Contents

Introduction

This document consists of all guidelines and steps to integrate the L1 RD Service to make client applications to able to use FM220U L1 and AST300 devices for Aadhaar authentication and E-KYC purposes. This document contains integration guidelines for Windows and Android platforms.

Note:
Here Web Integration has been separated as Windows and Android both RD Services supports Web Integration.

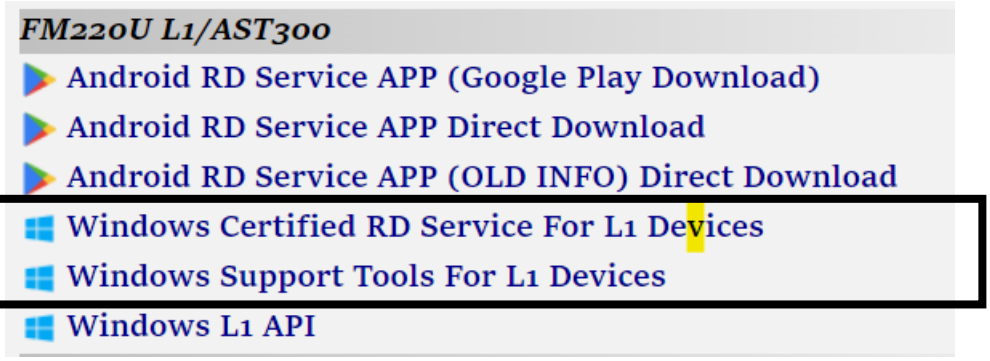
Note:
To detect device attachment and detachment at runtime, please find below VIDs and PIDs of both L1 device models. 1. FM220U L1 :- { VID: 0x0BCA, PID: 0x8230} 2. AST300 :- { VID: 0x34F9, PID: 0x8230}

Windows Integration

Integration Prerequisites:

Please install L1 RD Service and Support Tool setups from our website: https://acpl.in.net/RdService.html.

Please refer following screenshot for the same.



Note:
If ecosystem uses proxy, please refer following link to access guide to configure proxy settings in RD Service. https://www.acpl.in.net/assets/pdf/ProxySettingGuideforWindowsL1RD.pdf

Integration Guide:

To integrate L1 RD Service with any application, there are three HTTP web calls are provided as per UIDAI Specifications.

1. **RDSERVICE**
   Using RD Service Info XML, one can determine that device is in READY/NOTREADY/USED status.

   Refer following web call details,

   URL: https://localhost:11200/

   HTTP Method: RDSERVICE

   Content Type: text/xml

   Refer following snippet (C#) for programming guidance,

```
string completeUrl = "https://localhost:11200/";
HttpWebRequest request =
(HttpWebRequest)WebRequest.Create(completeUrl);
request.Method = "RDSERVICE";
request.Credentials = CredentialCache.DefaultCredentials;
request.ContentType = "text/xml";
WebResponse response = default(WebResponse);
response = request.GetResponse();
Stream str = response.GetResponseStream();
StreamReader sr = new StreamReader(str);
string finalResponse = sr.ReadToEnd();
```

   Refer sample RD Service Info XML given below for more knowledge.

```
<RDService xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" status="READY"
info="RD service for L1 provided by Access Computech">
        <Interface id="CAPTURE" path="/rd/capture" />
        <Interface id="DEVICEINFO" path="/rd/info" />
</RDService>
```

2. DEVICEINFO

Using Device Info XML, one can get all registered device related information like device certificate, device code, device provider code etc.

Refer following web call details,

URL: https://localhost:11200/rd/info

HTTP Method: DEVICEINFO

Content Type: text/xml

Refer following snippet (C#) for programming guidance,

```
string completeUrl = "https://localhost:11200/rd/info";
HttpWebRequest request =
(HttpWebRequest)WebRequest.Create(completeUrl);
request.Method = "DEVICEINFO";
request.Credentials = CredentialCache.DefaultCredentials;
request.ContentType = "text/xml";
WebResponse response = default(WebResponse);
response = request.GetResponse();
Stream str = response.GetResponseStream();
StreamReader sr = new StreamReader(str);
string finalResponse = sr.ReadToEnd();
```

Refer sample Device Info XML given below for more knowledge.

```
<DeviceInfo
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
dpId="STARTEK.ACPL" rdsId="RENESAS.ACPL.001" rdsVer="1.1.0"
dc="axxxxx1e-5xx0-4xx2-9xx7-4xxxxx84xx89" mi="FM220U L1"
mc="<device_public_certificate>" error="">
        <Additional_Info>
                <Info name="srno" value="AC0000056" />
                <Info name="sysid" value="RNVo4MzczOTA=" />
                <Info name="ts" value="0001-01-01T16:57:18+05:30" />
                <Info name="modality_type" value="Finger" />
                <Info name="device_type" value="L1" />
                <Info name="Customer_Bound" value="Open" />
                <Info name="FwVer" value="V2.02" />
                <Info name="TamperLevel" value="0" />
                <Info name="SubscriptionUpto" value="31-Dec-2099" />
                <Info name="BaseVer" value="1.0" />
        </Additional_Info>
</DeviceInfo>
```

3. CAPTURE

Using Capture call, one can capture biometric data and get the encrypted PID data XML. For capture we must send PID OPTION XML as input.

Refer following example PID OPTION XML.

```
<PidOptions ver="1.0" env="P">
<Opts fCount="1" fType="2" format="0" pidVer="2.0" timeout="" otp="" wadh="" posh="UNKNOWN"/>
<Demo></Demo>
<CustOpts></CustOpts>
</PidOptions>
```

Refer following web call details,

URL: https://localhost:11200/rd/capture

HTTP Method: CAPTURE

Content Type: text/xml

Data Payload: <PidOptions XML>

Refer following snippet (C#) for programming guidance,

```
string completeUrl = "https://localhost:11200/rd/capture";
HttpWebRequest request =
(HttpWebRequest)WebRequest.Create(completeUrl);
request.Method = "CAPTURE";
request.Credentials = CredentialCache.DefaultCredentials;
StreamWriter writer = new
StreamWriter(request.GetRequestStream());
string pidOptString = "<PidOptions ver=\"1.0\" env=\"P\"><Opts
fCount=\"1\" fType=\"2\" format=\"0\" pidVer=\"2.0\"
timeout=\"20000\" posh =\"UNKNOWN\" env=\"P\" wadh=\"\"
/></PidOptions>";
writer.WriteLine(pidOptString);
writer.Close();
WebResponse response = default(WebResponse);
response = request.GetResponse();
Stream str = response.GetResponseStream();
StreamReader sr = new StreamReader(str);
string finalResponse = sr.ReadToEnd();
```

Refer sample PID Data XML given below for more knowledge.

```
<PidData
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema">
        <Resp fType="2" iCount="0" iType="0" pCount="0" errCode="0"
errInfo="" fCount="1" nmPoints="45" qScore="82" />
        <DeviceInfo dpId="STARTEK.ACPL"
rdsId="RENESAS.ACPL.001" rdsVer="1.1.0" dc="axxxxx1e-5xx0-4xx2-
9xx7-4xxxxx84xx89" mi="FM220U L1"
mc="<device_public_certificate>" error="">
                <Additional_Info>
                        <Info name="srno" value="AC0000056" />
                        <Info name="sysid" value="RkNVo4MzczOTA=" />
                        <Info name="ts" value="0001-01-
01T17:10:15+05:30" />
                        <Info name="modality_type" value="Finger" />
                        <Info name="device_type" value="L1" />
                        <Info name="Customer_Bound" value="Open" />
                        <Info name="FwVer" value="V2.02" />
                        <Info name="TamperLevel" value="0" />
                        <Info name="SubscriptionUpto" value="31-Dec-
2099" />
                </Additional_Info>
        </DeviceInfo>
        <Skey ci="20xxx923">CZn86...</Skey>
        <Hmac>cb5ipiEzg5KWgBNS6w....</Hmac>
        <Data type="X">MjAyNC0.../B</Data>
</PidData>
```

Note:
All the request and response XML formats are given here are strictly based on UIDAI specifications. Please refer UIDAI specification documents from UIDAI website for XML format details.

Android Integration

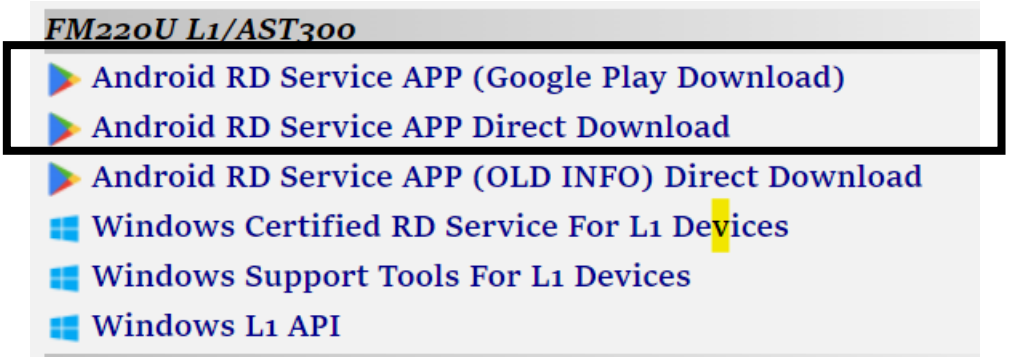
Integration Prerequisites

Please install L1 RD Service Application from our website: https://acpl.in.net/RdService.html

OR

Google Play Store.

Please refer following screenshot for the same.



Note:
If Android integration is achieved by web calls, please refer following link to access a guide to install HTTPS certificate on android device. https://acpl.in.net/assets/pdf/Android_HTTPS_Certificate_Setup.pdf OR https://acpl.in.net/assets/pdf/HTTPS_CERTIFICATES_MEHOD2.pdf

Integration Guide

To integrate L1 RD Service with any application, there are two Intent calls are provided as per UIDAI Specifications.

1. **INFO**

   This call will give RDService INFO XML and DeviceInfo XML in one request.

   Using RD Service Info XML, one can determine that device is in READY/NOTREADY/USED status.

   Using Device Info XML, one can get all registered device related information like device certificate, device code, device provider code etc.

   Refer following intent call details,

   Package Name: "*com.acpl.registersdk_l1"*

   Action Name: "*in.gov.uidai.rdservice.fp.INFO"*

   Refer following snippet (JAVA) for programming guidance,

```
ActivityResultLauncher<Intent> activityResultLauncher =
        registerForActivityResult(new
ActivityResultContracts.StartActivityForResult(), result -> {
            if (result.getResultCode() == RESULT_OK) {
                String rd_info =
result.getData().getStringExtra("RD_SERVICE_INFO");
                String dev String dev_info =
result.getData().getStringExtra("DEVICE_INFO");
            }
        });
```

.....

```
Intent intentCall = new Intent("in.gov.uidai.rdservice.fp.INFO");
intentCall.setFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
intentCall.setPackage("com.acpl.registersdk_l1");
activityResultLauncher.launch(intentCall);
```

Refer sample RD Service Info XML given below for more knowledge.

```
<RDService xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" status="READY"
info="RD service for L1 provided by Access Computech">
        <Interface id="CAPTURE" path="/rd/capture" />
        <Interface id="DEVICEINFO" path="/rd/info" />
</RDService>
```

Refer sample Device Info XML given below for more knowledge.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<DeviceInfo dpId="STARTEK.ACPL" rdsId="RENESAS.ACPL.001"
rdsVer="1.1.0" dc="a219be1e-5c10..." mi="FM220U L1"
mc="MIIDfzCCAmeg...">
        <Additional_Info>
                <Info name="modality_type" value="Finger"/>
                <Info name="device_type" value="L1"/>
                <Info name="srno" value="AC0000056"/>
                <Info name="Customer_Bound" value="Open"/>
                <Info name="sysid" value="7b46841748f60b7..."/>
                <Info name="SubscriptionUpto" value="31-Dec-2099"/>
                <Info name="ts" value="0001-01-01T17:28:41+05:30"/>
                <Info name="FwVer" value="V2.02"/>
        </Additional_Info>
</DeviceInfo>
```

2. CAPTURE

Using Capture call, one can capture biometric data and get the encrypted PID data XML. For capture we must send PID OPTION XML as input.

Refer following example PID OPTION XML.

```
<PidOptions ver="1.0" env="P">
<Opts fCount="1" fType="2" format="0" pidVer="2.0" timeout="" otp="" wadh="" posh="UNKNOWN"/>
<Demo></Demo>
<CustOpts></CustOpts>
</PidOptions>
```

Refer following intent call details,

Package Name: "*com.acpl.registersdk_l1"*

Action Name: "*in.gov.uidai.rdservice.fp.CAPTURE"*

Refer following snippet (JAVA) for programming guidance,

```
ActivityResultLauncher<Intent> activityResultLauncher =
registerForActivityResult(new
ActivityResultContracts.StartActivityForResult(), result -> {
    if (result.getResultCode() == Activity.RESULT_OK) {
        String pidDataXML =
result.getData().getStringExtra("PID_DATA");
    }
});
```

.....

```
Intent intentFingerCapture = new
Intent("in.gov.uidai.rdservice.fp.CAPTURE");
intentFingerCapture.setFlags(Intent.FLAG_ACTIVITY_CLEAR_TOP);
String pidOptXML = "<PidOptions ver=\"1.0\" env=\"P\"><Opts
fCount=\"1\" fType=\"2\" format=\"0\" pidVer=\"2.0\"
timeout=\"20000\" posh =\"UNKNOWN\" env=\"P\" wadh=\"\"
/></PidOptions>";
intentFingerCapture.putExtra("PID_OPTIONS", pidOptXML);
intentFingerCapture.setPackage("com.acpl.registersdk_l1");
activityResultLauncherCapture.launch(intentFingerCapture);
```

Refer sample PID Data XML given below for more knowledge.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<PidData>
        <Resp errCode="0" errInfo="" fCount="1" fType="2" iType="0"
iCount="0" pCount="0" nmPoints="32" qScore="76"/>
        <Data type="X">MjAyNC....</Data>
        <Skey ci="2025....">Y40bNSF...</Skey>
        <Hmac>wQuTw4N+yWpPV....</Hmac>
        <DeviceInfo dpId="STARTEK.ACPL"
rdsId="RENESAS.ACPL.001" rdsVer="1.1.0" dc="a219be1e-5c10-
47a2-9b87-4aecf5849689" mi="FM220U L1" mc="MIIDfzCCAm...">
                <Additional_Info>
                        <Info name="modality_type" value="Finger"/>
                        <Info name="device_type" value="L1"/>
                        <Info name="srno" value="AC0000056"/>
                        <Info name="Customer_Bound" value="Open"/>
                        <Info name="sysid"
value="7b46841748f60b759ff...."/>
                        <Info name="SubscriptionUpto" value="31-Dec-
2099"/>
                        <Info name="ts" value="0001-01-
01T17:31:13+05:30"/>
                </Additional_Info>
        </DeviceInfo>
</PidData>
```

Note:
All the request and response XML formats are given here are strictly based on UIDAI specifications. Please refer UIDAI specification documents from UIDAI website for XML format details.

Web Based Integration

To integrate L1 RD Service with any web application, there are three HTTP web calls are provided as per UIDAI Specifications. This can be achieved by using client side script code in JavaScript/jQuery.

Note:
If Android integration is achieved by web calls, please refer following link to access a guide to install HTTPS certificate on android device. https://acpl.in.net/assets/pdf/Android_HTTPS_Certificate_Setup.pdf OR https://acpl.in.net/assets/pdf/HTTPS_CERTIFICATES_MEHOD2.pdf

1. **RDSERVICE**

   Using RD Service Info XML, one can determine that device is in READY/NOTREADY/USED status.

   Refer following web call details,

   URL: https://localhost:11200/

   HTTP Method: RDSERVICE

   Content Type: text/xml

   Refer following snippet for programming guidance,

   ➔ JavaScript - Fetch

```
var requestOptions = {
  method: 'RDSERVICE',
  redirect: 'follow'
};

fetch("https://localhost:11200", requestOptions)
  .then(response => response.text())
  .then(result => console.log(result))
  .catch(error => console.log('error', error));
```

➔ JavaScript - jQuery

```
var settings = {
  "url": "https://localhost:11200",
  "method": "RDSERVICE",
  "timeout": 0,
};

$.ajax(settings).done(function (response) {
  console.log(response);
});
```

➔ JavaScript - XHR

```
var xhr = new XMLHttpRequest();
xhr.withCredentials = true;

xhr.addEventListener("readystatechange", function() {
  if(this.readyState === 4) {
    console.log(this.responseText);
  }
});

xhr.open("RDSERVICE", "https://localhost:11200");
xhr.send();
```

Refer sample RD Service Info XML given below for more knowledge

```
<RDService xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" status="READY"
info="RD service for L1 provided by Access Computech">
        <Interface id="CAPTURE" path="/rd/capture" />
        <Interface id="DEVICEINFO" path="/rd/info" />
</RDService>
```

2. DEVICEINFO

Using Device Info XML, one can get all registered device related information like device certificate, device code, device provider code etc.

Refer following web call details,

URL: https://localhost:11200/rd/info

HTTP Method: DEVICEINFO

Content Type: text/xml

Refer following snippet for programming guidance,

➔ JavaScript - Fetch

```
var requestOptions = {
  method: 'DEVICEINFO',
  redirect: 'follow'
};

fetch("https://localhost:11200/rd/info", requestOptions)
  .then(response => response.text())
  .then(result => console.log(result))
  .catch(error => console.log('error', error));
```

➔ JavaScript - jQuery

```
var settings = {
  "url": "https://localhost:11200/rd/info",
  "method": "DEVICEINFO",
  "timeout": 0,
};

$.ajax(settings).done(function (response) {
  console.log(response);
});
```

➔ JavaScript - XHR

```
var xhr = new XMLHttpRequest();
xhr.withCredentials = true;

xhr.addEventListener("readystatechange", function() {
  if(this.readyState === 4) {
    console.log(this.responseText);
  }
});

xhr.open("DEVICEINFO", "https://localhost:11200/rd/info");
xhr.send();
```

Refer sample Device Info XML given below for more knowledge.

```
<DeviceInfo
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema"
dpId="STARTEK.ACPL" rdsId="RENESAS.ACPL.001" rdsVer="1.1.0"
dc="axxxxx1e-5xx0-4xx2-9xx7-4xxxxx84xx89" mi="FM220U L1"
mc="<device_public_certificate>" error="">
        <Additional_Info>
                <Info name="srno" value="AC0000056" />
                <Info name="sysid" value="RNVo4MzczOTA=" />
                <Info name="ts" value="0001-01-01T16:57:18+05:30" />
                <Info name="modality_type" value="Finger" />
                <Info name="device_type" value="L1" />
                <Info name="Customer_Bound" value="Open" />
                <Info name="FwVer" value="V2.02" />
                <Info name="TamperLevel" value="0" />
                <Info name="SubscriptionUpto" value="31-Dec-2099" />
                <Info name="BaseVer" value="1.0" />
        </Additional_Info>
</DeviceInfo>
```

3. CAPTURE

Using Capture call, one can capture biometric data and get the encrypted PID data XML. For capture we must send PID OPTION XML as input.

Refer following example PID OPTION XML.

```
<PidOptions ver="1.0" env="P">
<Opts fCount="1" fType="2" format="0" pidVer="2.0" timeout="" otp="" wadh="" posh="UNKNOWN"/>
<Demo></Demo>
<CustOpts></CustOpts>
</PidOptions>
```

Refer following web call details,

URL: https://localhost:11200/rd/capture

HTTP Method: CAPTURE

Content Type: text/xml

Data Payload: <PidOptions XML>

Refer following snippet for programming guidance,

➔ JavaScript - Fetch

```
var myHeaders = new Headers();
myHeaders.append("Content-Type", "text/plain");

var raw = "<PidOptions ver=\"1.0\" env=\"P\"><Opts fCount=\"1\" fType=\"2\" format=\"0\" pidVer=\"2.0\" timeout=\"20000\" posh =\"UNKNOWN\" env=\"P\" wadh=\"\" /></PidOptions>";

var requestOptions = {
  method: 'CAPTURE',
  headers: myHeaders,
  body: raw,
  redirect: 'follow'
};

fetch("https://localhost:11200/rd/capture", requestOptions)
  .then(response => response.text())
  .then(result => console.log(result))
  .catch(error => console.log('error', error));
```

➔ JavaScript - jQuery

```
var settings = {
  "url": "https://localhost:11200/rd/capture",
  "method": "CAPTURE",
  "timeout": 0,
  "headers": {
    "Content-Type": "text/plain"
  },
  "data": "<PidOptions ver=\"1.0\" env=\"P\"><Opts fCount=\"1\"
fType=\"2\" format=\"0\" pidVer=\"2.0\" timeout=\"20000\" posh
=\"UNKNOWN\" env=\"P\" wadh=\"\" /></PidOptions>",
};

$.ajax(settings).done(function (response) {
  console.log(response);
});
```

➔ JavaScript - XHR

```
var data = "<PidOptions ver=\"1.0\" env=\"P\"><Opts fCount=\"1\"
fType=\"2\" format=\"0\" pidVer=\"2.0\" timeout=\"20000\" posh
=\"UNKNOWN\" env=\"P\" wadh=\"\" /></PidOptions>";

var xhr = new XMLHttpRequest();
xhr.withCredentials = true;

xhr.addEventListener("readystatechange", function() {
  if(this.readyState === 4) {
    console.log(this.responseText);
  }
});

xhr.open("CAPTURE", "https://localhost:11200/rd/capture");
xhr.setRequestHeader("Content-Type", "text/plain");
xhr.send(data);
```

Refer sample PID Data XML given below for more knowledge.

```
<PidData
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema">
        <Resp fType="2" iCount="0" iType="0" pCount="0" errCode="0"
errInfo="" fCount="1" nmPoints="45" qScore="82" />
        <DeviceInfo dpId="STARTEK.ACPL"
rdsId="RENESAS.ACPL.001" rdsVer="1.1.0" dc="axxxxx1e-5xx0-4xx2-
9xx7-4xxxxx84xx89" mi="FM220U L1"
mc="<device_public_certificate>" error="">
                <Additional_Info>
                        <Info name="srno" value="AC0000056" />
                        <Info name="sysid" value="RkNVo4MzczOTA=" />
                        <Info name="ts" value="0001-01-
01T17:10:15+05:30" />
                        <Info name="modality_type" value="Finger" />
                        <Info name="device_type" value="L1" />
                        <Info name="Customer_Bound" value="Open" />
                        <Info name="FwVer" value="V2.02" />
                        <Info name="TamperLevel" value="0" />
                        <Info name="SubscriptionUpto" value="31-Dec-
2099" />
                </Additional_Info>
        </DeviceInfo>
        <Skey ci="20xxx923">CZn86...</Skey>
        <Hmac>cb5ipiEzg5KWgBNS6w....</Hmac>
        <Data type="X">MjAyNC0.../B</Data>
</PidData>
```

Note:
All the request and response XML formats are given here are strictly based on UIDAI specifications. Please refer UIDAI specification documents from UIDAI website for XML format details.

Important Links

Please find below link to download demo code for ASP.NET

https://accesscomputech-my.sharepoint.com/:u:/g/personal/bhaumik_acpl_ind_in/EWhzZSaB6r1FpCAVz1iN2IsBLBy2YSwIHvf8hbtAzE9Phw

Please find below link to download demo code for C#.NET

https://accesscomputech-my.sharepoint.com/:u:/g/personal/bhaumik_acpl_ind_in/ETI9pGk6AFBAp2uOD_NKyIIBXsTCgH4eDDyWHSprLBpKTA

Demo Page to Test RD Service functionality.

https://www.acpl.in.net/fm220_entry/RD_Service_Call_HTTP.aspx

Please find below link to download demo code for Android in Kotlin

https://drive.google.com/file/d/1-0WKsuB7YY3bn2z57nljKWu09Ik8yQXt/view?usp=sharing

Please find below link to download demo code for Android in Java

https://drive.google.com/file/d/1XeahBM8tcY3LbroUzbznei8eYSBTNqfR/view?usp=sharing