FOKS Integration (BETA)

FOKS (Federated Open Key Service) is in beta. Current functionality provided is:

1. End-to-End Post-Quantum Encrypted Git Hosting
2. End-to-End Post-Quantum Encrypted Key-Value Store
3. Federated and Generalized Team Management
4. Device Management with Full YubiKey Support

See Foks.pub for a more detailed overview of **FOKS**.

For this journey, I'm primarily interested in the **Key-Value Store** feature and integrating it's usage into my daily routine. So far I've accomplished the following:

1. **FoksApi** a powershell script executing FOKS kv cli commands
2. **PSFoks** a powershell module executing FOKS kv cli commands
3. **Foks-Explorer** a web interface with integration to the **FOKS Key-Value Store**

There is a **FOKS User Guide** documentation in the works called Foks Book where others are contributing their knowledge on the usage of FOKS.

The remainder of the document outlines the integration work I've performed using **FOKS** on Linux with PowerShell.

Installation & Setup of FOKS

Initial Installation of FOKS

```
$ curl -fsSL  https://pkgs.foks.pub/install.sh  | sh
```

This will install both the **FOKS binary** and the **FOKS agent**.

```
PS> foks ctl status
foks agent is in state: active running

PS> which foks
/usr/bin/foks

PS> Get-Process -Name foks

 NPM(K)    PM(M)      WS(M)     CPU(s)      Id  SI ProcessName
 ------    -----      -----     ------      --  -- -----------
      0    37.25      34.20      40.25    3665 …65 foks
PS> Get-Command foks

CommandType     Name           Version    Source
```

```
-----------     ----            -------     ------
Application     foks            0.0.0.0     /usr/bin/foks
```

logs are located here: **$HOME/.cache/foks**

For subsequent installs/updates

```
$ apt-get install foks
```

FOKS signup

The signup process is for gaining access to the hosting service **foks.app**.

```
Choose the **foks.app** home server in the signup process.
If a invite code is requested use: cczjho9r

PS> foks signup
```

To upgrade to a paid hosting plan. The following command will generate a URL for accessing the FOKS Web Admin Panel.

```
PS> foks admin web
```

FOKS Command Line Basics

For a overview of all the commands.

```
PS> foks --help
```

For the **FOKS Key-Value Store** commands, one is dealing with a structure that is nearly identical to that of dealing with file systems.

All Key/Value paths start with the root path */* and the last node or value in the path is called the **Key**.

For instance, **/mynode/tom/api**, **api** is the key to the associated value assigned to it. The simplest command to create this keypath is:

```
PS> foks kv put /mynode/tom/api apivalue -p --force
```

The keypath is **/mynode/tom/api** where **api** is the key and **apivalue** is the value assigned to the key.

The -p flag will create all missing names in the path if needed and –force flag will overwrite that keypath if it already exists.

To retrieve the value in this keypath:

```
PS> foks kv get /mynode/tom/api
apivalue
```

To list all existing kv paths.

```
PS> foks kv ls /
```

Adding a second device

The same KV store data can be accessed from multiple devices (computers), if desired.

On the new device, install **FOKS**.

On the original device that **FOKS** was installed on.

```
PS> foks key assist
```

This prints passphrase to the console. Leave this console up until the new device has been associated to your **FOKS** account.

On the new device:

```
PS> foks key new

Select a server, enter username, enter device name. this also prints a
passphrase, leave it on the screen
```

Now on either device, type in the passphrase from the other device.

Once this process has been completed both devices will now have access to the same KV store data.

Setting up a passphrase

To control access to your **FOKS** KV store data, one can create a passphrase.

```
PS> foks passphrase --help

Available Commands:
  change      change passphrase
  set         set a new passphrase
  unlock      unlock local credentials with a passphrase

PS> foks passphrase set
```

IF YOU FORGET OR LOSE YOUR PASSPHRASE YOUR DATA IS LOST!!

To lock access to your **FOKS** KV store data

```
PS> foks key lock
```

To unlock

```
PS> foks passphrase unlock
```

Git Operations

Another extremely useful feature of **FOKS** is **Encrypted Git Hosting**.

For the powershell work I've done so far in testing **FOKS**, I've created a git repository.

Created a **FOKS** team foks_apps

```
PS> foks team create foks_apps
```

Create a git repository:

```
PS> foks git create FoksApi --team foks_apps
Created: foks://foks.app/t:foks_apps/foksapi
```

Anyone who is a member of the **foks_apps** team has access to this repository.

Team invite code is:

```
YcarI5JTMATAp1tJ4E5RIM5QgKVyeJ0HGsMgB9HRXNrVnXlrlcUcDH9nDkQR7QomaTpSqhU0Veue
Dw2w0zC7uK5jlsI61PcVSCanF
```

To setup the local git repository on my system, I did the following.

```
PS> cd $HOME
PS> mkdir git-foks
PS> cd git-foks
PS> git clone foks://foks.app/t:foks_apps/foksapi
```

Now with all any coding work being done with VScode, it can be committed to the git repository as needed.

IMPORTANT REMINDER THIS SOFTWARE IS IN BETA TESTING LIMIT YOUR USAGE TO TEST DATA ONLY

Installing PowerShell on Linux

PowerShell Installation

```
###################################
# Prerequisites

# Update the list of packages
sudo apt-get update

# Install pre-requisite packages.
sudo apt-get install -y wget apt-transport-https software-properties-common

# Get the version of Ubuntu
source /etc/os-release

# Download the Microsoft repository keys
wget -q
https://packages.microsoft.com/config/ubuntu/$VERSION_ID/packages-microsoft-
prod.deb

# Register the Microsoft repository keys
sudo dpkg -i packages-microsoft-prod.deb

# Delete the Microsoft repository keys file
rm packages-microsoft-prod.deb

# Update the list of packages after we added packages.microsoft.com
sudo apt-get update

###################################
# Install PowerShell
sudo apt-get install -y powershell

# Start PowerShell
pwsh
```

Install Gpaste for clipboard functionality

```
sudo apt install xclip xsel
sudo apt install gpaste
```

At the time I decided to migrate to Linux from Windows, I had a large time investment in learning PowerShell so I decided to give PowerShell a try on Linux. Now after several years of predominately using Linux, I almost exclusively find myself using the PowerShell environment.

For me, one of the big attractions to using PowerShell is that the same code it will run on Linux, MacOS, and Window. One does need to code PowerShell in a OS neutral manner for this to work

though.

FoksApi Overview

The primary focus is to provide programmatic access to the key/value store functionality implemented by FOKS. Currently, the foks command line interface is being used with the thought of migrating to a REST Api as some future date.

To follow the examples below, you'll a working version of FOKS and PowerShell installed. The script has been develop and tested on Linux in an OS neutral manner so should be working on all OSes.

FoksApi Operations

```
    KeyPaths       - Generate a list of current key/value pairs
    FindPaths      - List keys matching search expression
    Create         - Create a key/value pair
    Get            - Copy the value of a key/value pair to the clipboard
    Update         - Update a key/value pair with a new value
    Remove         - Remove a key/value pair
    Lock           - Require a passphrase to unlock FOKS
    Usage          - Display Server Usage Info
    passPhrase     - Set, Change, or Unlock the passphrase
    SetRandomValue - Random 20 char passphrase created in the clipboard
    Usage          - Display Server Usage Info
```

Creating a KV Entry

```
 PS> FoksApi Create /myfirst/love dontkissandtell
 Created /myfirst/love/
```

```
By default the last item name in the path is the key. If it is desired to
have a different key name associated with the path, then the '-kvkey'
parameter can be used.
```

```
PS> FoksApi Create -kvpath /myfirst -kvalue dontkissandtell -kvkey love
```

This command is yeilds the same results as the prior example.

If the value has embedded spaces or characters that need to be escaped, then the value should be in single quotation marks.

Updating KV Entry

```
PS> FoksApi Update /myfirst/love Traci
Updated /myfirst/love/
```

Lets update the value with a 20 character randomized value

```
PS> FoksApi Update /myfirst/love SetRandomValue
Updated /myfirst/love/
```

Get a KV value

```
PS> FoksApi Get /myfirst/love
```

The associated value is copied to the clipboard.

List KV Entries

Once one has a large collection of key/value pairs, there is easy way to list your key/value entries.

```
PS> FoksApi KeyPaths
$HOME/FoksPaths.txt new file created
```

The file generated is a dump of all the current key/value pairs.

To list all key/value pairs to the console.

```
PS> FoksApi FindPaths
```

To search for specific paths

```
PS> FoksApi FindPaths myfirst
/myfirst/love
```

Securing the FOKS implementation

Once the FOKS system is no longer being actively used, it is wise to lock down FOKS with a passPhrase to keep it secure.

Set a passphrase for FOKS. **Note the example below is using the foks cli.**

```
PS> foks passphrase set
```

DON'T LOSE YOUR PASSPHRASE

A secure passphrase can be generated as follows:

```
PS> FoksApi SetRandomValue
```

The generated random value is copied to the clipboard.

Enter the following command to lock the FOKS implementation.

```
PS> FoksApi Lock
```

On each execution of **FoksApi**, it will check if FOKS is locked and prompt for a passphrase to unlock.

PSFoks Module Overview

A PowerShell 7 module implementing FOKS KV store functionality to support a Web interface called, **Foks-Explorer**.

This module is functional on either Windows, Linux, or MacOS operating systems where PowerShell 7 is supported.

Installation of PSFoks

Copy the **PSFoks** directory to the default module installation location on your OS. On Linux, this location is **$HOME/.local/share/powershell/modules**.

Overview of PSFoks

```
PS> Get-Command -module PKFoks
```

This command will provide the following output.

```
CommandType     Name                               Version    Source
-----------     ----                               -------    ------
Alias           Foks-Bye                           0.0.1      PSFoks
Alias           Foks-ConsoleLog                    0.0.1      PSFoks
Function        Add-FoksKeyValue                   0.0.1      PSFoks
Function        Clear-FoksConsole                  0.0.1      PSFoks
Function        Edit-FoksKeyValue                  0.0.1      PSFoks
Function        Get-FoksConsole                    0.0.1      PSFoks
Function        Get-FoksKeyValue                   0.0.1      PSFoks
Function        Get-FoksModKeyPaths                0.0.1      PSFoks
```

```
Function        Remove-FoksKeyValue          0.0.1      PSFoks
Function        Set-FoksPassPhrase           0.0.1      PSFoks
```

To get help on individual functions within **PSFoks**

```
PS> Get-Help Get-FoksModKeyPath -full
```

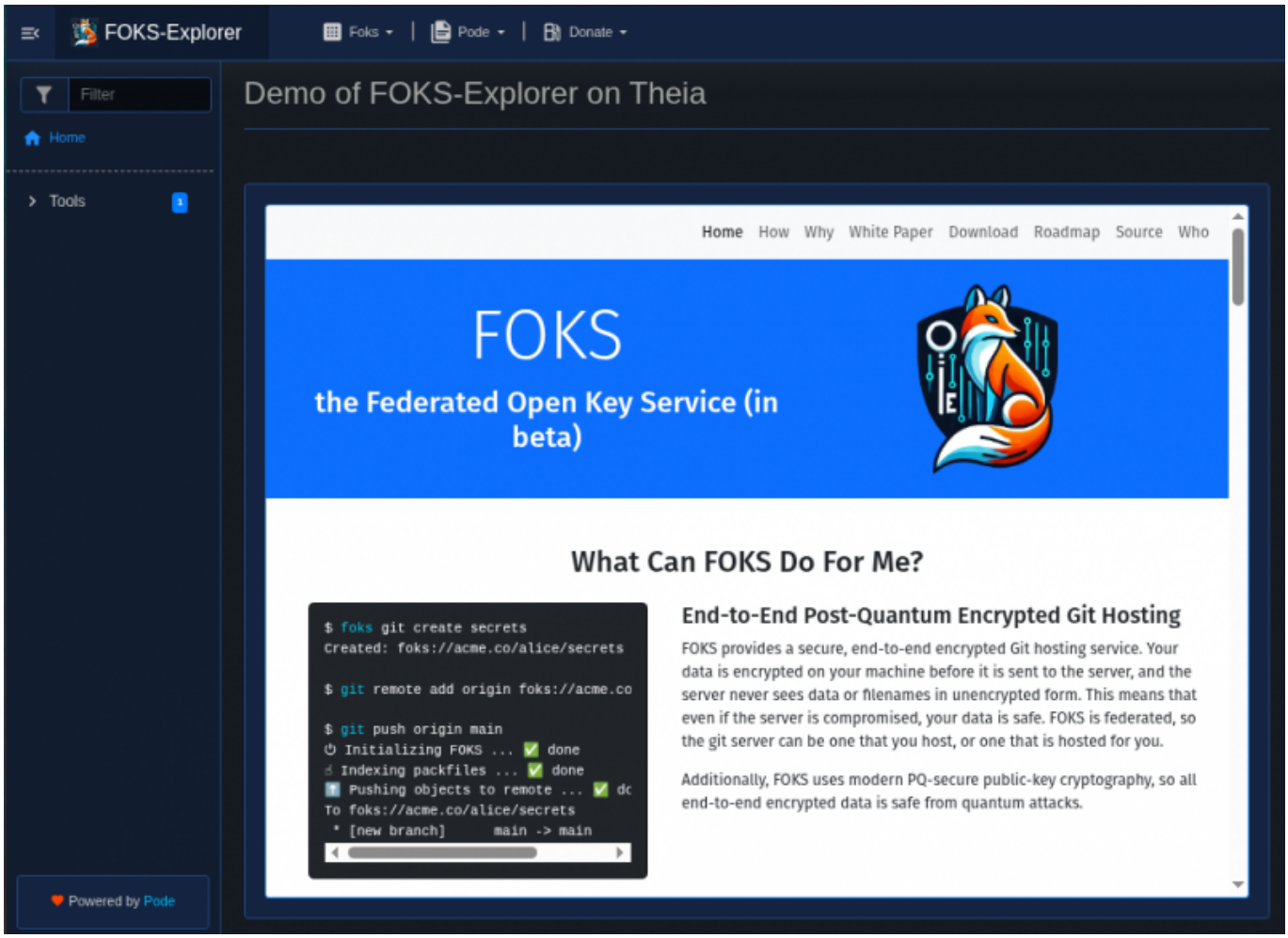
FOKS-Explorer Overview

FOKS-Explorer is a Web site that is hosted on a local a computer that supports the key-value store features implemented by **FOKS**.

The Web site is built using Pode.web which allows one to build web pages purely with PowerShell - no HTML, CSS, or JavaScript knowledge required.

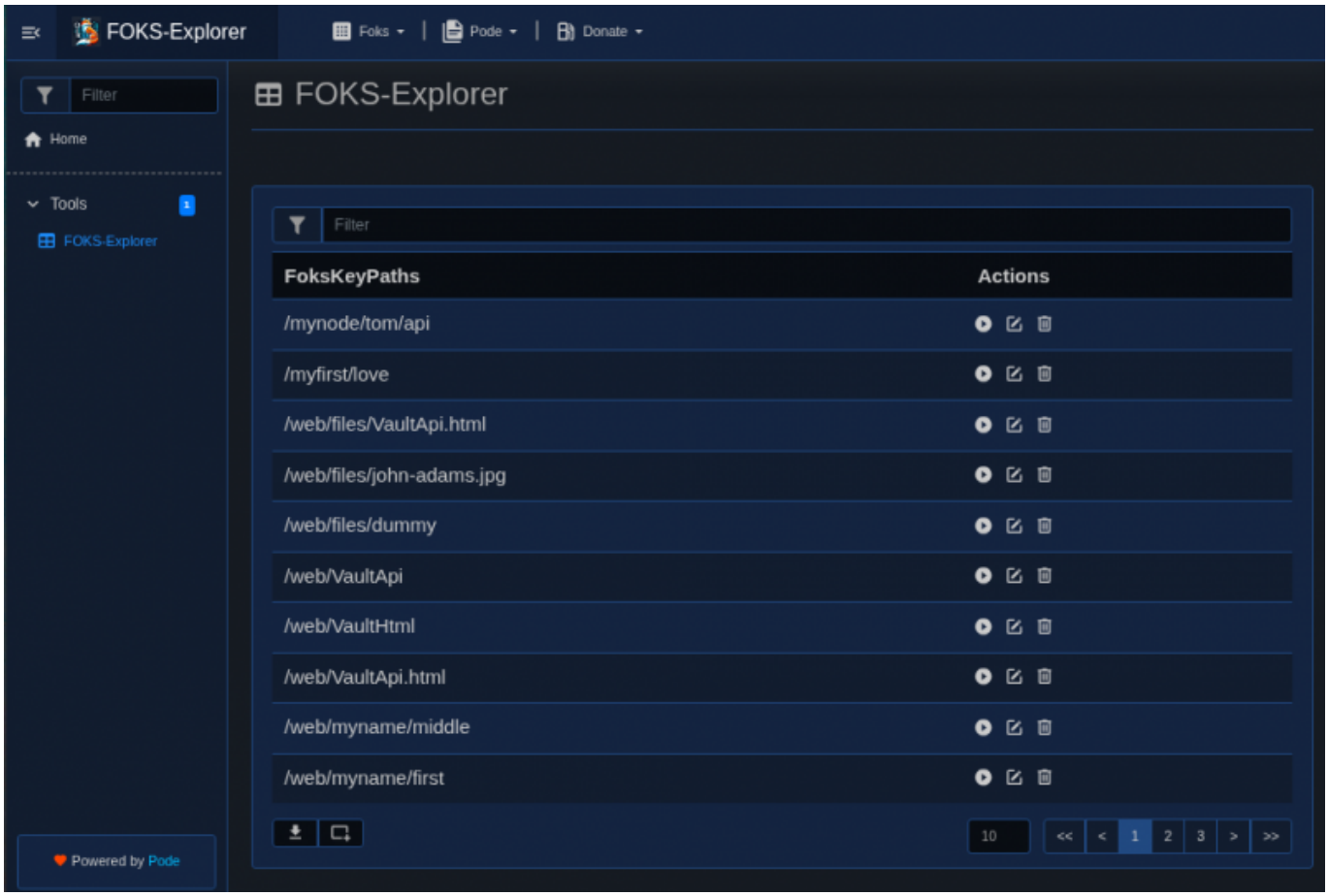
FOKS-Explorer Home

The home page appears as follows.



FOKS-Explorer

Selecting **FOKS-Explorer** from **Tools** in the navigation panel displays.



FOKS-Explorer Overview

At the top of web page is a **Filter icon**, that is used to limit the key-value paths to be displayed below. By default, all key-value paths are displayed.

Each row lists a key-value path where the last item in the path is the **Key** followed by 3 icons.

Click on the **Play icon** (first icon) to copy the value of the key to the clipboard.

Clicking on the second icon provides a menu for changing the value of key.

Clicking on the **Trash Icon** deletes the key and value from FOKS.

At the bottom left of the table is an **Export Icon** and an **Add Entry** icon.

At the bottom right of the table is a set of controls used to navigate through the list of key-value entries.

Software Requirements

The following is a list of software components required to support the FOKS-Explorer web site.

PSFoks module needs to be installed as documented above. If using Linux, then **gpaste** needs to be installed as documented above for clipboard support.

Pode module

```
PS> Install-Module Pode
```

Pode.Web module

```
PS> Install-Module Pode.web
```

Microsoft.PowerShell.ConsoleGuiTools

```
PS> Install-Module Microsoft.PowerShell.ConsoleGuiTools
```

Install Foks-Explorer

Copy the **Foks-Explorer** directory to your home directory path **$HOME/Foks-Explorer**

Next the **$HOME/Foks-Explorer** path needs to be added to your system environment PATH variable. The easiest way to do this is to update your powershell profile.

To find your default profile file:

```
PS> $profile
$HOME/.config/powershell/Microsoft.PowerShell_profile.ps1
```

Add the following line to your profile.

```
$env:PATH += ":$HOME/Foks-Explorer"
```

Starting Foks-Explorer

In a PowerShell console session enter:

```
Start-FoksExplorer

Checking if FOKS is Locked
Retrieving one-time password for Foks-Explorer
Starting Foks-Explorer Web Interface: foks-explorer.ps1
Listening on the following 1 endpoint(s) [1 thread(s)]:
```

```
    - http://localhost:23007/
```

Now Ctrl-Click on the URL listed in the console to open the **Foks-Explorer** Web Interface.

Configure Foks-Explorer

The configuration of Foks-Explorer can be changed by editing the file **FOKS-Explorer.xml** in the **data** directory.

```
<PodeWebCfg>
  <title>FOKS-Explorer</title>
  <address>localhost</address>
  <port>23007</port>
  <protocol>http</protocol>
  <authenticate>0</authenticate>
  <duration>60</duration>
  <logo>/pode.web/images/foks.jpg</logo>
  <logo1>/pode.web/images/DeatonCoatOfArms-1.jpg</logo1>
  <background>/pode.web/images/Bow-Lightening.png</background>
</PodeWebCfg>
```

By default, the web interface doesn't require any authentication because **<authenticate>** is set to zero.

When **<authenticate>** is set to “2”, The **Foks-Explorer** page will require authentication but the home page will not.

The authentication process implemented is a one-time password scheme using FOKS. An keypath entry of **/apps/Foks-Explorer/<$env:USERNAME>/OTPW** must be created for each user for authentication to succeed.

After successful authentication the **OTPW** key is updated with a new random 20 character password.

When **Start-FoksExplorer** is first launched, it will automatically copy the **OTPW** key value to the clipboard.

Get Foks-Explorer

Foks-Explorer, **PSFoks Module**, and **FoksApi** exist in the Foks git respository, **foksapi** where team members in the team **foks_apps** have access.

Option 1:

To join the FOKS team, **foks_app**:

```
PS> $inviteCode =
"YcarI5JTMATAp1tJ4E5RIM5QgKVyeJ0HGsMgB9HRXNrVnXlrlcUcDH9nDkQR7QomaTpSqhU0VeueDw2w0zC7uK5jlsI61PcVSCanF"

PS> foks team accept $inviteCode
```

I or one of the team owners will need to respond with a **foks team accept** to accept your invitation.

If you are using **Keybase** then join the **foks_book** team to let me or someone know an invite is pending.

Option 2

The **Foks-Explorer** git project is mirrored on GitHub

Option 3

Buy me 2 cups of coffee at BarnYard Market using Bitcoin and download a zip file.
