

# Freddy Li

DEV TEAM LEAD AT CHAINSAFE SYSTEMS(TORONTO, ON CANADA) · M.ENG(SE) GRADUATE FROM UNIVERSITY OF WATERLOO

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*"Love technology ; Self-motivated learning ; Love music, love sports and love compiled binary"*

## Skills

- Golang, NodeJS, Solidity, Ethereum, Truffle, Geth, Web3, Cosmos-SDK, Tendermint, Consensus Algorithms, Redis, PostgreSQL, MySQL, MongoDB, LevelDB, SQS, KMS, Linux, Git

## Education

### University of Waterloo

MASTER OF ENGINEERING (SOFTWARE ENGINEERING)

Waterloo, ON

Sept. 2015 - Dec. 2017

### Tianjin University of Technology

BACHELOR OF SOFTWARE ENGINEERING

Tianjin, China

Sept. 2011 - Jun. 2015

## Working Experience

### ChainSafe Systems

TEAM LEAD

Toronto, ON

Aug. 2021 - Now

- Lead the development work on Cosmos-Chainlink module(Detail is in Project section).
- Lead the development work on GTS(Gasless Transaction as Service)(Detail is in Project section).
- Developer & Researcher of the ChainSafe ChainBridge(Detail is in Project section).

### ChainSafe Systems

BLOCKCHAIN DEVELOPER

Toronto, ON

Jan. 2021 - Aug. 2021

- Technologies: Go, NodeJS, Cosmos, IBC, Cosmos-Chainlink Moudle, Ethermint, GTS
- Developed Ethermint RPC layer(Detail is in Project section).
- Designed and developed Cosmos-Chainlink module(Detail is in Project section).
- Designed and developed GTS(Gasless Transaction as Service)(Detail is in Project section).

### BitSpawn

BLOCKCHAIN PAYMENT SYSTEM DEVELOPER

Toronto, ON

Jul. 2019 - Dec. 2021

- Technologies: Go, NodeJS, BitCoin, Solana, Ethereum, Solidity, Etherscan-api, BlockCypher-api, ERC-20 Standard, PostgreSQL, Redis, Bloom Filter, HD wallet, KMS, BitGo, Paypal, Stripe
- Designed and implemented Deposit Manager(Detail is in Project section).

### OneLedger

BLOCKCHAIN PROTOCOL DEVELOPER

Toronto, ON

Apr. 2019 - Jan. 2021

- Technologies: Go, Typescript, NodeJS, Tendermint, PBFT, LevelDB, HD key derivation, PostgreSQL, SQS, Linux
- Developed Blockchain RPC endpoint layer.
- Developed Blockchain Transaction Verification layer.
- Developed Blockchain Transaction Check and Distribution layer.
- Developed Blockchain Fullnode and Validator node block scope layer.
- Developed Blockchain Distributed Database layer.
- Designed and developed Oneledger HD Wallet that supports BTC, ETH and OLT(Oneledger) key derivation.
- Designed and developed Oneledger Blockchain SDK.
- Designed and developed Oneledger Blockchain Explorer.

## SkyQuark

Toronto, ON

### BLOCKCHAIN APPLICATION DEVELOPER

Apr. 2018 - Apr. 2019

- Technologies: Ethereum, geth, parity, Solidity, Truffle, Mist, web3, IPFS, EOS, Docker, koa framework
- Designed and developed Skyquark Crowdsourcing system back-end using NodeJS, MongoDB, LevelDB, web3JS, Parity
- Designed and developed Skyquark Aristotle Chain using Parity.
- Designed and developing the Aristotle token system within Edusphere eco-system.
- Developed Edusphere Intellectual Property protection dApp(smart contracts) on Aristotle Chain.
- Developed Edusphere certificate verification dApp(smart contracts) on Aristotle Chain.
- Designed and developed Skyquark ICO smart contract(ERC-20)
- Provided 'Blockchain for Junior' online lectures as instructor at www.edusphere.io
- Developed an EOS based PoC of Aristotle Chain prototype.

## BlackBerry

Waterloo, ON

### SECURITY PLATFORM AUTOMATION DEVELOPER INTERN

May. 2017 - Sept. 2017

- Technologies: Android, Jenkins, Shell Script, UiAutomatorViewer, JUnit4, Linux, Git, JIRA, SSH, Security key exchange
- Developed security key based unit test cases including S/MIME, PGP and large size Sign and Encrypt key.
- Developed test sanity to automatically build testing job for different BlackBerry app components.
- Set up and configure Jenkins server and nodes to organize BlackBerry security message jobs.
- Designed and developed Monkey command tool App for automation and pressure test on BlackBerry apps.

## Oracle

Tianjin, China

### BACK-END DEVELOPER INTERN

Sept. 2014 - Feb. 2015

- Technologies: JavaEE, AJAX, jQuery, DBCP, MySQL, Tomcat, Apache Component lib, MVC, Linux, SSH, Git
- Developed a social network system based on JavaEE(SSH framework) and MySQL.
- Designed the database and implemented with PowerDesigner.
- Designed the architecture and using MVC for implementation.
- Awarded Best Intern Project by Oracle.

## Projects(Github)

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### ChainSafe Systems - ChainBridge

TECHNOLOGIES: Go, ETHEREUM, SOLIDITY, CRYPTOGRAPHY, LEVELDB, ORACLE

Feb. 2022 - Now

- ChainSafe ChainBridge is a decentralized cross-chain messaging protocol. It currently supports ERC20, ERC721 and generic message between any EVM based chain.
- Participated as researcher & dev in this project.
- Mainly in charge of the Dynamic fee feature, which is another independent service to connect with chain oracle and provide the gas price and token price for the destination chain as reference to the cross-chain messaging request; It also contact the fee handler contract to preform fee calculation.
- Also working on the research for bringing Cosmos ecosystem into the project by Cosmos ComsWasm.

### ChainSafe Systems - Gasless Transaction as Service

TECHNOLOGIES: Go, ETHEREUM, SOLIDITY, OPEN ZEPPELIN RELAYER

Nov. 2021 - Feb. 2022

- GTS is a centralized server, which is able to pay gas fee on behalf of the signer of a transaction on EVM based chain.
- Participated as TL & dev in this project.
- Currently support 3 types of transactions: Sending Ether, ERC-20, ERC-721 token transfer, arbitrary contract call.
- Powered by Open Zeppelin Relayer on the backend.

### ChainSafe Systems - Cosmos Chainlink Module

TECHNOLOGIES: Go, COSMOS-SDK, CHAINLINK

Mar. 2021 - Nov. 2021

- Cosmos Chainlink module is one of the Cosmos SDK modules that designed and developed by ChainSafe Systems.
- Participated as TL & dev in this project.
- This module follows Cosmos Module development standard.
- It links Cosmos and Chainlink ecosystems so that community developers are able to submit/retrieve the feed data from Chainlink in the Cosmos ecosystem.
- Hierarchical management design makes sure the validity of the oracle data. Each data feed maintains its own owner list and data provider list.
- Token rewarded to the valid data provider each round.
- Business agnostic design makes the module generic in any kind data.

## ChainSafe Systems - Ethermint

TECHNOLOGIES: Go, ETHEREUM, COSMOS

Jan. 2021 - Mar. 2021

- Ethermint is a blockchain protocol developed in Go that enables Solidity on Cosmos which combines the smart contract ability of Ethereum with the fast finality and cheaper gas of Cosmos.
- Developed the gRPC and JSON-RPC layer for Ethermint. It is compatible with Web3js so that any dApps using web3js can be connected to Ethermint seamlessly.

## BitSpawn - Deposit Manager

TECHNOLOGIES: Go, NODEJS, REDIS, POSTGRESQL, BLOOM FILTER, HD WALLET, FSM, ETHEREUM, BITCOIN, SOLANA

Jul. 2019 - Dec. 2021

- Designed and implemented Deposit Manager(Golang+NodeJS) centralized server which is the Bitspawn Payment Gateway that
  - 1.) accepts deposit by multiple currencies(ETH/BTC/ERC20 tokens/SPL tokens/USD) and mint SPWN token on internal POA network;
  - 2.) allow withdraw from SPWN token to multiple currencies(ETH/BTC/ERC20 tokens/SPL tokens/USD);
  - 3.) Providing real time currency exchange rate query, internal token conversion .etc APIs for other backend services.
- Cobra CLI: support side features other than deposit/withdraw: token migration; KMS encryption/decryption; admin mint/burn/transfer; smart contract deployment; HD wallet management and Production tx scanning and reporting.
- Support multiple platforms withdraw for one currency.
- Down time catching up for all missed blocks/transactions.
- Highly configurable: easily switch ON/OFF for deposit/withdraw currency availability, and support auto or manual process.
- Finite State Machine design allows future scalability.
- Admin customizable Solidity smart contracts ensure the atomicity of both deposit and withdraw transactions.
- This whole project was implemented by myself, currently has approximately 170,000 active users(By Jan 2022).

## OneLedger - Blockchain Protocol

TECHNOLOGIES: Go, TENDERMINT

Oct. 2019 - Dec. 2021

- OneLedger blockchain is one of the public Blockchain networks which aims to build enterprise level Interoperability and open source for community to build dApps. (<https://github.com/Oneledger/protocol>).
- Using Tendermint as core consensus engine, OneLedger chain has application(node) layer, RPC layer, transaction verification /distribution layer and chain state distributed database(LevelDB) layer on fullnode and validator node.
- RPC layer: designed and implemented RPC endpoints for transaction and query.
- Transaction layer: designed and implemented transaction verification(signature mapping) for all transaction types, transaction fee charge logic, fee collection and reward withdrawal for validators.
- Distributed Database layer: designed and implemented database schema and store structure for different transaction types and block info.
- Block scope: designed and implemented block beginner and block end for internal transaction logic.
- Transactions: OneLedger Domain Service, Governance, Staking&Delegation, Block Rewards, Multi-currency Transfer, ETH/OLT Interoperability.

## OneLedger - Hierarchical Deterministic(HD) Wallet

TECHNOLOGIES: BITCOIN, ETHEREUM, TYPESCRIPT, BIP-32, BIP-39, ED25519, SECP256K1, RIPEMD160, SHA256

Jun. 2019 - Apr. 2020

- OneLedger HD Wallet is a JavaScript module that provides ability to generate keypairs and sign Raw Transactions for multiple chains.
- Support configurable entropy to derive master seed.
- Support whole wallet backup and recovery from any device by mnemonic.
- Support BTC, ETH and OLT(OneLedger) keys derivation, address verification and transaction signing.
- Hide derived master seed and all private key to maximum security.
- Using hardened extended key path from BIP-39.
- Easily extendable to support other blockchain key algorithm.

## OneLedger - SDK

TECHNOLOGIES: TYPESCRIPT, NODEJS, RPC

Apr. 2019 - Jan. 2021

- OneLedger SDK is a whole middle layer of JavaScript modules between community developers and OneLedger blockchain protocol which allows developers to query block or transaction info and securely serialise transactions offline and broadcast them.
- Highly configurable offline transaction serialization and signing workflow which allows community to extend their own transaction types, even using different network.
- Support different types of transaction broadcasting such as Async, Sync.
- Support both regular transaction and BTC/ETH Interoperability transaction.
- Multiple sub-modules design that separates transaction preparation, signing and broadcast into different modules for scalability.
- Easily configurable error handler for community to add and handle new errors.
- Configurable storage usage for different platforms(Web/Chrome Extension/Electron/Native).
- Support Ledger Device(Cold Wallet) with different connection type such as Bluetooth, USB etc.

## OneLedger - Blockchain Explorer

TECHNOLOGIES: GO, WEBSOCKET, TENDERMINT, TENDERMINT EVENTS, POSTGRESQL, SQS, CRONJOB

Jun. 2019 - Jan. 2021

- OneLedger blockchain Explorer is a set of services that watch, synchronize new block from OneLedger blockchain; persist block/transaction data into postgresQL database; provide restful APIs for querying; send configurable notification for blockchain data alert.(<https://oneledger.network>)
- Self-catch-up plus SQS design guarantees the data integrity if Explorer or blockchain node is down or restarted.
- Micro-services design that data source is writing to SQS, and data handler is reading from SQS.
- Internal cronjob(goroutines) module maintains the public metrics data.
- Configurable notification module sends alerts to multiple receivers.
- Easily extendable transaction type design and DB design for new transaction types.
- Provide web socket for real-time blockchain info.
- Provide APIs for community developers to query blocks and transactions info.

## SkyQuark - Aristotle Chain

TECHNOLOGIES: TRUFFLE, PARITY, AWS

May. 2018 - Apr. 2019

- Aristotle Chain using parity with PoA consensus algorithm generates an EVM based public chain for the foundation of SkyQuark Eco-system.
- Users need to sign up Edusphere system to get a wallet address connecting to Aristotle Chain.
- ETH Pre-fund accounts are transaction validators who are responsible for mining new blocks, validating all transactions.
- Users could be part of validators and sync full Aristotle Chain blocks to earn more tokens.

## SkyQuark - Crowdsourcing System

TECHNOLOGIES: NODEJS, KOA, MONGODB, LEVELDB, WEB3.JS, TRUFFLE, AWS, POSTMAN

Sept. 2018 - Apr. 2019

- Crowdsourcing system is the extension of Nodejs back-end web server between Edusphere system and Aristotle Chain.
- It's also the Aristotle chain user address, chain nodes and smart contracts management center.
- It connects with MongoDB as main business logic database and LevelDB as users reputation and other behaviors databases.
- It communicates with Aristotle Chain through Web3.js API.
- It provides APIs to the front-end edusphere system.
- It provides users a revenue auto-distribution system based on the Aristotle Token mechanism without signing any paper or electrical revenue sharing contracts
- Users behaviors on edusphere.io will be used to calculate the reputation and token rewards and the smart contracts deployed on Aristotle Chain will be triggered to make reward transactions

## SkyQuark - Intellectual Property Protection dApp

TECHNOLOGIES: TRUFFLE, SOLIDITY, WEB3, NODEJS, IPFS, WEBPACK

Jun. 2018 - Sept. 2018

- IP Protection dApp developed on Rinkeby testnet first and deployed to Aristotle Chain after.
- It has four different layers: chain layer, smart contract layer, web3(NodeJs) layer and UI layer
- For the web part, it needs a web server like AWS to host the all front-end resource files(or IPFS) and web3 will connect to blockchain provider to interact with smart contracts and send transactions to the chain.
- For all large size documents that users submit, they are all stored on the IPFS, only hash value will be stored into blockchain.

## BlackBerry - Monkey

TECHNOLOGIES: ANDROID, ADB SHELL MONKEY, ANDROID SYSTEM PERMISSION, ANDROID SYSTEM SIGN, GIT

Jun. 2017 - Sept. 2017

- This is an Android application for BlackBerry Spark Day.
- This app encapsulates adb shell monkey command for BlackBerry internal pressure and performance testing.
- Granting Android system permission and system sign to run sudo commands.
- Running monkey command on target apps and generating the testing report for analyzing.

## UWaterloo Hackathon - Waterloo Discovery

TECHNOLOGIES: ANDROID, GOOGLE MAP API, GEOLOCATION, AWS, MYSQL, WEB SERVER, GIT

Feb. 2017 - Feb. 2017

- Developed an Android application about exploring the city of Waterloo for new comers such as international students and travelers in 2 people's team.
- Using Google Map API to locate users, then calculate the distance.
- Using Google Nearby resources.
- Awarded Top 5 Hackathon project.

## Accomplishments

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### Waterloo Hackathon No.1 Team 2016

Oct. 2016 - Oct. 2016

- Technologies: HTML5, CSS3, AngularJS.
- Developed a widget based on UW Portal SDK in a 5 people team.
- This widget allows students to create and answer questions for different subjects.
- Questions and answers could be ranked by different features.
- Awarded No.1 Hackathon project.

### Java Coding Standards Research

Mar. 2016 - Jul. 2016

- Research about Java Coding Standard – Exception chapter.
- Software Reliability Engineering Research.
- Applying testing tools to prove reliability. ex. PMD, SonarQube, FindBugs, JML, Checker Framework, Z3, SMT, SAT.
- Awarded Top Research project by UW Research Group in Summer 2016.

## Honors & Awards

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| 2015 | <b>Outstanding Graduated Student</b> , Tianjin University of Technology   | <i>Tianjin China</i> |
| 2015 | <b>National Scholarship of China</b> , Tianjin City Government            | <i>Tianjin China</i> |
| 2014 | <b>First Class Student Scholarship</b> , Tianjin University of Technology | <i>Tianjin China</i> |