StrongAuth®

Securing the Core

Using your FIDO U2F Authenticator (Token) with StrongKey CryptoCabinet User Guide - v3

StrongAuth, Inc.
150 W Iowa Ave
Sunnyvale CA 94086-6171
USA

August 2015

Products covered by and information contained in this publication are controlled by U.S. Export Control laws and may be subject to the export or import laws in other countries. Nuclear, missile, chemical or biological weapons or nuclear maritime end uses or end users, whether direct or indirect, are strictly prohibited. Export or reexport to countries subject to U.S. embargo or to entities identified on U.S. export exclusion lists, including, but not limited to, the denied persons and specially designated nationals lists is strictly prohibited.

DOCUMENTATIONIS PROVIDED “AS IS” AND ALL EXPRESSOR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTYOF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSEORNON-INFRINGEMENT, AREDISCLAIMED, EXCEPT TO THE EXTENT THAT SUCHDISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Introduction

StrongKey CryptoCabinet (SKCC) is an open-source web-application which allows end-users to encrypt files within a corporate environment and share those files securely with others while storing all encryption keys securely within a secure vault on-premises.

SKCC was originally created to demonstrate how to write web-applications using StrongAuth's open-source StrongKey CryptoEngine (SKCE) software. SKCE is the underlying “engine” that encrypts files of any-type and any-size, optionally storing them in public clouds such as Amazon Web Services' Simple Secure Storage (S3), Microsoft's Azure and Eucalyptus Walrus.

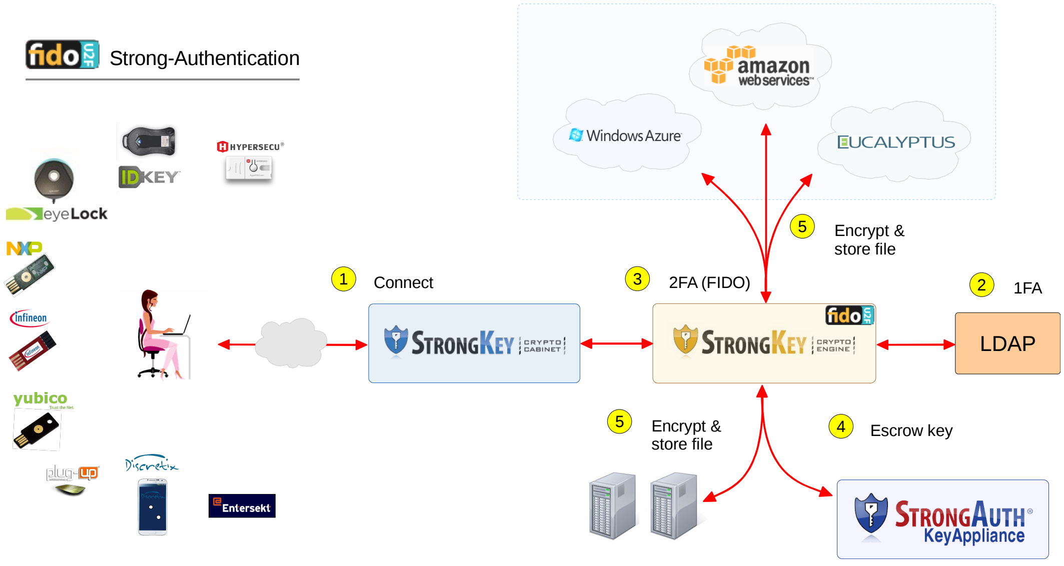
The SKCE also allows you to digitally sign documents to establish the authenticity of documents while simultaneously verifying their integrity.

More recently, StrongAuth built a Fast Identity Online (FIDO) Universal 2nd Factor (U2F) server into the SKCE to support the burgeoning protocol for strong-authentication. The SKCE is now an officially FIDO Certified™ U2F server.

SKCC, the web-application, was FIDO-enabled to take advantage of the FIDO Server built into SKCE, to demonstrate how to use the FIDO strong-authentication capability in the SKCE to protect end-user credentials within web-applications.

This document walks you through a demonstration of how to use your FIDO U2F Authenticator (aka Token) with SKCC on a demo site established by StrongAuth. The high-level architecture of the infrastructure you are interacting with, looks like the following:

__Note__: Secure cloud-storage is a standard feature of CryptoEngine, and may be used to store encrypted documents in the cloud if desired. However, cryptographic keys are __never__ stored in the cloud.



Prerequisites

In order to successfully work with this demonstration, you must have the following:

#	Description	
1	A FIDO Certified™ or FIDO Ready™ U2F Authenticator. While this document mentions three types of Authenticators in the text - HyperSecu, Neowave and Yubico U2F Authenticators (shown below) - it must be mentioned in fairness to all U2F Authenticator manufacturers, that SKCC has been tested with nearly a dozen different Authenticators – Discretix, eGis Technologies, Entersekt, EyeLock, Infineon, NXP, Plug-Up, Sonavation, ST Microelectronics, etc. - all successfully! As such, SKCC will work with <u>any</u> FIDO Ready™ or FIDO Certified™ U2F Authenticator available on the market.	
	HyperSecu	
	Neowave	
	Yubico	
2	A release of the Google Chrome browser that supports the U2F protocol. This document describes the use of SKCC with version 43 or above	
3	A Microsoft Windows, Apple OS-X or CentOS Linux-based computer.	

Please note that if you are using a Linux PC, you must perform the following task before beginning the demo:

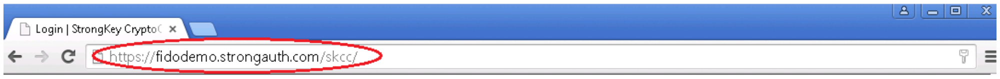
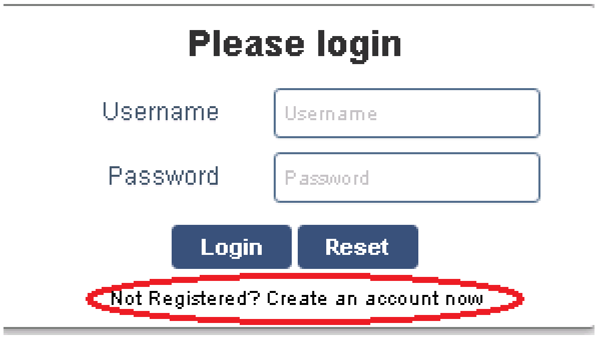
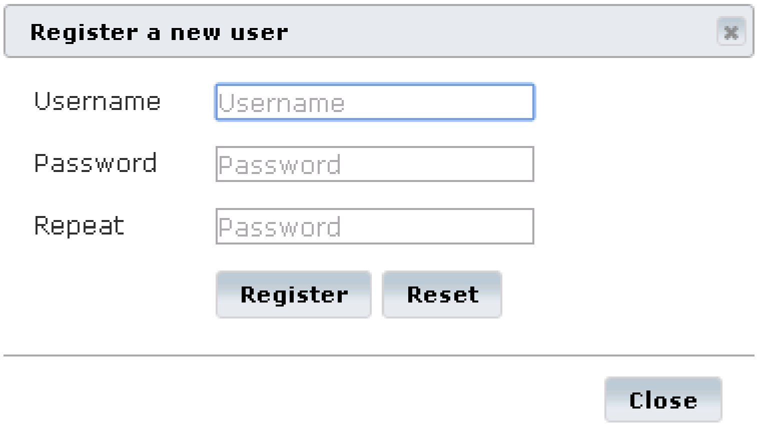
1. As the *root* user, or using *sudo*, modify the **/etc/udev/rules.d/70-u2f.rules** file. If it doesn't exist, create it;
2. Add the following text to the file:

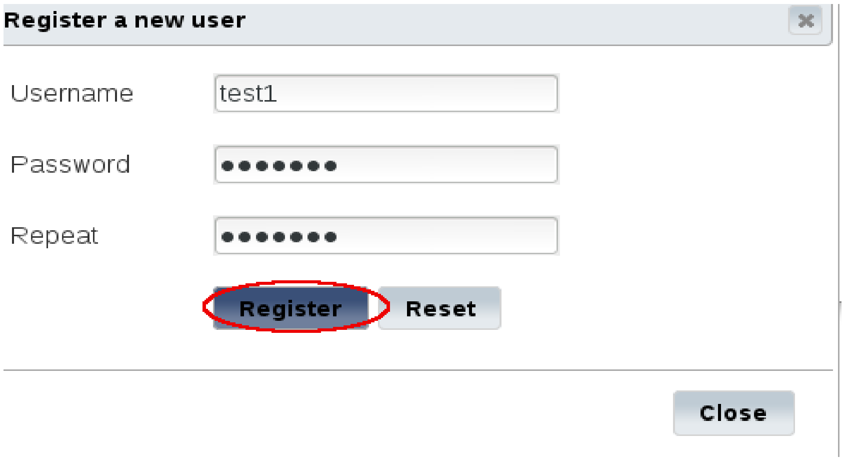
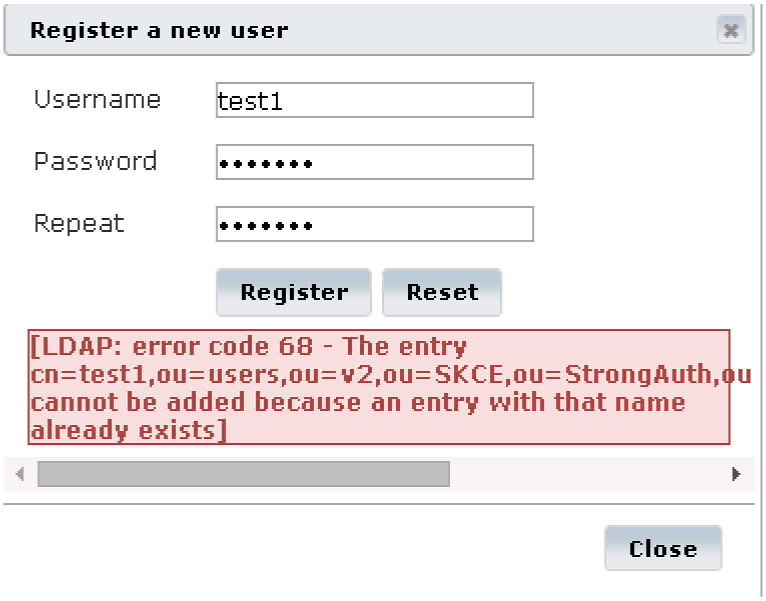
```
ACTION!="add|change", GOTO="u2f_end"
KERNEL=="hidraw*", SUBSYSTEM=="hidraw", ATTRS{idVendor}=="*",
ATTRS{idProduct}=="*", TAG+="uaccess"
LABEL="u2f_end"
```

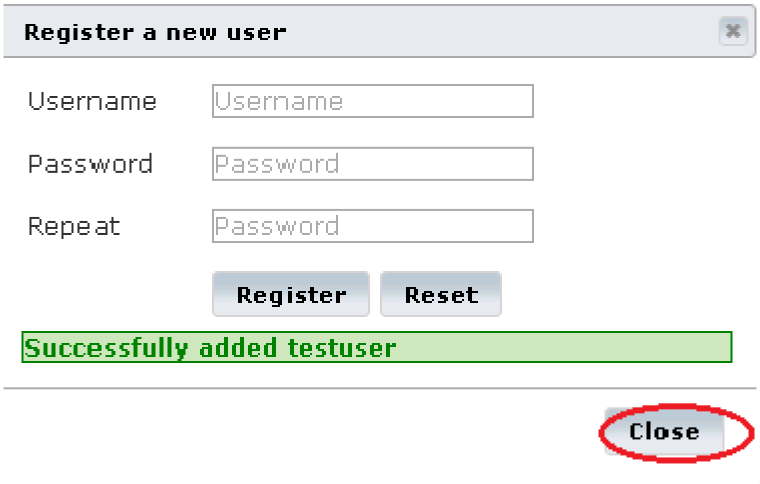
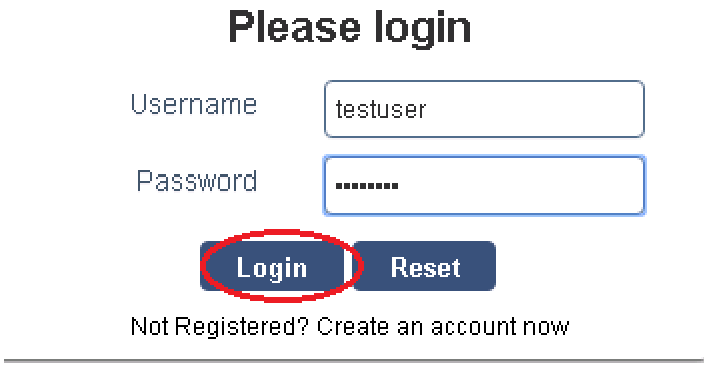
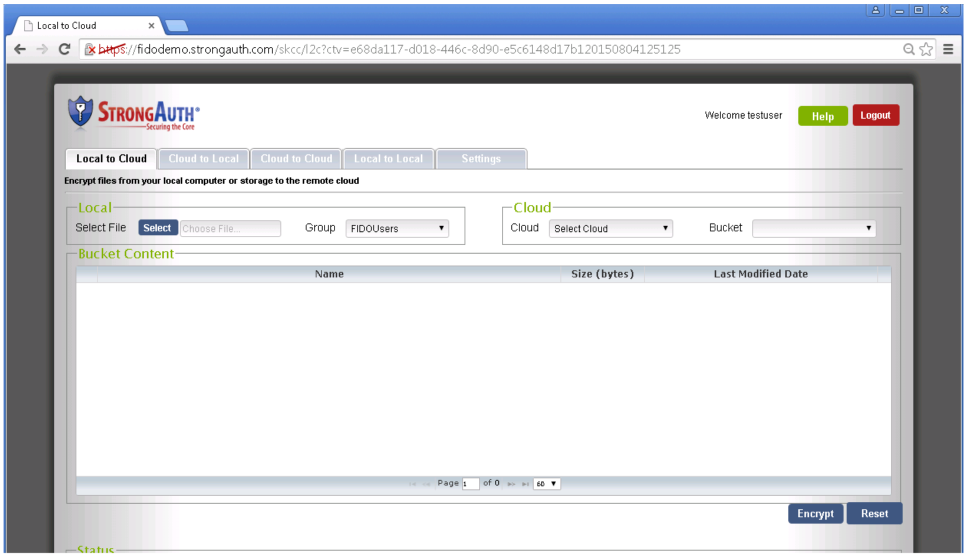
3. Reboot the Linux PC

Register a New User Account

In this section of the demonstration you will create a new account on the public site where SKCC is hosted. After creating the account, you will login with the newly-created credential into SKCC *without* a FIDO Authenticator.

Step	Description
1	Using Chrome, connect to https://fidodemo.strongauth.com/skcc.  Login | StrongKey Crypto(https://fidodemo.strongauth.com/skcc/
2	At the home-page of the SKCC application, click on the **Not Registered? Create an account now** web-link.  Please login Username Username Password Password Login Reset Not Registered? Create an account now
3	The link will pop-up a registration panel.  Register a new user Username Username Password Password Repeat Password Register Reset Close
4	Supply a Username while keeping the following rules in mind: • Username must be between 3 and 30 characters in length; and • Username must consist of only lowercase alphabet (a-z), numbers, and periods.
5	Supply a Password and repeat it while keeping the following rules in mind:

Step	Description
	- Password must be at least 6 characters long;
6	Click on the **Register** button to create the account:  Username test1 Password ••••••• Repeat •••••••
7	If you see the following error message, it implies the Username already exists on the system and was chosen by another user; click the **Close** button and attempt registering with a different Username.  Username test1 Password ••••••• Repeat ••••••• [LDAP: error code 68 - The entry cn=test1,ou=users,ou=v2,ou=SKCE,ou=StrongAuth,ou cannot be added because an entry with that name already exists]
8	If you see the following message, the account was created successfully. Click on **Close** - you will be taken back to the Login page.

Step	Description
	 **Register a new user** Username: Username Password: Password Repeat: Password Successfully added testuser
9	Supply the credentials you just created and click on **Login**.  **Please login** Username: testuser Password: ••••••••• Not Registered? Create an account now
10	If the credentials are correct, you will be presented with the SKCC application:  ~~https~~://fidodemo.strongauth.com/skcc/l2c?ctv=e68da117-d018-446c-8d90-e5c6148d17b120150804125125 Welcome testuser Encrypt files from your local computer or storage to the remote cloud Local: Select File: Choose File... Group: FIDOUsers Cloud: Cloud: Select Cloud Bucket: Bucket Content: Name / Size (bytes) / Last Modified Date Page 1 of 0 60 Local to Cloud StrongAuth Securing the Core Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Select Encrypt Reset Status

Enable 2-Step Verification

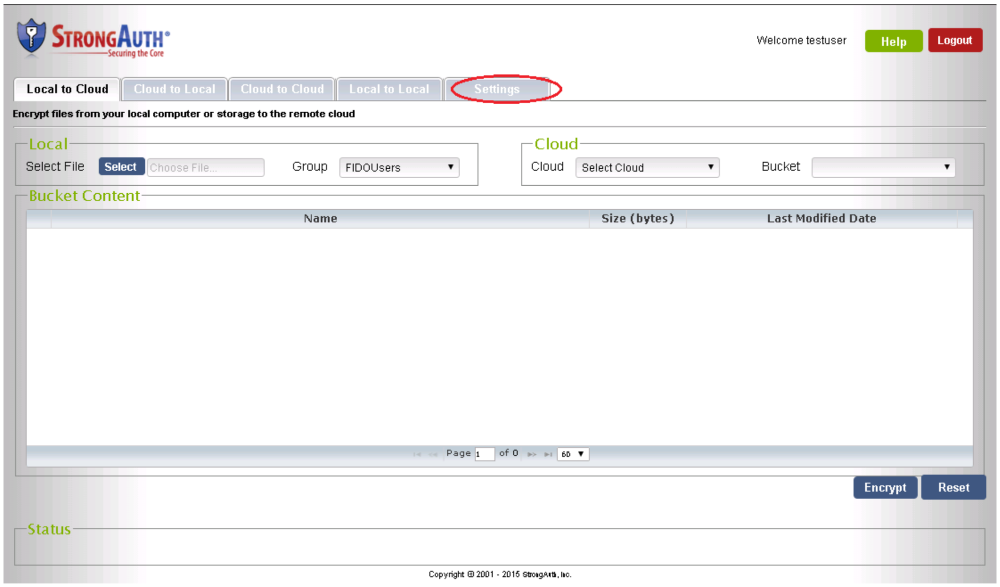
In this section of the demonstration you will enable 2-Step Verification – a process by which a random, one-time code is sent to a registered e-mail address (supplied by you), so the system can verify your identity when you confirm your credential with the one-time code.

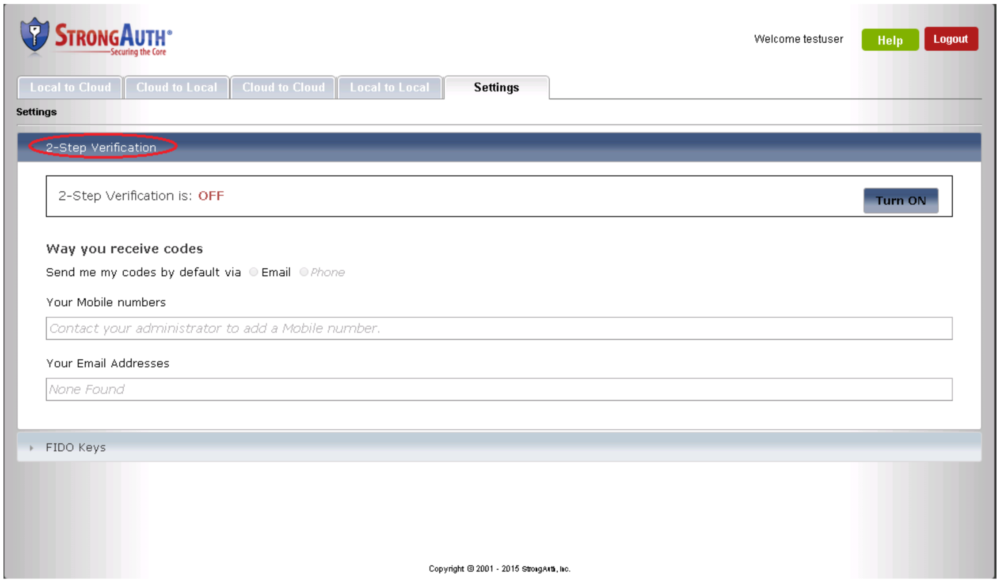
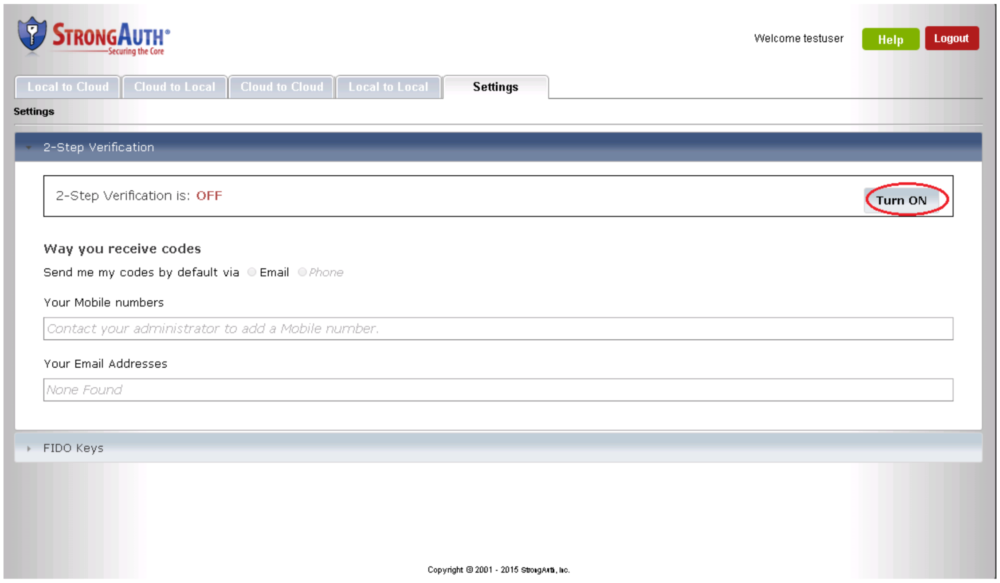
If FIDO authentication is so strong, easy and intends to supplant passwords, it begs the question: why is 2-Step Verification necessary?

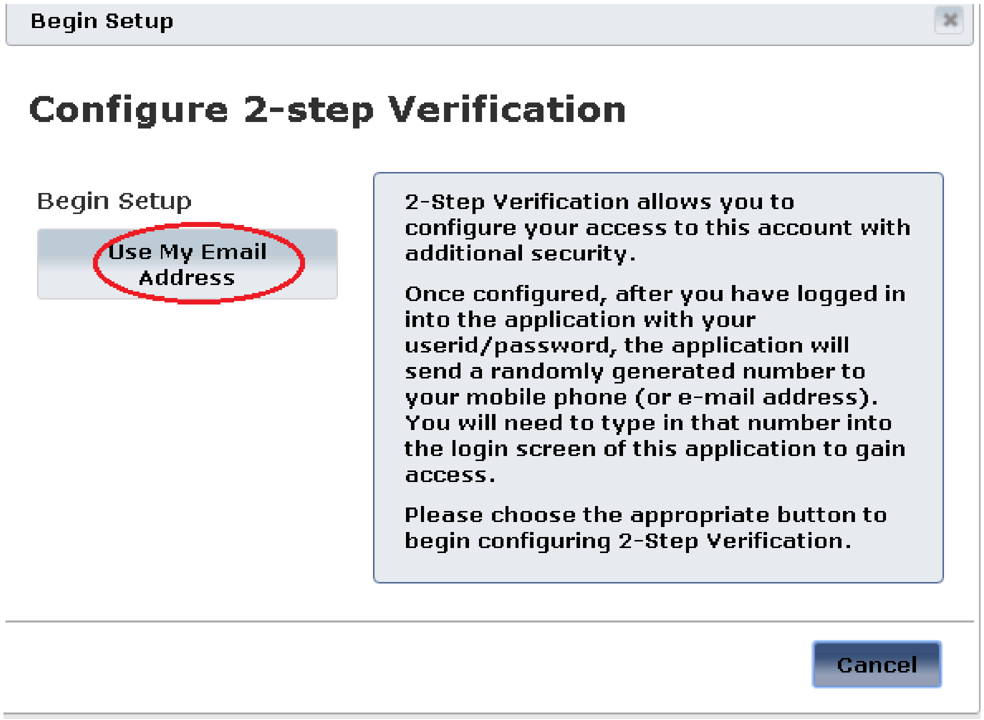
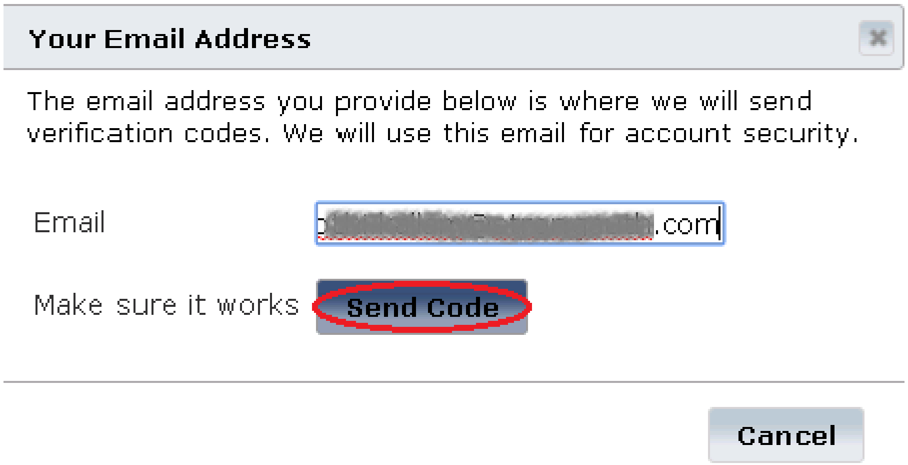
Designers of web-applications must take into account, that a user may forget their FIDO Authenticator at home before coming into work,, may lose their FIDO Authenticators, or Authenticators may become inoperable accidentally. In case of any of these events, a web-application must allow legitimate users to get back into their accounts without having to spend inordinate amounts of time with Support staff to get back into the website.

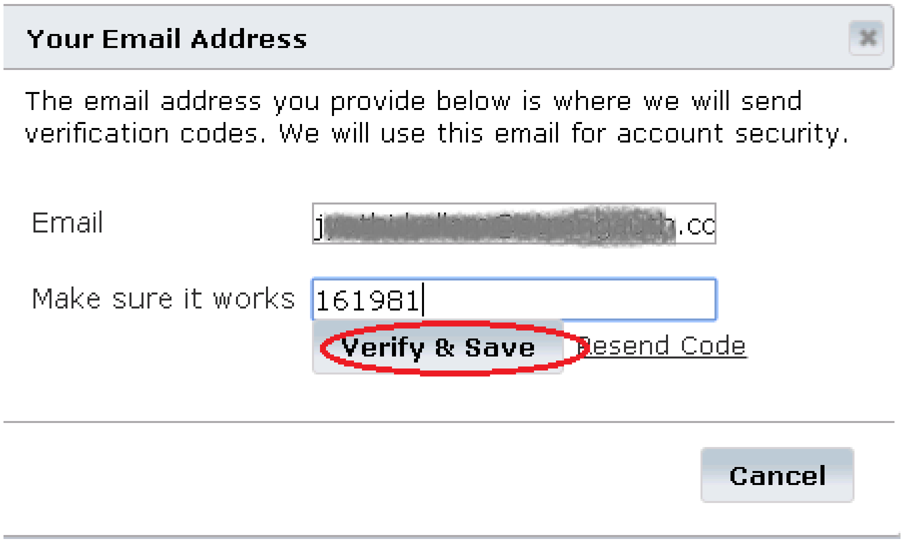
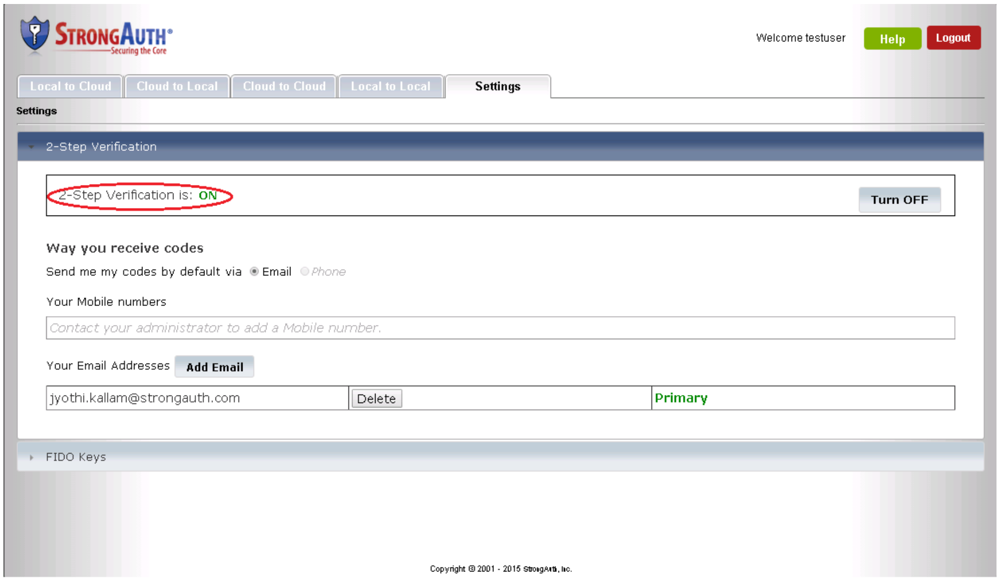
On the assumption that a user's mobile phone or e-mail account is generally secure or in control of the legitimate user, 2-Step Verification is a reliable mechanism to enable users to take control of their accounts using a one-time random code sent to an e-mail address or a mobile phone number.

If the user opts to use 2-Step Verification to authenticate to the web-application, after receiving the random code the user must supply that code to the web-application to gain access to the account. The SKCC implements this mechanism.

Step	Description
1	In the SKCC application, click on the **Settings** tab to navigate to that page:  Encrypt files from your local computer or storage to the remote cloud Copyright © 2001 - 2015 StrongAuth, Inc. STRONGAUTH® Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Local Select File Select Choose File... Group FIDOUsers Cloud Cloud Select Cloud Bucket Bucket Content Name Size (bytes) Last Modified Date Page 1 of 0 50 Encrypt Reset Status
2	Click on the **2-Step Verification** label to open up the “accordion-page”:

Step	Description
	 StrongAuth Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Turn ON Settings 2-Step Verification 2-Step Verification is: OFF Way you receive codes Send me my codes by default via ○ Email ○ Phone Your Mobile numbers Contact your administrator to add a Mobile number. Your Email Addresses None Found FIDO Keys Copyright © 2001 - 2015 StrongAuth, Inc.
3	Click on the **Turn ON** button to activate 2-Step Verification:  StrongAuth Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Turn ON Settings 2-Step Verification 2-Step Verification is: OFF Way you receive codes Send me my codes by default via ○ Email ○ Phone Your Mobile numbers Contact your administrator to add a Mobile number. Your Email Addresses None Found FIDO Keys Copyright © 2001 - 2015 StrongAuth, Inc.
4	You will see a configuration panel. Click on the **Use My Email Address** button to configure an email address:

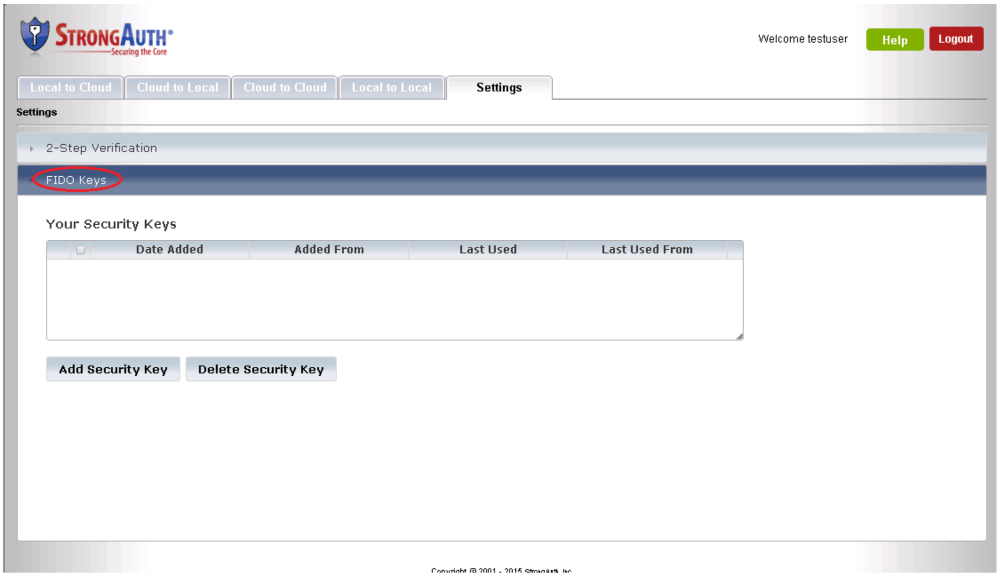
Step	Description
	 Begin Setup Configure 2-step Verification Begin Setup Use My Email Address Cancel 2-Step Verification allows you to configure your access to this account with additional security. Once configured, after you have logged in into the application with your userid/password, the application will send a randomly generated number to your mobile phone (or e-mail address). You will need to type in that number into the login screen of this application to gain access. Please choose the appropriate button to begin configuring 2-Step Verification.
5	Supply an email address to which you have access and click on the **Send Code** button:  The email address you provide below is where we will send verification codes. We will use this email for account security. Email [redacted].com Make sure it works
6	In the mail tool you use (Outlook, Thunderbird, browser, etc.) to access the e-mail account associated with the address you provided for 2-Step Verification, check for an e-mail from info@strongauth.com and a subject of *Your verification code*. It will have a 6-digit code in the body of the e-mail.
7	Type this 6-digit code in the Make sure it works field, and click on the **Verify & Save** button. In case the code times out, or in case the e-mail goes to your Spam folder or you accidentally delete the e-mail, you can click on the **Resend Code** link and have a new verification code sent to your e-mail address:

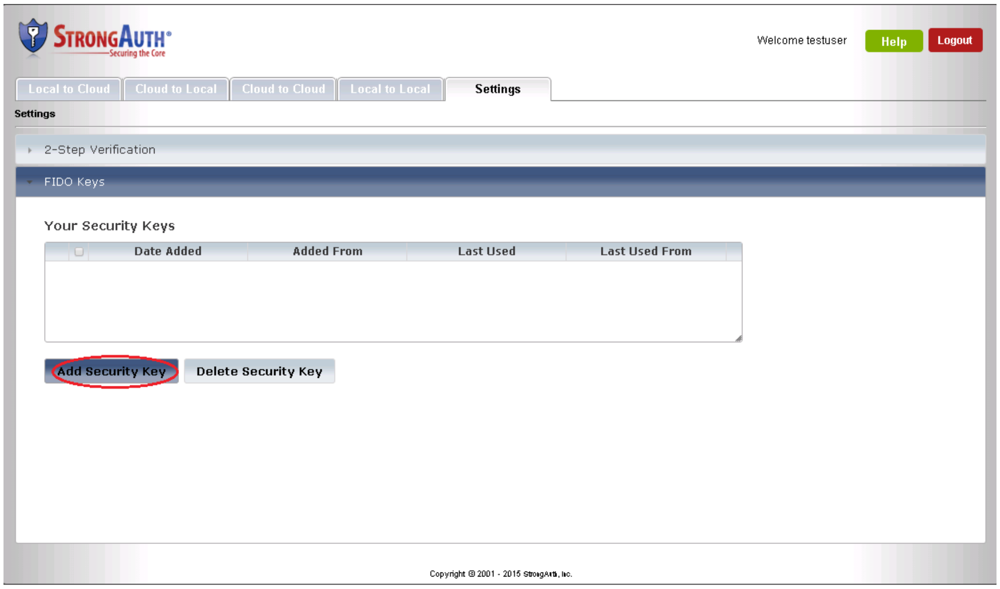
Step	Description
	 **Your Email Address** The email address you provide below is where we will send verification codes. We will use this email for account security. Email [redacted] Make sure it works 161981 Verify & Save Resend Code Cancel
8	If your code is verified successfully, you will see 2-Step Verification turned **ON**, You will also see the e-mail address you provided stored in the Your Email Addresses section of the 2-Step Verification accordion-page.  Welcome testuser Help Logout Local to Cloud · Cloud to Local · Cloud to Cloud · Local to Local · Settings Settings 2-Step Verification 2-Step Verification is: ON Turn OFF Way you receive codes Send me my codes by default via ● Email ○ Phone Your Mobile numbers Contact your administrator to add a Mobile number. Your Email Addresses Add Email jyothi.kallam@strongauth.com Delete Primary FIDO Keys Copyright © 2001 - 2015 StrongAuth, Inc.
9	If the code you typed in is incorrect, you will see an error message indicating the code was incorrect. You are then prompted to try again, or have a new code sent to you.

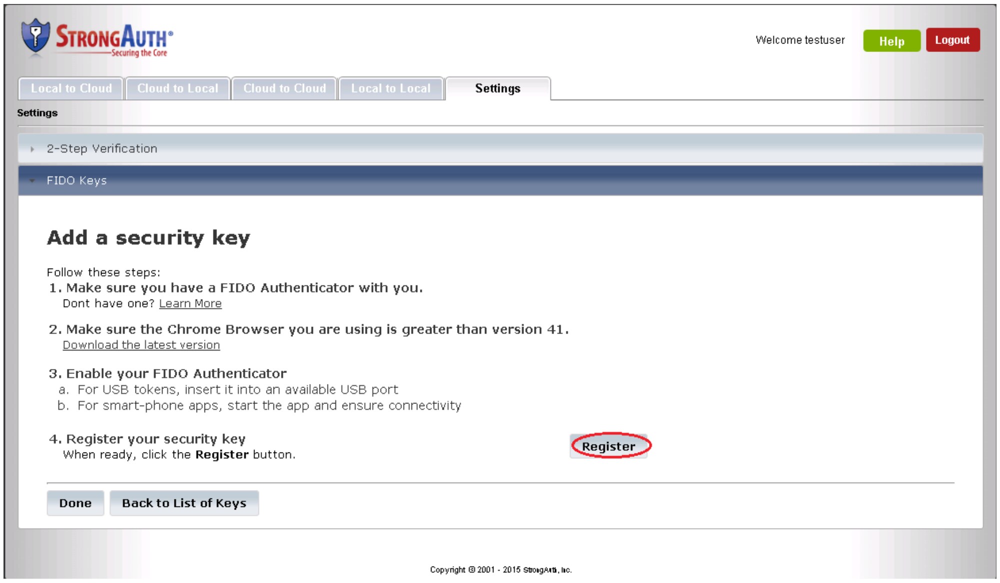
Register a FIDO Authenticator with your account

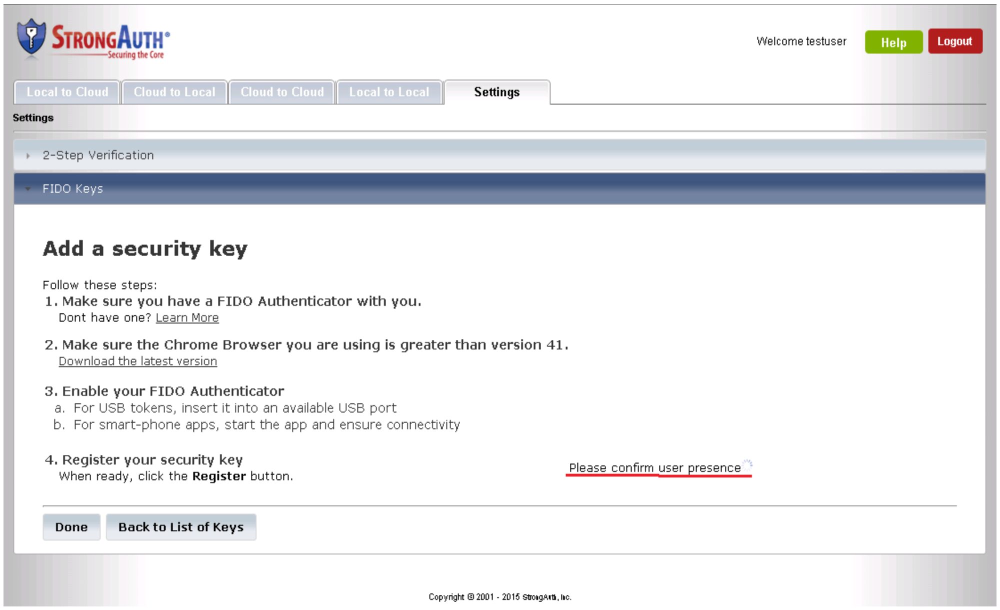
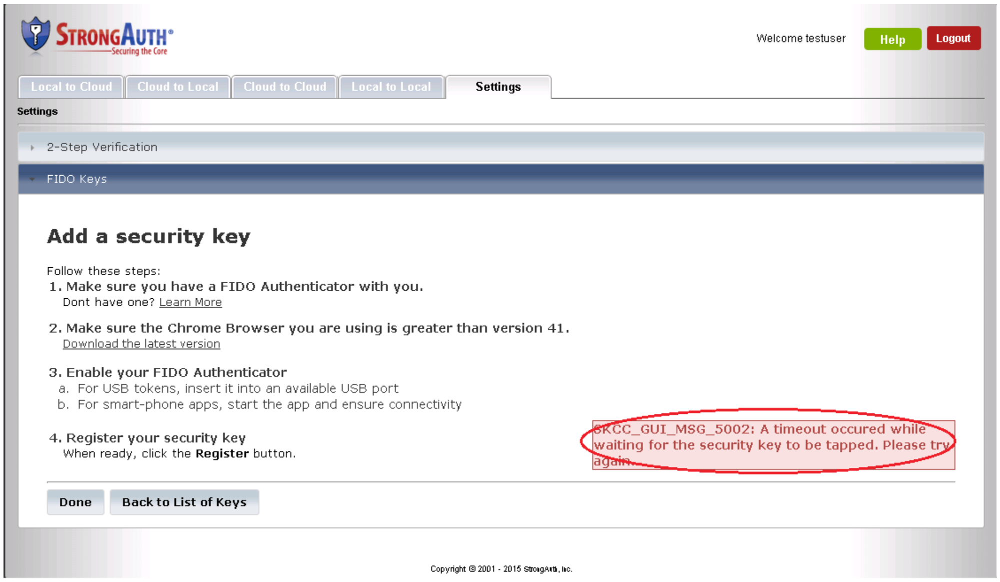
Now that 2-Step Verification has been configured, in this section of the demonstration, you will learn how to register a unique FIDO cryptographic key (generated on your FIDO Authenticator) with your account.

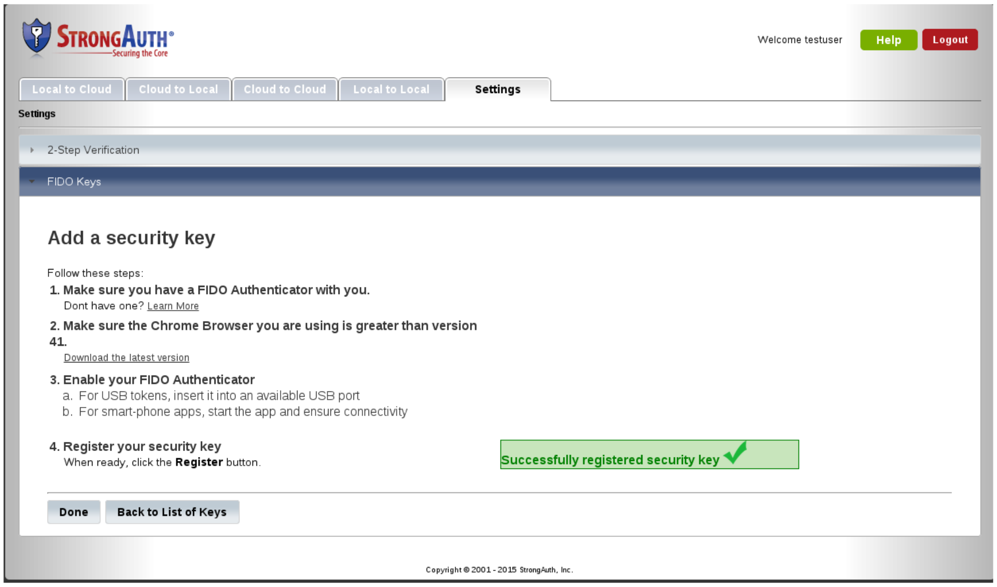
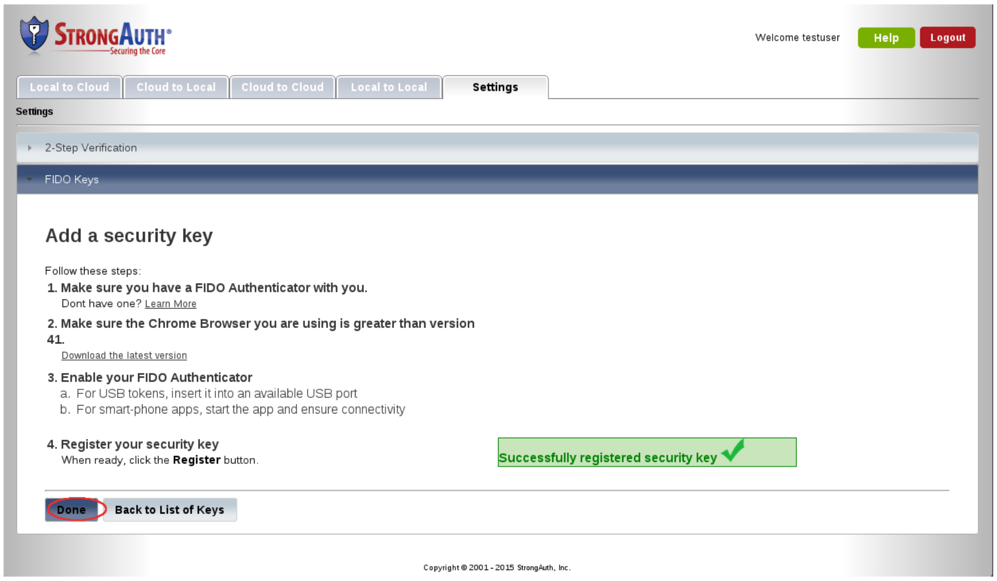
Since the process appears to sound complex, the industry and text in this document might sometimes refer to this as “register your FIDO Authenticator” or “register your FIDO Token” to simplify it. Please recognize that it really implies the generation of a new and unique cryptographic key-pair and the public-key of that pair being registered with the website.

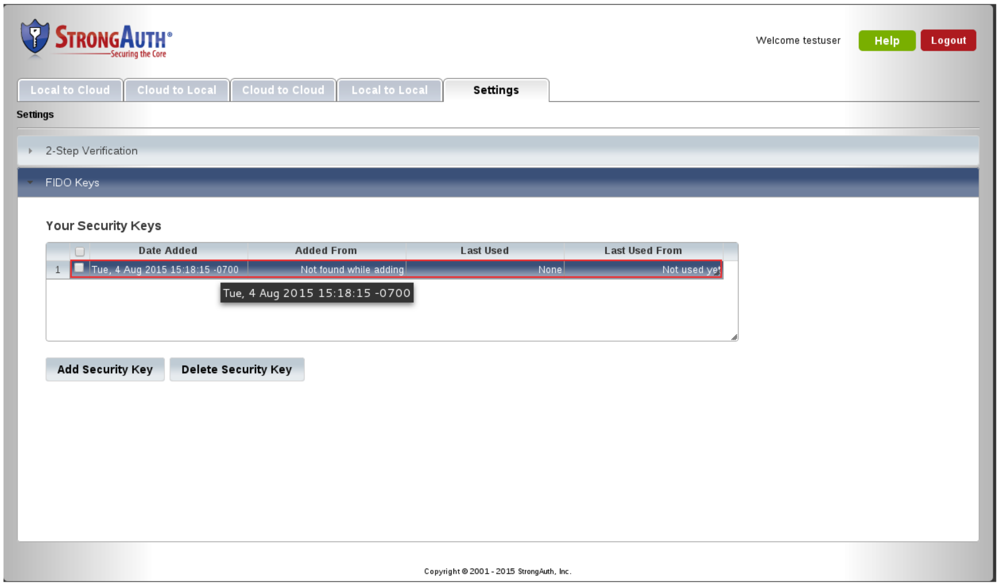
Step	Description
1	If you are still within the Settings page, click on the **FIDO Keys** label to open that accordion-page. If have navigated away from the Settings page, navigate back to that page. If you have logged out of SKCC, login again – but recognize that you will now be prompted to enter the one-time verification code before you can gain access to SKCC (because of the previous 2-Step Verification process).  STRONGAUTH Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys Your Security Keys Date Added Added From Last Used Last Used From Add Security Key Delete Security Key Copyright © 2001 - 2015 StrongAuth, Inc
2	You will see a panel with a list of **Your Security Keys.** Unless you have registered FIDO keys with this instance of SKCC before (under the username you used to login into the application), the list will be empty.
3	Click on the **Add Security Key** button to register a new cryptographic key on a FIDO Authenticator, for this site, with your account:

Step	Description
	 StrongAuth Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys Your Security Keys Date Added Added From Last Used Last Used From Add Security Key Delete Security Key Copyright © 2001 - 2015 StrongAuth, Inc.
4	The SKCC will bring up a panel with a set of instructions on how to register your FIDO Authenticator. Review the instructions to ensure you can meet the requirements mentioned there.
5	Since the FIDO U2F protocol currently supports using Authenticators only as a Human Interface Device (HID) over the Universal Serial Bus (USB), plug-in the FIDO Authenticator into an available USB port on your computer. Once plugged in, wait for a little (no more than a minute) to ensure any necessary HID device drivers are installed and registered with the operating system. The Microsoft Windows operating system will specifically notify you on the status bar when the Authenticator is ready to use. Note that the installation of device drivers is done only once by the operating system – subsequent operations with the FIDO Authenticator should be possible as soon as the device is plugged into the USB port.
6	When the FIDO Authenticator's device driver is enabled, click on the **Register** button:

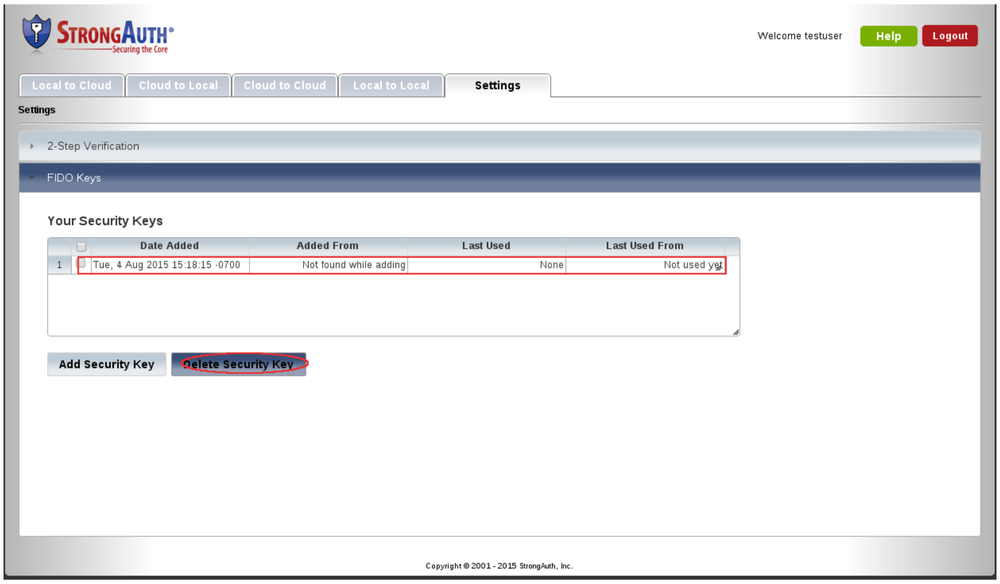
Step	Description
	 STRONGAUTH Securing the Core Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Register Done Back to List of Keys Welcome testuser Settings 2-Step Verification FIDO Keys **Add a security key** Follow these steps: 1. Make sure you have a FIDO Authenticator with you. Dont have one? Learn More 2. Make sure the Chrome Browser you are using is greater than version 41. Download the latest version 3. Enable your FIDO Authenticator a. For USB tokens, insert it into an available USB port b. For smart-phone apps, start the app and ensure connectivity 4. Register your security key When ready, click the **Register** button. Copyright © 2001 - 2015 StrongAuth, Inc.
7	Within seconds, the SKCC should prompt with a message: **Please confirm user presence**. This is a requirement of the U2F protocol. U2F-based strong-authentication mandates that the user prove to the FIDO Server, that they possess a valid U2F Authenticator and are in physical proximity to the device where the browser is executing. “User presence” is implemented differently from Authenticator to Authenticator, depending on how the manufacturer chose to design their Authenticator. Some manufacturers expose a metal plate with a blinking Light Emitting Diode (LED), which must be touched by a human finger to verify user-presence (Yubico); others have a raised button with a blinking LED that must be pressed or pinched to verify user-presence (HyperSecu); yet others require that the Authenticator be removed from the USB port and reinserted to verify user-presence (Neowave and Plug-Up). Depending on the type of Authenticator you have, perform the appropriate operation to verify user-presence.

Step	Description
	 StrongAuth Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys **Add a security key** Follow these steps: 1. Make sure you have a FIDO Authenticator with you. Dont have one? Learn More 2. Make sure the Chrome Browser you are using is greater than version 41. Download the latest version 3. Enable your FIDO Authenticator a. For USB tokens, insert it into an available USB port b. For smart-phone apps, start the app and ensure connectivity 4. Register your security key When ready, click the **Register** button. Please confirm user presence Copyright © 2001 - 2015 StrongAuth, Inc.
8	Note that there are at least two reasons that a FIDO key-registration operation might fail: 1. There is a challenge sent by the FIDO Server (in the SKCE) that can time-out within 30 seconds. If it does, time-out, a response from the FIDO Authenticator/Browser to the FIDO Server will be invalid; or 2. The driver for the FIDO Authenticator may not yet have been installed when the user-presence action was performed. As a result the FIDO Authenticator will not be able to digitally sign the challenge sent by the FIDO Server. In both cases, you are likely to see the following error:  StrongAuth Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys **Add a security key** Follow these steps: 1. Make sure you have a FIDO Authenticator with you. Dont have one? Learn More 2. Make sure the Chrome Browser you are using is greater than version 41. Download the latest version 3. Enable your FIDO Authenticator a. For USB tokens, insert it into an available USB port b. For smart-phone apps, start the app and ensure connectivity 4. Register your security key When ready, click the **Register** button. SKCC_GUI_MSG_5002: A timeout occured while waiting for the security key to be tapped. Please try again. Copyright © 2001 - 2015 StrongAuth, Inc.

Step	Description
9	To attempt the registration once again, you can either refresh the browser-page, or you can click on either of the two buttons – **Done** or **Back to List of Keys** – and then click on the **Add Security Key** button to start over again.
10.	If the key-registration succeeds, you will see the following confirmation:  Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys Add a security key Follow these steps: 1. Make sure you have a FIDO Authenticator with you. Dont have one? Learn More 2. Make sure the Chrome Browser you are using is greater than version 41. Download the latest version 3. Enable your FIDO Authenticator a. For USB tokens, insert it into an available USB port b. For smart-phone apps, start the app and ensure connectivity 4. Register your security key When ready, click the **Register** button. Successfully registered security key ✓ Done Back to List of Keys Copyright © 2001 - 2015 StrongAuth, Inc.
11	Click on the **Done** button to go back to the page with the list of keys.  Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Settings 2-Step Verification FIDO Keys Add a security key Follow these steps: 1. Make sure you have a FIDO Authenticator with you. Dont have one? Learn More 2. Make sure the Chrome Browser you are using is greater than version 41. Download the latest version 3. Enable your FIDO Authenticator a. For USB tokens, insert it into an available USB port b. For smart-phone apps, start the app and ensure connectivity 4. Register your security key When ready, click the **Register** button. Successfully registered security key ✓ Done Back to List of Keys Copyright © 2001 - 2015 StrongAuth, Inc.
12	When there are FIDO keys registered in your account, this page displays some meta-data about them – such as the date/time when they were generated, date/time when they were last used, and if geo-location retrieval is enabled, the geographical location (city) from which the key was last used.

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td></td><td>


Your Security Keys
<table>
<tr><th></th><th>□</th><th>Date Added</th><th>Added From</th><th>Last Used</th><th>Last Used From</th></tr>
<tr><td>1</td><td>□</td><td>Tue, 4 Aug 2015 15:18:15 -0700</td><td>Not found while adding</td><td>None</td><td>Not used yet</td></tr>
</table>
Tue, 4 Aug 2015 15:18:15 -0700
</td></tr>
<tr><td>13</td><td>
You can delete a key on this page, by selecting the key-to-delete in the list and clicking on the <b>Delete Security Key</b> button. (See note below on why you might choose to delete one or more FIDO keys from your account).



Your Security Keys
<table>
<tr><th></th><th>□</th><th>Date Added</th><th>Added From</th><th>Last Used</th><th>Last Used From</th></tr>
<tr><td>1</td><td>□</td><td>Tue, 4 Aug 2015 15:18:15 -0700</td><td>Not found while adding</td><td>None</td><td>Not used yet</td></tr>
</table>
</td></tr>
<tr><td>14</td><td>Log out from the application by clicking on the <b>Logout</b> button on the top right-hand corner.</td></tr>
</table>

If FIDO provides strong-authentication and protects your account from getting hacked, why would you ever want/need to delete one or more keys?

Good question! As long as you control the FIDO Authenticator and you have it in your possession, the premise is that the keys are “good” and can be trusted. However, there is always a possibility that a FIDO Authenticator might get lost; or a batch of Authenticators may be declared unsafe due to a manufacturing defect discovered after the Authenticator was sold on the market.; or that there is a vulnerability discovered in an implementation of an Authenticator.

In all cases, to protect the user-account, registered FIDO keys must be deleted to prevent unauthorized people from accessing your account. This design allows users to “manage” their keys on their own and protect them from such risks. Once deleted, anyone – including the legitimate user herself – will be unable to use that FIDO Authenticator to authenticate to that web-application (if there are other keys on that Authenticator, registered at other web-sites, those may also need to be deleted).

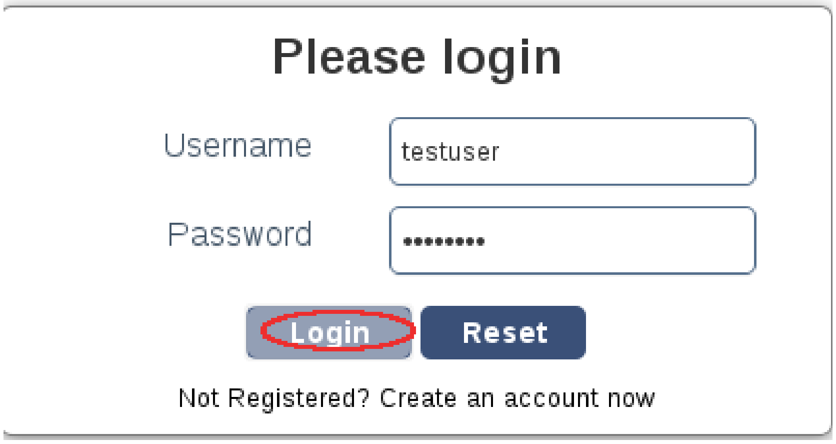
In the event the user “loses” their Authenticator and deletes their registered keys from their account (after having authenticated with 2-Step Verification), and then finds the “lost” Authenticator, they can use the same Authenticator to generate a new key-pair and register the key for the same site and account. This is possible because, once a user has deleted their registered key with a site, the FIDO protocol does not “recognize” that key on the Authenticator even if the key is still present on the Authenticator.

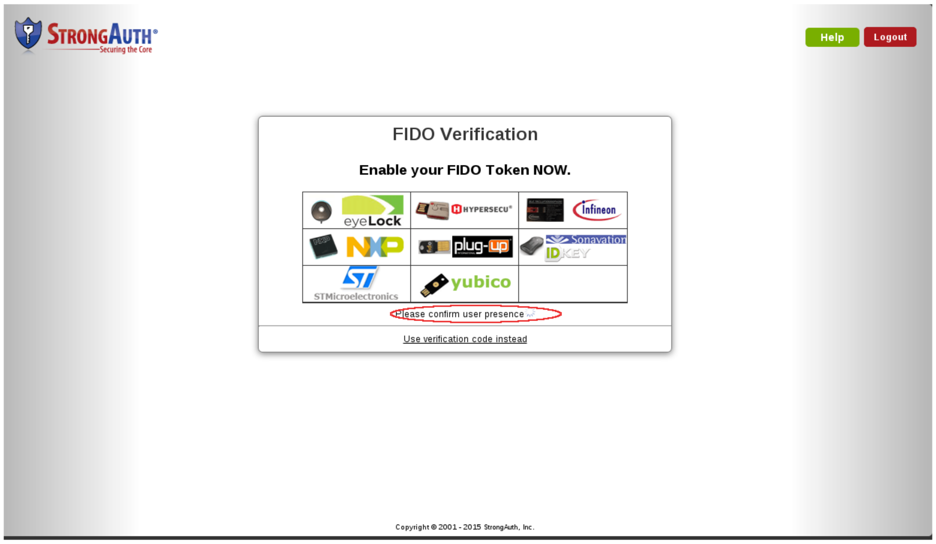
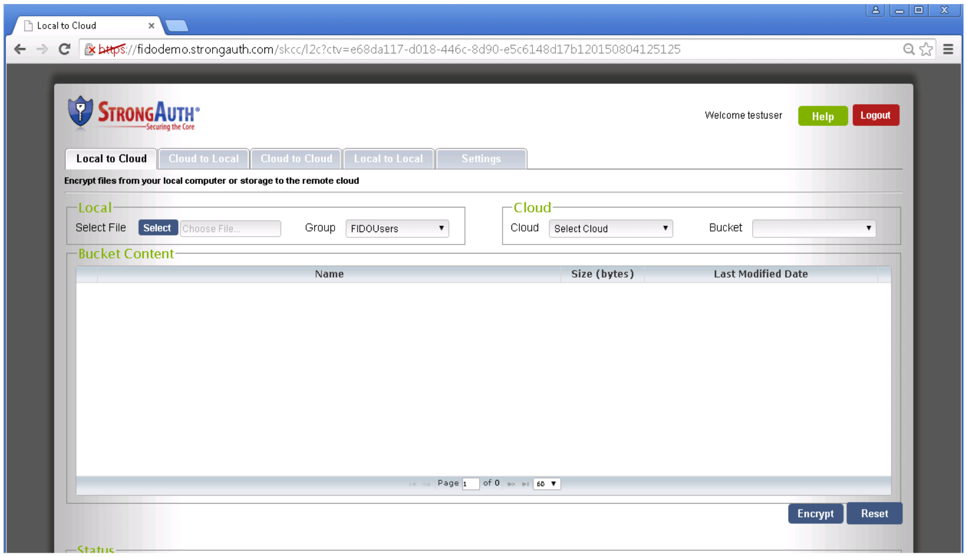
The user can choose to use multiple FIDO Authenticators - a primary and a backup – to register multiple keys with an application site, and use either Authenticator to access the web-application. The loss of one Authenticator does not force them to go through a 2-Step Verification – they can use the alternate Authenticator to login. The user may also choose to carry one FIDO Authenticator on their key-chain, and leave one on their desk at home, or one permanently plugged-in into their computer; all these use-cases are permissible.

Authenticate with FIDO and Userid/Password

Now that you have a FIDO Authenticator registered with the SKCC, in this section of the demonstration, you will strongly-authenticate to the user-account with the FIDO U2F Authenticator.

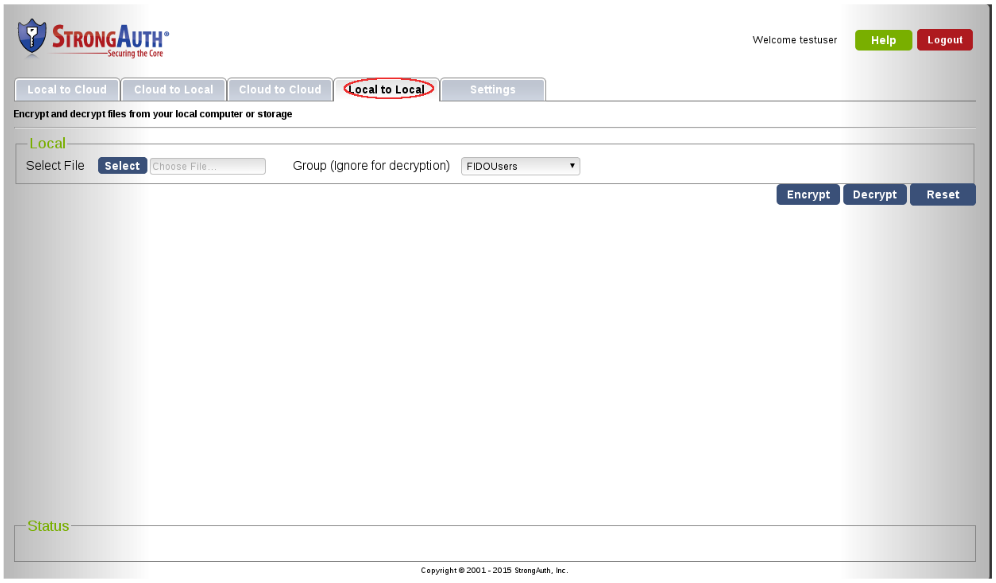
> Note that this example of strong-authentication shows the use-case where the user must authenticate with their Userid/Password (UP) and a FIDO Authenticator to access the web-application.
>
> The benefit of this mode of authentication – FIDO+UP – is that the user can choose to use a FIDO Authenticator that does not mandate local authentication (on the FIDO Authenticator) with a Personal Identification Number (PIN) or some biometric, because their Userid/Password still protects access to their account even if the FIDO Authenticator is compromised through loss, negligence or other mishap.
>
> Later sections of this document demonstrate using two other authentication modes:
>
> - FIDO+CAPTCHA – when the web-application chooses to dispense authenticating with the Userid/Password and only uses FIDO strong-authentication. This is useful on an internet-facing website to prevent random, drive-by attempts to bog down your web-application with authentication requests, while keeping it convenient for legitimate users with FIDO Authenticators because they don't have to remember a password any more to the site; and
>
> - FIDO – when the web-application dispenses with UP and CAPTCHA completely, and only requires a FIDO Authenticator for strong-authentication. This is useful for web-applications on the intranet (completely inside the enterprise network) so you know authentication requests are likely to come only from trusted entities with FIDO Authenticators, and when the FIDO Authenticator has a mechanism to authenticate the user using a PIN or biometric match on the Authenticator. (You don't want a legitimate user to lose an Authenticator that does not have local-authentication, and for someone else to masquerade as the legitimate user if they happen to find the Authenticator and connect to the web-application).
>
> StrongAuth is happy to discuss these details with you at any time; just let us know.

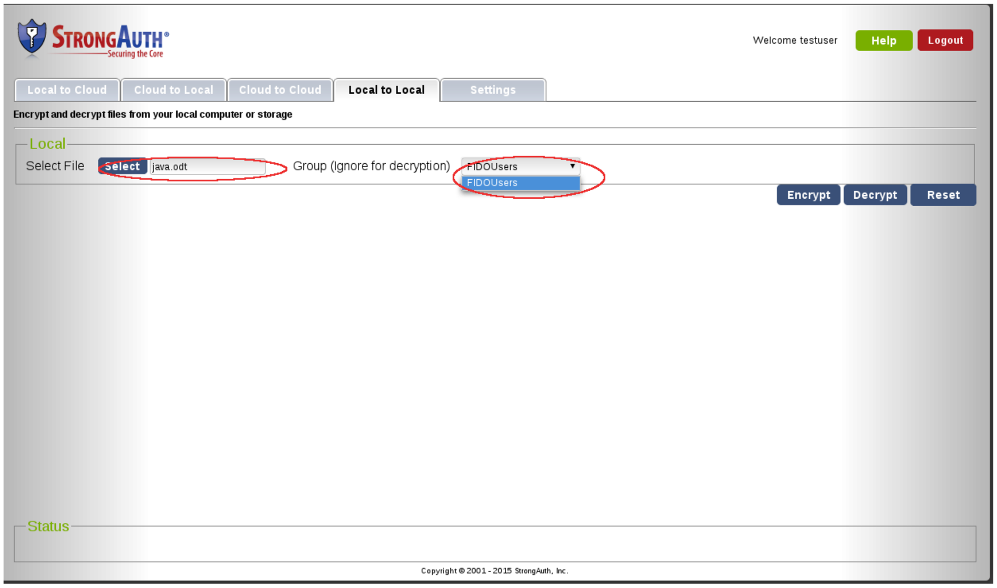
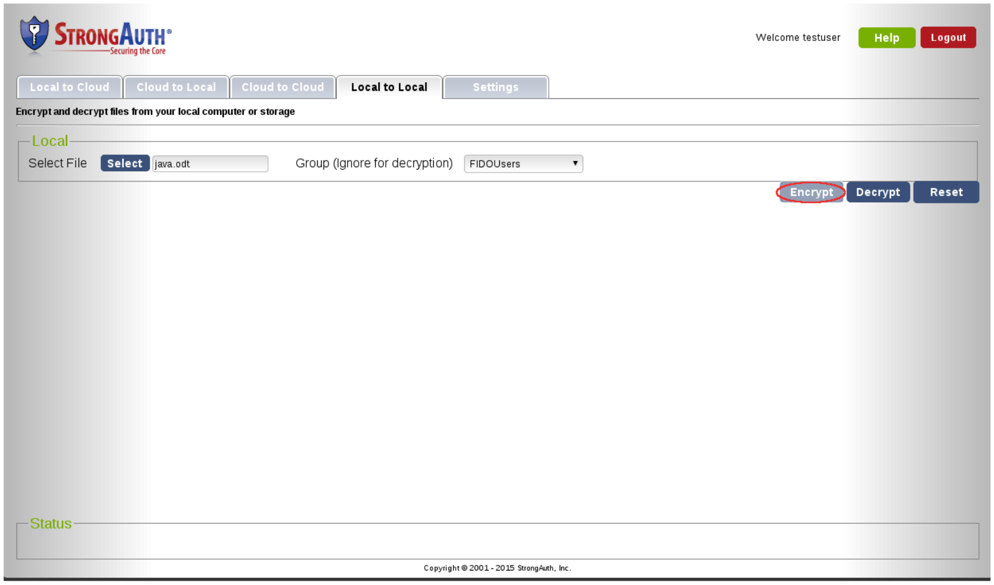
Step	Description
1	At the login page for SKCC, type in the Username and Password for the credential you created in this demonstration. When done, click on the Login button:  Please login Username testuser Password •••••••••
2	Since FIDO authentication is enabled (by the fact that a FIDO key is registered for

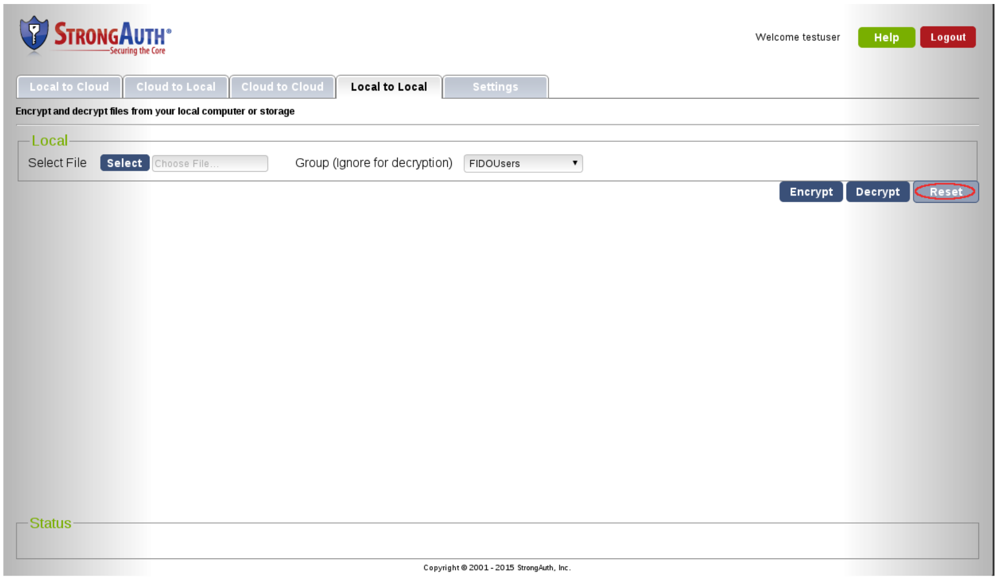
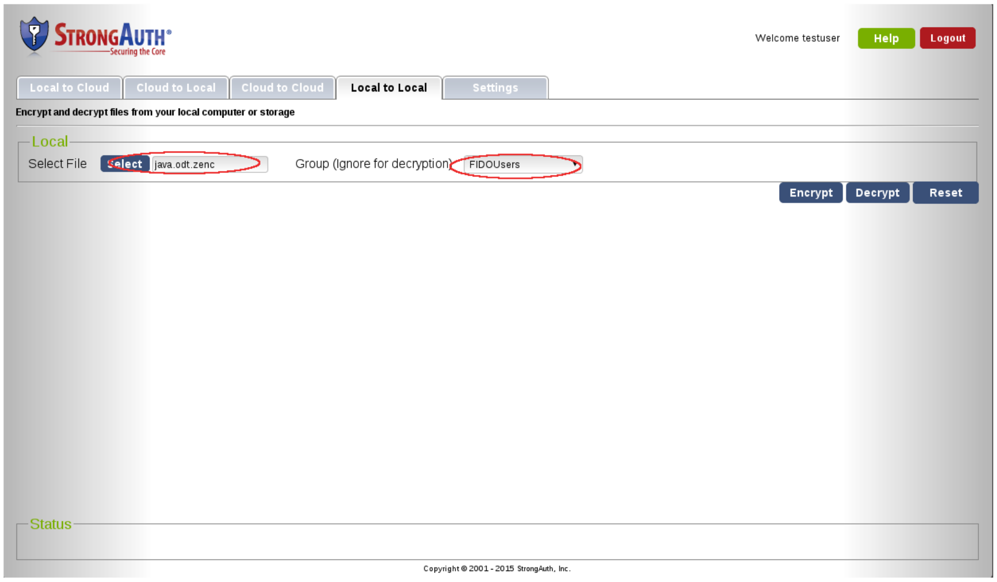
Step	Description
	the application) SKCC automatically prompts with a challenge on the FIDO Verification page asking you to **Please confirm user presence**. This page displays the logos of various FIDO U2F Authenticators that were previously tested by StrongAuth at one point or another; you can, technically, use any FIDO Certified™ U2F Authenticator with SKCC even if they do not appear on this list.
3	Insert the FIDO Authenticator into an available USB port and depending on the type of Authenticator, perform the appropriate operation to verify user-presence:  FIDO Verification Enable your FIDO Token NOW. Please confirm user presence Use verification code instead Copyright © 2001 - 2015 StrongAuth, Inc. StrongAuth® Securing the Core Help Logout eyeLock HYPERSECU® Infineon NXP plug-up Sonavation IDKEY STMicroelectronics yubico
4	If the strong-authentication succeeds, you are presented with the SKCC web-application:  Local to Cloud https://fidodemo.strongauth.com/skcc/l2c?ctv=e68da117-d018-446c-8d90-e5c6148d17b120150804125125 Welcome testuser Encrypt files from your local computer or storage to the remote cloud Local: Select File: Choose File...; Group: FIDOUsers Cloud: Cloud: Select Cloud; Bucket: Bucket Content: Name | Size (bytes) | Last Modified Date Page 1 of 0 60 Status StrongAuth® Securing the Core Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Select Encrypt Reset
5	If you see an error message indicating that a timeout occurred while waiting, click on **Retry** and perform the appropriate operation to verify user-presence when prompted.
6	If you don't have your FIDO Authenticator, click on the **Use verification code instead** link to use 2-Step Verification to authenticate to SKCC.

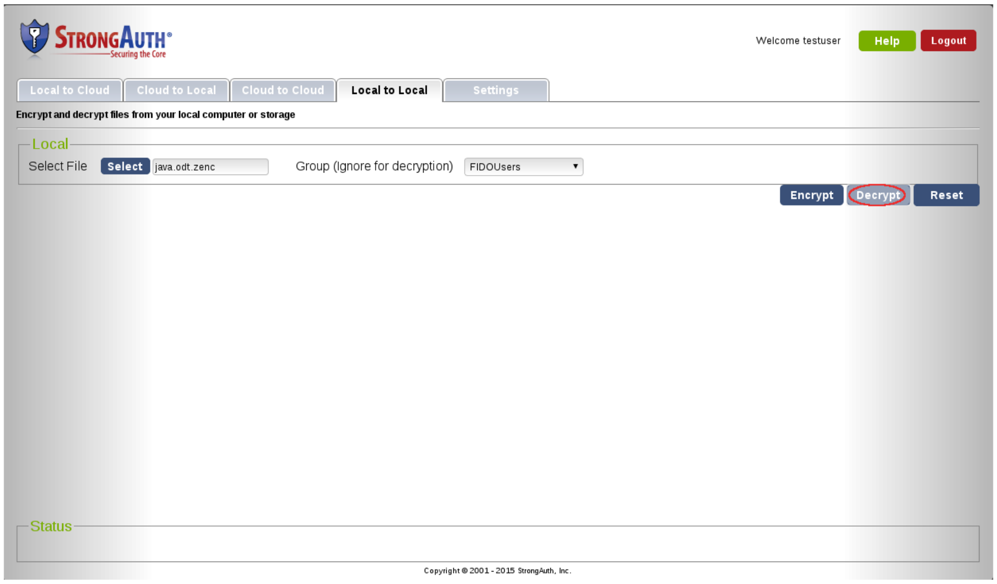
Encrypt/Decrypt a File

Since SKCC is a web-application that encrypts/decrypts files using a centralized key-management system and FIDO-based strong-authentication, in this section of the demonstration you will learn how to encrypt and decrypt a file local to your computer.

Step	Description
1	After authenticating to SKCC, navigate to the **Local to Local** tab by clicking on it. The “Local to Local” label implies that the file to encrypted (or decrypted) is sourced from your local computer, and the destination for the encrypted (or decrypted) file is your local computer. The other tabs allow for using Public or Private Cloud storage for the encryption/decryption operations, but they are disabled on the fidodemo.strongauth.com site.  Welcome testuser Encrypt and decrypt files from your local computer or storage Local Select File: Choose File... Group (Ignore for decryption): FIDOUsers Status Copyright © 2001 - 2015 StrongAuth, Inc. StrongAuth Securing the Core Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Select Encrypt Decrypt Reset
2	Using the **Select** button, choose a file from your local computer for encryption.
3	By default, the demonstration site is configured with only a single *decryption group* from a Lightweight Directory Access protocol (LDAP) Directory Server. Users from this *decryption group* – called *FIDOUsers* on this demonstration site - are authorized to decrypt the file being encrypted. Users on Production sites may select any number of decryption groups from their Directory Server, thereby authorizing one or more users within those groups to decrypt encrypted files:

Step	Description
	 STRONGAUTH Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Local Select FIDOUsers Encrypt Decrypt Reset Status Encrypt and decrypt files from your local computer or storage Select File: java.odt Group (Ignore for decryption): FIDOUsers Copyright © 2001 - 2015 StrongAuth, Inc.
4	Click on the **Encrypt** button. This initiates an upload of the selected file to the SKCC servlet, where it is handed off to the SKCE EncryptionEngine which generates a symmetric key, escrows the key on a DEMO StrongAuth KeyAppliance cluster, encrypts the plaintext file and returns a **z**ipped-**enc**rypted file (with a ***.zenc*** extension) to be saved in the default download folder of your browser.  STRONGAUTH Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Local Select Encrypt Decrypt Reset Status Encrypt and decrypt files from your local computer or storage Select File: java.odt Group (Ignore for decryption): FIDOUsers Copyright © 2001 - 2015 StrongAuth, Inc.
5	Click on the **Reset** button to reset the application's state to perform another cryptographic operation.

Step	Description
	 STRONGAUTH® Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Local Select Encrypt Decrypt Reset Status Copyright © 2001 - 2015 StrongAuth, Inc.Encrypt and decrypt files from your local computer or storage Select File: Choose File... Group (Ignore for decryption): FIDOUsers
6	Using the **Select** button, this time select the downloaded encrypted file with the ***.zenc*** extension:  STRONGAUTH® Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Local Select Encrypt Decrypt Reset Status Copyright © 2001 - 2015 StrongAuth, Inc.Encrypt and decrypt files from your local computer or storage Select File: java.odt.zenc Group (Ignore for decryption): FIDOUsers
7	Click on the **Decrypt** button.

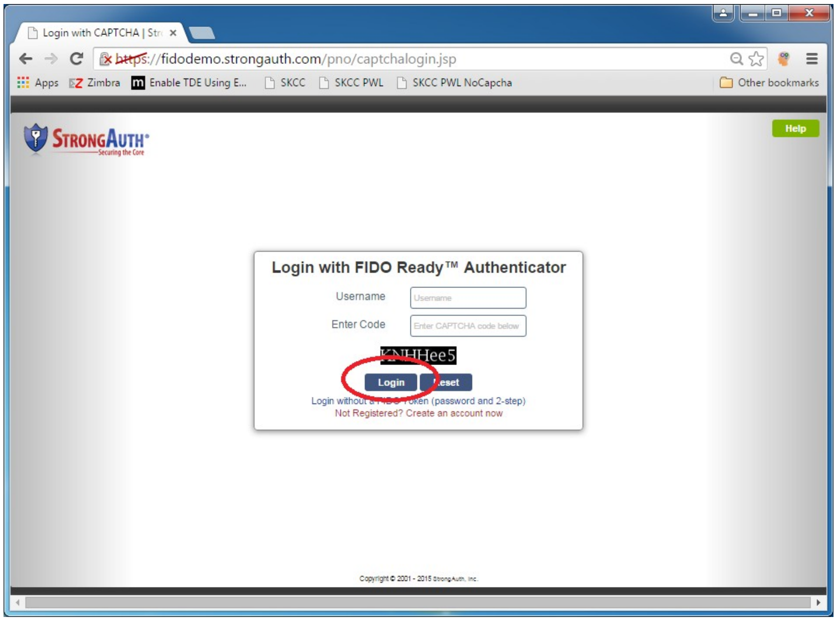
Step	Description
	 STRONGAUTH® Securing the Core Welcome testuser Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Encrypt and decrypt files from your local computer or storage Local Select Encrypt Decrypt Reset Status Copyright © 2001 - 2015 StrongAuth, Inc. Select File: java.odt.zenc Group (Ignore for decryption): FIDOUsers
8	SKCC now initiates the upload of the ZENC file, hands it off to SKCE, which parses the meta-data of the ciphertext file to determine the authorized groups/users and the required decryption key (among other things). Once authorization is completed, SKCE retrieves the required cryptographic key from the DEMO StrongAuth KeyAppliance cluster, using the algorithm determined from the ZENC file's meta-data, decrypts the file and returns the result to the local computer for storage (without the ***.zenc*** extension).

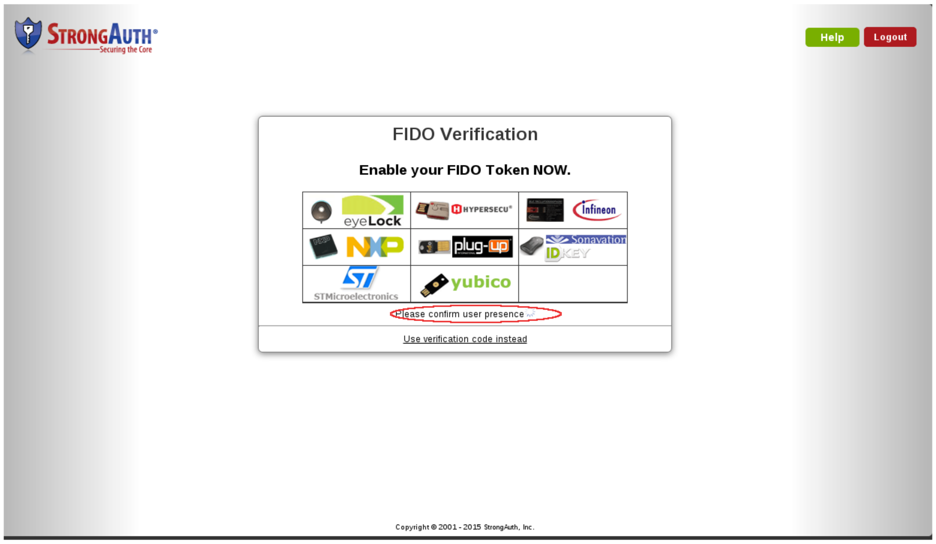
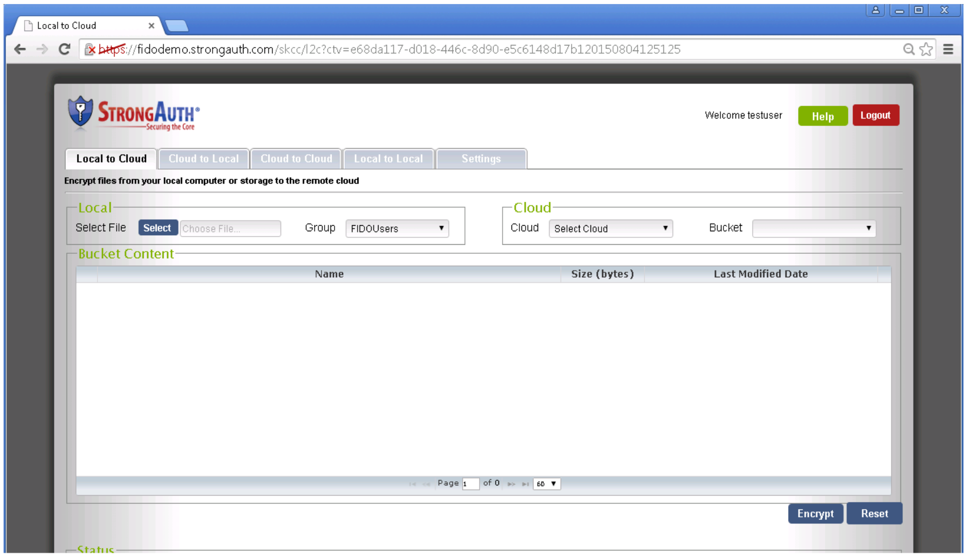
Authenticate with FIDO and CAPTCHA

In this section of the demonstration, you will strongly-authenticate to the user-account with the FIDO U2F Authenticator and the use of CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) instead of a password.

The benefit of this mode of authentication is that the web-application can dispense authenticating the user with a password, thus allowing them to forget the password to the account and never having to reset it. This is useful on an internet-facing website to prevent random, drive-by attempts to bog down the web-application with spurious authentication requests while keeping it convenient for legitimate users with FIDO Authenticators.

This demonstration requires connecting to a slightly different URL with the browser: **https://fidodemo.strongauth.com/pno.** It leads to the same web-application, but through a login-page that does not prompt for the user's password.

Step	Description
1	At the login page for SKCC, type in the Username and the CAPTCHA code visible on the page, for the credential you created in this demonstration. When done, click on the Login button:  Login with CAPTCHA | Str ~~https~~://fidodemo.strongauth.com/pno/captchalogin.jsp Apps Zimbra Enable TDE Using E... SKCC SKCC PWL SKCC PWL NoCapcha Other bookmarks STRONGAUTH Securing the Core Help Login with FIDO Ready™ Authenticator Username Username Enter Code Enter CAPTCHA code below KNHHee5 Login Reset Login without a FIDO Token (password and 2-step) Not Registered? Create an account now Copyright © 2001 - 2015 StrongAuth, Inc.
2	Since FIDO authentication is enabled (by the fact that a FIDO key is registered for the application) SKCC automatically prompts with a challenge on the FIDO Verification page asking you to **Please confirm user presence**. This page displays the logos of various FIDO U2F Authenticators that were previously tested by StrongAuth at one point or another; you can, technically, use any FIDO Certified™ U2F Authenticator with SKCC even if they do not appear on this list.
3	Insert the FIDO Authenticator into an available USB port and depending on the type of Authenticator, perform the appropriate operation to verify user-presence:

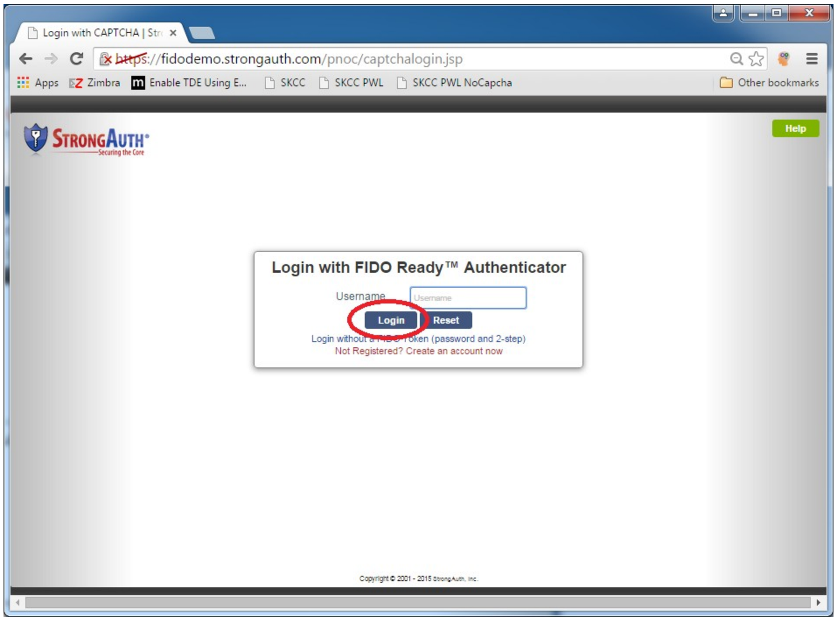
Step	Description
	 StrongAuth Securing the Core Help Logout eyeLock HYPERSECU Infineon NXP plug-up Sonavation IDKEY STMicroelectronics yubico FIDO Verification Enable your FIDO Token NOW. Please confirm user presence Use verification code instead Copyright © 2001 - 2015 StrongAuth, Inc.
4	If the strong-authentication succeeds, you are presented with the SKCC web-application:  Local to Cloud StrongAuth Securing the Core Help Logout Local to Cloud Cloud to Local Cloud to Cloud Local to Local Settings Select Encrypt Reset Status ~~https~~://fidodemo.strongauth.com/skcc/l2c?ctv=e68da117-d018-446c-8d90-e5c6148d17b120150804125125 Welcome testuser Encrypt files from your local computer or storage to the remote cloud Local Select File: Choose File... Group: FIDOUsers Cloud Cloud: Select Cloud Bucket: Bucket Content Name | Size (bytes) | Last Modified Date Page 1 of 0 60
5	If you see an error message indicating that a timeout occurred while waiting, click on **Retry** and perform the appropriate operation to verify user-presence when prompted.
6	If you don't have your FIDO Authenticator, click on the **Use verification code instead** link to use 2-Step Verification to authenticate to SKCC.

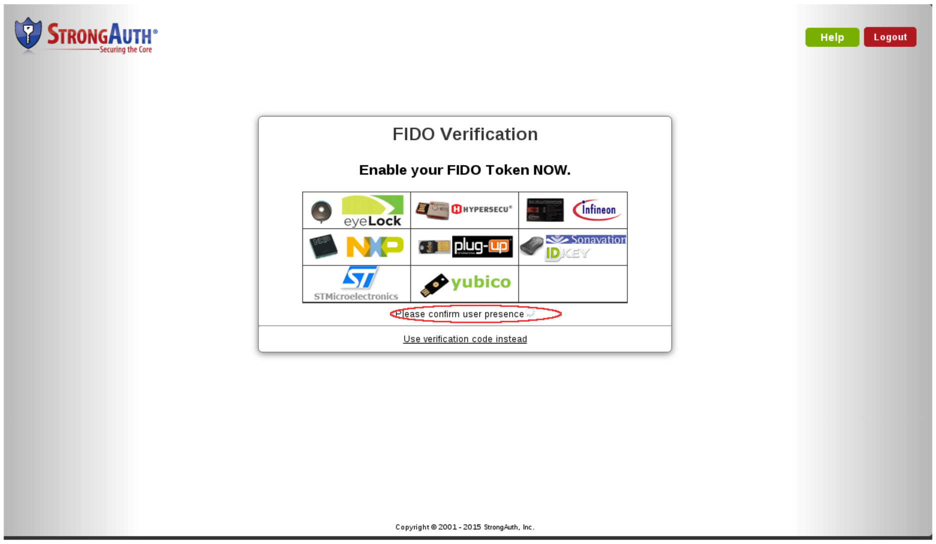
Authenticate with FIDO only

In this section of the demonstration, you will strongly-authenticate to the account with just the FIDO U2F Authenticator and nothing else – no password or CAPTCHA. Your username is always required in all forms of U2F strong-authentication to identify you.

The benefit of this mode of authentication is that the web-application can completely dispense with the password or CAPTCHA. If the web-application is designed well (to remember the username from a cookie, then it will allow the user to move seamlessly from application to application by clicking on bookmarks, links or URLs without having to type anything – and yet be strongly authenticated with their FIDO Authenticator. This is most useful for intranet web-applications where users are authorized to access the applications internally.

This demonstration requires connecting to a slightly different URL with the browser: **https://fidodemo.strongauth.com/pnoc.** It leads to the same web-application, but through a login-page that does not prompt for the user's password.

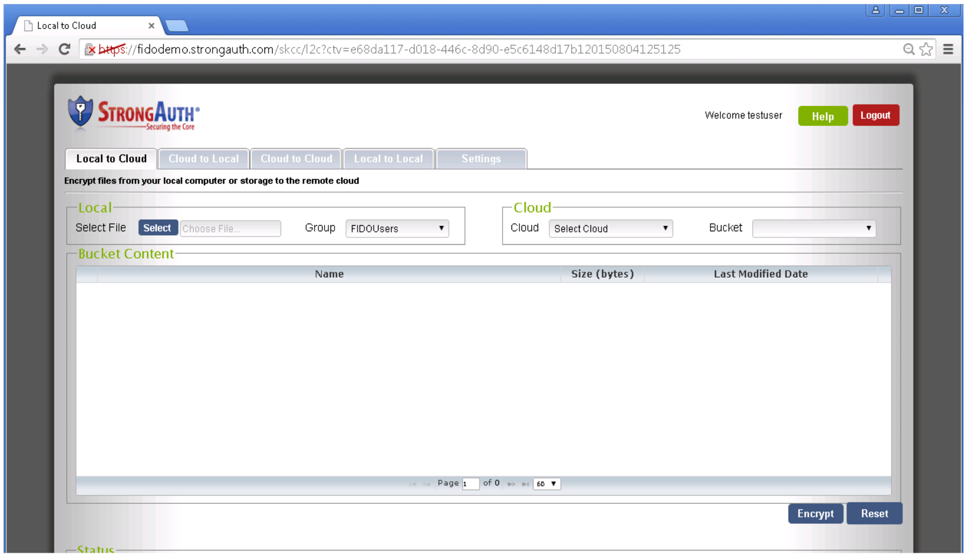
Step	Description
1	At the login page for SKCC, type in the Username for the credential you created in this demonstration. When done, click on the Login button:  Login with CAPTCHA | Str ~~https~~://fidodemo.strongauth.com/pnoc/captchalogin.jsp Apps Zimbra Enable TDE Using E... SKCC SKCC PWL SKCC PWL NoCapcha Other bookmarks StrongAuth Securing the Core Help Login with FIDO Ready™ Authenticator Username Username Login Reset Login without a FIDO Token (password and 2-step) Not Registered? Create an account now Copyright © 2001 - 2015 StrongAuth, Inc.
2	Since FIDO authentication is enabled (by the fact that a FIDO key is registered for the application) SKCC automatically prompts with a challenge on the FIDO Verification page asking you to **Please confirm user presence**. This page displays the logos of various FIDO U2F Authenticators that were previously tested by StrongAuth at one point or another; you can, technically, use any FIDO Certified™ U2F Authenticator with SKCC even if they do not appear on this list.
3	Insert the FIDO Authenticator into an available USB port and depending on the type of Authenticator, perform the appropriate operation to verify user-presence:

<table>
<tr><th>Step</th><th>Description</th></tr>
<tr><td></td><td>


Enable your FIDO Token NOW.

Please confirm user presence

Copyright © 2001 - 2015 StrongAuth, Inc.
</td></tr>
<tr><td>4</td><td>
If the strong-authentication succeeds, you are presented with the SKCC web-application:



https://fidodemo.strongauth.com/skcc/l2c?ctv=e68da117-d018-446c-8d90-e5c6148d17b120150804125125

Welcome testuser

Encrypt files from your local computer or storage to the remote cloud

Group: FIDOUsers

Cloud: Select Cloud

</td></tr>
<tr><td>5</td><td>If you see an error message indicating that a timeout occurred while waiting, click on <b>Retry</b> and perform the appropriate operation to verify user-presence when prompted.</td></tr>
<tr><td>6</td><td>If you don't have your FIDO Authenticator, click on the <b>Use verification code instead</b> link to use 2-Step Verification to authenticate to SKCC.</td></tr>
</table>

This completes the demonstration of the SKCC and the FIDO strong-authentication with your Authenticator. The SKCC and SKCE are capable of doing a lot more to protect your sensitive data; feel free to download them from sourceforge.net and test them out internally within your company.

Support

If you have any questions on any of the above, please send an e-mail to info@strongauth.com.