SecuGen

SecuGen WebAPI Programmer's Manual

SDK version 1.1

SecuGen WebAPI Programmer's Manual (SG1-0121A-007)

Contents

1. Introduction

SecuGen WebAPI is an application programming interface that enables web applications to access SecuGen fingerprint readers from most modern web browsers. With support for JavaScript access to the readers, SecuGen WebAPI can be used across different browsers for extremely fast capturing and matching of fingerprint data for use in a web application.

SecuGen WebAPI makes it very simple to incorporate fingerprint capturing functionality in your browser based application through JavaScript. Using SecuGen WebAPI eliminates the need for Java runtimes or browser plug-ins on the client machine, so there are no issues involving applet signing and deployment related to different JRE versions and browser versions. This document describes the RESTFUL web service calls that are supported by SecuGen WebAPI.

Main Features
- Easy to integrate fingerprint capture, enrollment, and matching functions
- Works with most modern web browsers
- Supports JavaScript
- Utilizes RESTful web service and JSON objects
- No Java runtimes needed
- No browser plug-ins needed
- Small client software

Fingerprint Functions Provided
SecuGen WebAPI provides simple web service calls to the WebAPI Client application to capture fingerprint data and create a fingerprint template in a single method.

- Capture – single finger
- Capture and enroll – single finger
- Capture and enroll – multiple fingers
- Match

UIDAI/Aadhaar Specific Support
SecuGen WebAPI provides calls that are specific to UIDAI to capture PID block for single or multiple fingers. Support for UIDAI BFD (Best Finger Detection) provides RBD block with local duplicate check. Applications such as Aadhaar authentication, Aadhaar-based e-KYC, and BFD are extremely easy to develop and deploy as web-based applications using SecuGen WebAPI.

License Requirements
A license key for each domain that hosts your web application will be needed. If no license key is installed, the web service will work for a limited period of 60 days. Please contact your SecuGen Representative for information about licensing and pricing.
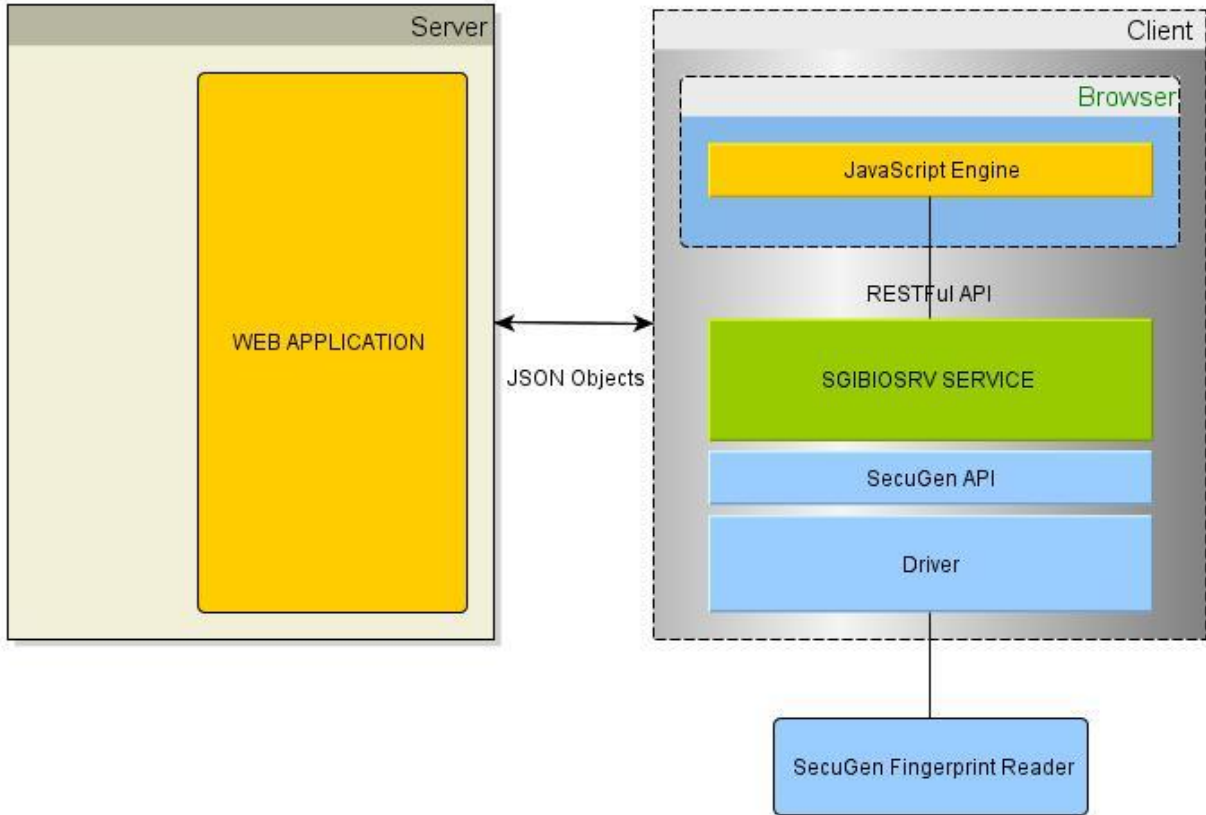
2. Installation and Requirements

System Requirements
- Windows 7 or later, 32-bit or 64-bit
- Memory 4 GB minimum

Supported SecuGen Fingerprint Readers
- Hamster Pro (HUPx)
- Hamster Pro 10 (HU10)
- Hamster Pro 20 (HU20, HU20-A, HU20-AP)
- Hamster IV (HSDU04P)
- Hamster Plus (HSDU03P)

Drivers for Fingerprint Reader
This product is built on top of the drivers for the supported SecuGen fingerprint readers listed above. It is recommended that the latest driver be installed. The drivers can be installed by one of two ways:
(A) Plug in the SecuGen fingerprint reader and the driver will automatically download and install via Windows Update, or
(B) Go to https://secugen.com/download, download and manually install the latest WBF driver.

WebAPI Client Application
To download the WebAPI client application (SgiBioSrv), go to: https://webapi.secugen.com/ and click on the appropriate link for the 32-bit or 64-bit client.
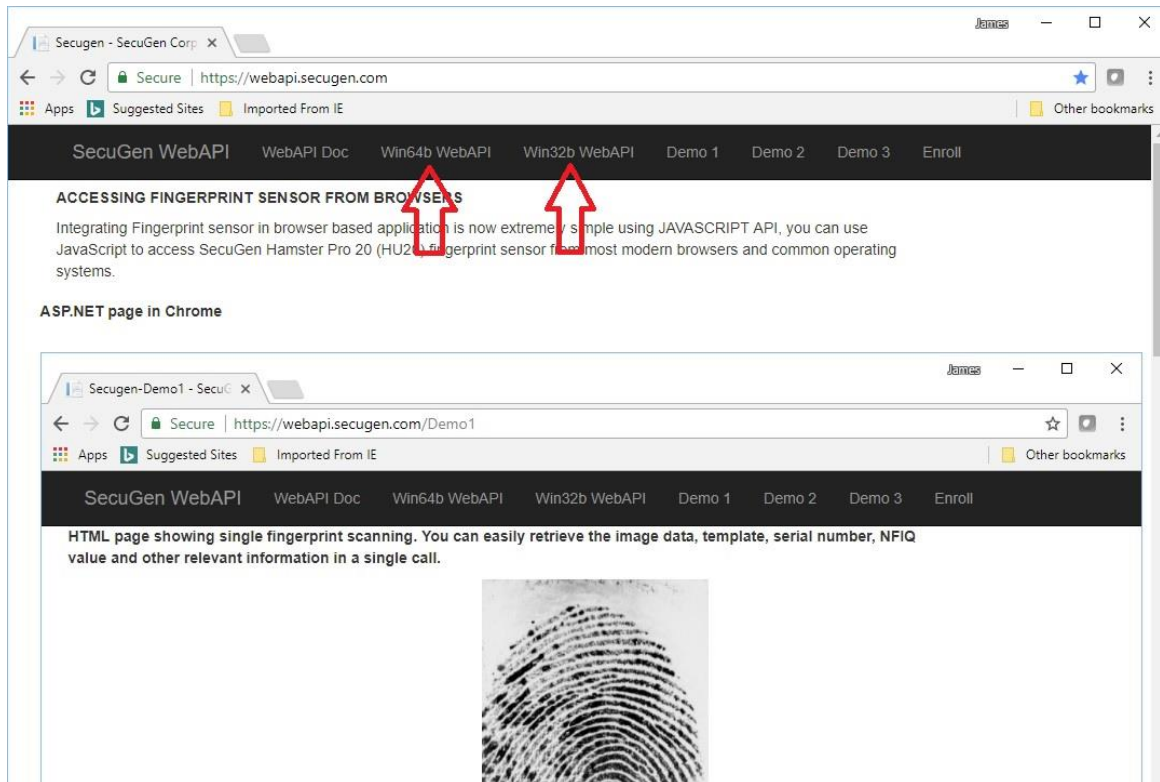
Run the downloaded zip file.
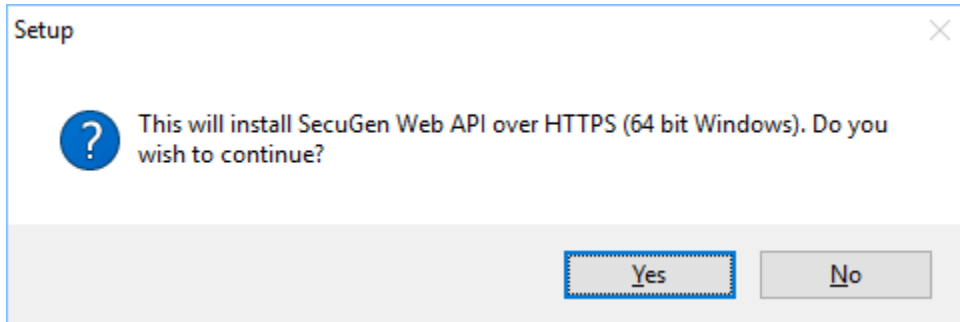
Click Yes to continue with installation.
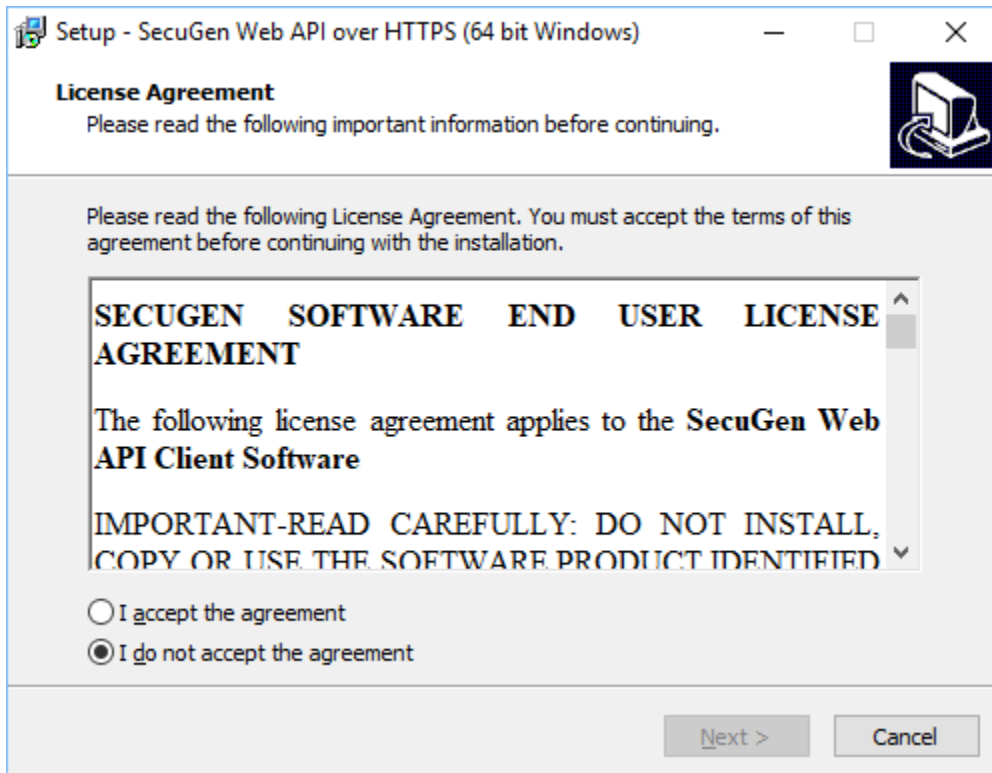
Click "I accept the agreement" and click Next.
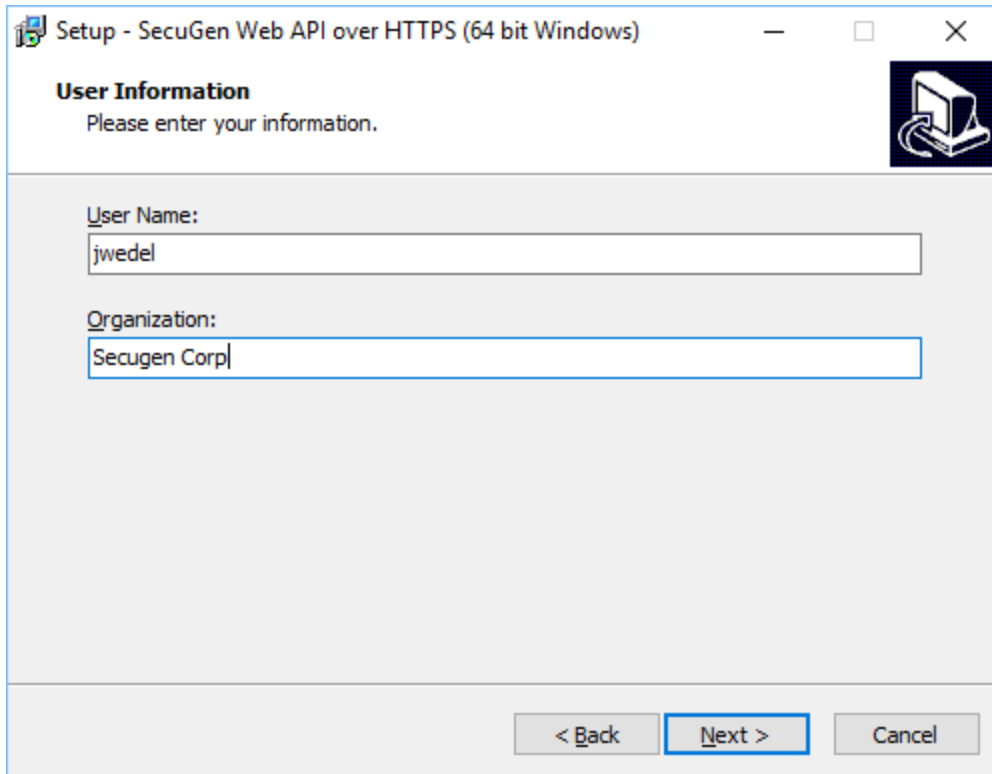
Fill in the User Name field along with the appropriate Organization. The User Name field is prepopulated with the name of the current Window user. Click Next.
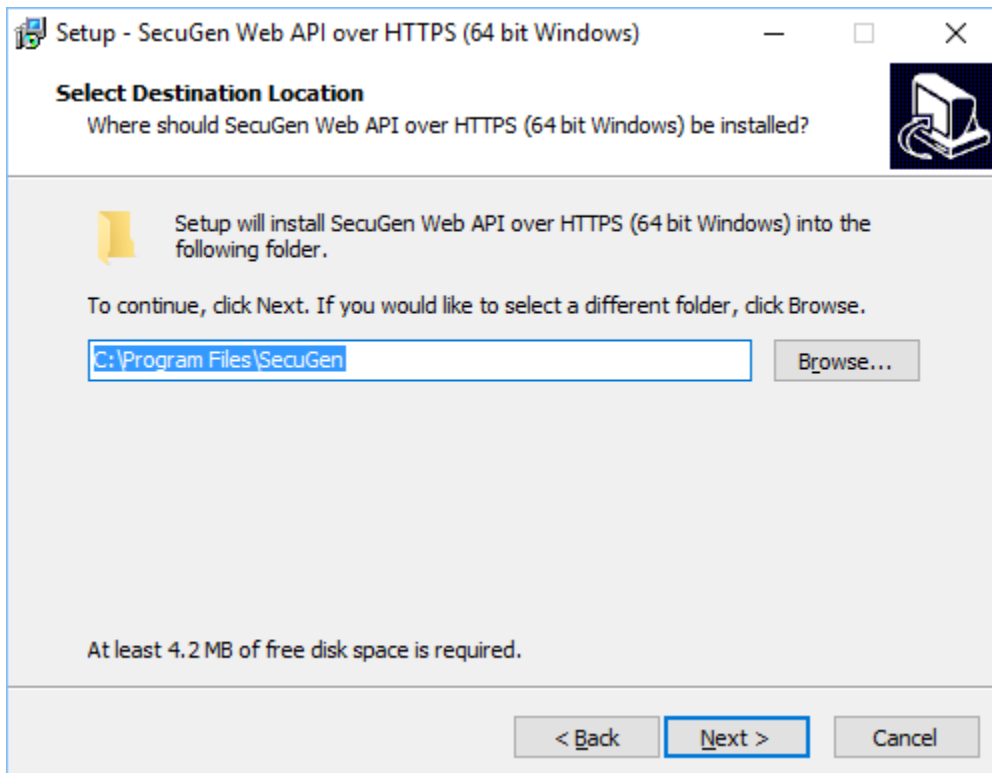
A default location is listed but can be changed if desired. Click Next.

Review the summary information and click Install to continue.

Select Yes and click Finish to complete the installation.

3. SGIFPCapture

The SGIFPCapture service returns fingerprint data, details of the fingerprint reader, and the extracted template to the caller as a JSON object. For HTTP requests, this service can be called as URI https://localhost:8000/SGIFPCapture. The port number may change depending on the way the service is configured. The default port for the service is 8000.

Parameters
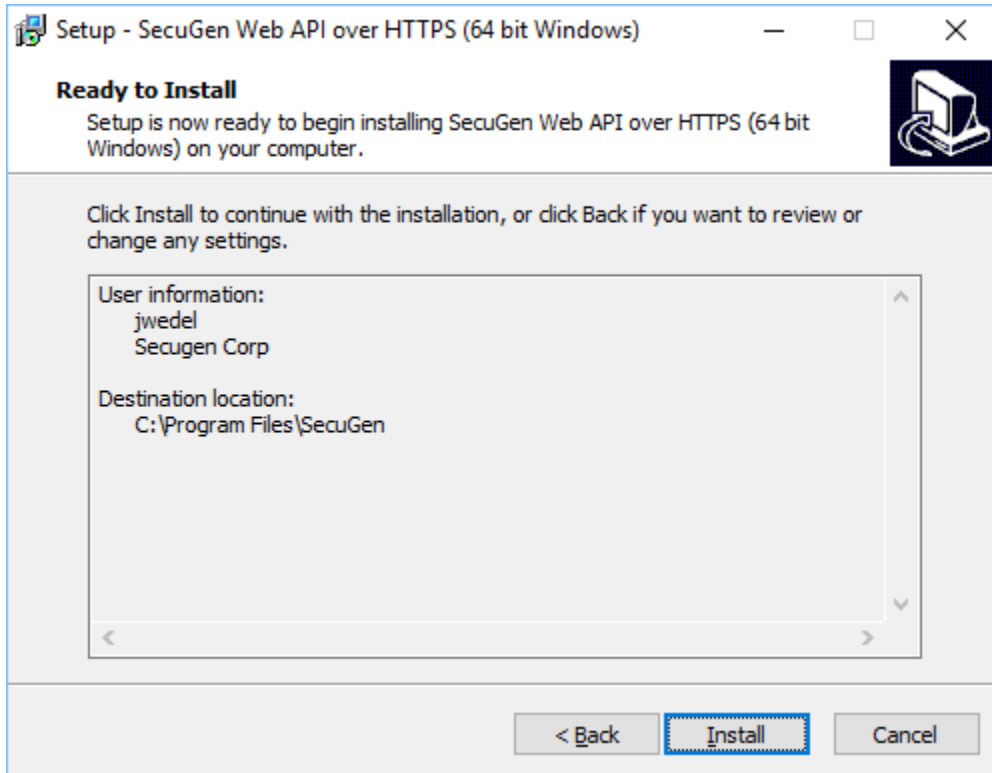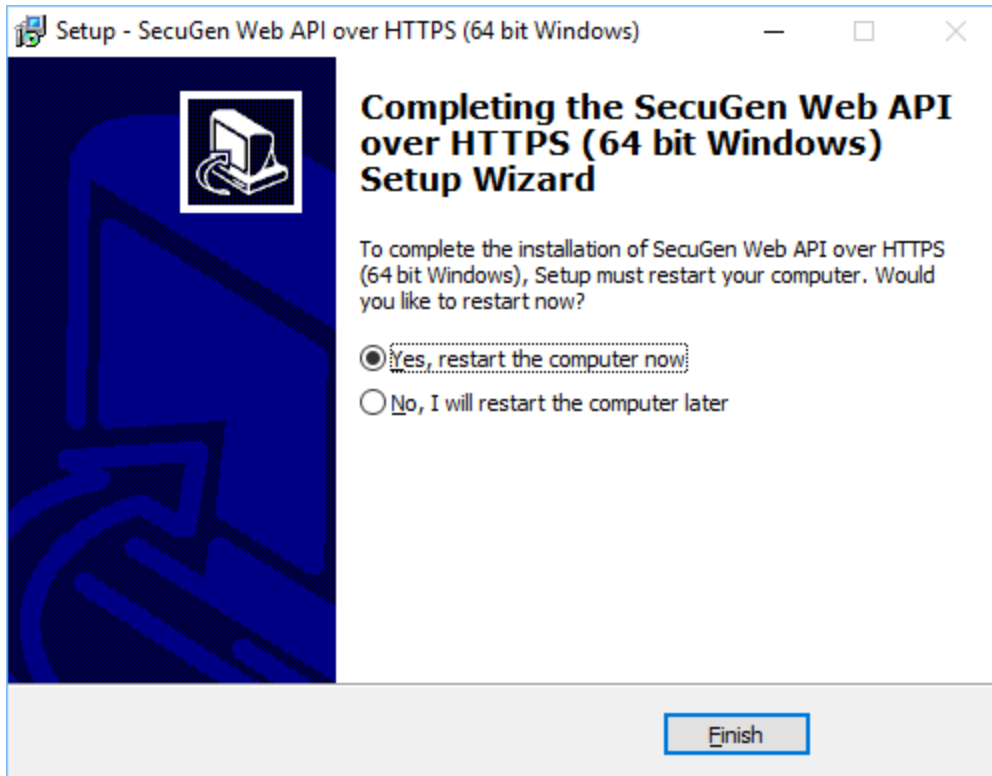The following table describes the parameters and their permissible values that can be passed to the service. All the parameters are optional, and their defaults are described below.

Name	Type	Description
Licstr	STRING	This is the license key provided for the domain. If not provided, the Web server will work for only a limited period of 60 days.
FakeDetection	INTEGER	Specifies the level of fake finger detection. At higher levels of fake finger detection, it becomes more difficult for users to successfully authenticate. Not all SecuGen fingerprint devices support all levels of fake finger detection, and some devices don't support any level of fake finger detection. Default value is 0 (OFF).
Timeout	INTEGER	Specifies the timeout in milliseconds to wait for the sensing operation to complete. If fingerprint image is not captured within this time (i.e. user does not place the finger on the reader), then an error is generated. Default value is 10000.
TemplateFormat	STRING	Extractor template format is specified in this parameter. Currently supported values are "ISO" and "ANSI". Default is "ISO".
ImageWSQRate	FLOAT	Wavelet Scalar Quantization specification compression ratio. 2.25=WSQ_BITRATE_5_TO_1; 0.75=WSQ_BITRATE_15_TO_1; 0=No compression (WSQImage is not returned)

JSON Object Returned
The web service returns a JSON formatted object that contains the following fields.

Name	Type	Description
ErrorCode	INTEGER	Integer value indicating error if any. Value of 0 indicates no error. Non-zero error code indicates various errors described in this document elsewhere. *You must check this value before accessing other fields of JSON object. If this is not 0, then other fields are NULL or undefined.*
Manufacturer	STRING	SecuGen
Model	STRING	String indicating model of fingerprint reader
SerialNumber	STRING	String containing the unique serial number of the connected reader
ImageWidth	INTEGER	Integer value indicating the width of the fingerprint image in pixels
ImageHeight	INTEGER	Integer value indicating the height of the fingerprint image in pixels

Name	Type	Description
ImageDPI	INTEGER	Integer value indicating resolution of the fingerprint image in dots per inch.
ImageQuality	INTEGER	Integer value indicating the quality of the image captured. It will always be equal to or higher than the quality parameter passed as argument.
NFIQ	INTEGER	Integer value, NIST Finger Image Quality number from 1 – 5, where 1 is best and 5 is worst
ImageDataBase64	STRING	String containing actual raw image data encoded as a base64 string
BMPBase64	STRING	String value fingerprint image in .BMP format encoded as a base64 string, useful for display in browser using data element in image tag
TemplateBase64	STRING	String value containing fingerprint template encoded as a base64 format. This value is encrypted if called with session key parameter.
WSQImageSize	INTEGER	WSQ Image size returned in bytes
WSQImage	STRING	String containing encoded Wavelet Scalar Image compressed into a base64 string

4. SGIEnrollCapture

The SGIEnrollCapture service is useful for capturing multiple fingerprints from the fingerprint reader. The parameters are the same as those used for SGIFPCapture and can be used to capture one fingerprint as well. For HTTP requests, this service can be called as URI https://localhost:8000/SGIFPEnroll. The port number may change depending on the way the service is configured. The default port for the service is 8000.

The first call to this service creates a unique session and returns the session handle in the returned JSON object. The caller can use this handle for subsequent calls to capture additional fingerprints in the same session. These are accumulated by the service until the session ends. The session ends when the service is called with a null session handle or no session handle. Every call returns a JSON object containing all the templates captured up until that point.

If you wish to capture multiple fingerprints, call this service the first time with the SrvHandle parameter as null (or do not provide it at all). When the call returns, you will receive a session handle as part of the JSON object, which you can keep on passing for as long as you wish the fingerprint scans to be accumulated.

Call this service once for each capture along with the same server handle to accumulate fingerprint scans. The service also ensures that one fingerprint is present only once in the array, i.e. a local duplicate check is performed on the client end. The returned JSON object will contain an array of templates and current scan data.

Parameters

The following table describes the parameters and their permissible values that can be passed to the service. All the parameters are optional, and their defaults are described below.

Name	Type	Description
Licstr	STRING	This is the license key provided for the domain. If not provided, the Web server will work for only a limited period of 60 days.
FakeDetection	INTEGER	Specifies the level of fake finger detection. At higher levels of fake finger detection, it becomes more difficult for users to successfully authenticate. Not all SecuGen fingerprint devices support all levels of fake finger detection, and some devices don't support any level of fake finger detection. Default value is 0 (OFF).
Quality	INTEGER	Specifies the quality of the image. Desired value is from 1 to 100. Higher value implies better image. Default value is 50.
TemplateFormat	STRING	Extractor template format is specified in this parameter. Currently supported values are "ISO" and "ANSI". Default is "ISO".
SrvHandle	INTEGER	Service handle returned by the call. If the same handle is passed, then the service will continue to accumulate fingerprint scans, while checking for duplicates. This works as a session ID, where accumulation of scan is per session. When this value is not passed, a new session begins, and earlier data is lost.

JSON object returned is described below.

```
{
        ErrorCode: INTEGER,
        Manufacturer: STRING,
        Model: STRING,
        SerialNumber: STRING,
        ImageWidth: INTEGER,
        ImageHeight: INTEGER,
        ImageDPI: INTEGER,
        ImageQuality: INTEGER,
        ImageNFIQ: INTEGER,
        Attempts: INTEGER,
        Result: INTEGER,
        EnrollData :    {    Templates :
                                    [ { fpos : STRING, nfiq : INTEGER, TemplateBase64 : STRING },
                                      { fpos : STRING, nfiq : INTEGER, TemplateBase64 : STRING },
                                      ...
                                    ]
                        }
        SerHandle: INTEGER,
        BMPBase64: STRING
}
```

Note that the EnrollData object contains an array of all the templates captured in the same session. The fields in the main object pertain to the current scan and maybe useful for a variety of functions such as displaying the image or determining the quality of the current scan. The attempts field counts the number of attempts made to achieve the specified quality. A maximum of 3 attempts is allowed.

5. SGIMatchScore

The SGIMatchScore service takes two templates as input, compares them with each other, and returns a matching score back to the calling application. For HTTP requests, this service can be called as URI https://localhost:8000/SGIMatchScore. The port number may change depending on the way the service is configured. The default port for the service is 8000.

Parameters

The following table describes the parameters and their permissible values that can be passed to the service. All the parameters are optional, and their defaults are described below.

Name	Type	Description
Licstr	STRING	This is the license key provided for the domain. If not provided, the Web server will work for only a limited period of 60 days.
Template1	STRING	String value containing template encoded as base 64 format. This value is encrypted if called with session key parameter.
Template2	STRING	String value containing template encoded as base 64 format. This value is encrypted if called with session key parameter.
TemplateFormat	STRING	Extractor template format is specified in this parameter. Currently supported values are "ISO" and "ANSI". Default is "ISO".

JSON Object Returned

The web service returns a JSON formatted object that contains the following fields.

Name	Type	Description
ErrorCode	INTEGER	Integer value indicating error if any. Value of 0 indicates no error. Non-zero error code indicates various errors described in this document elsewhere. ***You must check this value before accessing other fields of JSON object. If this is not 0, then other fields are NULL or undefined.***
MatchingScore	INTEGER	Integer value indicating the matching score of the 2 templates previously captured. Matching score is 0 – 199, with 199 being the very close to an identical match.

Error Codes

ERROR CODE	DESCRIPTION
0	No error
1	Creation failed (fingerprint reader not correctly installed or driver files error)
2	Function failed (wrong type of fingerprint reader or not correctly installed)
3	Internal (invalid parameters to sensor API)
5	DLL load failed
6	DLL load failed for driver
7	DLL load failed for algorithm

ERROR CODE	DESCRIPTION
51	System file load failure
52	Sensor chip initialization failed
53	Sensor line dropped
54	Timeout
55	Device not found
56	Driver load failed
57	Wrong image
58	Lack of bandwidth
59	Device busy
60	Cannot get serial number of the device
61	Unsupported device
101	Very low minutiae count
102	Wrong template type
103	Invalid template
104	Invalid template
105	Could not extract features
106	Match failed
1000	No memory
4000	Invalid parameter passed to service
2000	Internal error
3000	Internal error extended
6000	Certificate error cannot decode
10001	License error
10002	Invalid domain
10003	License expired
10004	WebAPI may not have received the origin header from the browser