

Smart Contracts: A White Paper

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Softjourn, Inc.



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Executive Summary

This white paper assumes that the reader is broadly familiar with smart contracts and distributed ledger technologies. Accordingly, it provides a high-level summary SJ Coins, the Softjourn blockchain ecosystem.

In this paper, we will offer an overview of smart contracts, their types depending on the transaction involved, and blockchain technology providers.



About Blockchain



Blockchain technology is distributed ledger recording technology. It can record transactions in a secure, transparent, decentralized, efficient, and low-cost way. Blockchain technology originated with bitcoin as a bottom-level technology. It was originally used to record historical transactions of encrypted digital currencies. As research on digital currencies went deeper, the underlying blockchain technology was separated from bitcoin and further developed as it related to cryptography, network topology, and consensus algorithms.

Blockchain technology may be applied in many areas. These include currency—including currency transfer, remittance, and e-payment systems—smart contracts in financial markets, and social applications such as notary services, voting, and healthcare delivery.

About Smart Contracts



The idea of smart contracts goes back to 1994, close to the dawn of the World Wide Web. That's when [Nick Szabo](#), cryptographer widely credited with laying the groundwork for bitcoin, first coined the term "smart contract." At their core, these automated contracts work like any other if-then statements. They simply do it in a way that interacts with real-world assets. When a pre-programmed condition is triggered, the smart contract executes the corresponding contractual clause.

Because smart contracts are computer programs, it is trivial to add more complex betting elements such as odds and score differentials into the mix. While there are services today that can handle this sort of transaction, they all charge a fee. The key difference with smart contracts is that they are part of a decentralized system accessible to anyone, that doesn't require any intermediaries.

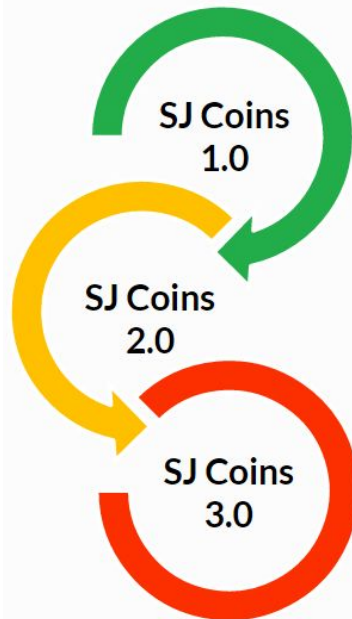
The Business Case for SJ Coins



Softjournal Coins—[SJ Coins](#)—is a corporate social responsibility (CSR) ecosystem that we built on Monax, a private Ethereum technologies-based blockchain.

SJ Coins has evolved from a single-server platform for a vending machine to a mobile app to a way to underwrite social projects. Soon, SJ Coins will enter the third stage of its development as our employees use it to obtain services from local providers.

Development Phases



Phase 1.0: Engaging Employees

During this stage, we engaged our employees. All employees received coins on their individual accounts—initially not based on any reward. Employees could spend their coins for products in the Saeco vending machine located in our office.

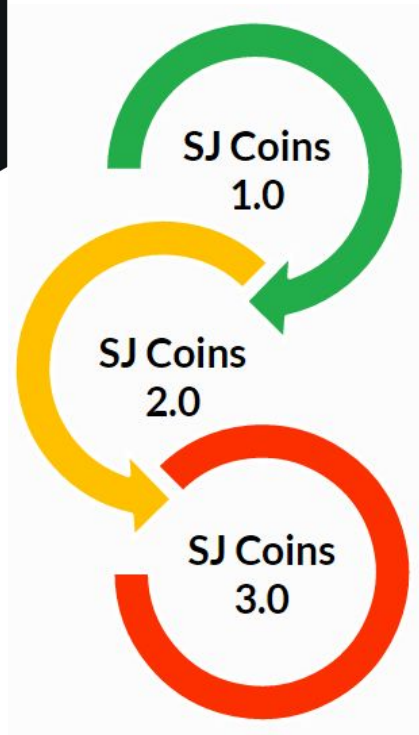
Phase 2.0: Softjournal Foundation: Crowdfunding Social Projects

Softjournal employees developed a web portal where they could suggest a social project in which to become involved. Examples include sponsoring clean-up of a park or lake, helping the needy pay medical expenses, or supporting an animal shelter.

The Business Case for SJ Coins



Development Phases



Phase 2.0: Softjour Foundation: Crowdfunding Social Projects

This phase of the SJ Coins initiative—which is in place today—operates like standard crowdfunding. A sponsor sets a required funding level and a deadline for raising funds. If the designated amount is raised by the deadline, the amount (corresponding to the SJ Coins) is taken from the Softjour Foundation and sent to the social organization.

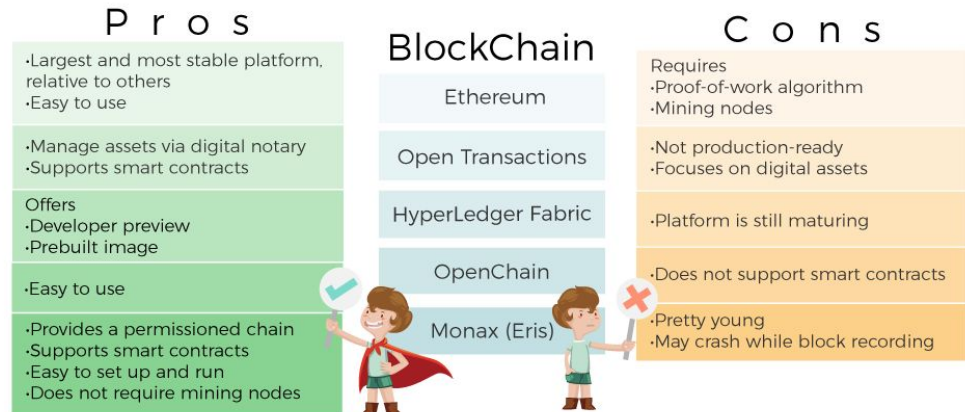
Phase 3.0: Paying for Services

A local health club, for example, agrees to give a discount to Softjour employee, in the form of bitcoins added to their virtual wallets. To participate, an employee must meet certain criteria, i.e., visit the health club at least five times in a row or participate in Softjour activities, and we match the discount offered by the partner.

Comparing Blockchain Platforms

In the process of developing SJ Coins, we evaluated a number of blockchain systems, including Open Transactions, Ethereum, OpenChain, and Monax. Each of these systems have its advantages and disadvantages.

We narrowed our choice to Ethereum and Monax, choosing Monax because it doesn't require mining nodes. That requirement was important to us because we wanted only one minter of coins initially.



It is important to note that the features—and benefits—of these platforms are changing so rapidly that you might choose one platform in January and by March would choose another.

Comparing Blockchain Platforms

A Closer Look at Monax

Monax is quite richly featured. Its excellent documentation and ease of deployment and use are distinct advantages. In addition, Monax offers the following capabilities:

- Blockchain management tooling
- Ethereum virtual machine
- Tendermint consensus engine
- Ability to implement proof-of-stake on top of the Tendermint consensus engine



Recently, Monax has joined Hyperledger, the Linux Foundation-led open-source consortium building a wide-range of enterprise-grade solutions based on blockchain technology. While Hyperledger now counts more than [100 companies](#) among its members, the admission of Monax to the consortium makes it the first to also submit a codebase with an Ethereum virtual machine, which is the component that handles state computation on the public ethereum blockchain.

Using Smart Contracts

Blockchain enables the creation of smart contracts, with terms and conditions both sides can specify and that ensure trust in enforceability and the identity of the counterparty. A blockchain smart contract between a supplier and a buyer consists not of a hard copy document in a drawer or a word processing document on a computer server but instead a computer program that runs on the blockchain and is executed by the entire blockchain network. Its program code—the terms and conditions of the contract—cannot be changed. The contract thus provides the level of trust that used to require elaborate control and audit processes.

Not only can blockchain contracts contain the same level of detail as a physical contract, they can also do something that no conventional contract can: They can perform tasks such as negotiating prices and monitoring inventory levels. This capability replaces expensive, manual effort with automated, dynamic tracking of supply chains, inventory levels, and prices to reduce costs and maximize profits.



Using Smart Contracts



Challenges and Risks

Blockchain brings with it all the risks of any emerging technology. These range from the maturity of the technology itself and the standards surrounding it to the challenges of integrating it with existing platforms and business processes. Instant provision of trust among trading partners and the ability of smart contracts to negotiate and finalize transactions may require major changes in workflows and business processes. Because of its disruptive nature, however, blockchain also carries at least two risks that potential adopters should consider carefully:



1. Once deployed on a ledger, it can't be edited or withdrawn.
2. No one legally responsible for the deployment of a smart contract and its activity.

SJ Coins and Smart Contracts



At Softjourn, our contemplation of the implications of smart contracts has led us to envision a social responsibility component through which employees can “spend for good.” Using smart contracts via blockchain has the potential to create endless scenarios in which organizations can collaborate to encourage charitable donations, both in their own communities and abroad—where financial transactions can be more challenging, especially during emergencies or natural disasters.

Currently, our employees can get involved in corporate giving and have a voice in how money is spent without this technology. However, on a practical level—as an international tech firm—we see multiparty smart contracts and blockchain technology as an efficient and transparent way to exchange currency. They allow better tracking of funds and contributors, depending on the number of users with their own node servers who are participating in block creation and monitoring. Smart contracts can also be more secure. And, as described, smart contracts do a lot of the heavy lifting as a utility. Transactions—and the conditions of those transactions—take place automatically, quickly, and accurately.

SJ Coins and Smart Contracts

A Note about Solidity

Smart contracts are the cornerstone of the SJ Coins project, because after a contract is completed, none of the parties can make any changes and must adhere to the contract conditions. At Softjourn, we use Solidity, a contract-oriented, high-level language whose syntax resembles JavaScript. This is ideal for creating applications for voting, crowdfunding, blind auctions, etc. Similar to object-oriented programming, Solidity offers constructors, object-oriented programming methods, inheritance, functions, and different simple and complicated types such as structures, arrays, hashes, etc. These features all allow a programmer to create ever-smarter contracts.



Types of Smart Contracts: How the Code Looks



Storage

```
pragma solidity ^0.4.0;

contract SimpleStorage {
    uint storedData;

    function set(uint x) {
        storedData = x;
    }

    function get() constant returns (uint) {
        return storedData;
    }
}
```

The first line simply notes that the source code is written for Solidity version 0.4.0 or anything newer that does not change current functionality—up to, but not including, version 0.5.0. This ensures that the contract does not begin to behave differently with a new compiler version.

Types of Smart Contracts: How the Code Looks



Smart Contract: Mint Function

```
contract Coin {
    address minter;
    uint8 public tokenColor;

    mapping (address => uint) balances;

    mapping (address => mapping (address => uint)) allowed;

    event Transfer(address from, address to, uint value);

    event Approval(address from, address to, uint value);

    function Coin(uint8 _tokenColor) {
        minter = msg.sender;
        tokenColor = _tokenColor;
    }

    function setColor(uint8 _tokenColor) {
        if (msg.sender != minter) throw;
        tokenColor = _tokenColor;
    }

    function getColor() returns (uint8) {
        return tokenColor;
    }

    function mint(address owner, uint amount) {
        if (msg.sender != minter) return;
        balances[owner] += amount;
    }
}
```

Smart Contract: Transfer Function

```
function transfer(address receiver, uint amount) returns (bool) {
    if (balances[msg.sender] < amount) return false;
    balances[msg.sender] -= amount;
    balances[receiver] += amount;
    Transfer(msg.sender, receiver, amount);
    return true;
}
```

Future Direction


As noted earlier in this paper, Softjour envisions extending SJ Coins to relationships with service providers such as health clubs, retailers, and cafés that will provide discounts to employees in the form of more SJ Coins. But beyond our own home-grown program, what we're most excited about is the potential for smart contracts in corporate social responsibility programs globally.

Given the tangible and intangible benefits to organizations, employees, and social service agencies, we envision businesses around the world deploying blockchain technology with multi party smart contracts for their own giving programs. Not only do blockchain and smart contracts offer security and ease of use but also unique opportunities to create innovative programs that inspire employees to give back to their communities.

Conclusion

Without doubt, this is early-stage technology, but by starting small and building pilot programs, we can see the potential to create a path to something bigger. Because we realize success depends on a critical mass of users, crunching blocks in the chain, to create a trusted solution, we recommend the following approach:

- Evaluate available blockchain technology.
- Develop and test innovative block chain business models and products.
- Implement selective proofs of concept.
- Leverage experienced partners to build a hardware and software lab to best understand blockchain ever-changing potential and challenges.



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About Softjournal Inc.

Headquartered in California and in operation since 2001, Softjournal is a technology services provider with 150+ employees and two R&D centers, one in Ukraine and one in Poland. We see the SJ Coins project as growing into a platform to be used by employers who want to give their employees the opportunity to participate more frequently and easily in CSR projects and to vote for and feel ownership in these projects. This could be donor-based organizations, such as NGOs, whose members will have transparent access to information about who is donating funds. Since blockchain has very practical implications for the nuts and bolts of payment solutions, Softjournal intends to be part of the future of this currency and to apply it where it can do good.

Softjournal has been recognized by IAOP from 2014 to 2017 as one of The Global Outsourcing 100® from 2014–2017 and is one of the Inc. 5000 list of America's fastest-growing companies.

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