceptado, por ende se puede realizar un viaje. Lo mas probable que pueda pasar por lo investigado, que se realizara el viaje de manera gratis, para cuando llegue el momento de que Uber realizara el cargo a la tarjeta, este no podrá, se puede dar el caso de que Uber detecte en ese momento que la tarjeta es falsa y bloquee la cuenta, que es lo que le ha pasado a algunos usuarios que han realizado este método y por otro lado se puede dar el caso que queda el pago pendiente el cuenta, hasta realizar un nuevo viaje con otro método de pago o se cargara el pago cuando se registre otra tarjeta.

8.2. Ubicación Actual

En esta actividad, se desea realizar un cambio en la ubicación de Uber Drive. En que consiste Uber drive, es la aplicación de los chóferes de Uber donde este les muestra un Mapa de donde se encuentran los lugares donde existe la tarifa dinámica, esto quiere decir que en esos lugares donde esta la tarifa dinámica, el valor del viaje se multiplicara por lo indicado por Uber, esto depende de la cantidad de vehículos que anden trabajando y la cantidad de personas que solicitan el vehículo, cuando la demanda es alta, y los vehículos no alcanzan a cubrir todas las necesidades, se realiza la tarifa dinámica. Entonces que se desea realizar en esta actividad, es modificar la ubicación del teléfono de manera que yo no me encuentre en el lugar que debo estar, sino que asigne que mi ubicación se encuentra en el lugar de tarifa dinámica para poder aceptar viajes con un valor mas alto y tener un mayor ingreso a la cuenta. Por ende se instala Cydia.

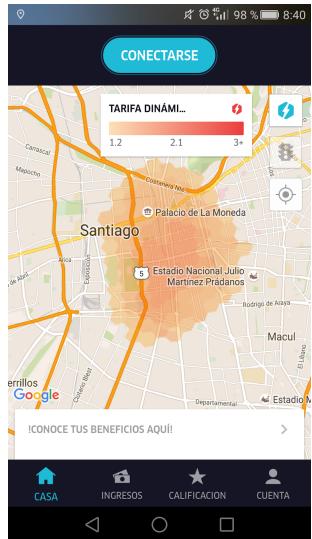


Cydia es una aplicación para iOS, que permite proveer software y demás modificaciones que no están disponibles en la App Store para los usuarios de jailbreak. Funciona a través de repositorios (repos) que son agregados por el propio usuario. Estos ficheros tienen extensión .deb, y pueden ser instalados descargándose de su respectivo sitio web (desde el dispositivo) o copiándolos a la carpeta de Cydia.

Luego se instala Fake GPS, que lo que realiza esta aplicación es asignar como ubicación actual, la ubicación que uno le indique que desea estar, siendo esa tu nueva ubicación actual.



Una vez que se instala Fake GPS, se abre Uber Drive para buscar el lugar que se encuentra con mayor flujo de gente y tarifa dinámica.



Luego de un tiempo, uber instalo un sistema que no se podía abrir la aplicación si es que este detectaba que el dispositivo fue adulterado por Cydia. Uber se volvió una de las aplicaciones mas seguras que existe en el mercado, generando una aplicación casi invulnerable debido a que esta instalo sistema de protección contra equipos adulterados, como por ejemplo en iPhone el sistema Cydia y en el caso de Android el sistema de Rootear el equipo.

8.3. Análisis de puertos

Para esta actividad se realizara una investigación donde se debe analizar el archivo AndroidManifest.xml que este se obtiene cuando se realiza la descompilación de la aplicación. Una vez descompilada se abre el archivo AndroidManifest con un editor de texto. Al analizar, se encuentra la dirección hacia el servidor con la que ellos trabajan.

```
<action android:name="android.intent.action.VIEW"/>
<category android:name="android.intent.category.DEFAULT"/>
<category android:name="android.intent.category.BROWSABLE"/>
<data android:host="m.uber.com" android:pathPrefix="/ul/" android:scheme="http"/>
<data android:host="m.uber.com" android:pathPrefix="/ul/" android:scheme="https"/>
```

Se puede visualizar que la dirección de estos es m.Uber.com . Abrimos Terminal, donde acá se ejecutara NMAP que sera la aplicación con la cual se analizaran los puertos. Para esto se ingresa sudo nmap -O http://m.uber.com y este dará los puertos que se encuentran desbloqueados en el servidor

```
Nmap scan report for m.uber.com (104.36.194.160)
Host is up (0.24s latency).
Other addresses for m.uber.com (not scanned): 104.36.194.232 104.36.194.134 104.36.194.159 104.36.194.190 1
04.36.194.234 104.36.194.231 104.36.194.191
Not shown: 997 filtered ports
PORT      STATE SERVICE
21/tcp    open  ftp
80/tcp    open  http
443/tcp   open  https
```

Este arroja que el servidor cuenta con 3 puertos abiertos, que estos son el puerto 21 - 80 - 443. Donde es de FTP - HTTP - HTTPS respectivamente, si estos puertos empezamos a analizar que tipo de ataques se pueden realizar, podemos ver que:

Puerto 21 - ftp:

- Buffer Overflow
- Denegacion de Servicio (DoS)
- Ataque de Fuerza Bruta
- Punto de Acceso

Puerto 80 http:

- Ataque CGI
- Buffer Overflow
- Denegación de Servicio (DoS)
- Recogida de Información
- Punto de Acceso
- Posibilidad de sniffer.

Adicionalmente al realizar el mapeo de Uber, se detecto que este dio 7 IP mas, esto quiere decir que debe haber un servidor Maestro y el resto son para repartir la carga de la cantidad de usuarios que existen.



9. Entregables

Entregable	Fecha
Entregable 1	27/09/2017
Entregable 2	11/10/2017
Entregable 3	25/10/2017
Entregable 4	2/11/2017
Entregable 5	15/11/2017
Entregable Final	29/11/2017

Cuadro 1: Tabla de entregables.

10. Anexos

Codigo de Verificacion de Bin