# A Secure Password Wallet based on the SEcube™ framework

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To authenticate, Master password + Device are required

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## Introduction

This work regards the implementation as a desktop application that exploits the capabilities of the SEcube™ (Secure Environment cube) hardware and software framework to store and protect passwords.

The desktop application, named **SEcubeWallet**, was written in C/C++and Qt, and it interacts with a SEcube™ device, requesting services like authentication and encryption/decryption of data.

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**zxcvbn: Password strength estimator**

Dictionaries, keyboard patterns, sequences, years

# The SEcube™ Open Security Platform

## Hardware

## Software

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Developed by the Blu5 Group

**Software**

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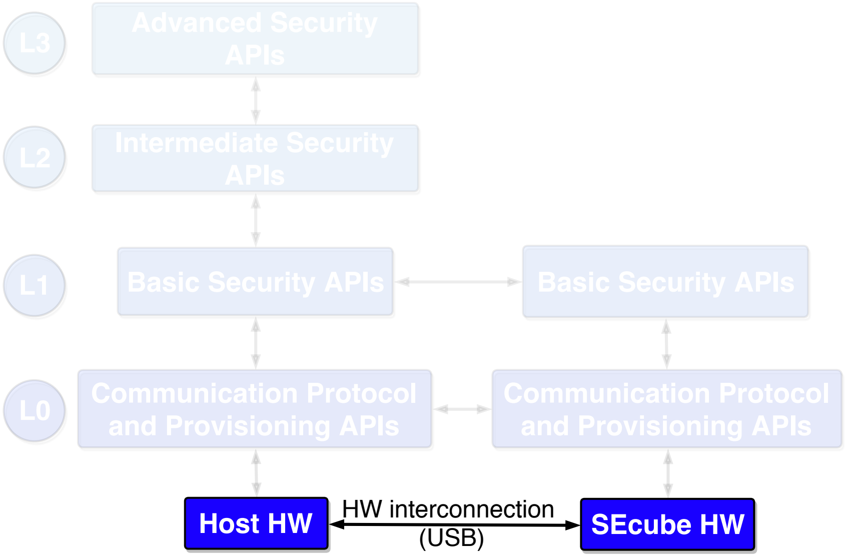
**Host libraries:** Allow to experience the platform as a high-security black box.

# SEcube™ APIs hierarchy



L3
Advanced Security APIs
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L1
Basic Security APIs
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HW interconnection (USB)
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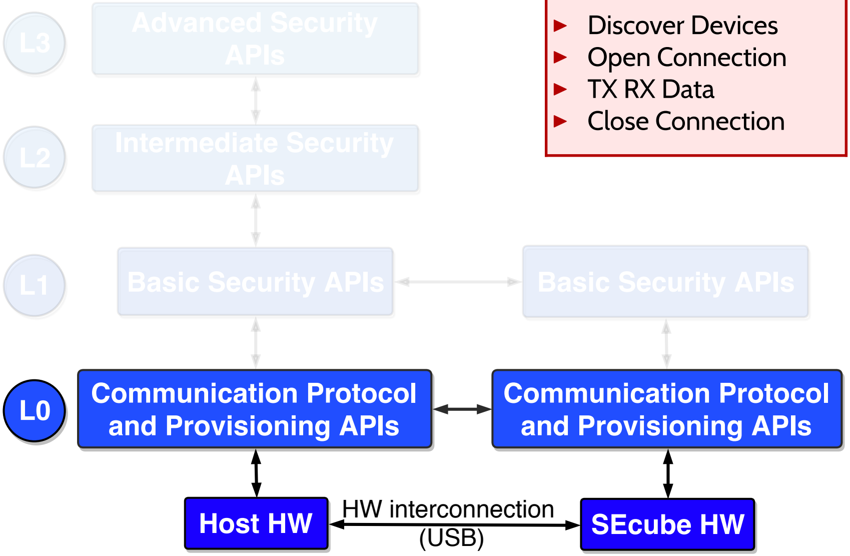

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- Discover Devices
- Open Connection
- TX RX Data
- Close Connection

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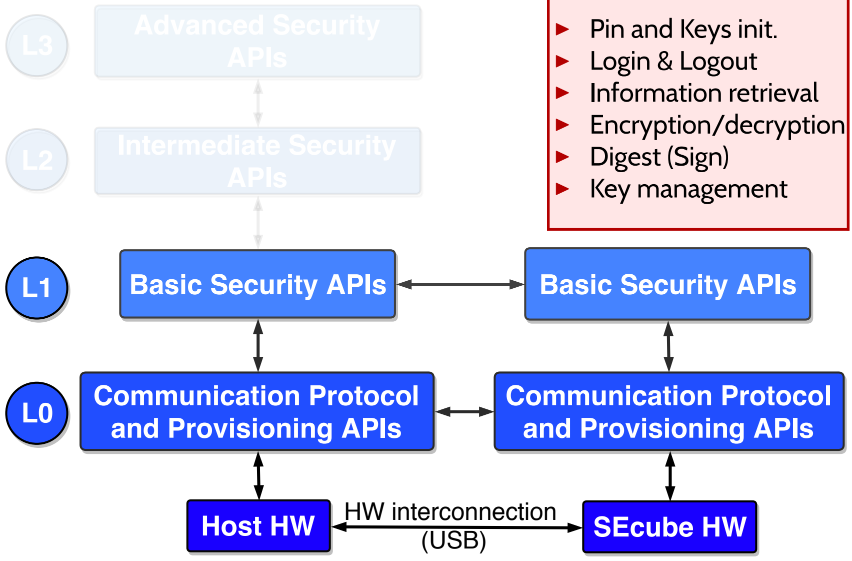
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- Login & Logout
- Information retrieval
- Encryption/decryption
- Digest (Sign)
- Key management

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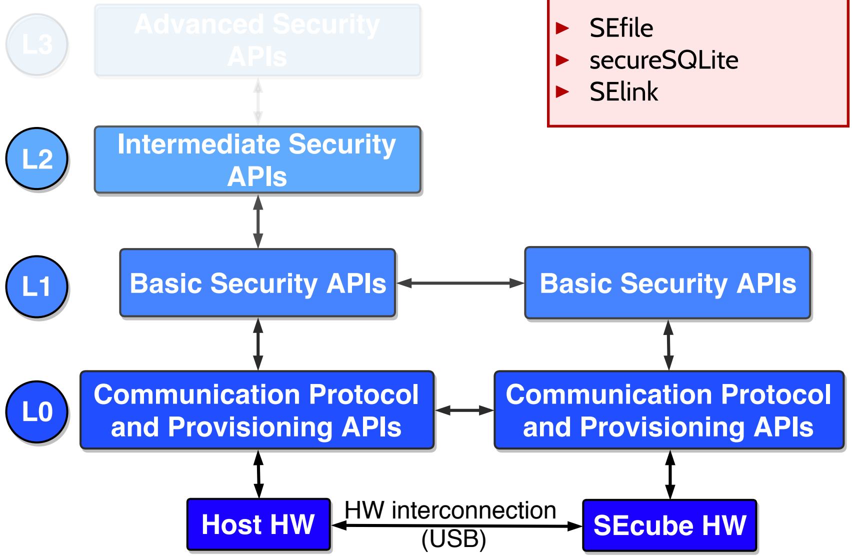

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- secureSQLite
- SElink

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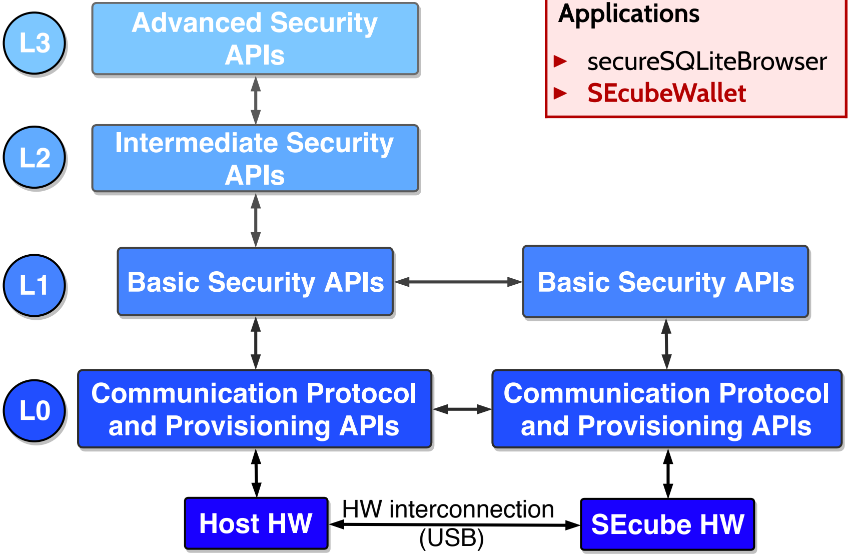

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**Applications**

- secureSQLiteBrowser
- **SEcubeWallet**

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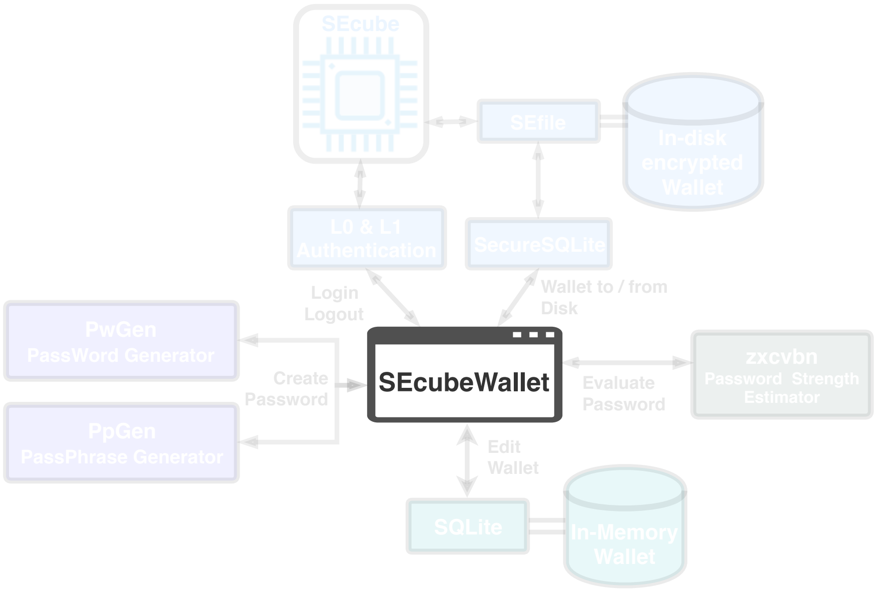
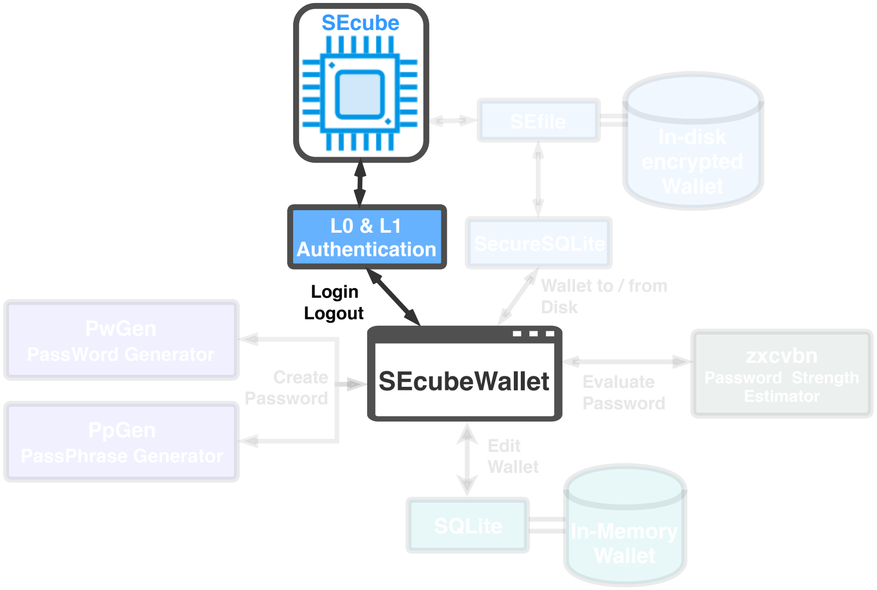
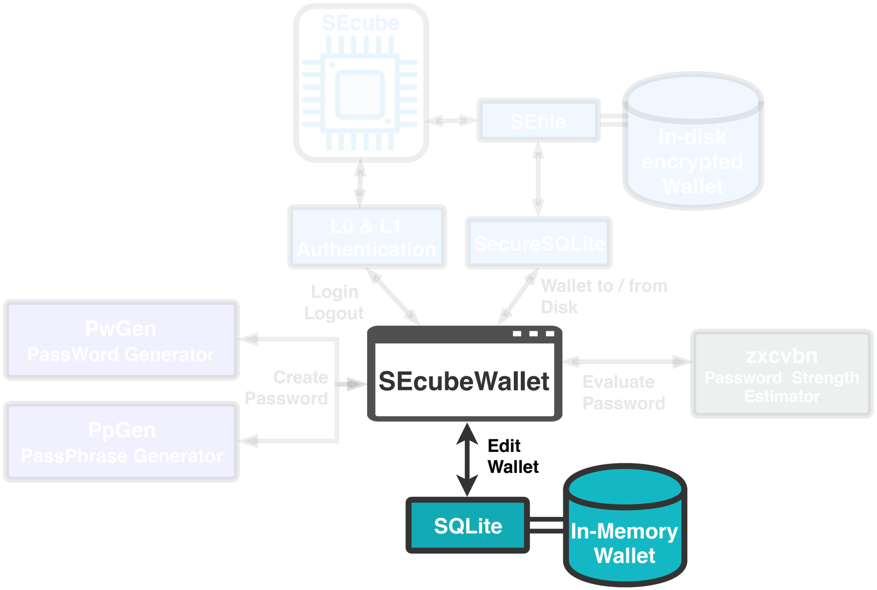
# SEcubeWallet Application



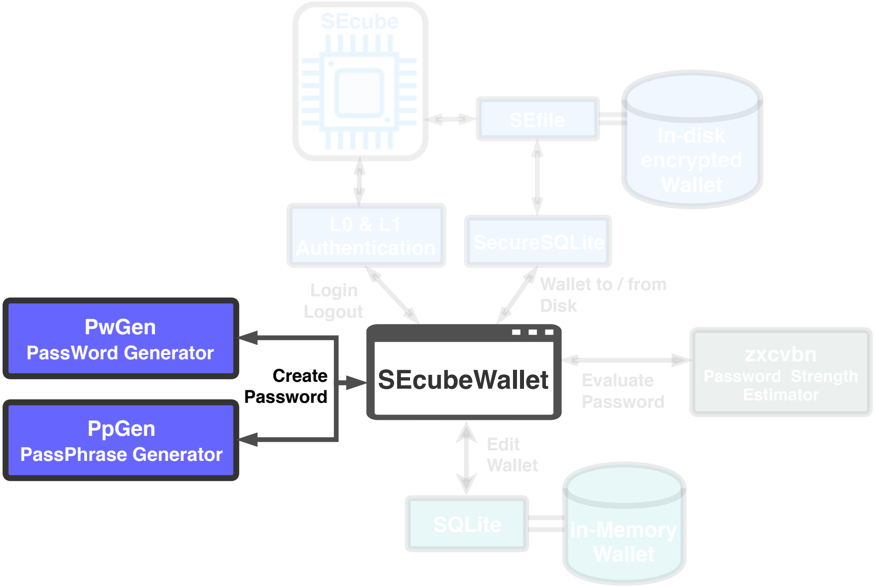
# Open device and authenticate



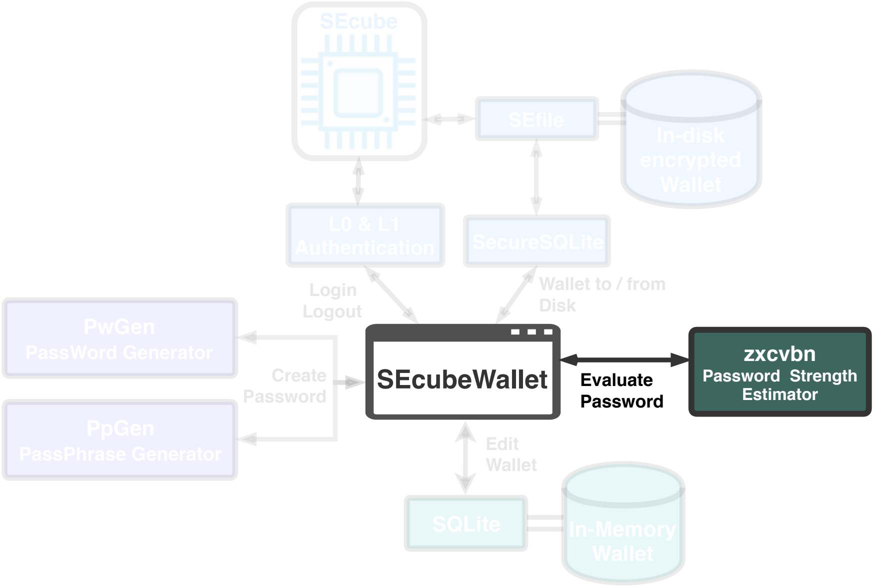
# Create In-memory Wallet



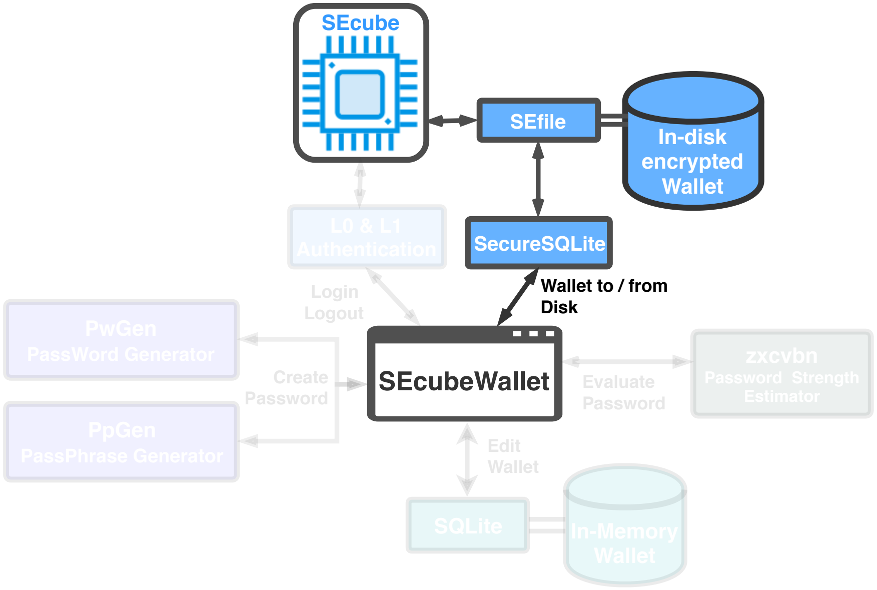
# Generate Password/Passphrase



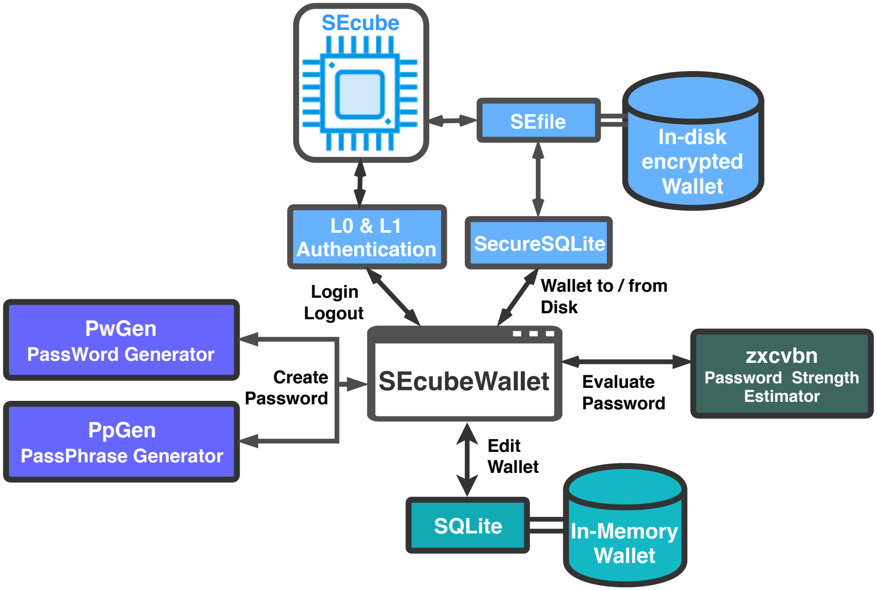
# Evaluate Strength



# Encrypt and Save Wallet to disk



# General Architecture



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**The data (passwords) can only be accessed if:**

- SEcube™ device is connected
- Login pin is the correct one
- Key inside the device is the correct one.

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- **Delete Wallet:** Both the In-memory DB and the In-disk encrypted file are deleted.

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- Main Window
    - **Table View** for displaying the wallet entries
    - **Filters** So the user can search in each of the table's columns.
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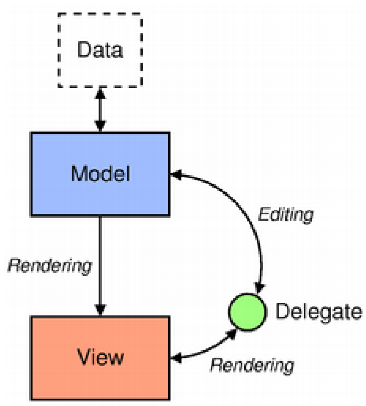

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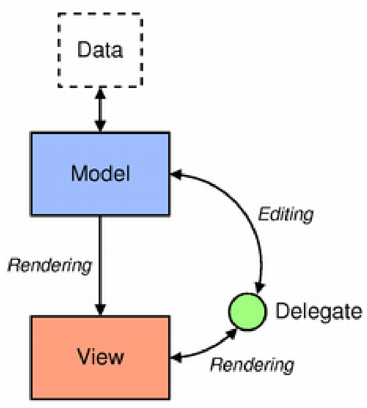

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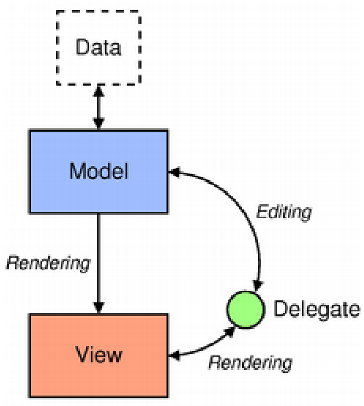

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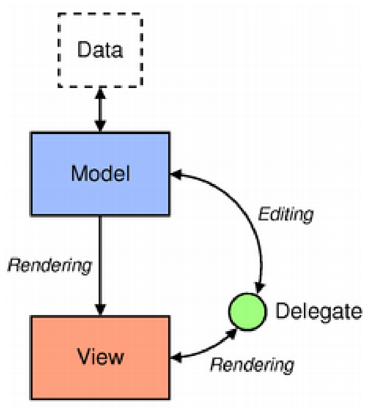

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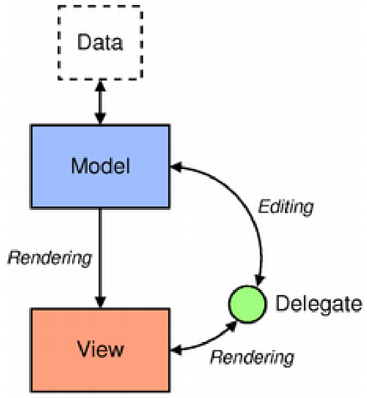

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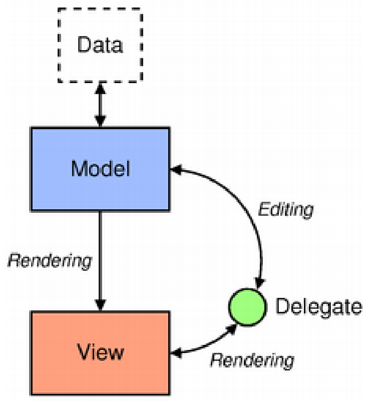

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**PassPhrase Generator**

- Implemented as a C++/Qt function.
- Works by extracting Random words out of dictionary files (plain text).

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## Generate and evaluate password

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- The developed application still lacks some features in order to be considered a truly commercial product.

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### Android

- Use a SEcube™ phone device
- Port SEcube™ host-side libraries to android
- Port Qt application to android