




FACTOM

Data Structures and APIs Usage

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AGENDA

- 1.** Factom Data Structures
 - 2.** Installing Factom Environment
 - 3.** How to use Factom Enterprise Wallet?
 - 4.** Factom APIs Usage
 - 5.** Summary
- 



Factom Data Structures

1. Chains -- Grouping of Entries specific to an Application

- Chains in Factom are sequences of Entries that reflect the events relevant to an Application
- Chain name:
 - A Chain Name is a value to uniquely identify a Chain.
 - The choice of Chain Name is left up to the user.
 - It can be a random number, a string of text, a public key...



1. Chains -- Grouping of Entries specific to an Application

- ChainID:
 - A ChainID is a series of SHA256 hashes of Chain Name segments
 - The ChainID is 32 bytes long
 - The algorithm hashes each segment of the Chain Name.
Those hashes are concatenated, and are hashed again into a single 32 byte value.
 - $\text{ChainID} = \text{SHA256}(\text{SHA256}(\text{Name}[0]) \mid \text{SHA256}(\text{Name}[1]) \mid \dots \mid \text{SHA256}(\text{Name}[X]))$

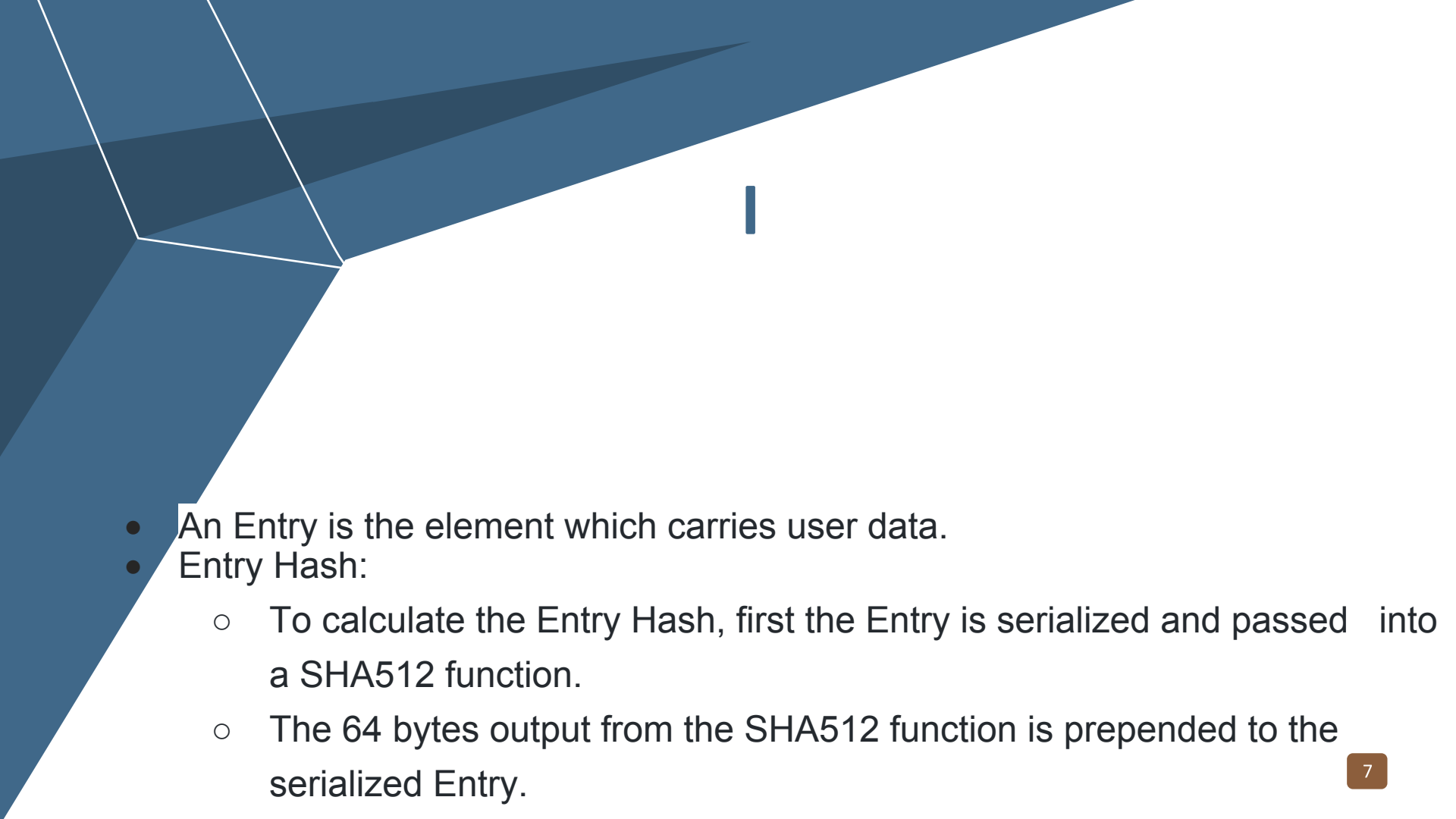
Chain

CHAIN ID

67a417820b1dc4edb6047602be06ced302635d5cf74a0a1512c45285137d617f

2.Entries -- Contains an Application's raw data or a hash of its private data

- An Entry is the element which carries user data.
- Entry Hash:
 - To calculate the Entry Hash, first the Entry is serialized and passed into a SHA512 function.
 - The 64 bytes output from the SHA512 function is prepended to the serialized Entry.
 - The Entry+prependage are then fed through a SHA256 function, and the output of that is the Entry Hash.

- 
- An Entry is the element which carries user data.
 - Entry Hash:
 - To calculate the Entry Hash, first the Entry is serialized and passed into a SHA512 function.
 - The 64 bytes output from the SHA512 function is prepended to the serialized Entry.

The slide features a decorative header with overlapping geometric shapes in shades of blue and teal. The main title is preceded by a small blue vertical bar.

| Consensus Algorithm

SUB TITLE 1

HEADER

- BODY



Consensus Algorithm

Sub Title 2

SUB TITLE 2

HEADER

- BODY



Installing Factom Environment



Install Factom Environment

Install Factom Federation

INTRODUCTION

- + Factom Federation (FF) is available for Mac, Windows, Linux and Docker.
- + Step by step guide on how to install FF binaries on Mac, Windows, and Linux.

Step 1 Download the installer for Mac, Windows, or Linux on [GitHub](#). There are various versions, make sure to select the one best suited for your system.

Step 2 Save it to your desktop or downloads folder on your local hard drive.

Step 3 Follow the instructions for your OS.

LINUX INSTALLATION

- + This installer is for commands *factomd*, *factom-walletd* and *factom-cli*.
- + The three binaries will be installed on your local drive together with a *.factom* folder in the root of the local user Home Folder “*~/.factom*”.
- + Download the “**factom-amd64.deb**” or “**factom-i386.deb**” installer that suits your system as per Step 1 then run the following command to install.

```
sudo dpkg -i ./factom-amd64.deb
```

```
sudo dpkg -i ./factom-i386.deb
```

LINUX INSTALLATION

OS	Factomd Installer
Windows 64bit	FactomInstall-amd64.msi
Windows 32bit	FactomInstall-i386.msi
Mac	Please install from source
Linux (Ubuntu/Debian) 64bit	factom-amd64.deb
Linux (Ubuntu/Debian) 32bit	factom-i386.deb
Linux (Redhat/Centos)	Please install from source

Manual download

1. Go to Github Repository here
<https://github.com/FactomProject/distribution#factom-command-line-interface-programs>
2. Download **factom-amd64.deb** for Ubuntu 64bit

LINUX INSTALLATION

You also can run by the command using `wget`

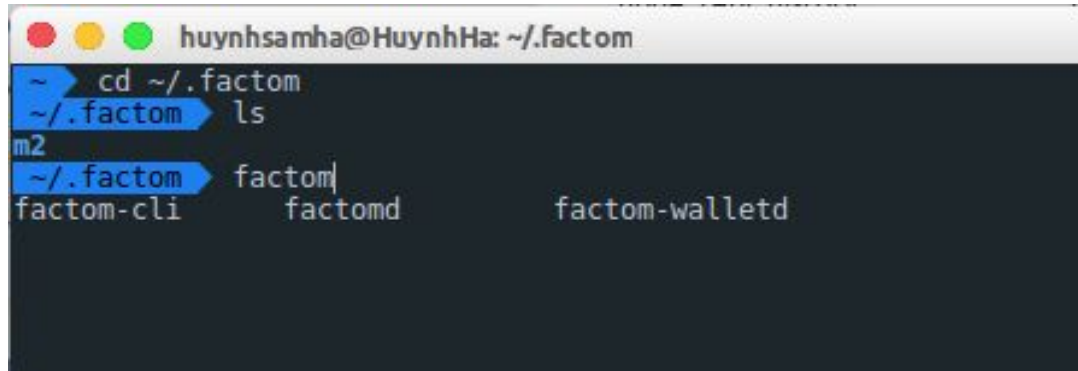
`wget`

`https://github.com/FactomProject/distribution/releases/download/v5.4.2/factom-amd64.deb`

LINUX INSTALLATION

Run “`sudo dpkg -i ./factom-amd64.deb`”

Open terminal and 3 factom commands are available, including **factom-cli**, **factomd** and **factom-walletd**

A terminal window with a dark background and light text. The title bar shows 'huynhsamha@HuynhHa: ~/.factom'. The terminal shows the following commands and output:

```
~> cd ~/.factom
~/.factom> ls
m2
~/.factom> factom|
factom-cli      factomd      factom-walletd
```

FACTOM COMMANDS

- **factomd** is the main program. It manages the blockchain, connects to the public network, and enforces the network rules.
- **factom-walletd** is an application for holding private keys. It builds Factoid transactions and handles crypto related operations to add user data into Factom.
- **factom-cli** is a program for users to interface with *factomd* and *factom-walletd*. It may be used to create Chains, Entries, and Factoid transactions.



Install Factom Environment

Factom Control Panel?

INTRODUCTION

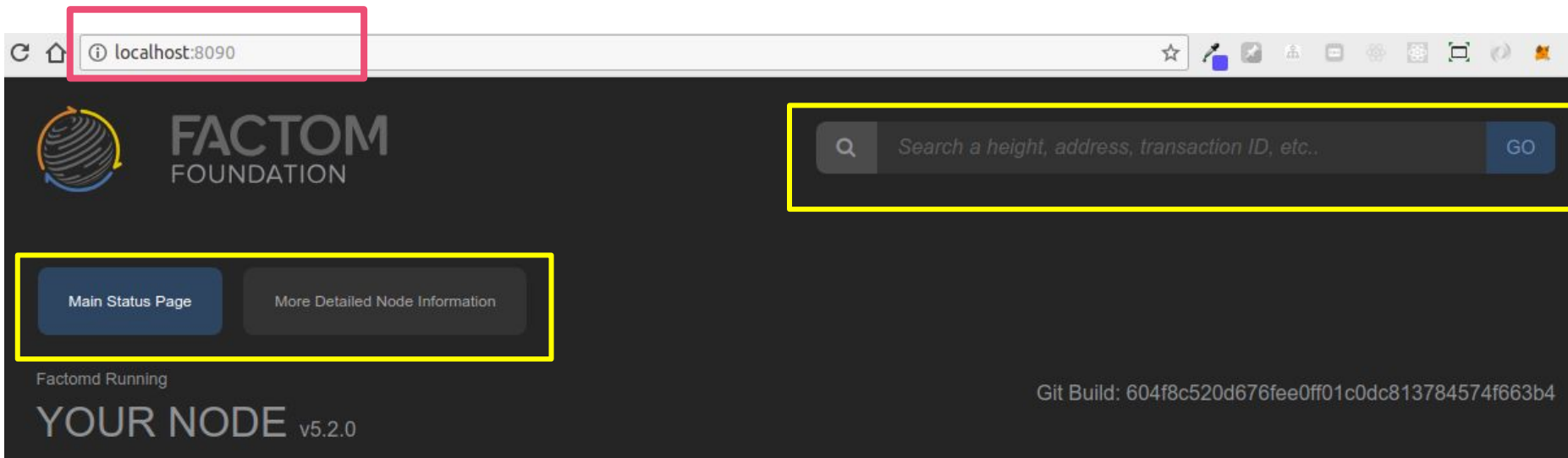
- + The Factomd Control Panel (FCP) is graphical interface for a factomd node.
- + It presents a lot of useful information such as the state of the node, blockchain sync status, connected federated servers, etc.
- + It also allows you to search for transactions' IDs, block height, factoid and entry credit addresses, or other data points similar to using the Factom Explorer.
- + A very useful tool to have for any Factom user or developer who wants to keep an eye on what's going on when running factomd on their local machines.

INSTALLING AND USAGE

- + After installing Factom Federation (FF), you can access Factomd Control Panel without installation.
- + The Control Panel is accessible after running “**factomd**” via command line at the following URL: <http://localhost:8090>.
- + The Control Panel has two main windows:
 - + The Main Status Page
 - + The More Detailed Node Information Page

FACTOM CONTROL PANEL

MAIN STATUS PAGE



FACTOM CONTROL PANEL

MAIN STATUS PAGE

Main Status Page

More Detailed Node Information

Factomd Running

YOUR NODE v5.2.0

Git Build: 604f8c520d676fee0ff01c0dc813784574f663b4

Your Block Height:

51144

Node Sync Status (1st pass):

32% Synced (51144 of 157121)

Node Sync Status (2nd pass):

3% Synced (4889 of 157121)

Federated

1

Audit

0

18 Connections:

IP	STATUS	DURATION	SENT	RECEIVED	ACTIONS
23.111.178.50	Online	8 mins	150(1.1 MB)	410(2.2 MB)	DISCONNECT
23.20.21.45	Online	8 mins	118(61.2 KB)	253(1.3 MB)	DISCONNECT
18.223.95.3	Online	8 mins	171(1.1 MB)	378(1.8 MB)	DISCONNECT
18.214.236.26	Online	8 mins	126(1.1 MB)	311(1.9 MB)	DISCONNECT
18.206.2.235	Online	8 mins	106(59.9 KB)	249(1.3 MB)	DISCONNECT
18.197.200.61	Online	8 mins	114(47.5 KB)	235(1.3 MB)	DISCONNECT
MSGs(DATA)			2.4 K(10.5 MB)	6.1 K(28.7 MB)	

MAIN STATUS PAGE

TRANSACTIONS & ENTRIES

Factoids(100)

Chain/Entry Commits (100)

Last Directory Block - 51664

TRANSACTION ID

TOTAL INPUT

INPUT
ADDRESSES# OUTPUT
ADDRESSES

fa8c0d3eb76d0a0bbc25e3e7edda3ff1467f9d8392426deaccce11d4cbe132

0.110200

1

1

a14068a9fc09ca99c642dea5ec0245b69646541661c9c39438903c10a3b29f5a

99.510200

1

1

6dab59c833462a188dab80df7648e930b50be46c38ec52a8d9f6f2fd1b13f5dc

8.510200

1

1

68ee9f3c118c0f13b6d7479ffd3125d33cff49fc53ac7f776eff264153050624

199.010200

1

1

2ed11d2508fcc310b36c8c35df2d14ef97baf02668d9cecc20077d0a0fa99c206

494.127200

1

1

450a0277349b98b73899418914a65fce3bf9807cf0cb3fdc183513f5e40c3dd3

14.606800

1

1

eed0581e09ba27421f7acff748de1ede0eb293af60916cb873cb4c86c68a62ed

466.665200

1

1

a459150bfae9faad10cf61aca238c43f2e25a1f9e633c4ef75becc1b38bf5a14

298.510200

1

1

MAIN STATUS PAGE

Factoids(100)

Chain/Entry Commits (100)

Last Directory Block - 51823

ENTRY HASH

CHAIN ID

EC COST

ca2c6920a88c2caf052c876eb59f5c76b34cfedd7468bce651d4adf67ee15bab

MAIN STATUS PAGE

TRANSACTIONS & ENTRIES

Factoids(100)

Chain/Entry Commits (100)

Last Directory Block - 52078

LAST DIRECTORY BLOCK INFORMATION

KeyMR:	f498edba1f7540fe98bc1173f55550d8e99418ad87e52462318454a6d9fedf5a
Body KeyMR:	4c48d69f38b4af4701f15f19f7f261c48c00c529a4e6e68754e853e6a8958478
Full Hash:	d7ee069a9de17e2c5e94290c6cad7f32cd4bc2c6c534c0604aa41d4c50544090
Timestamp:	2016-08-29 14:50:00
Block Height:	52078

MORE DETAIL NODE INFORMATION PAGE

Main Status Page More Detailed Node Information

TERMINAL DATA IMPORT

Summary Process List PrintMap Servers Elections Connections


Raw Syncing

```
===SummaryStart===
  FNode0[455b7b]  _____  0/ 0  0.0%  0.000 52929[058116] 52927/52930/157124  -/ 0      69/0/0/2126
152/0/271/0      0      0      0/0/0      0/0/0  0.00/0.00 52930-:-0 - 73c047

                                0
                                Review  0
                                Holding  47
                                Acks     0

                                MsgQueue  0
                                InMsgQueue 0
                                APIQueue  0
                                AckQueue   0
```

SEARCH HEIGHT, ADDRESS, TRANSACTION, ETC

**FACTOM**
FOUNDATION

DIRECTORY BLOCK

KeyMR:	8a7611f9d49ed89b8ff7849f5e11b1bc1945bc5cce080253a4a2ef2bd87899a8
Body KeyMR:	b085b785be2eead177a4902a46b0a2dc29843ccdee58fcc60bd422fc010f3b25
Full Hash:	2c16d35c03d897df24285e47dc32238204dd454eb56f4bbb646d0bbd3f7112a0
TimeStamp:	2015-09-02 06:10:00
Block Height:	20
Previous Directory Block:	Previous KeyMR : 5e1d504123f8d743b53ef574a48fe73d3ab96a4d921cd98bb6aea6a641233608 Previous Full Hash : d69f6ad1f4f846637d195c48c653ce3e0dc8bf5f7efdbad16a33b1f429898f91

Blocks Contained in Block 4 Blocks

Type:	Admin Block
KeyMR:	f9f7cee7afade8d462896c8e976c0f56fc52de1a8eb8711522768e189db75fa



Install Factom Environment

Install Enterprise Wallet

INTRODUCTION

- + Desktop Application for Windows, Mac, or Linux, uses the same file locations as the binary version (*factom-walletd*)
- + Step by step guide on how to install Enterprise Wallet on Mac, Windows, and Linux.

Step 1 Download the installer for Mac, Windows, or Linux on [GitHub](#).

- **Mac:** *enterprise-wallet-setup.dmg*
- **Windows 64bit:** *enterprise-wallet-setup-amd64.exe*
- **Linux (Ubuntu/Debian) 64bit:** *enterprise-wallet-setup-amd64.deb*
- **Linux (Redhat/Centos):** *enterprise-wallet-linux.zip*

Step 2 Save it to your desktop or downloads folder on your local hard drive.

Step 3 Follow the instructions for your OS.

LINUX INSTALLATION

1. Manual download [enterprise-wallet-setup-amd64.deb](https://github.com/FactomProject/distribution/releases/download/v0.4.2.11/enterprise-wallet-setup-amd64.deb) on Github.

Or use the following command for Ubuntu 64bit

“wget

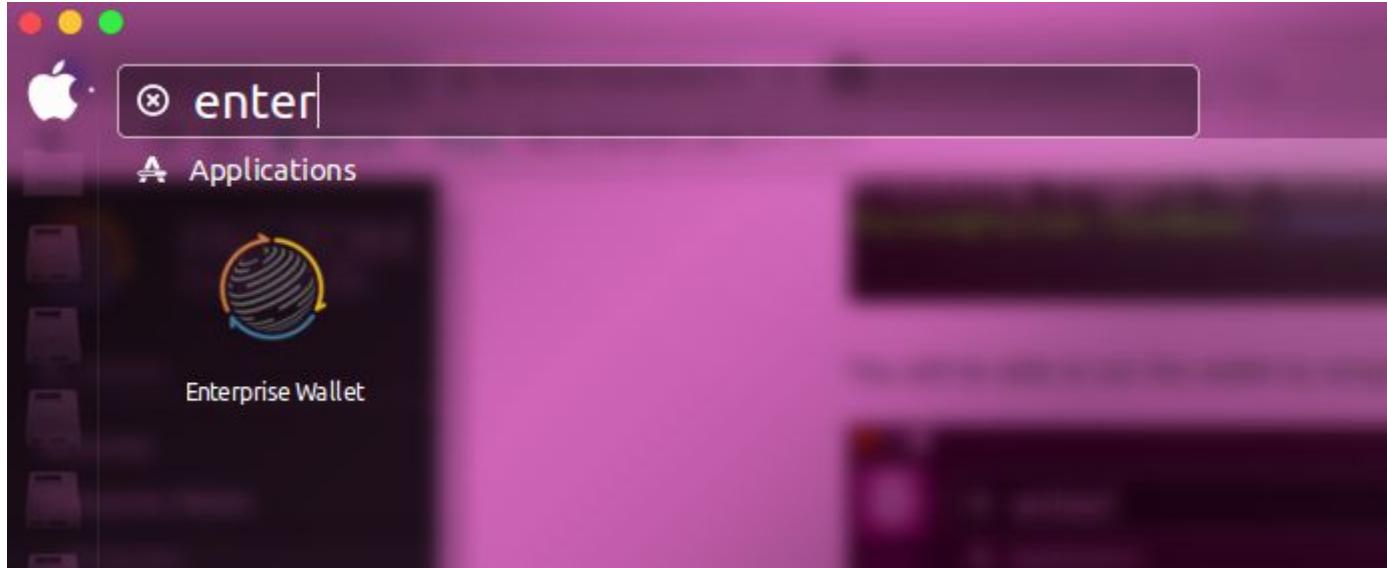
<https://github.com/FactomProject/distribution/releases/download/v0.4.2.11/enterprise-wallet-setup-amd64.deb>”

2. Run command for installing:

```
sudo dpkg -i enterprise-wallet-setup-amd64.deb
```


LINUX INSTALLATION

3. Open Enterprise Wallet





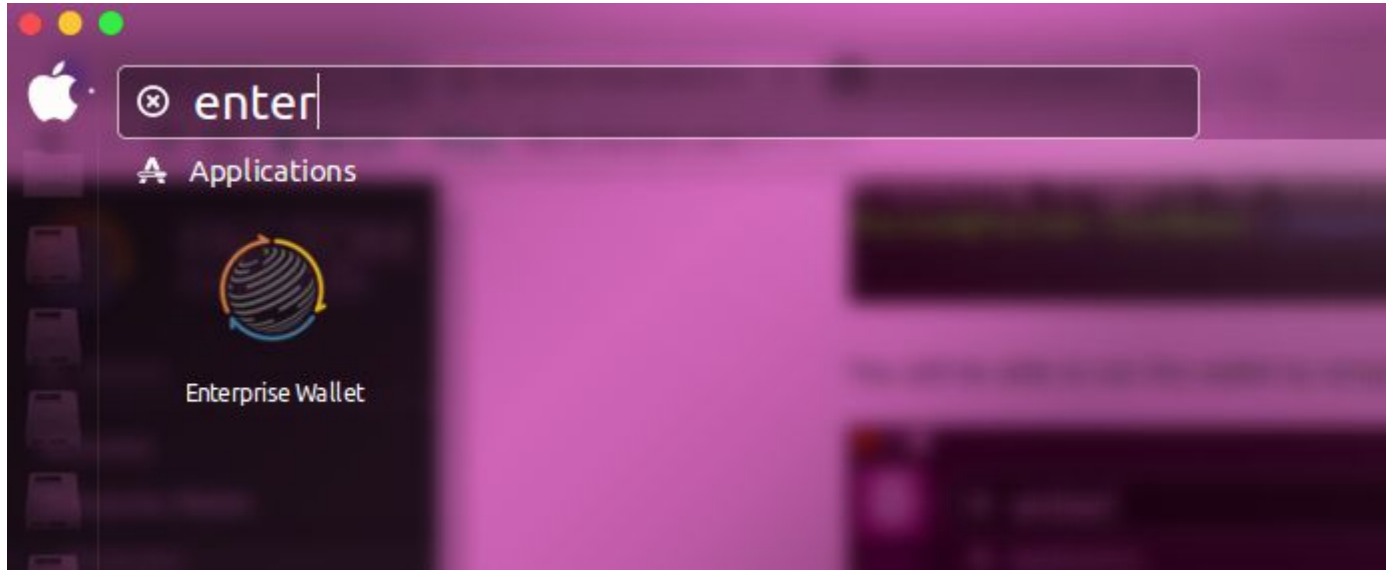
How to use Enterprise Wallet?

How to use Enterprise Wallet?

Choose Your Wallet Type

CHOOSE YOUR WALLET TYPE

OPEN ENTERPRISE WALLET



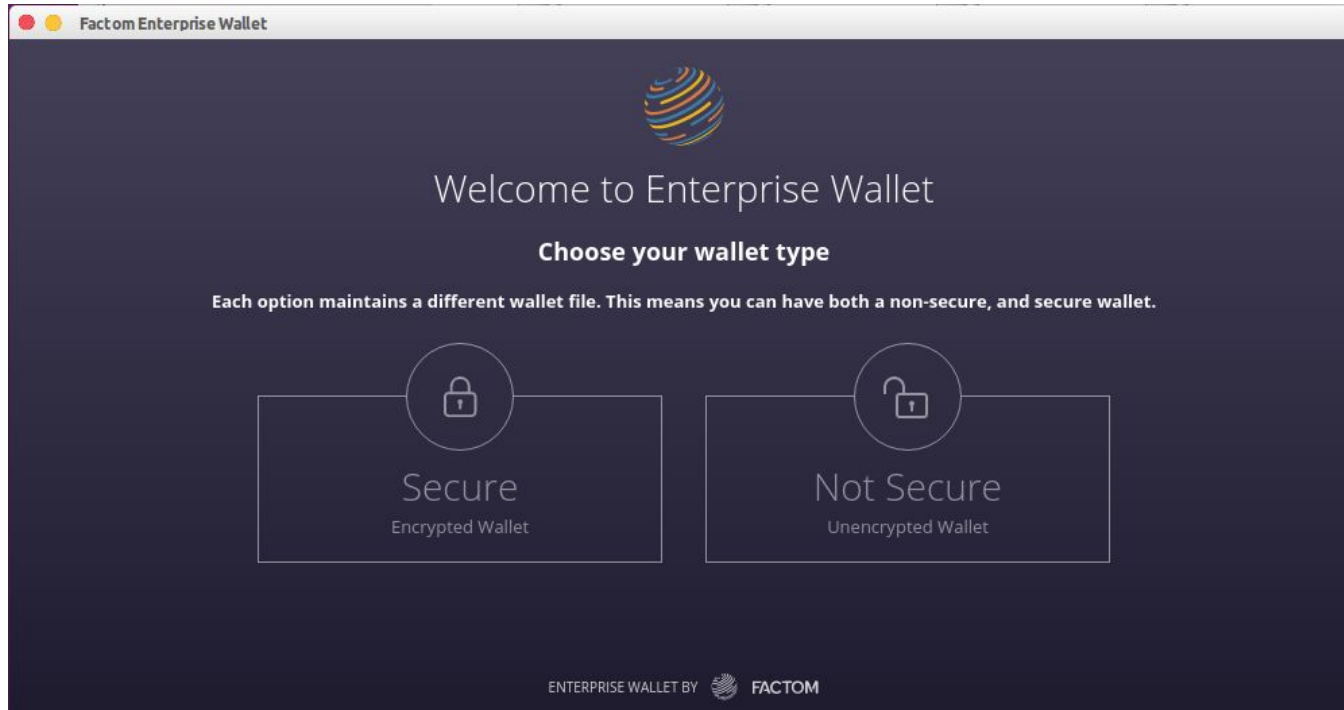
CHOOSE YOUR WALLET TYPE

CHOOSE WALLET TYPE

- + When you launch Enterprise Wallet you have the option to choose a “*secure*” or a “*not secure*” wallet, the former is encrypted the latter is unencrypted.
- + To open either one, just close and relaunch Enterprise Wallet, selecting the one you wish to open.

CHOOSE YOUR WALLET TYPE



CHOOSE WALLET TYPE




CHOOSE YOUR WALLET TYPE

SECURE TYPE

Factom Enterprise Wallet



Secure
Encrypted Wallet

 Enterprise Wallet

Opening a secure wallet will encrypt all private keys and the seed.

Keep in mind this means that **if you forget your password and seed, there is no recovery option.**

Be careful selecting this option.

When using an encrypted wallet, be sure to immediately back up your seed. This allows you to regenerate your wallet if you lose the password or the database gets corrupted.

This option will not convert a v1 wallet if found on disk. This is intentional, as converting any wallet to an encrypted wallet means the original wallet still exists, and still insecure. Addresses and seeds can still be backed up and restored.


For directions on how to transfer your Factoids to a secure wallet, [read our blog post here.](#)

Input the password used to encrypt your wallet.

.....

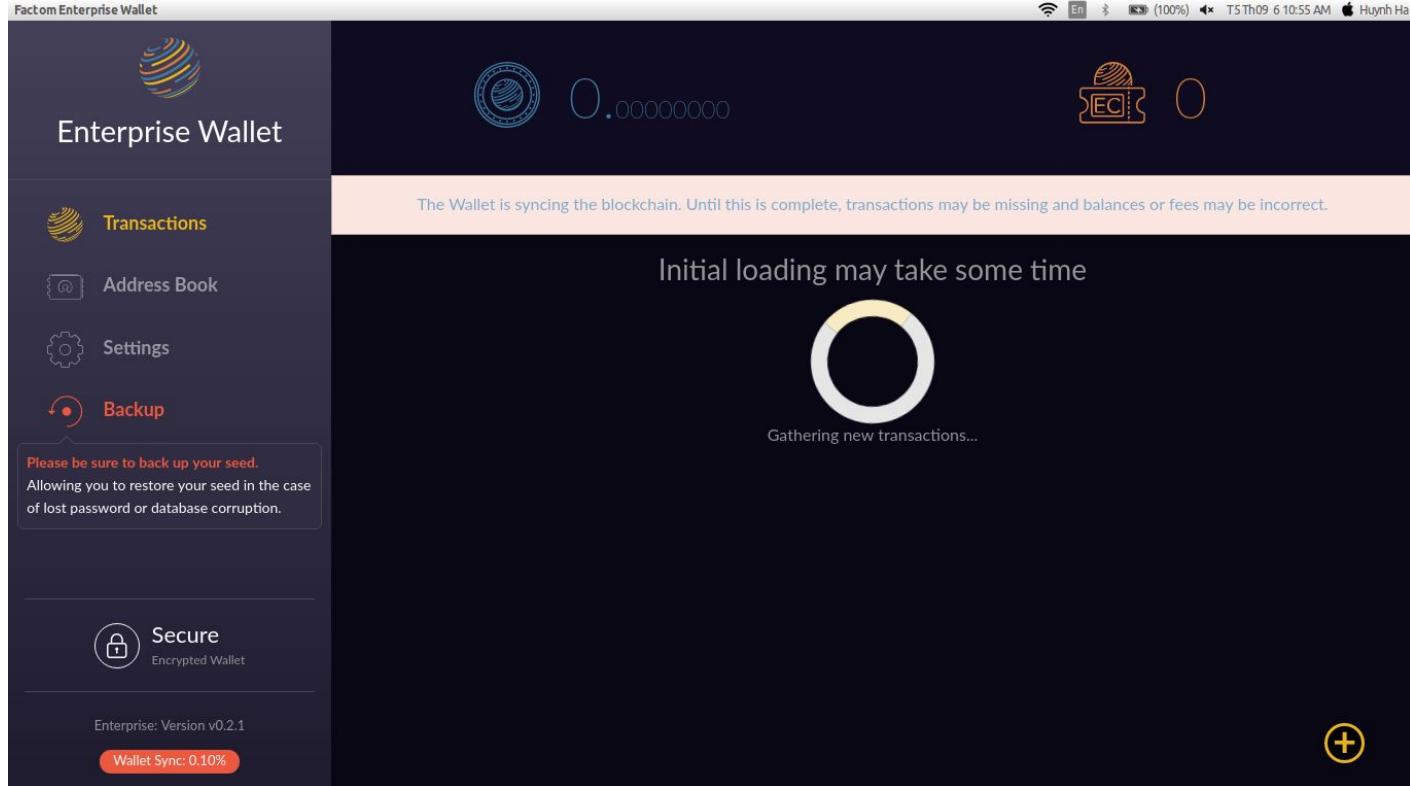
☒ I acknowledge that if I lose this password and my seed I will lose access to the wallet and its funds.

Proceed to Encrypted Wallet

ENTERPRISE WALLET BY  FACTOM

CHOOSE YOUR WALLET TYPE

SECURE TYPE

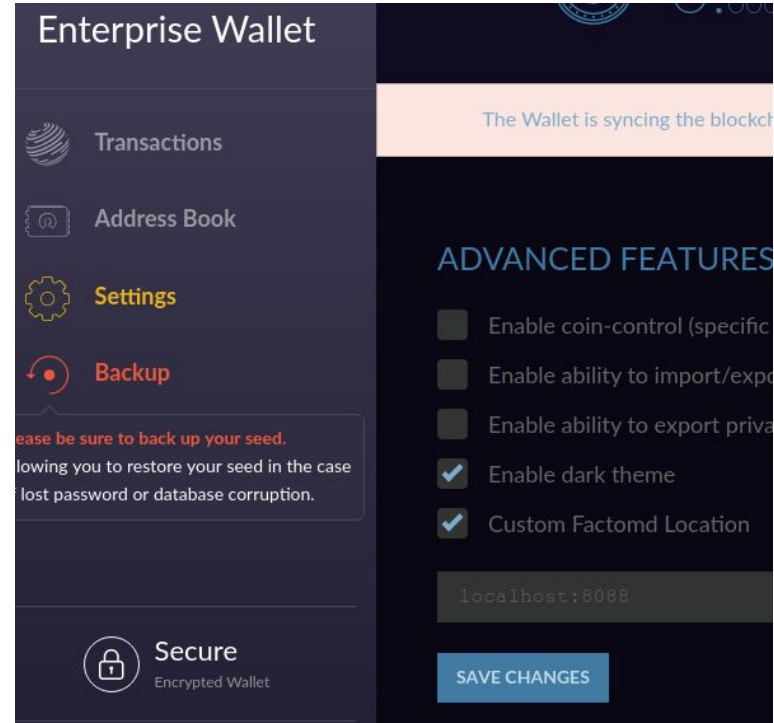


How to use Enterprise Wallet?

Enterprise Wallet Mode

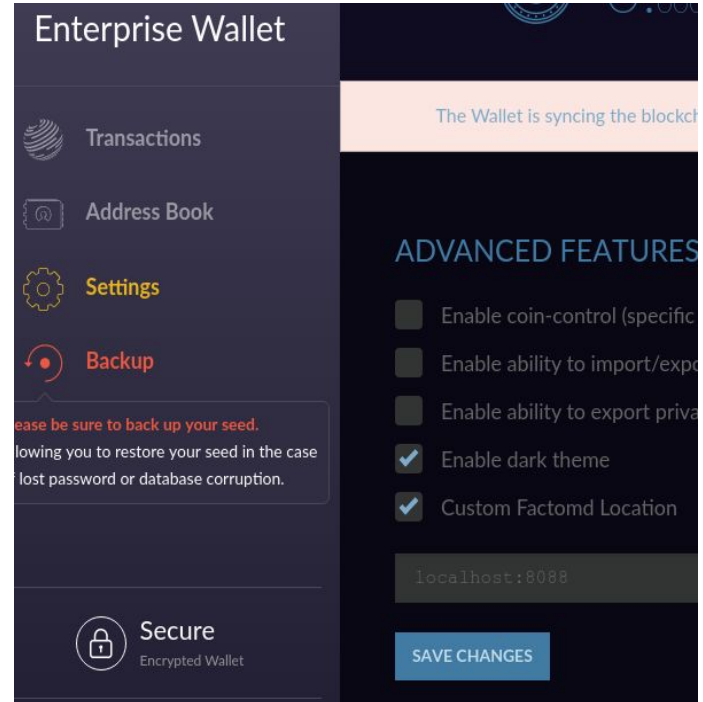
RUN ONLINE

1. Go to “Settings.”
2. Now click “Custom Factomd Location” and enter in a valid factomd instance. Use: **courtesy-node.factom.com**.
3. Then click “Save Changes.”
4. You are now using an online version of factomd! No need to sync the whole blockchain, just the transactions.



RUN LOCALLY

1. Go to “Settings.”
2. Now click “Custom Factomd Location” and enter in a valid factomd instance. Use: **localhost:8088**.
3. Then click “Save Changes.”
4. Open terminal and Start your factom by run: ***“factomd”***
5. Now your Enterprise Wallet is syncing with your local database



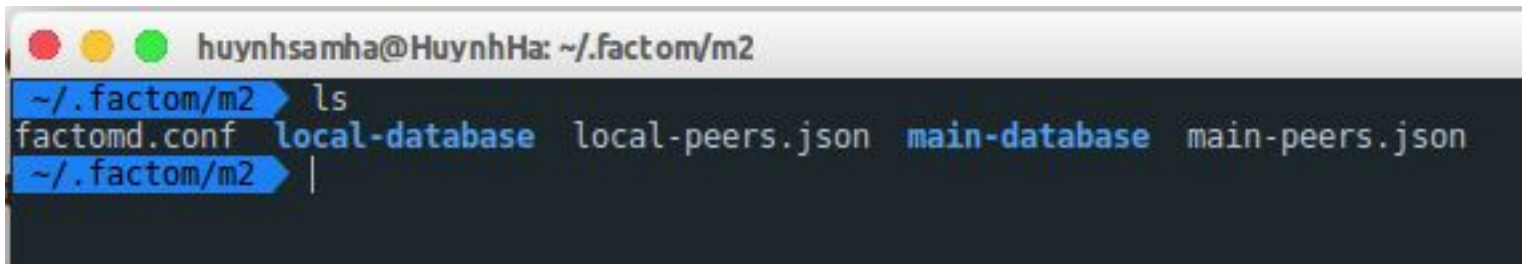
CHANGE NETWORK TO LOCAL

By default, **factomd** will run on **MAIN** net, that will sync your database on local machine with MAIN net, about 12GB.

To change to **LOCAL** net, run **factomd** command with param **-network=LOCAL**.

factomd -network=LOCAL

Now your local run on database at local, which not sync with MAIN net.

A terminal window with a title bar showing 'huynhsamha@HuynhHa: ~/.factom/m2'. The terminal has a dark background with blue and white text. The user has entered 'ls' and the output shows 'factomd.conf', 'local-database', 'local-peers.json', 'main-database', and 'main-peers.json'.

```
huynhsamha@HuynhHa: ~/.factom/m2  
~/.factom/m2 ➔ ls  
factomd.conf  local-database  local-peers.json  main-database  main-peers.json  
~/.factom/m2 ➔ |
```

How to use Enterprise Wallet?

How to use the features?

HOW TO USE THE FEATURES?

CREATE A FACTOID ADDRESS

NEW ADDRESS

Generate address from:

Random new factoid address



Private key:

An new factoid address will be created

Nickname:

FA_001

ADD TO ADDRESS BOOK

HOW TO USE THE FEATURES?

CREATE AN ENTRY CREDIT ADDRESS

NEW ADDRESS

Generate address from:

Random new entry credit address



Private key:

A new entry credit address will be created

Nickname:

ECA_001

ADD TO ADDRESS BOOK

HOW TO USE THE FEATURES?

IMPORT FROM PRIVATE KEY

In local, to use Factoids, please use with private key

Fs3E9gV6DXsYzf7Fqx1fVBQPQXV695eP3k5XbmHEZVRLkMdD9qCK

The screenshot shows a dark-themed interface for creating a new address. The title 'NEW ADDRESS' is at the top left. Below it, the 'Generate address from:' section has a dropdown menu with 'Import from private key' selected. To the right of this dropdown is a blue arrow icon. Below the dropdown is a large text input field for the 'Private key', which contains the long alphanumeric string 'Fs3E9gV6DXsYzf7Fqx1fVBQPQXV695eP3k5XbmHEZVRLkMdD9qCK'. To the right of the private key field is a 'Nickname:' label and a text input field containing 'FA_100'. At the bottom right, there is a blue button labeled 'ADD TO ADDRESS BOOK'.

NEW ADDRESS

Generate address from:

Import from private key ▼

Private key:

Fs3E9gV6DXsYzf7Fqx1fVBQPQXV695eP3k5XbmHEZVRLkMdD9qCK


Nickname:


FA_100

ADD TO ADDRESS BOOK

HOW TO USE THE FEATURES?

SEND AND RECEIVE FCT

 20000.00000000

 0

SELECT ADDRESS

- ☐ (0.00000000 FCT) FA_001
- ☒ (0.00000000 FCT) FA_002
- ☐ (0.00000000 FCT) FA_003
- ☐ (0.00000000 FCT) FA_004
- ☐ (0.00000000 FCT) FA_005
- ☐ (20000.00000000 FCT) FA_100

ADD ADDRESS

100 FCT +

Amount of factori FCT -


Fee: ---- FCT


Total: ---- FCT

VIEW TRANSACTION

HOW TO USE THE FEATURES?

SEND AND RECEIVE FCT



 20000.000000000

 0

SEND FACTOIDS

Send to:

OUTPUTS

FA2LYPd6yuEtwK8jCSmb9lJsEH4qhJyYb2QlHAu4v7HzEbTLFfN2		100	FCT	+
FA3cd7hv8FWzrgbCNqQYEhdanDWqD8Ato3hrXFYNswmzQMDqY4Cb		200	FCT	-

Fee:

FCT



Total:

FCT

[VIEW TRANSACTION](#)

HOW TO USE THE FEATURES?



SEND AND RECEIVE FCT

 20000.000000000 0

SEND FACTOIDS

Send to:

OUTPUTS

FA2LYPd6yuEtwK8jCSmb91JsEH4qhJyYb2Q1HAu4v7HzEbTLPfN2		100	FCT	+
FA3cd7hv8FWzrgbCNqQYEHdanDWqD8Ato3hrXFYNswmzQMDqY4Cb		200	FCT	-

Fee:

0.00022

FCT

SEND TRANSACTION

EDIT TRANSACTION

Total:

300.00022






FCT

Click "Send Transaction" to send, or go back to editing it

VIEW TRANSACTION

HOW TO USE THE FEATURES?

SEND AND RECEIVE FCT

	19999.99978000		0
	09/08/2018 : Sent FA_100 (FA2jK2HcLnRdS94dEcU27rF3meoJfpUcZPSinpb7AwQvPRY6RL1Q)	-300.0002 FCT	
	09/08/2018 : Received FA_001 (FA2LYPd6yuEtwK8jCSmb91JsEH4qhJyYb2Q1HAu4v7HzEbTLPfN2) FA_002 (FA3cd7hv8FWzrgbCNqQYEhdanDWqD8Ato3hrXFYNswmzQMDqY4Cb)	300 FCT	
	09/01/2015 : Received FA_100 (FA2jK2HcLnRdS94dEcU27rF3meoJfpUcZPSinpb7AwQvPRY6RL1Q)	20000 FCT	

HOW TO USE THE FEATURES?

SEND AND RECEIVE FCT

On Factom Control Panel

FACTOID TRANSACTION

Inputs

FA2jK2HcLnRdS94dEcU27rF3meoJfpUcZPSinpb7AwQvPRY6RL1Q

Outputs

FA2LYPd6yuEtwK8jCSmb91JsEH4qhJyYb2Q1HAu4v7HzEbTLPfN2
FA3cd7hv8FWzrgbCNqQYEhdanDWqD8Ato3hrXFYNswmzQMDqY4Cb

Transaction ID (txid): 40bf397e0977a471236c40ae31a9c9e81c8369d3e90c8ec97152bb9ffd127fef

Transaction Hash: 5107b99f946c9676f68976ce2181f67a2d1aa4fc924b411ae883aaba96d3716f

Total Input: 300.00022000 Factoids

Total Factoid Output: 300.00000000 Factoids

Total EC Output: 0.00000000 Factoids

Transaction Status: DBlockConfirmed



HOW TO USE THE FEATURES?

CONVERT FCT TO ENTRY CREDIT

BUY ENTRY CREDITS

Send to:

OUTPUTS

EC3dhgwyDBVd2jecS5in5qp5uuhehVzRz9tvkxxvVmd9o8hqG2vk		100	EC	+
EC34e6FTeVHShAZbeYqbSs5l3w74iHLhWLdcZaYZ3jYBy5rK2Gvw		200	EC	-

Fee:

0.00022

FCT

SEND TRANSACTION

EDIT TRANSACTION

Total:

0.00322

FCT

Click "Send Transaction" to send, or go back to editing it

VIEW TRANSACTION

HOW TO USE THE FEATURES?

CONVERT FCT TO ENTRY CREDIT



19999.99656000



300



09/08/2018 : Sent

FA_100 (FA2jK2HcLnRdS94dEcU27rF3meoJfpUcZPSinpb7AwQvPRY6RL1Q)

-0.0032 FCT



09/08/2018 : Converted

ECA_001 (EC3dhgwyDBVd2jecS5in5qp5uuhehVzRz9tvkxxvVmd9o8hgG2vk)

0.003 FCT

ECA_002 (EC34e6FTeVHShAZbeYqbSs513w74iHLhWLdcZaYZ3jYBy5rK2Gvw)

HOW TO USE THE FEATURES?

VERIFY FCT AND EC BALANCES

Factom provided 2 way to verify transactions:

- + Use Factom Control Panel (<http://localhost:8090/>)
- + Use Factom Explorer (<https://explorer.factom.org/>)



Factom APIs

| Usage

Factom APIs Usage

Overview APIs in Factom Blockchain

**factomd
API**

**factom
walletd
API**

Debug API

Overview APIs in Factom Blockchain

factomd API

- + Use factomd -network=LOCAL
- + Run on <http://localhost:8088/v2>
- + The API is designed for outside application to process transactions and interact with the Factom federated servers.

factom-walletd API

- + Use factomd-walletd
- + Run on <http://localhost:8089/v2>
- + The API is designed for managing wallet, create, factoid account, ec account, chain, transaction and entry.

All these APIs use JSON-RPC, which is a remote procedure call protocol encoded in JSON



Factom APIs Usage

Setup Environment and API Testing Tool

Install Factom Federated for Setup Environment

factomd

Run on

<http://localhost:8088>

Use APIs for transactions

factom-walletd

Run on

<http://localhost:8089>

Use APIs for chains,
entries, accounts and
transactions

Factom Control Panel

Run on

<http://localhost:8090>

Open browser for
verification

Install Postman for API Testing



Postman Makes API Development Simple



chrome web store



Postman

Offered by: www.getpostman.com

★★★★★ 9,132

[Extensions](#)

 3,871,517 users

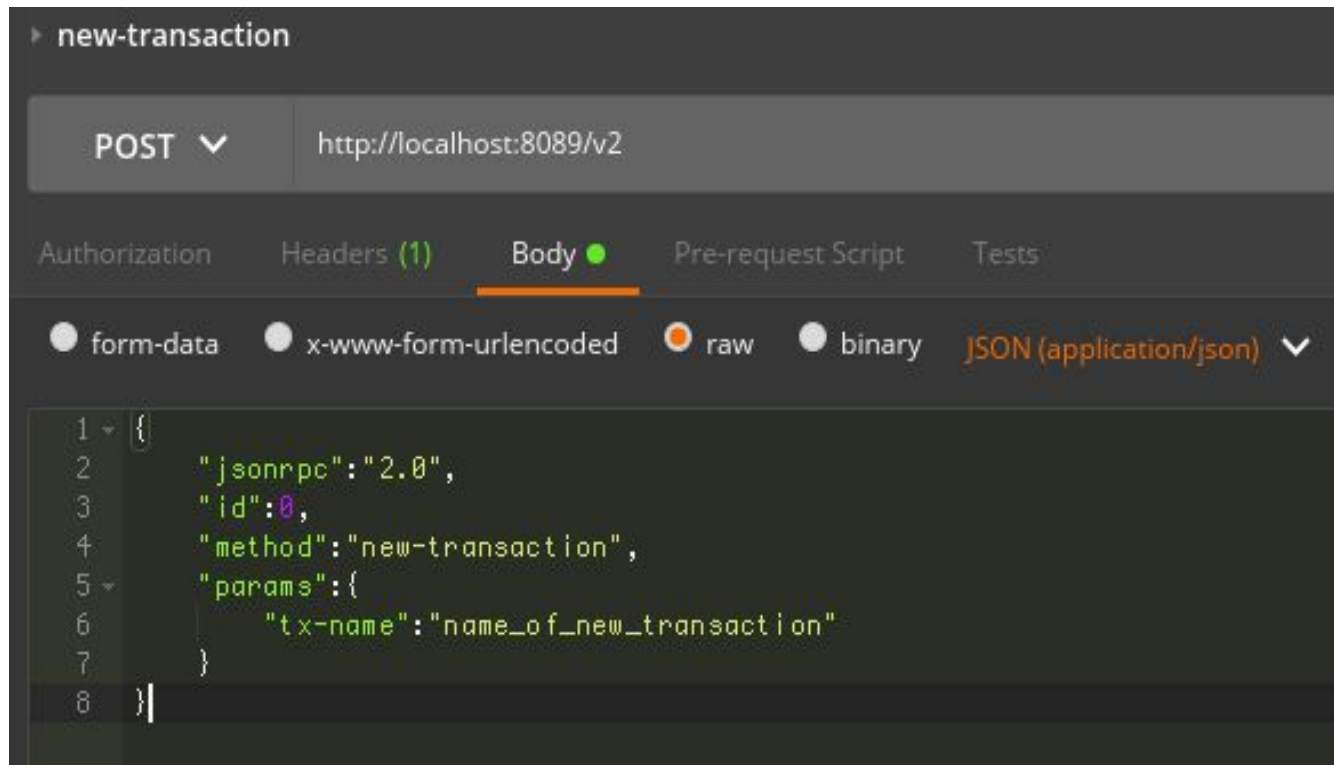
Factom APIs Usage

Quickstart APIs Testing with Postman

Go to my setup Postman for using Postman easier:

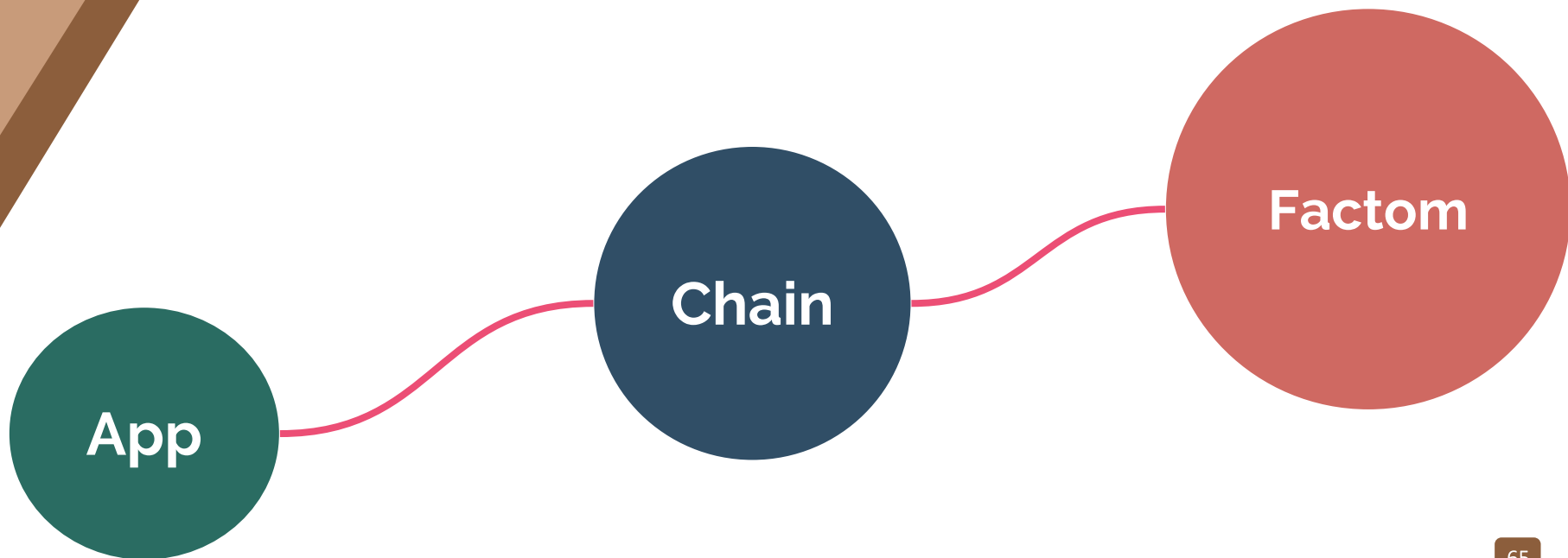
<https://documenter.getpostman.com/view/2583401>

First example creating new transaction

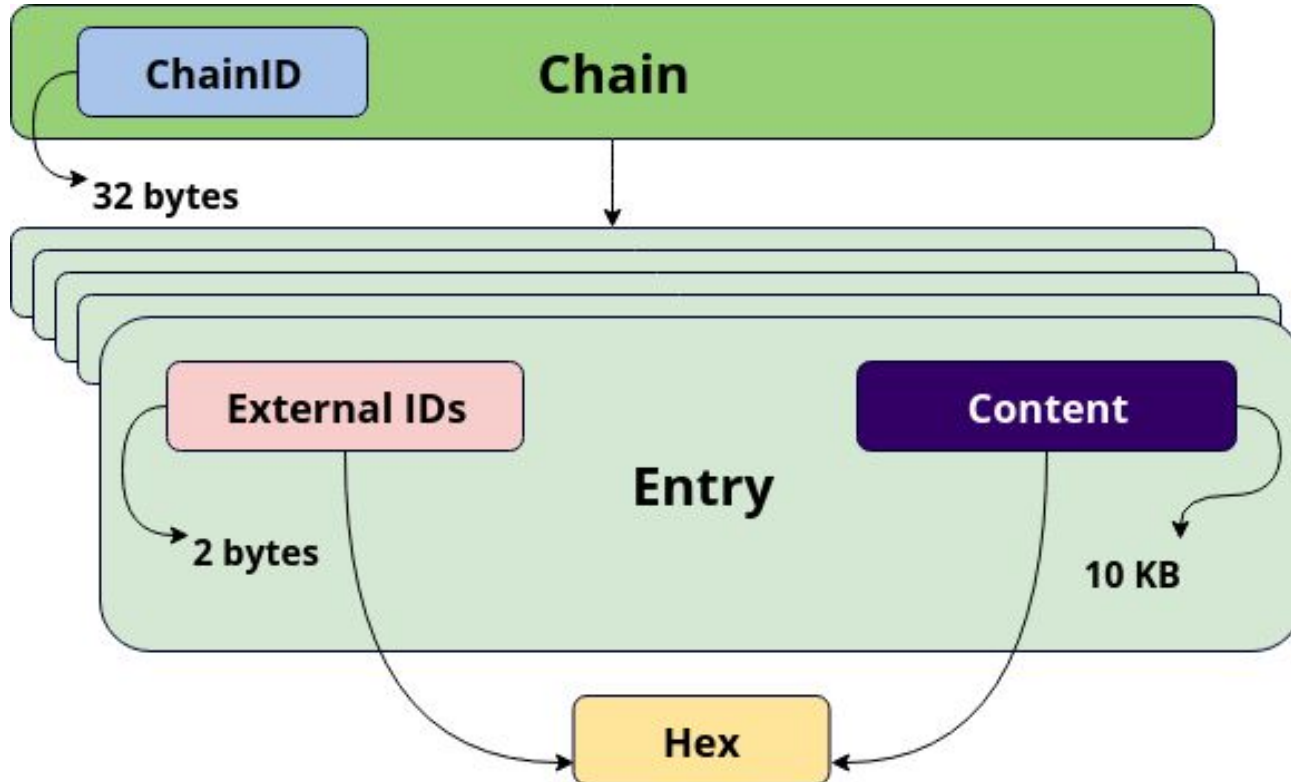


Factom APIs Usage

Life of Chain in Factom



Chain and Entries



3 steps for Creating new Chain

compose-chain

Use factom-walletd (8089)
Compose transaction
marshals the transaction
into a hex encoded string

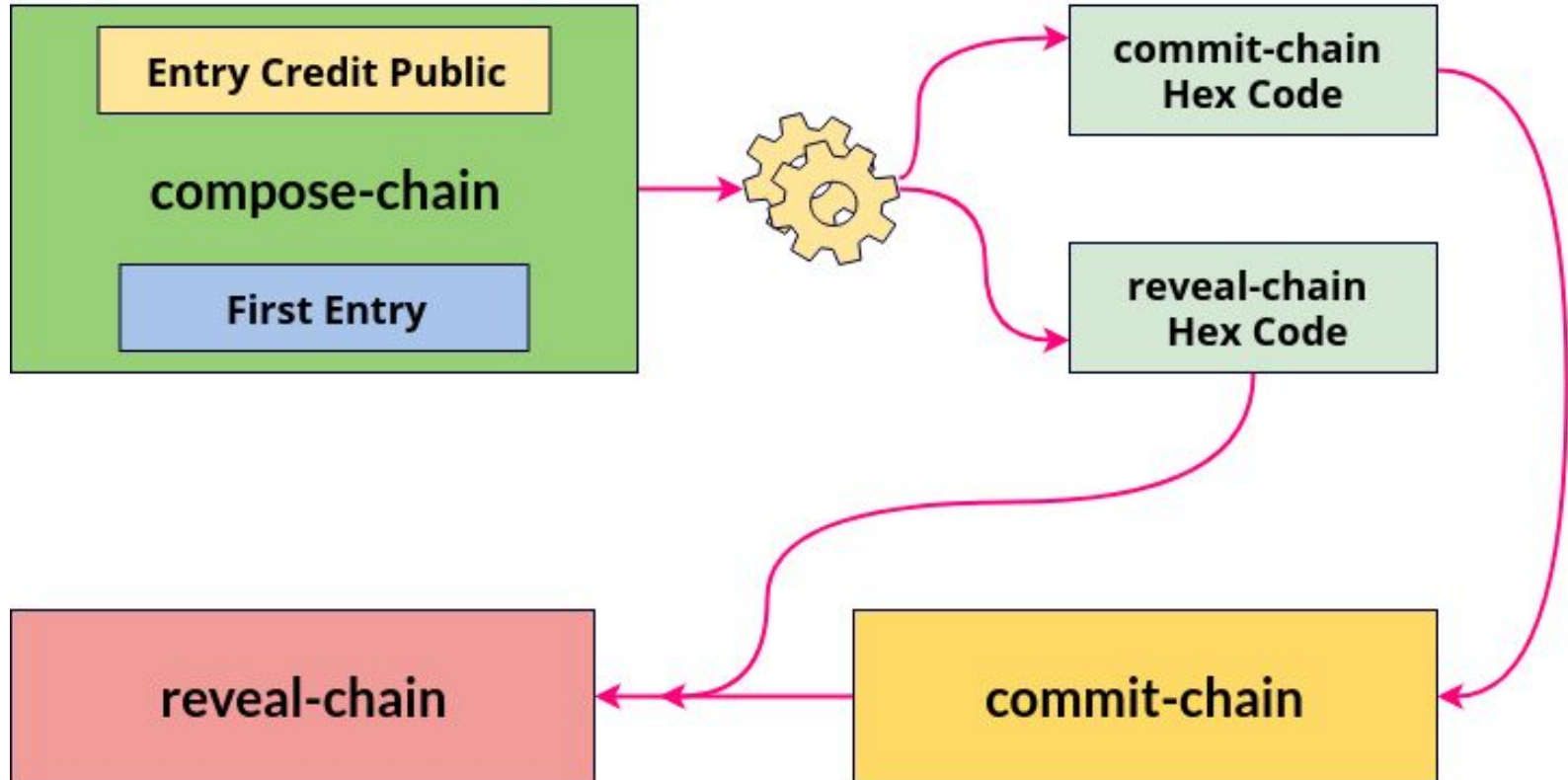
commit-chain

Use factomd (8088)
Send a Chain Commit
Message to factomd to
create a new Chain. The
commit chain hex encoded
string

reveal-chain

Use factomd (8088)
Reveal the First Entry in a
Chain to factomd after the
Commit to complete the
Chain creation. The
reveal-chain hex encoded
string

3 steps for Creating new Chain



3 steps for Creating new Entry in a Chain

compose-entry

Use factom-walletd (8089)
Compose entry into a hex encoded string for a Chain

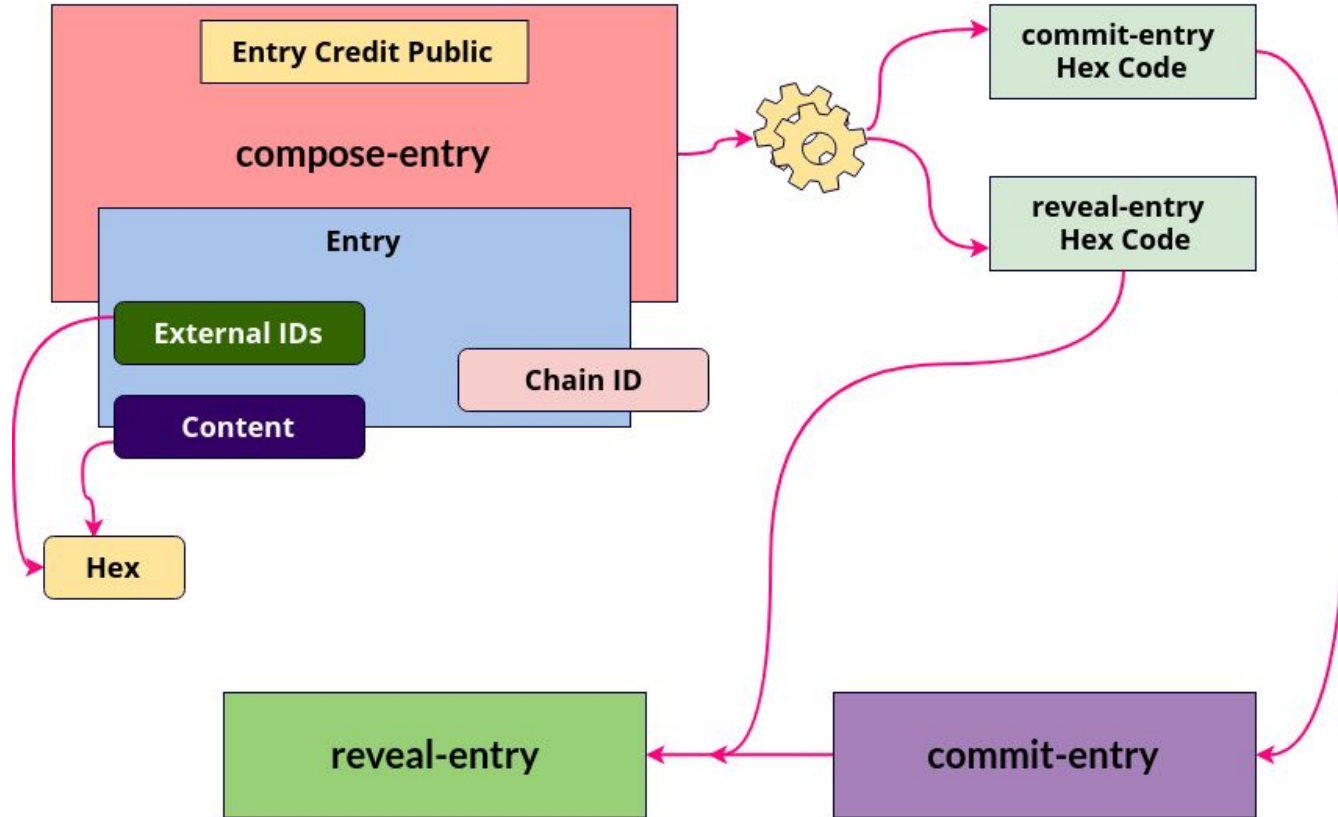
commit-entry

Use factomd (8088)
Send an Entry Commit Message to factom to create a new Entry. The entry commit hex encoded string

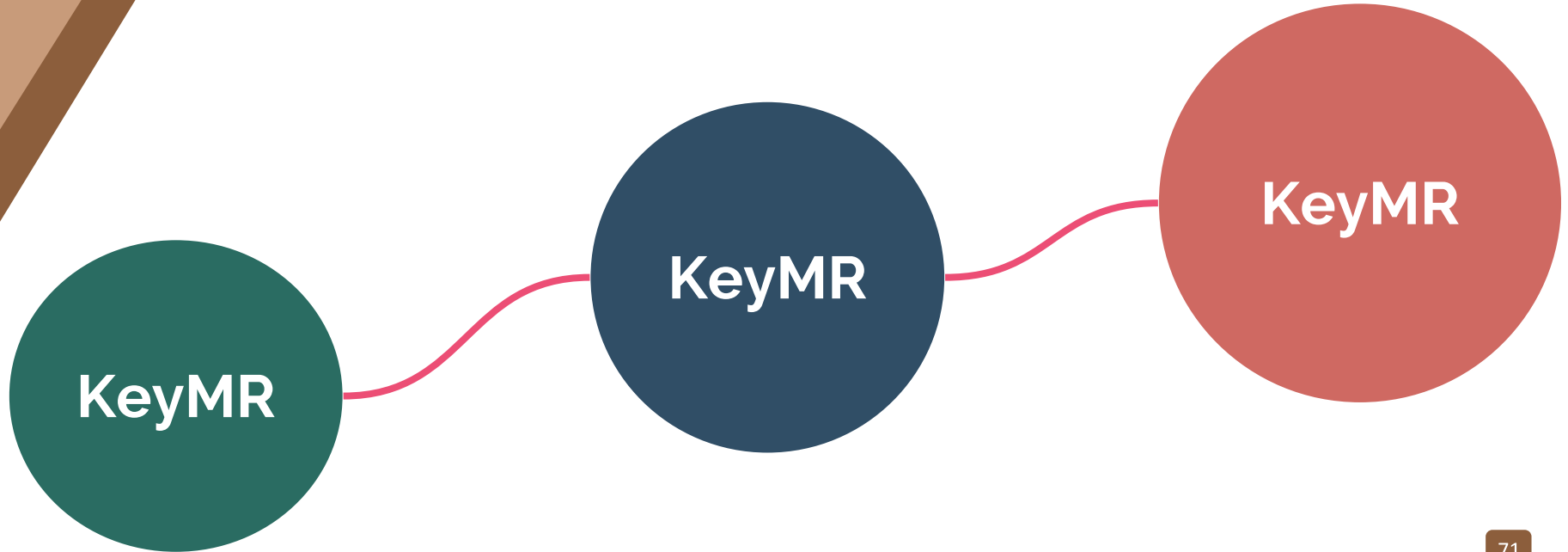
reveal-entry

Use factomd (8088)
Reveal an Entry to factomd after the Commit to complete the Entry creation. The reveal-entry hex encoded string

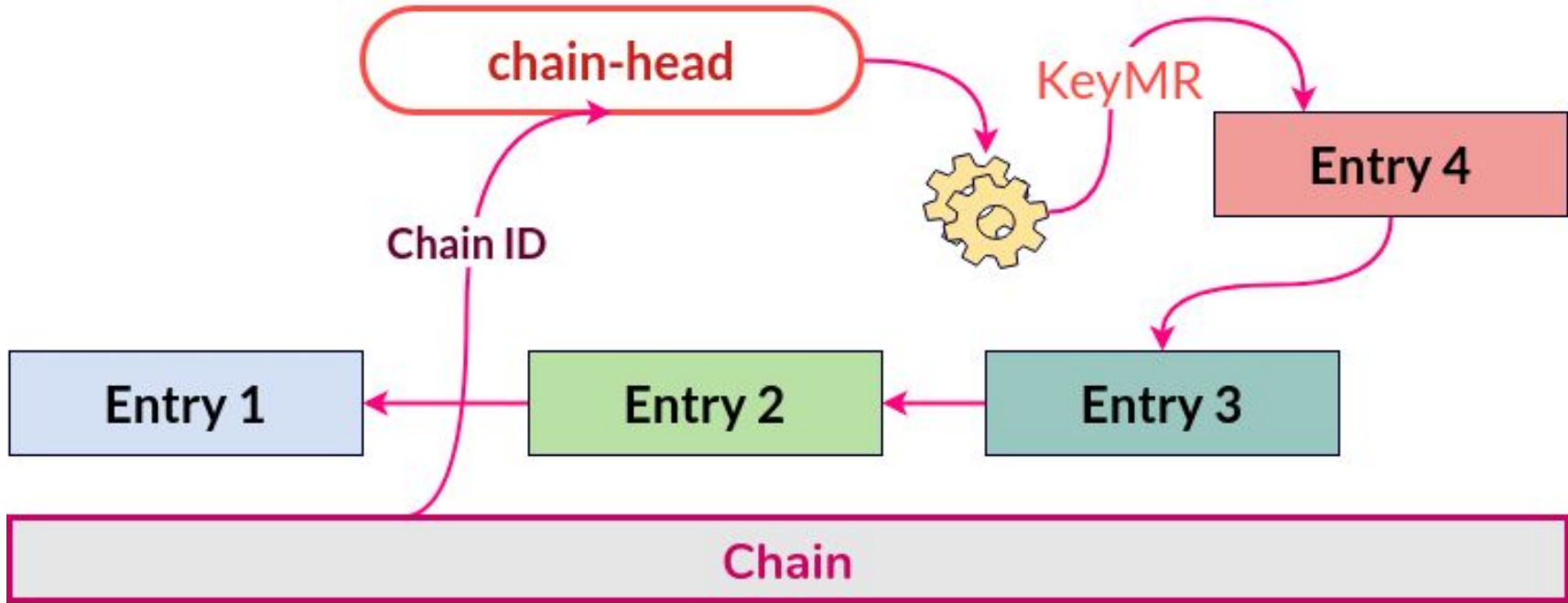
3 steps for Creating new Entry in a Chain



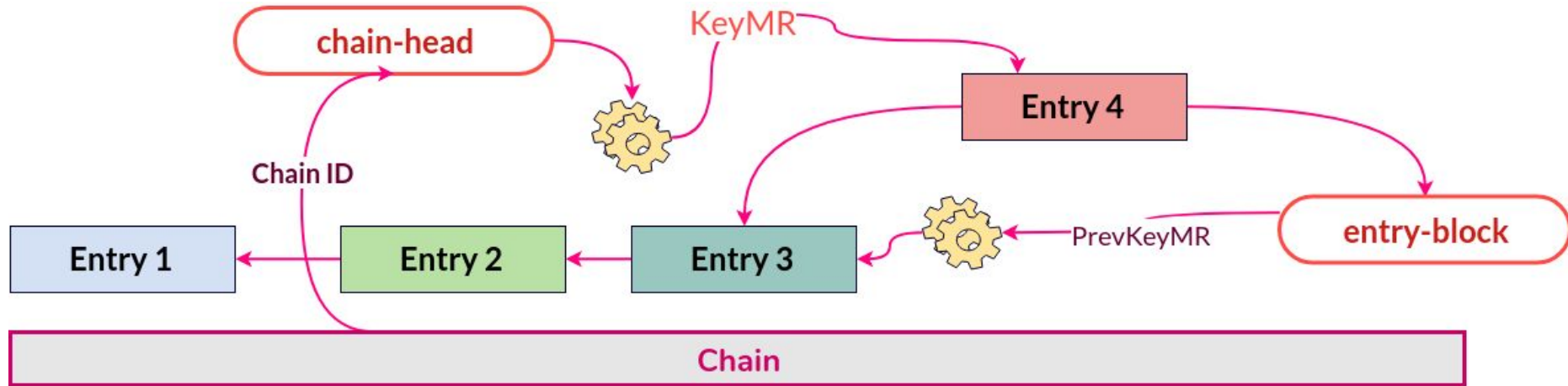
How to retrieve a Chain?



Use chain-head to retrieve a last KeyMR



Use entry-block to recursive all chain

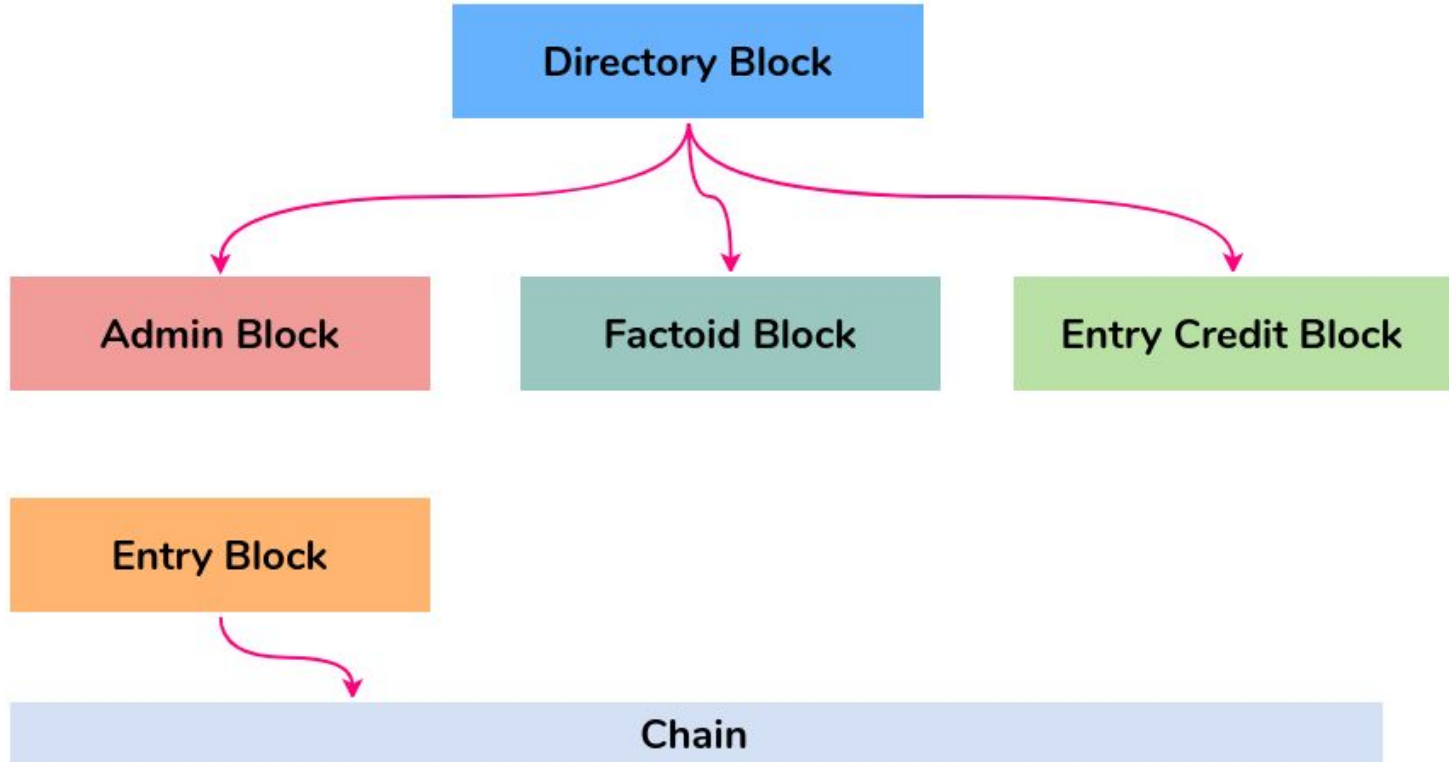




Factom APIs Usage

Retrieve Blocks

Types of Blocks



How to retrieve?

Merkel Root Key

directory-block
admin-block
factoid-block
entrycredit-block
entry-block

Height

ablock-by-height
dblock-by-height
ecblock-by-height
fblock-by-height

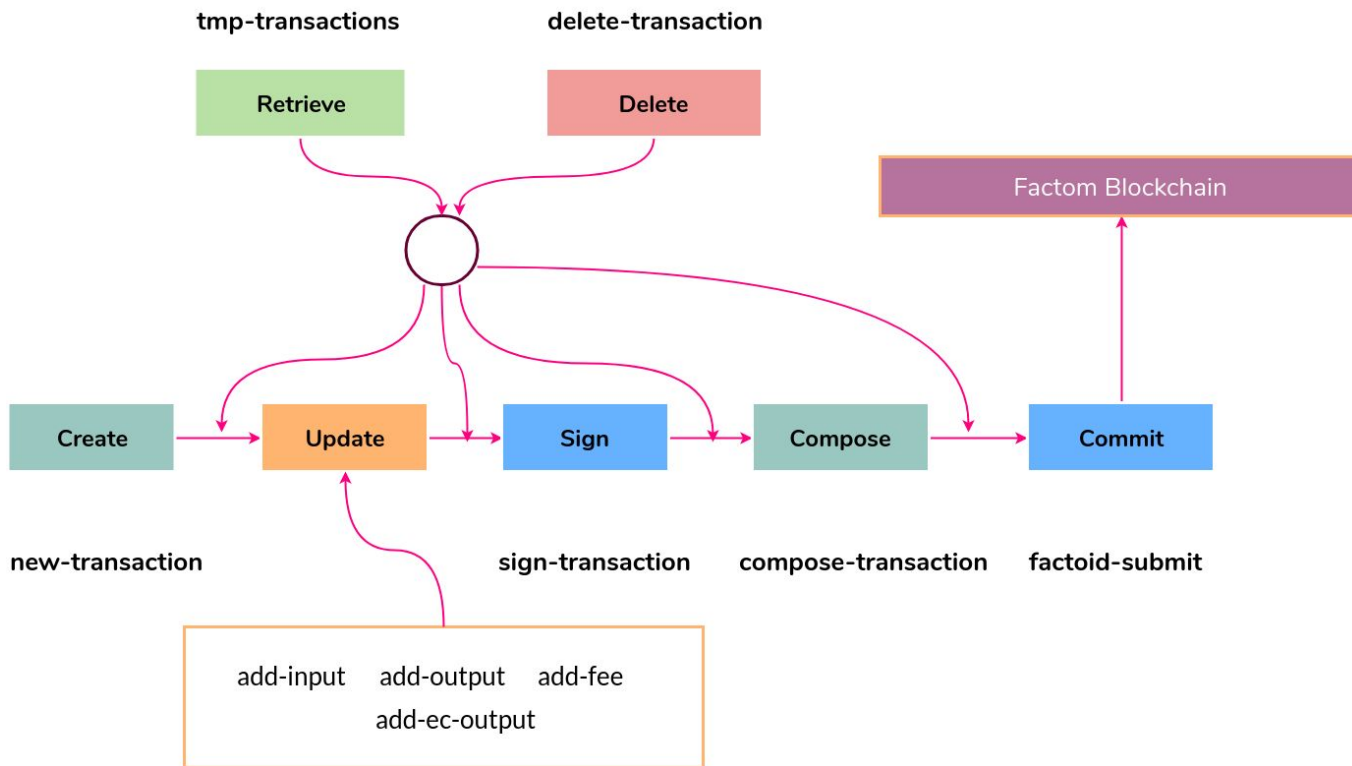


Factom APIs Usage

Life of Transaction

What is a Transaction in Factom?

How to do it with APIs?



Summary

REFERENCES

- + Factom Data Structures:
<https://github.com/FactomProject/FactomDocs/blob/master/factomDataStructureDetails.md>
- + Enterprise Wallet: <https://docs.factom.com/#enterprise-wallet>
- + Factom Control Panel:
<https://docs.factom.com/#the-factomd-control-panel>
- + Factom Developer Sandbox Setup:
<https://github.com/FactomProject/FactomDocs/blob/master/developerSandboxSetup.md>
- + Factomd APIs: <https://docs.factom.com/api>