Blockchain Implementation for the Mutual Fund RTA

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Abstract. Registrar and Transfer Agents (RTA or R&T Agents) are important financial intermediaries in the investment asset management industry who can use blockchain technology in their financial transaction record keeping and investor (customer) service activities. This paper examines the operational, banking, financial and non-financial transactions of an RTA for possible cost and process optimization with a blockchain implementation. Enterprise Ethereum Alliance (EEA) standards are considered so that the system is enterprise-grade, scalable and plugs with other vendor systems. It is found that the on-chain and off-chain features of the blockchain can help in document man`agement as well as optimal resources of the RTA.

Keywords: asset management company, financial intermediaries, blockchain architecture, blockchain standard, blockchain layers, offchain computation

1 Introduction

Registrar and Transfer Agents (RTA or R&T Agents) provide vital financial transaction record keeping services and are a one-stop contact point for information on mutual funds (mf) (such as scheme details, statutory information, NAV updates etc.) for the investor. The Asset Management Company (AMC) is already burdened with the scheme design, portfolio management and related activities and hence outsourcing time-critical operational activities such as transaction processing, statement generation and customer support to an RTA makes sense. RTAs have branches across the country and hence AMCs need not open branch offices in the same locations again. Further, an investor visiting an RTA branch can get support of multiple AMCs from a single location. Finally, because RTAs have inter-connectivity with other RTAs, sending consolidated account statement will be a breeze.

Blockchain is spearheading the fintech revolution, the beginning of which we are witnessing right now. While blockchain as a disruption technology eliminates non-value adding “intermediaries”, the future of RTAs is in doubt and is a huge topic for a separate debate. This paper presumes that the role of RTAs is too huge to be eliminated from the system, at least for now, considering that the industry is in early stages of realizing the technological importance. The next steps will be to slowly migrate towards practical implementations before disrupting the “middlemen”. In fact, this is not the first time that the need for RTAs is questioned, or rather, challenged. Back in 2009, financial market

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regulator, the Securities Exchange Board of India (SEBI) began allowing mf orders to be routed through the stock exchanges whereby investors can call their stock broker to place their mf transaction request. Funds get adjusted with the stock broker ledger balance and units will be held in demat format thereby reducing the need on an RTA. However, this initiative got lukewarm response back then [5] and the low and dull response remained the same even after a decade. This highlights the indispensable role of an RTA.

This paper explores the various RTA functions and device methods by which blockchain technology can fit in their existing processes and thereby bring in process optimize so as to derive cost cutting and time saving advantages

2. Research Design

2.1 Research Methodology

Being an evolving technology, Exploratory Research Methodology, as discussed by Robson [8], will be used to *find out what is happening* with the blockchain technology, to *seek new insights* (in terms of developments and evolution), to *ask questions* (in regard to applicability of the technology for the RTA industry) and to *access phenomenon* in a new light.

2.2 Data Sources

Being an evolutionary technology, only secondary data sources are used to collect information from journals, yellow papers and official websites.

2.3 Literature Study

Blockchain benefits for the banking and financial industry [1] in general and for sub-sectors such as the mf industry in particular [2] are already well documented. Trends show that it is getting increased acceptance beyond the typical use-case level. However, there is hardly any efforts put on studying RTAs. Clearly, there is a literature gap in regard to blockchain usage by the RTA and this paper attempts to fill it.

2.4 Need for study

While there are no industrial figures in regard to the quantum of mf transactions being processed every day, the industry size metrics would give a broad estimate. Globally, there are 114,000 open-ended regulated mf schemes managing US $49 trillion as of end of 2017[4]. Back in India, the number of mf folios have almost doubled from 4.03 crore (in Dec 2014) to 8.03 crore (as of Dec 2018). Assets being managed by Indian MFs are now worth Rs. 24.25 trillion (Feb 2019). Increased financial literacy and investment awareness is making investors to remain invested for the long term. As much as 29.7% of equity investors are staying invested for more than 2 years [3].

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Financial Regulators (such as SEBI in India), recognize and regulate RTAs as "intermediaries" and grants certificate of registration, does inspection of books and records for compliance etc. SEBI Regulations of 1993, 1996 and 2008 are the primary regulations governing RTA operations in India.

This study is of significance considering the wide applicability of process optimization and time savings that come along with blockchain implementation for the RTAs.

3. Blockchain and the RTAs

Blockchain in a decentralized peer-to-peer network running a virtual machine (such as the Ethereum Virtual Machine (EVM)) with a clear separation between public and private layers wherein blocks containing information are chained (connected) to the previous block on the network. The Enterprise Ethereum has some unique features such as improved speed of processing (throughput), ability to perform transactions in private (off-chain) and membership enforcement (permissioning).

3.1 Operational aspects of RTA

RTA is responsible for safe and accurate maintenance of records, facilitate transaction processing and addressing investor complaints in a timely manner. They are expected to have mechanisms such as maker-checker for ensuring checks and balances in all transactions and to maintain compliance at all times. Being official investor service centres (ISC), they are responsible for investor-facing transactions of a fund.

RTAs perform key operational aspects in the mf transaction cycle. These include allowing customers to transact (purchase, redeem, switch) with the fund either off-line or on-line, issue and redeem mf units with the appropriate NAV, create and update folios reflecting investor transactions, updating unit capital account on a daily basis so that fund accounts / custodian can use this information for determining portfolio value, update the AMC and its fund manager about the inflow and outflow after banking the payment instruments (such as cheques and demand drafts), process dividends and redemptions and sending periodic statements and statutory information to investors [6].

All investor requests (financial or otherwise) are to be timestamped and serial numbered. This timestamping process will differ a little if a payment instrument (such as a

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cheque) is accompanied. Blockchain implements timestamping as a part of its core service offering and in an automated method.

With Independent Financial Advisors (IFA) and investors allowed to participate using the special stock exchange platform window – such as the Mutual Fund Service System (MFSS) of the National Stock Exchange (NSE) and BSE StAr of the Bombay Stock Exchange (BSE), RTAs have to make special arrangements for data collection and dissemination in a consist manner.

Apart from servicing AMCs and investors, RTAs also support and assist Mutual Fund Distributors (MFD) who in-turn can appoint sub-brokers under them. The MFDs are already part of a distribution network called FinNet (in India), an internet-based platform for allowing distributors to allow their investor clients to transact in 35-odd mutual fund schemes.

Clearly, the RTA blockchain need to handle both information and fund flow in an optimal manner.

2.1 Banking Operations of MF

Cash Management Services (CMS) are used in mfs for effective utilization of funds. The various types of accounts being maintained are: Collection Account, investment Account, Redemption Account and Expenses Account. A variety of financial instruments (such as cheques, demand drafts etc.) and banking services (ABSA, NACH of NPCI, ECS etc.) apart from online banking and their modern extensions (such as UPI, wallet payments etc.) are allowed as part of banking transitions of a mutual fund.

2.2 Financial Operations of MF

The mf application form is first contact point between the investor and the MF. RTAs collect, capture, store and maintain a lot of investor information as mandated by SEBI. Transactions are allowed using the transaction slips and a variety of payment instruments are to be accepted. Purchase transactions are to be processed as per time-line. Statement of Account (SoA) has to be sent within 5 business days. Of course, with transactions being processed online, SoAs are often sent within 1 to 2 working days. Blockchain can interfere and can cut down this time to few hours. When blockchain networks interconnect different RTAs, sending a Consolidated Account Statement (CAS) will be on-the-fly. Systematic Investment Plan (SIP) transactions involve processing to be done by the bank. Redemptions

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are done keeping in mind on the applicability of exit load of the scheme. Systematic Transfer and Withdrawal (STP / SWP) are to be facilitated.

While cryptocurrencies cannot be right away allowed in mutual funds because of regulatory restrictions, bank transaction requirements can be addressed with blockchain.

2.3 Non-Financial Transactions

For an RTA, non-financial transactions are equally important as financial and banking transactions owing to regulatory requirements of providing timey response to investor requests. The bulk of the non-financial transactions include change of investor details (such as Address, Bank details, Option of a scheme, Name of an individual investor, Corporate name or status, Authorised signatories etc.). All these non-financial requests are to be supported by a request letter and necessary proofs which are scanned and stored permanently in digital format. Blockchain has the ability to store documents on-chain in the form of the document itself or by storing a hash on-chain but keeping the actual document off-chain. Blockchain provides tamper resistance, visibility and decentralized storage abilities in this regard.

2.4 EEA Layered Architecture

In the process of defining and implementing standards, the EEA prepared a five-layered Enterprise Ethereum Architecture Stack. Confirming to the standards have many long-term benefits for the blockchain implementors because it allows scalability, easy communication and plugs-in to systems of other vendors, helps in inter-operability with other disruption technologies (such as IoT, Machine Learning, Artificial Intelligence) etc. These things are important considering clients (such as RTAs and AMCs) indeed have plans to use a mix of various technologies so as to have an edge over their competitors.

At the bottom of the EEA stack is the Network layer where the communication between blockchain notes are facilitated by two protocols – DEVp2p wire protocol (that is used for establishing and maintaining communication for higher layer protocols) and the Ethereum wire protocol (that is used for exchanging block and transaction information between Ethereum client nodes).

The Core Blockchain layer takes care of storage / ledgering (to store the blockchain state), execution (implements the Ethereum Virtual Machine (EVM) or the Ethereum-flavored WebAssembly [eWASM]) and consensus (by allowing consensus algorithms such as Proof of Stake to run).

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The Privacy / Scaling layer carries necessary extensions to allow enterprise-grade deployments at two levels – Level 1 (on-chain scaling implemented at protocol layer level) and Level 2 (off-chain scaling implemented using smart contracts at application protocol layer).

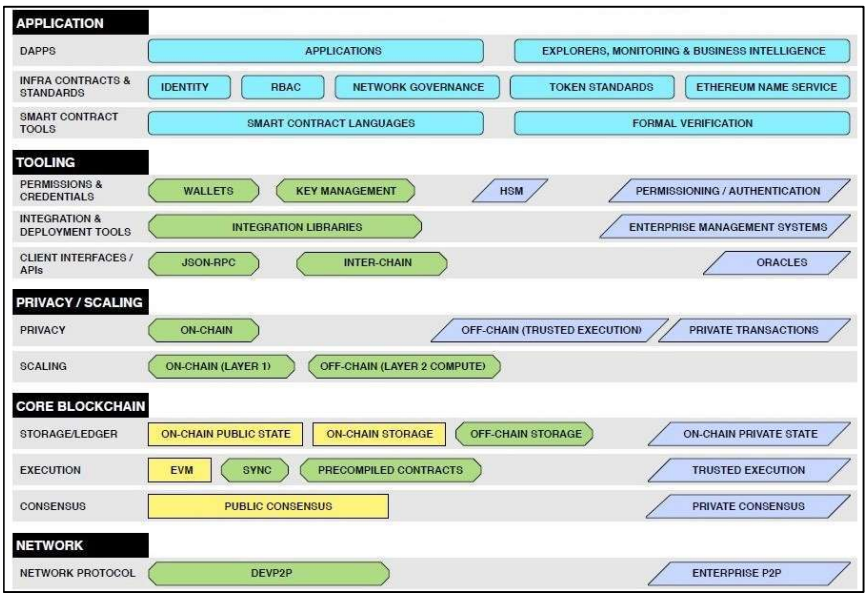

Fig. 1. The Enterprise Ethereum Architecture Stack provides a five-layer standardized implementation of enterprise grade apps. Source: Enterprise Ethereum Alliance

Communication with clients is handled by the API's (such as JSON-RPC API) provided by the Tooling layer for activities such as submitting transactions for execution etc. Compilation and verification of smart contracts will be provided by support to languages such as Solidity, LLL etc.

The Application layer is the top most layer providing highest level services by residing partially or fully outside of the client. Wallet services, Ethereum Naming Services (ENS), node monitoring etc. This layer provides the ground for the running Decentralized Applications (DApps), certain enablers that allow extensions (Infrastructure Contracts and Standards) and support to language parsers, compilers and debuggers for smart contract tools.

While the bottom three layers are common for any enterprise, the top two layers (Tooling and Application) would require special and specific changes for use by the RTAs.

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2.3 Off-chain Computation

The EEA Off-chain trusted compute specification [7] resembles a distributed computer wherein the blockchain implementation will have *n* Member Enterprises (ME). Each ME will have Requestors (that sends a Work Order), EE Client and a number of Workers (that execute a Work Order) running under it that are managed by a worker service (WS), all of which are registered with the main blockchain. The workers are computational resources that take up the responsibility of executing a Work Order by doing the actual computation necessary and returning back the computational result. Imagine the RTA blockchain with ME's being RTA branch office nodes. Each ME will have multiple workers who do transaction processing (such as processing a SIP, a redemption request etc.). When one branch ME is done processing all its work orders and is in idle state, another branch ME can send a work request to the Requestor of the idle ME to get the transaction processed. This way, optimal resource utilization of the blockchain can be done. The work orders are issued either by a DApp or an application smart contract. Either the direct mode or the proxy mode can be used by the Requestor to submit a work order. A Work Order Receipt will be created by the Requestor and are updated by Workers to tell if the transaction processing is a success or a failure. Since all these transactions happen off-chain, higher throughput can be achieved.

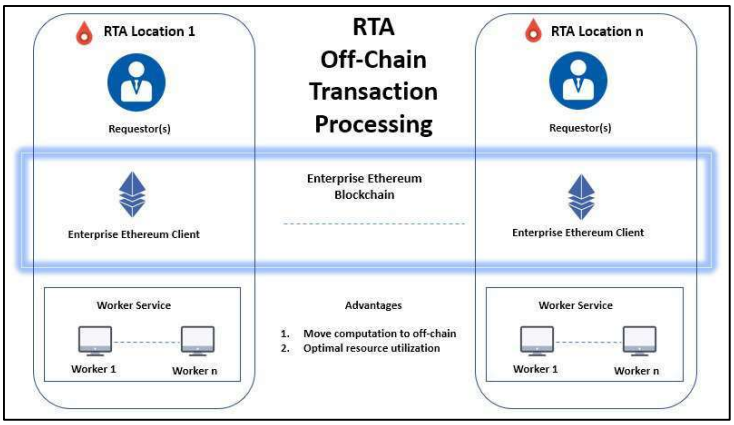

Fig. 2. The Off-Chain Transaction Processing for the RTA is based on EEA Off-chain Trusted Compute Specification V0.5

3. Research Findings

1. Blockchain can help in various operational aspects of an RTA, particularly in the banking, financial and non-financial transactions.
2. Using the various architectures and the five-layered system proposed by the Enterprise Ethereum Alliance (EEA) can help in building scalable, inter-operable and pluggable systems.

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3. Blockchain can accommodate direct on-chain and hash-based off-chain storage of documents which are important in non-financial transaction processing activity.
4. Resource intensive computational operations can be moved off-chain and so, high industry-grade performance throughput can be obtained.

4. Scope for further development

1. This paper touches only the mutual fund aspects of an RTA and clearly this can be extended to other investment instruments (such as units issuing insurance policies, PMS, venture capital and hedge fund activities etc.).
2. The exchange routed MFs (including ETFs) require a separate through discussion as it includes several other entities that are not of the core traditional MF route.
3. Some RTAs and AMCs provide auxiliary services such as capital gains statement etc. which can also be considered for implementation over blockchain.

5. Conclusions

RTAs provide record keeping and investor support services and are vital financial intermediaries in the mf industry. Various features of the Blockchain technology, particularly the Enterprise Ethereum, can help RTAs to migrate to the Blockchain so that process optimization and cost cutting can be done. The services of EEA (such as the architectural framework and the layered approach) can help in bringing about standards in the blockchain industry and help derive long term benefits because of easy inter-operability with multiple vendors. Moving transactions and storage off-chain can reduce some burden and improve throughput of the blockchain network as well as in optimal system resource utilization.

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