# Faster Payments QIAT

Proposer: **Hub Culture, ECCHO, Xalgorithms**

February 21, 2017

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Final Version

Faster Payments Task Force Proposal

RAIN™ and RAIL™
Real-time Asset Interchange Network
Real-time Asset Interchange Ledger

April 29, 2016

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EXECUTIVE SUMMARY

Provide a high-level description of what the solution does from end to end. In providing the description, proposers should highlight the main improvements the solution achieves over existing payment systems; that is, they should define the gaps in the current payment systems that the solution intends to address and what features of the solution address these gaps. Please also include the definition of the solution’s baseline features, and a description of the direction of the payment flow (for example, whether, the payment is “pushed” by the payer to the payee, the payee’s provider “pulls” the payment out of the payer’s account, or both).

The Real-time Asset Interchange Network (RAIN)™ and the Real-time Asset Interchange Ledger (RAIL)™ are a suite of technologies that enable end-to-end global payment capabilities from a managed platform system. Together, RAIN and RAIL enable ubiquitous real-time payment and settlement with a high level of security and transparency, while enabling growth of an ecosystem of participants for rapid iteration and development of new value-added services in payment architectures.

RAIN and RAIL are designed to intersect with legacy payment systems to foster integration between in-use systems and as a new System. The System offers cost and time advantages that make it compelling and easy to use by legacy market participants. The system works globally to enable payments between convertible assets, including fiat currency, digital assets, cheques, and other unique value asset types. RAIN and RAIL enable P2P, B2B, and N2N (node-to-node) exchange, facilitating A2A (anything-to-anything) value transfers between people, entities, and the emerging IoT of devices/objects. The system includes both push and pull mechanisms based on embedded rule preferences for particular types of transactions.

Real-time Asset Interchange Network - RAIN

At the core of RAIN is an exchange matching mechanism making it possible for any participant in the network to facilitate a value transfer with any other participant on a P2P basis. This direct connection is facilitated by a Unique Synchronized Identity mechanism that labels participants with a unique alphanumeric code tokenized into a persona based identifier. Banks and other institutions providing services for individual nodes in the network (persons or entities) are able to aggregate their existing data frameworks by layering a Unique Synchronized Identity (USI) onto existing accounts, creating a new global meta-layer of commonly understood data between currently disparate and unconnected accounts/data sets. The relationship between the Unique Synchronized Identity and the existing data sets is recorded onto a distributed database as a receipt, establishing a publicly available, (but privacy enabled) data record between disparate “old” account management systems (IBAN, SWIFT, account number, email, phone number), and the new meta-layer of USI. Once existing accounts obtain a USI, the new meta-layer enables seamless P2P transfer between personas of all types that exist within the network.

Real-time Asset Interchange Ledger – RAIL

The RAIL offers a commonly shared, accessible vast data set generated by the RAIN. RAIL simply records all of the transactions between participants in the market, using the Open Audit Initiative (http://oai.io), an open source block-chain based receipt mechanism for managing the records of transactions via a federated dataset.
RAIN is a federated data set that posts transactions between members of RAIN, including time stamp, value, asset type, receiver, sender, and direction (push/pull). The RAIL presents a public key of anonymized data transactions at the USI level between market participants, and can be cryptographically scrambled to present randomized tokens to replace USI identity data posted to the ledger to maintain market participant privacy. This ‘tumbler’ is a simple algorithm that sits between the RAIN transaction and the data receipt posted to RAIL, ensuring that while the data histories are publicly available, the data inside the transactions are not viewable by others.

As a shared ledger, RAIL is essentially an aggregator of transactions across RAIN, and from a software structure point of view would be openly available to replicate by market participants, presenting holonic opportunities for RAIN members to form their own Private Ledgers, which would auto-replicate data to the main RAIL as smaller-loop internal transactions occur.

Therefore, RAIL offers both a cryptographically private and centralized but open master audit of transactions made by RAIN, and a segmented ledger opportunity layered onto existing closed loop transaction networks.

Together, RAIN and RAIL offer an open platform for the Federal Reserve to offer Faster Payments capabilities to the global market at large, and will enable an open common language for value transmission of all types. Security comes from a combination of open receipting with a new network exchange layer that enables real-time settlement and clearance between any combination of parties, including escrow and multi-party payments.

Both RAIN and RAIL enable data anonymization, which the Privacy Technology Focus Group defines as "technology that converts clear text data into a nonhuman readable and irreversible form, including but not limited to pre-image resistant hashes (e.g., one-way hashes) and encryption techniques in which the decryption key has been discarded."

**Supported Use Case Coverage Summary**

*In the table below, identify (by entering a “Y” or an “N”) which use cases the solution intends to support for payments within the United States and a description of the specific type of payments the solution supports (example provided in the table below). Also indicate for each use case whether the solution offers cross-border functionality. Blanks will be assumed as “N”.*

<table>
<thead>
<tr>
<th>Use case</th>
<th>Supported (Y/N)</th>
<th>Cross-border (Y/N)</th>
<th>Examples of payments supported</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: Business to Person (B2P)</td>
<td>Y</td>
<td>N</td>
<td>The solution assists business and governments to make payments. Payments supported include: social security, government pensions and employee wages.</td>
<td>Note that the solution targets regular income payments to individuals. It would not be suitable for all types of business-to-person payments, such as ad hoc legal settlement payments or</td>
</tr>
</tbody>
</table>
### Supported use case coverage summary

<table>
<thead>
<tr>
<th>Use case</th>
<th>Supported (Y/N)</th>
<th>Cross-border (Y/N)</th>
<th>Examples of payments supported</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business to Business (B2B)</td>
<td>Y</td>
<td>Y</td>
<td>The solution enables direct value payments between business entities at all levels by creating a network for transactions and settlement between all participants by assigning existing accounts a USI. The USI enable A2A – anything to anything payments with a core digital asset that acts like a universal translator between the send/receive function.</td>
<td>Any type of payment whether automated, group (social security or government) etc. is assigned a 48 digit USI – with 140 trillion unique USI combinations assigned to RAIN at the outset, and irrevocably mapped to existing account data sets/types across the market via RAIL, the basis of an open platform for further growth and development by market participants.</td>
</tr>
<tr>
<td>Business to Person (B2P)</td>
<td>Y</td>
<td>Y</td>
<td>A2A: See above B2B explanation</td>
<td></td>
</tr>
<tr>
<td>Person to Business (P2B)</td>
<td>Y</td>
<td>Y</td>
<td>A2A: See above B2B explanation</td>
<td></td>
</tr>
<tr>
<td>Person to Person (P2P)</td>
<td>Y</td>
<td>Y</td>
<td>A2A: See above B2B explanation</td>
<td></td>
</tr>
</tbody>
</table>

### Cross-border Use Case Coverage (If Applicable)

For those use cases supporting cross-border, provide the jurisdictions and systems with which the solution interoperates in the table below.

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Non-US Corridor(s) and Systems</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business to Business (B2B)</td>
<td>Global</td>
<td>RAIN and RAIL are non-geo specific but include country level designations within the USI data sets.</td>
</tr>
<tr>
<td>Business to Person (B2P)</td>
<td>Global</td>
<td></td>
</tr>
<tr>
<td>Person to Business (P2B)</td>
<td>Global</td>
<td></td>
</tr>
<tr>
<td>Person to Person (P2P)</td>
<td>Global</td>
<td></td>
</tr>
</tbody>
</table>
Proposal Assumptions

RAIN and RAIL anticipate a number of assumptions with regard to the effectiveness criterion.

1. Participation by market actors, including banks, payment providers and others, is on a voluntary, or opt-in basis.
2. That participation in the network should be devoid of as much cost as possible to the end-user and to participating network aggregators (such as banks, non-bank financial providers, etc) but that business models would be developed.
3. Rule making bodies would oversee the logical aggregation of data set types to the USI, ensuring that a standard logic emerges for USI via an aggregating technology, such as the emerging Xalgorithms Federated Registry and Lichen component. These could systematically automate how RAIN and RAIL draw upon computational rules from various authoritative source repositories.
4. USI personas would call upon ISO200022 data sets and existing data sets from participating network banks to source components of the USI, tokenized into a synchronized data set.

ECCHO Rules for Legal Framework

ECCHO will manage the effort to implement the legal framework for Faster Payments meeting the Legal Criteria developed in the Faster Payments Legal Work Group—which was chaired by ECCHO. ECCHO’s experience is unrivalled—building a new rules scheme from concept to rapid adoption in a transitioning, complex, multi-operator, many vendor environment. For Faster Payments, we propose to use the ECCHO methodology that combines teleconferences with in-person meetings, adding the Hub Culture network to combine the physical with the virtual.

This approach enables creation of various groups to facilitate the communication and education within the subcommittees, operations committee and Board. The Hub Culture network will be a vehicle to communicate with consumers to deliver education as well as seek input on important issues. With the use of purpose-driven hubs, we can speed communication and decisions on straight-forward topics, enabling more time for debate and in-person discussions of complex topics. The ECCHO methodology results in one of the best human networks in the payments industry. Adding hubs will strengthen the peer network by adding another dimension.

Need for Rules

Faster Payments system rules serve the important role of reducing the uncertainty of dispute resolution among parties by establishing the legal rights and obligations of stakeholders in a consistent and uniform manner. These rules outline the legal responsibilities, in the form of warranties and indemnifications, and how exceptions are resolved. Payment system rules are vital because they address the ambiguities and gaps in the law and provide a uniform application regardless of any providers’ specific solution. While there are existing laws that cover many aspects of payments, there is currently no law that covers all aspects of payments in an online real-time payment system. A common, uniform set of rules can best address this need.
Objective Development
Faster Payments rules development should be led by an independent and impartial party not associated with any specific service provider—one that is dedicated to finding the best solution for the industry and all versions of faster payments. Rules development should include fair representation to all participants through a transparent process. This is not an easy task as issues affect organizations and parties to the payment transaction differently. Only through facilitated conversation can disparate parties gain the understanding of other perspectives and find the best long term approach/solution—often one that was not previously conceived.

ECCHO Focus
ECCHO’s not-for-profit status ensures that our focus is on the needs of the stakeholders. ECCHO is unique in its stakeholder-centric approach. While most organizations develop the system or product, then seek to acquire users, ECCHO begins with an understanding of the stakeholders’ objectives and then develops the rules to best address those objectives.

We believe this focus ultimately drives usage by creating a level playing field for large and small participants, within a transparent, inclusive setting—finding solutions that everyone can embrace. ECCHO, in conjunctions with broad industry participation, found ways around every obstacle in the ramp-up of the check image payment system—resulting in the fastest usage transition in payment system history.

ECCHO Methodology
ECCHO’s Rules development methodology is preferred across the industry because it involves the active participation of stakeholders—listening to their issues and jointly creating a solution. We explore issues regardless of who brings them to the table—implementing if there is consensus about the value. ECCHO Rules enable an open environment suitable for all vendors and solutions.

The ECCHO Rules methodology is:
- Bottom-up – members bring us real-life problems and opportunities to discuss and resolve
- Inclusive – involve widest group to pursue most equitable way forward
- Continuous – always improving and making additions to the rules and operational procedures including large banks, bankers’ banks, credit unions, small banks, processors, corporate credit unions, Federal Reserve, The Clearing House, regional payments associations, consultants, solutions providers and will add consumer representation and corporates for Faster Payments

Attorneys create an initial draft of the Rules followed by broad stakeholder discussion, review and modification. Once the initial set of rules has been implemented the next phase of continual maintenance and enhancement begins. The process begins with issues brought by members, ECCHO staff and other industry players and continues to discussions amongst the membership.

Discussions begin in subcommittees or at an informal brainstorming roundtable session. Members discuss whether others are experiencing the same challenges and how best to address the issues. Subcommittee meetings are teleconferences for the widest participation, ad hoc, and exist on an as-needed basis.
ECCHO currently hosts hundreds of participants on conference calls and facilitates input from all who wish to voice opinions and offer ideas. Rules drafts are created and refined in subcommittee. Subcommittees typically are formed for: rules development, exception processing management, legal & compliance issues, special projects, etc. Following discussion in subcommittee, rules language is reviewed by the Legal Subcommittee which is comprised of the most experienced payment system lawyers in the U.S. Ultimately, rules are finalized in the in-person operations committee meetings and sent to the Board for approval. The rules language recommended in the operations committee is the exact rule that proceeds to the Board for approval.

**Faster Payments Education**

With any new system, education is a vital component. ECCHO will provide Faster Payments education to the industry in conjunction with the Regional Payments Associations (RPAs). ECCHO has a strong, long-time partnership with the RPAs—speaking at their conferences and engaging them to provide training for the National Check Professional certification program. At the request of the industry, ECCHO and the RPAs can create a certification program for Faster Payments to ensure expertise is developed by users across the industry.
PART A: DETAILED END-TO-END PAYMENTS FLOW DESCRIPTION

Part A is composed of three sub-sections:

- Section 1 focuses on the broad solution, looking across the eight stages of the payment lifecycle.
- Section 2 focuses on the details of the solution by describing the solution’s supported use cases across the eight stages of the payment lifecycle.
- Section 3 provides a summary table of whether the Effectiveness Criteria are addressed by each supported use case.

1. Initiation
Describe how and when end users can initiate and/or receive payments, and to which accounts payments can be initiated and received. Indicate whether there are any pre-requisites or limitations to initiating or receiving a payment (e.g., enrollment,) and, if applicable, how those pre-requisites are met. Include whether the solution provides the ability to make multi-currency and/or cross-border payments, and describe the process for foreign currency conversion. Indicate for each use case, the channels, devices and platforms through which end users can access and use the solution (e.g., remote with a mobile device, online, etc.). Describe any consumer protections; for example, whether and at what point there would be disclosure of end-user fees.

In this sub-section the proposer should also describe the capability and steps required for contextual data to be transferred or associated with the payment. Also describe any security features associated with initiation, including protecting sensitive information. Proposers should include flow diagrams of the messaging and payment flows through the end-to-end payment process of their solution in this section.

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to initiation: U.1 (Accessibility); U.2 (Usability); U.3 (Predictability); U.4 (Contextual data capability); U.5 (Cross-border functionality); U.6 (Applicability to multiple
RAIN enables any end user to initiate a payment in real-time by accessing a ‘vast closed loop’ that facilitates the movement of both an asset token and message across an electronic network with layered and holonic capabilities. Payment is initiated by a requester or sender inputting an asset type, asset value, and destination with a digital time stamp for a post-dated or immediate transaction into a digital interface. In the case of a **Network Aggregation Player** (NAP, such as depository institution, non-bank account provider or financial intermediary) the request can be made by the NAP on behalf of the end user (in this case a consumer, entity, or bot) from their existing user interface setup (such as an online banking profile, IBAN account number, credit card number, or Paypal account).

A pre-requisite to participation is the possession of a USI by the end user or a set of USIs for end users held by the NAP and the recipient. If a user initiates a payment but the receiver or their NAP has not obtained a corresponding USI, the funds would be held in escrow by RAIN until the point at which the recipient claims the value transfer. While a value transfer could be linked to an existing NAP account, such as a bank account or other, it would not be required – it can be delivered by a mechanism as simple as finding ANY identity metric held by the initiator – such as an email address, phone number, bank account number, etc. If the recipient or its NAP has opted in but does not have a direct connection to the sender, the funds/asset would initiate instantly by using the RAIN network.

Since each data asset related to the USI is contextualized into the data set, and each data point or combination of data points is unique to the end user, the process is the predictably the same for all transactions. Since USIs can be composed of many types of data and is itself tokenized, end user data is protected across the network while enabling the network to locate the payment recipient quickly and reliably.

2. **Authentication**

*Describe how the identity of an end user and provider would be authenticated. Describe any security features associated with authentication, including protecting sensitive information.*

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to authentication: U.2 (Usability); U.3 (Predictability); S.7 (Security controls); S.9 (End-user data protection); S.10 (End-user/provider authentication).

Authentication over RAIN is achieved at two levels. If the sender and recipient have an established connection resulting from a previous payment between the parties, the connection relies on the previous linkage to facilitate the payment. If it is a new connection and transaction, the request would authenticate to the RAIN network by searching for the fastest route to a matching component of the USI data string associated to the network. The higher number of matching components, the higher the probability ratio of success related to the payment, which would be reported back to the initiator to confirm sending the payment. For example, if a USI included a swift code, bank number, email, name, and address, and the initiator inputted one or more of these data points, the system would return a success score
verifying the likelihood of that USI being the proper destination for the payment, which the sender would then approve.

This provides a real-time data check to confirm the information related to a payment to a particular USI, and could be approved or “switched-on” by the recipient, also in near real-time. This ‘Check’ on the transaction could be set for various circumstances or scenarios to improve security depending on the transaction type and could be delivered to a POS device at retail as a simple Yes/No confirmation based on a recommendation engine as part of RAIN. In this way, the Network acts as a basic AI, learning with each transaction the probability of a successful authentication related to the data submitted by every individual payment request, with the USI for each recipient becoming stronger and more certain with each transaction.

3. **Payer Authorization**

   Detail how and when payments would be authorized by the payer. If the solution allows pre-authorization, detail the process for establishing pre-authorization, and the process and timeframes within which a payer can revoke pre-authorization or change relevant parameters for pre-authorization.

   In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to payer authorization: U.2 (Usability); U.3 (Predictability); S.2 (Payer authorization); S.7 (Security controls); S.9 (End-user data protection).

   Payer Authorization involves a three step process for approval by the payer. 1. First, the user authenticates a transaction request and the request is transmitted through RAIN to find the recipient based on the data provided. 2. Once the recipient is authenticated, the system checks the asset balance for the value transfer requested, and if approved (including a potential negative balance/credit limit if managed by a NAP or as part of the payer’s account) then the user is provided an option to approve the payment. 3. Finally, the payer would be required to approve the transaction at the time of payment via an approval in the payment process, or if pre-approved, by an agent on behalf of the payer or by the payer themselves via a push notification. In the case of NAPs, automated functions might provide this service on behalf of the payer if setup as parameters beforehand, and would be subject to change by the payer if they chose to revoke the parameter.

4. **Approval by the Payer’s Provider**

   Detail the process for approval of the payer’s provider (depository institution or regulated non-bank account provider), including how long approval will take from the point of completion of payment initiation, and the point at which the payment becomes final and irrevocable. Describe the consumer protections around payer approval and the assurance of good funds. Also describe any security features associated with approval, including protecting sensitive information, and detecting and limiting unauthorized, fraudulent or erroneous payments.

   In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to approval by the payer’s provider: S.3 (Payment finality); S.7 (Security

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1 The completion of payment initiation is defined as just following payer authorization to their provider, or just following confirmation by the payer’s provider that pre-authorization exists for a given payment.
controls); S.9 (End-user data protection); F.1 (Fast approval); F.5 (Prompt visibility of payment status).

For the purposes of this proposal, we refer to depository institutions and regulated non-bank account providers as NAPs – Network Aggregation Players – who manage individual accounts on behalf of end-nodes within the system, whether person, entity or bot.

Requests from end nodes within the system may pass through NAPs in their search for the recipient, and may pull data from the NAP when approving or authenticating a transaction related to funds availability.

RAIN is maintained by a Master Base Asset (MBA) that exists as a unit of value in all nodes. The MBA value enables real-time exchange and settlement across the network and converts into and out of other value assets based on real-time market pricing mechanisms. The amount of MBA value held in the RAIN network is referred to as the RAIN Pool, and each node maintains its own RAIN Pool for instant, irrevocable transactions and settlement to the payee upon authenticated approval.

For instances where the payer requests a transaction where the MBA is able to fulfil and execute the transaction, the approval and settlement to the recipient are accomplished in real-time, at which time the payment is final and irrevocable. If the transaction requires the payer to access funds from their localized asset account held by an NAP, it converts the request into the localized asset (such as USD) and requests this from the NAP, resulting in a delay in the clearance from the NAP’s end user account through the network. This delay is minimized by the fact that both the end user and the NAP are accumulating value in the BA Pool (also expressed in their localized asset form) within the RAIN network. As such, over time less and less conversions are needed because the RAIN pool is maintaining the core asset, which is simply reflected in the balance accounts of the user’s various individual NAPs.

Once the Payer approves the transaction, whether by direct payment within RAIN or via an NAP to a localized asset, the payment is irrevocable. Within RAIN, such approvals are checked by 1. mapping the route between payer and payee, 2. checking the approval of the balance transfer, 3. deciding if the payment comes from the RAIN Pool held by the user, and debiting the pool, or by the NAP, in which case the NAP’s pool is accessed.

When the NAP account is accessed, then the transaction is offset by the NAP ledger and the funds are pulled from the NAP Pool, which benefits from larger aggregated balances and records both transactions onto the RAIL for authentication and reference purposes. According to the capabilities of the individual NAP, the end-user’s account is then adjusted according to the transaction posted.

This system enables near-instant clearance of balances across the system, without sacrificing the existing NAP account balance and settlement infrastructure already in place.

The system would allow for fast approvals of up to millions of transactions a second by routing the transactions across the RAIN and posting those transactions to the RAIL. Transactions within existing networks (VISA, MasterCard etc) could be simply posted to
RAIN as part of the data flow, with the USI attached to the transactions for rapid authentication mapping.

5. **Clearing**

*Detail the process for the exchange of relevant payment information between a payer’s and a payee’s providers (depository institution or regulated non-bank account provider), including payment format (message) standards utilized, the necessary communication processes, and how long the clearing process will take from the point of completion of payment initiation. Also describe any security features associated with approval, including protecting sensitive information.*

*In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to clearing: E.4 (Payment format standards); S.7 (Security controls); S.9 (End-user data protection); F.2 (Fast clearing).*

In RAIN, Clearing is a function of the network payment request, and handles instantly within the network along with the messaging request for authentication.

6. **Receipt**

*Describe how the approach would enable availability of funds (and contextual data, as appropriate) to the payee and the time this will take from the completion of payment initiation. Detail when and how the approach will make the payment status visible to the payer and payee (for example, visibility to the payer and payee that the payment has been approved, visibility to the payer and payee that the funds have been received in the payee’s account for use, etc.). Describe any security features associated with approval, including protecting sensitive information and mechanisms to block funds availability if an unauthorized, fraudulent, or erroneous payment is reasonably identified by the payer’s provider (depository institution or regulated non-bank account provider) prior to payment finality.*

*In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to receipt: U.1 (Accessibility); U.2 (Usability); U.3 (Predictability); U.6 (Applicability to multiple use cases); S.5 (Handling disputed payments); S.7 (Security controls); S.9 (End-user data protection); F.3 (Fast availability of good funds to payee); F.5 (Prompt visibility of payment status).*

Receipt of funds to the payee are concurrent with the approval of the request by the payer when the payment is handled through RAIN. A simple debit on the account of the payer is immediately reflected on the account of the payee via the network, and posted immediately as a data receipt to the RAIL.

Operating as a vast closed loop, the payment debits and credits immediately within the RAIN network. In cases where the NAP is pulling the transaction from the end users’ account, or depositing in a localized asset, the transaction remains instant and instantly posted in RAIN, but may be delayed based on the NAPs discretion. It could be up to the user or the Payee to have the transaction ultimately settle in an NAP or to access their account via a direct user interface, where the value is always instantly available.
7. **Settlement**

Describe the approach or model for funds settlement between the providers to the approach, and the time it takes from the completion of payment initiation to the settlement of the payment. Describe whether the settlement will take place in central bank money or commercial bank money. Detail how the solution will manage settlement risks that may arise from a lag between funds availability to the payee and settlement between providers, or from settlement in commercial bank money.

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to settlement: S.4 (Settlement approach); S.7 (Security controls); S.9 (End-user data protection); F.4 (Fast settlement among depository institutions and regulated non-bank account providers).

All settlement in RAIN takes place in a digital asset, which at the outset could be based on either central bank money or commercial bank money. Our recommendation for RAIN is that the MBA is the Ven, a global digital asset backed by diversified fiat currency and carbon, creating a highly stable in value global asset. Because the Ven is asset backed, its use as the core MBA inside RAIN has many advantages for the Fed, extending Fed policy to digital assets and beyond the borders of the US, while providing a highly stable unit of account that minimizes political objections. As a developer of the system, the core components of the Ven as an MBA in RAIN could be adjusted to the requirements of the Fed according to its priorities.

NAPs authorized to create commercial bank money could also generate RAIN Pools relative to their institutions, and to utilize them for settlement clearance from their own balance sheets and end user accounts.

8. **Reconciliation**

Describe the solution’s mechanisms to create and record information to facilitate post-transaction evaluation, the processes and timeframes for handling unauthorized, fraudulent, erroneous, or otherwise disputed payments, and the allocation of liability among, and substantive liability limits for, all parties involved in the payment. Describe how consumer protections are built into the reconciliation processes. Also describe any security features associated with reconciliation, including protecting sensitive information.

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to reconciliation: U.3 (Predictability); E.7 (Exceptions and investigations process); S.5 (Handling disputed payments); S.6 (Fraud information sharing); S.7 (Security controls); S.9 (End-user data protection).

Reconciliation is based in part on RAIL – where a distributed record of transactions is available for auditing and reconciliation purposes. In an event where a transaction is disputed – due to a requested charge back, or a fraudulent transaction, the payer, payee or NAP could post a Dispute Objection (DO) to the RAIL after the transaction has been posted to their individual ledger. This involves a two step process, by which the two parties are able to resolve the dispute directly, by for instance rejecting the payment of the transaction, pushing the funds back to the payer, and simply forms another transaction on the RAIL, negating the original payment and returning the funds to the sender.
In cases where the dispute is not immediately resolvable, the complaint maker would be able to register the transaction dispute with a federated authority – such as an NAP, for arbitration. In cases where the dispute is with an NAP, the dispute could be passed to an arbitration body related to the RAIL governing authority, which could charge a fee for review of the process transaction and come to a decision about the charge-back or reconciliation.

In cases where the RAIN network is transferring RAIN Pool MBA, the ultimate liability would rest with the sender of the transaction, or by extension their NAP, implying a greater responsibility on the part of the consumer for transactions they have authorized. Since there is often no central repository holding funds (especially MBAs) on behalf of the end user, the end user holding the funds bears ultimate responsibility for the transactions they execute. As a safety and liability protection against such circumstances, the end user may be incentivized to hold MBAs with established NAPs, which could provide insurance or protection services against reconciliation eventualities, providing a new market funding mechanism for NAPs or other institutions in the RAIN network.

At all times, reconciling parties and their adjudicators would have the ability to refer to RAIL to track a ledger and map the transaction to the USI, resulting in lower fraud and reconciliation rates at large.

In instances where reconciliation is required, the payment data related to the transaction could be accessed by a 3rd party with the approval of the requester, and the 3rd party would be able to request a response from the counterparty directly, but not be able to withhold, reverse or otherwise claim funds.

Part A, Section 2: Use Case Description

In this section, the proposer should describe what the solution does at each stage of the end-to-end payments process for each use case that the solution supports (business to business; business to person; person to business and/or person to person, as indicated in the table “Supported use case coverage summary”, above). Proposers should include flow diagrams of the messaging and payment flows and the roles of stakeholders (end users, technology providers, processors, including the proposer(s) for the solution) through the eight stages of the end-to-end payment process of their solution. The description and diagrams should be specific to each supported use case and should highlight all processes and features that are unique to the use case being described. For example, the solution may be designed to enable contextual data capability for business-to-business payments, but not for person-to-person payments. The business-to-business use case description should, therefore, include all the additional processes and features related to enabling contextual data capability.

Legacy: The following diagrams outline the current flow for various payment types in the current system and then outline a comprehensive solution for the future RAIN/RAIL system.
RAIN RAIL
Real-time Asset Interchange Network on a Real-time Asset Interchange Ledger

B2P

Wages, Salaries

Net Tax Payments

Factor Payments

Savings

Net Tax Payments

Government

Wages, Rent, Interests & Profits

Government Purchases of Goods

Financial Markets

Investments

Businesses

Households

Consumption Expenditure on Goods and Services

N2N

Lending Banks

Host Government

Sponsors/Shareholders

Development Finance Institution

Operators

Suppliers

Contractor

Concessionaire/Special purpose entity
RAIN RAIL
Real-time Asset Interchange Network on a Real-time Asset Interchange Ledger

N2N

P2P
P2P: Bank Centric

B2P

Businesses pay salaries through ACH

Government entities receive tax before clearing house, via wiring and fedwire.

Clearing House deposit the salary into the banks of employees. Provide receipt.

People (money is deposited into banks)
There are 10 use cases for RAIN and RAIL outlined as follows:

Direct P2P Payment

Direct B2P Payment

Government Bulk Payment (B2P)

Company Supplier Payment (B2B)

Person to Government Payment (P2B)

Business Service Recurring Automated Payment (P2B)

Trade Finance Payment (B2B)

Intercompany Clearing Payment (B2B)

Retail POS Payment (P2B)

Bot Payment (N2N)

From a diagram point-of-view, these 10 use cases combine into a link/node system that enables all participants to function on a distributed basis, based on the USI, and node to node exchange as part of the network, whether as an individual, entity, bot, government office or NAP. In RAIN and RAIL, it all comes down to a simple payer and payee, with institutions providing potential pass-through points on the transaction:
RAIN RAIL
Real-time Asset Interchange Network on a Real-time Asset Interchange Ledger

P2P RAIN / RAIL

A2A ACH Payment

Fed
D-U-N-S NUMBER to BLOCKCHAIN ID MAPPING FOR USI

A major contributor to the USI system will be Dun & Bradstreet. Since 1963, the D-U-N-S Number has become the global standard for business identification and tracking. Over 250M business locations worldwide have a D-U-N-S Number. Dun & Bradstreet will further expand the value of the D-U-N-S Number by assigning a unique blockchain ID to most D-U-N-S Numbered business entities.

Within private distributed ledgers that are subject to regulation, counterparties must be identified and validated before being allowed to execute any transactions. The Dun & Bradstreet...
Blockchain ID would allow customers to meet these regulatory demands requiring them to resolve the identity of businesses leveraging blockchain infrastructure to execute a transaction. An additional piece of value D&B can provide is the reputation or credit-worthiness data for a select group of business entities. This would help ensure the credit quality of participants in a transaction.

The D&B Blockchain ID can then be mapped back to the D-U-N-S Number, allowing for a seamless crosswalk to other identification systems, such as CUSIP, LEI, or other global systems such as the Siren, VAT, CRO, and over 200 additional registration and identification systems.

By extending our proprietary D-U-N-S Numbering capabilities for 250M entities to include a blockchain ID we intend to create value on two fronts:

- Our customers that participate in approved blockchain networks can rest easy knowing that valid identifiers are being used within closed networks.

- For blockchain providers there will be no need to create duplicative identifiers each and every time a new counterparty is added to their network.

Business identity on the blockchain is the foundation on which all other compliant business transactions will be built. Dun & Bradstreet will service the need to be identified and enhance it with best in class reputation content.
Part A, Section 3: Use Case by Effectiveness Criteria

For each use case that the solution supports (business to business; business to person; person to business and/or person to person, as indicated in the table “Supported use case coverage summary”, above), complete the following table. For each criterion relevant to the lifecycle stage, enter a “Y” if the use case addresses the Effectiveness Criteria (at least to a “somewhat effective level”) or an “N” if it does not (blanks will be assumed as “N”). For example, the solution may be designed to enable contextual data capability for business-to-business payments (U.4, Contextual data capability criterion), but not for person-to-person payments. Proposers should enter a “Y” for any functionality that will be in place at the date of implementation or for which there is a credible plan to implement the enhancement at a future date (as described in Part B, sub-section 1 “Implementation Timeline”).

For solutions where lifecycle stages occur simultaneously, the proposer should enter a “Y” or an “N” based on the criterion listed (rather than focusing on the categorization by lifecycle stage). The table is intended to be a summary of the description in Part A, Section 2.

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## Use case by effectiveness criteria

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PART B: BUSINESS CONSIDERATIONS

In this part, the proposer should describe important business considerations to demonstrate the feasibility for the solution. Proposers may detail their qualifications or past experience in implementing faster payments in the sub-sections below if they view it will support the description.

1. **Implementation Timeline**

   Specify the projected timeline and explain the credible plan for developing, testing and achieving initial implementation of the solution, including all key milestones and project phases to reach ubiquity (as defined in the glossary). The level of detail in the credible plan and timeline will assist in demonstrating the feasibility of the solution. The description should clearly indicate the use cases, functionality (e.g., cross-border, domestic, contextual data capability, etc.), whether the solution will be newly built and/or interface/interoperate with existing solutions, and features that will be ready at initial implementation and those that will be added in subsequent phases. The description should also indicate key dependencies (e.g., stakeholders or other external factors) and possible risks to the projected timeline.

   In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to implementation timeline: U.1 (Accessibility); U.2 (Usability); U.3 (Predictability); E.3 (Implementation timeline); E.5 (Comprehensiveness).

RAIN and RAIL use a network approach to transform payments into a Platform structure, which can enable a robust ecosystem of application development around a common core. As an open platform, the network itself encourages both participation and cooperation among industry participants, and creates incentives for legacy technologies to connect to the platform at a market-led pace. Some of the core technology for RAIN and RAIL already exists. The core network was built and deployed to the market in 2007 as part of a digital asset transfer system created by one of the proposers.

The existing P2P system has processed over half a billion transactions that settle using asynchronous, direct connections between participants in a patent pending call/confirm/settle process without a single network fault, resulting in perfect-to-date predictability. In 2015, the system was expanded to include B2B and N2N (bot) functionalities, enabling up to 6 transaction pair types between personas, entities and bots (P2P, P2B, P2N, B2B, B2N, N2N). This improved accessibility and usability, allowing anyone to join the network and to process a transaction to any other user with a basic identity metric.

The proposers estimate that an expanded prototype for the basic RAIN and RAIL system can be built in less than 12 months, and would at outset enable any participant to join the system on an individual basis, as well as be able to route payments to any domestic or international bank account, credit card, email address, phone number, or NAP pool address in real time. Settlement into the RAIN pool for any such destination would be effectively instant, and final settlement into accounts managed by NAPs would be dependent on the NAPs integration speed.
Comprehensiveness for the project would be initially small, as the proposers envision opt-in transactions across the network. Growth would be rapid, because any payment made over the system does not require the initial participation of the Payee or in instances of a payment request, the Payer. In such instances where no direct link exists between the two payment nodes, one party or the other could establish the connection and an ISU simply by inputting the “old data” – a bank account, phone number etc. – at which point an ISU would be assigned and act as a reference point for future transactions from anyone else in the system wishing to pay that end point.

This would allow for extremely rapid proliferation of ISUs across payment landscapes, and create incentives for application providers to use open APIs from RAIN or RAIL to assign ISUs to their network account architecture. This could be done extremely easily and with relatively small data strings. The proposer estimates that unique combinations of between 8-9 digits would generate upwards of 140 trillion unique USIs – and could be expanded to 200 trillion unique USIs by adding a 10th digit. The system could also create category specific USIs to similar numbers by deploying 48 digit ID strings that contain tokenized information related to KYC and identity clearance as part of the solution. This would produce a global payment identity network with up to 400 trillion unique endpoints that is fully comprehensive for current and near future payment horizons.

2. **Value Proposition and Competition**

For each use case supported by the solution, describe the value proposition to each stakeholder in the solution (end users, technology providers, processors, the proposer(s) of the solution) through each of the eight stages of the payment lifecycle (as discussed in Part A). Consider why stakeholders will adopt the solution. **NOTE**: If the value proposition discussion includes fees in the system, describe the nature of what type of fees might be charged to and received by different stakeholders such as whether they are one-time, recurring, per item, ad valorem, any floors/caps, per item + ad valorem and provide any related system constraints. Do not provide any proprietary cost or pricing information.

Describe how the solution will enable access to new entrants (competition) into the broader ecosystem of the proposed solution (e.g., to provide base-level features or value-added services).

In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to pricing model and competition: U.3 (Predictability); E.1 (Enables competition); E.2 (Capability to enable value-added services).

There are numerous value propositions available to market participants in the RAIN and RAIL system. A fundamental value of the proposers rests on the idea that individuals in the network should both own and be able to manage their identity in a digital world. With distributed, devolved individual ownership, ownership of the USI assigned to each node in the network rests at the ends of the network, not the center. In this scenario, market participants could choose how their USI is accessed or used, and could accumulate value or micro-payments in the MBA relative to particular payment use cases. This would enable all types of innovation in terms of businesses creating incentives around retail payments, NAPs creating consumer incentives for the privilege of managing pool accounts, and more. For
NAPs, the ability to charge transaction or processing fees for access to their base networks become available, and the incentive to provide additional management services for consumers becomes very strong. Since the network is open to anyone, the ability to provide credit services, insurance, and other financial services becomes possible, while at the same time drastically lowering the transaction cost, time, and infrastructure expenditure for payments across the network.

With regard to RAIL, the functional posting of receipts across replicated datasets create huge data mining opportunities, allowing “the cloud and the crowd” to determine better real-time analytics for nearly infinite data combinations – creating enormous incentives for companies to parse, interpret and functionlize the raw data flowing from the system. This value-added stream of open data would remain anonymized but provide hugely valuable insights into aggregate economic performance, reaction to events and more in a much faster and more complete way than is currently available via sampling or the snapshots available from closed networks that paint only a small part of the economic picture.

Together, RAIN and RAIL lower transaction costs for existing players, enable their legacy systems to charge for access for settlement into their systems on a market oriented basis and also enable everyone to participate in transactions if they choose not to use the legacy networks for whatever reason (i.e. faster speed, lower cost). At the same time, enormous new opportunities are created for both legacy players and new entrants to offer products and services tied to both transaction participation and the data flows created by said participation.

3. **Integration Effort**

   For each use case supported by the solution, describe the points of integration required for each stakeholder in the solution (end users, technology providers, processors, the proposer(s) of the solution) for each of the eight stages of the payment lifecycle (as discussed in Part A). Proposers should include flow diagrams of the points of integration and the business relationships between the various stakeholders. For each stakeholder, identify the effort required on a relative order of magnitude basis (e.g., either temporally – days, weeks or years – and/or as compared to other common integration experiences in the payments industry such as, connecting to a new EFT service or supporting a new ACH file type). Discuss any explicit on-going efforts to maintain integration to the system.

   Integration points must consider the payer’s depository institution or non-bank account provider (for origination and receipt on behalf of end users), third-party service providers, merchants (e.g., PoS and eCommerce), billers, consumers, businesses, etc.

   In completing this description, proposers should focus on the following Effectiveness Criteria as they relate to payment volume assumptions: U.1 (Accessibility); U.3 (Predictability); E.1 (Enables competition); E.2 (Capability to enable value-added services); E.6 (Scalability and adaptability).

   Integration is very simple for end users, and offers three distinct opportunities for technology providers, processors and the solution providers, who are for the purposes of RAIN and RAIL described as NAPs. The even playing field for the NAPs is based on the ability for them to layer services into the process and to participate in a race to build data technologies
that expand the meta-layer of USIs to existing accounts. Since RAIN eliminates or simplifies many aspects of the existing payment architecture, a major opportunity lies in building integration points between legacy systems and accounts. For end users, the ability to access RAIN could come from a direct connection, or by accessing their existing financial service providers as normal, and to instigate a payment as normal. The NAP could then access RAIN to settle directly to an account or to pay an NAP who would settle to the account.

The proposers expect it would take years to cover all aspects of the financial system with the meta-layer of USI identities, but that integration would be fairly simple once the initial system is live and operational. The aim would be to enable exponential coverage – by a system that identifies new category types of account, then assigns a USI structure to each category type, to provide a template for nodal layering of USIs to individual nodes within each network. In this way, USIs are a form of language across account types, and provide a common understanding that makes sense throughout the system.

Once any account or node in legacy networks is identified with the USI, it becomes active in the RAIN network and therefore compatible with RAIL and RAIN. This is great for end users and individual institutions because it does not require industry consensus to begin to work – legacy users would be able to adopt access or build on-ramps at their leisure, while the network itself does much of the hard work of building connective tissue between the systems.

As previously described, the system would therefore be theoretically functional on day one to any account and account type, whether held by an end user or an NAP, and the operational functionality would grow rapidly with each transaction and participant that links to the network – whether biller, payee, merchant, NAP, bot, etc. The system does not require any legacy systems to operate, but is of course operationally and practically enhanced by each integration between legacy systems and RAIN through the expansion of the USI meta-layer, or asset transfer capability between accounts and the RAIN pools.

In an effort to enhance adoption and integration speeds, RAIN would function as a member of the existing correspondent banking system, with a seat at the table for transactions originating from legacy payment networks and correspondent banks.
PART C: SELF-ASSESSMENT AGAINST EFFECTIVENESS CRITERIA

This section should be used by proposers to assess how the solution meets each of the criteria outlined in the Effectiveness Criteria (considering all use cases supported by the solution). Proposers should include in their self-assessment any functionality that will be in place at the date of implementation or for which there is a credible plan to implement the enhancement at a future date (as described in Part B, sub-section 1 “Implementation Timeline”). For example, the Effectiveness Criteria specifically acknowledges that proposers may not have cross-border functionality at implementation but may have a credible plan to implement it at a later date.

Proposers should use the tables below to indicate their self-assessed rating on the Effectiveness Scale outlined for each criterion, as well as a detailed discussion of why the rating is justified and how the solution meets each criterion (e.g., U.1, U.2, etc.), including each consideration (e.g., U.1.1, U.1.2, etc.). Proposers may use the far-right column (“Proposal Page Number”) in the tables to cross-reference the section/page number for the relevant description provided in Part A or Part B, above.

Proposers should note that a number of the criteria have been written in a way that provides flexibility for a range of different approaches to address the criteria or for the solution to determine how certain terms and parameters are defined. Proposers should ensure their justification of how the solution meets each criterion includes a clear explanation of the approach taken in the solution, and how solution-determined terms and parameters are defined. For example, S.2.3 (Payer authorization criterion) requires the solution to enable the payer to revoke any pre-authorization of payments easily and timely. The proposer’s justification for S.2 should include how the revocation is “easy” for the payer and the time it takes (i.e., number of minutes, hours, or days) for the revocation to take effect. Similarly, E.6.2 (Scalability and adaptability criterion) requires the solution to demonstrate the capacity to handle projected volumes and values (determined by the solution), including heightened transaction volumes and values during peak times or periods of stress. The proposer’s justification for E.6 should include its assumptions for determining the heightened volumes and values and how they relate to normal periods (e.g., heightened volumes are equal to twice the projected volumes during normal periods).

NOTE:  VE = Very Effective  
E = Effective  
SE = Somewhat Effective  
NE = Not Effective

Proposers should refer to the Effectiveness Criteria for an explanation of what Very Effective, Effective, Somewhat Effective and Not Effective mean for each criterion.

1. **Ubiquity**

   Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: accessibility, usability, predictability, contextual data capability, cross-border functionality, and applicability to multiple use cases.
## Self-assessed rating:

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria Name</strong></td>
<td><strong>#</strong> Consideration Name</td>
<td><strong>VE</strong></td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.1 Accessibility</td>
<td>X</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.2 Usability</td>
<td>X</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.3 Predictability</td>
<td>X</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.4 Contextual data capability</td>
<td></td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.5 Cross-border functionality</td>
<td>X</td>
</tr>
<tr>
<td>Ubiquity</td>
<td>U.6 Applicability to multiple use cases</td>
<td>X</td>
</tr>
</tbody>
</table>

### Justification for U.1:

Anyone can access RAIN and RAIL – as an open network and an open receipt ledger, the transparency of the system provides vast opportunities for participation. Due to the structure of RAIN, NAPs are likely to provide the bulk of the transactions in the system, but that does not stop individual participants, entities and even bots from building and initiating payments via the USI system. The flexibility of the network allows these layers to co-exist without conflict, and enable opt-in participation at the varying levels of comfort held by everyone in the payment ecosystem.

### Justification for U.2:

RAIN and RAIL transform the Fed into potential curator of a platform that is open to many new players who can provide unique new usability experiences geared toward a wide variety of consumer and business needs. At the same time, the system is relatively simple – allowing easy access and functionality for participants so that safe, effective and reliable transactions can be enabled, working through or in conjunction with the legacy payment systems.

### Justification for U.3:

Once a USI is connected to an account type, the system should enjoy perfect predictability.

### Justification for U.4:

Contextual data capability for a digital network like RAIN can be expanded from current use-cases by embedding harmonized data types tokenized into the USI that avoids replication of core identity data, enabling user privacy, and at the same time providing unstructured space for unique data transmission relative to individual use cases with the transaction itself. Limitations on unstructured data are open to consideration, and could in fact be customized by service providers relative to various payment scenarios or types.

### Justification for U.5:
RAIN and RAIL are both geography agnostic, and can connect to any type of account, anywhere in the world. Extending RAIN pool transfers to localized accounts would require integration, but is not required for the end users – they simply need to claim their USI to begin accessing RAIN transactions relative to their associated account.

**Justification for U.6:**
Current versions of RAIN in the market could feasibly enable about 50 different account data types to be linked to the system. By the time it launches, the proposers expect 200+ account types could be enabled, enabling widely divergent use cases for the payment network, and creating economic value around such transactions as a result.

2. **Efficiency**
Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: enables competition, capability to enable value-added services, implementation timeline, payment format standards, comprehensiveness, scalability and adaptability, and exceptions and investigations process.

### Self-assessed rating:

<table>
<thead>
<tr>
<th>Criteria Name</th>
<th>Consideration Name</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency E.1</td>
<td>Enables competition</td>
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<td></td>
</tr>
<tr>
<td>Efficiency E.2</td>
<td>Capability to enable value-added services</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Efficiency E.3</td>
<td>Implementation timeline</td>
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<tr>
<td>Efficiency E.4</td>
<td>Payment format standards</td>
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</tr>
<tr>
<td>Efficiency E.5</td>
<td>Comprehensiveness</td>
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<td></td>
</tr>
<tr>
<td>Efficiency E.6</td>
<td>Scalability and adaptability</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Efficiency E.7</td>
<td>Exceptions and investigations process</td>
<td>X</td>
<td></td>
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</tbody>
</table>

**Justification for E.1:**
Since RAIN enables a platform approach with open access, competition can be greatly expanded for NAPs, technology companies and others who want to build for the system.

**Justification for E.2:**
The data associated to RAIL enables enormous new opportunities for value-added services to NAPs and end users in the RAIN system. Additionally, the lower costs associated with transaction clearance, and the ability to seek charges for transfer of asset types between each other (MBA to fiat, fiat to fiat, etc) offer great ways for market participants to provide as-yet-unimagined value creation services to the market.

**Justification for E.3:**
Aspects of RAIN are already in operation, and the creation of a replicant system with standardized rules for access, participation and further development are achievable. The first aspects of the RAIN system could be available in a matter of months, with basic implementation of the USI available in less than 12 months.

**Justification for E.4:**
The USI system can connect to many different payment types, allowing them to work together and across systems in a new way. Existing payment types could be identified, with transfer technologies to enable both ledger recording on RAIL and asset transfer via RAIN.

**Justification for E.5:**
Initially, the network and ledger are not comprehensive, but they contain the capability to become comprehensive as they grow. Each integration point between legacy systems will improve comprehensiveness, without compromising the ability for the core network to operate from the beginning. Over time, as more and more payment types are assigned a USI and introduced to the network, the comprehensive nature of the system will become evident.

**Justification for E.6:**
The RAIN/RAIL/USI system is highly scalable and adaptable. Current plans for the network would enable up to 240 trillion individual identities and value accounts, but the number could be increased if needed by growing the alphanumeric strings assigned to accounts.

**Justification for E.7:**
Exceptions and investigations would be handled via the RAIL, with a real-time accounting capability to trace transactions between market participants. The need for privacy between two partners could be preserved, with only disputed transactions requiring a view from a 3rd party (such as a regulator or law enforcement). For standard dispute resolution, the callback function would require the approval of the account holder or the NAP. In situations where agreement on the call back is not reached, it could be elevated or passed on to mediators in the network whose job it is to provide dispute resolution. Again this becomes a business model and potential revenue stream for NAPs or other startups in the ecosystem.

3. **Safety and Security**
   Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: risk management, payer authorization, payment finality, settlement approach, handling disputed payments, fraud information sharing, security controls, resiliency, end-user data protection, end-user/provider authentication, and participation requirements.

**Self-assessed rating:**

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<th>E</th>
<th>SE</th>
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<td>Settlement approach</td>
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<td>Participation requirements</td>
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</tbody>
</table>

**Justification for S.1:**
RAIN and RAIL distribute risk across the spectrum of participants and enable market participants and NAPs to build and deploy technologies for security, fraud prevention, identity scaling and more by their open nature. This creates a market oriented environment with competitiveness around risk reduction, accelerating the time for risk reduction improvements to the system at large. Since the USI system is both universal and synchronized, its simplicity reduces risk points relative to exploitation or probing for weak points between system components. The RAIL further reduces risk by indelibly connecting the USI with legacy account types in a way that can not be changed by others.

**Justification for S.2:**
Depending on the access point, various access security and authorization components can be added by NAPs or open market providers to enhance security around payer authorizations. While the core system would employ standard digital security techniques (ranging from biometric to SSL or other sign-on techniques like passwords) the RAIL data stream that builds around each RAIN transaction would over time create probability clouds that could
spot erroneous behaviour as it occurs, and intelligently deploy resources to confirm payer authorization at the point of the transaction.

**Justification for S.3:**
Payments made via RAIN settle in real time and are posted to the RAIL. This is fantastic for payment finality, because to reverse or recall a transaction, a request must be approved by the payee or their NAP if acting on behalf of the payee. This could include a payee approval layer for certain types of transactions, with the network effectively holding escrow between a sender’s request and a receiver’s confirmation.

**Justification for S.4:**
Settlement across RAIN is in real time, so occurs under the same circumstances as payment finality.

**Justification for S.5:**
Disputed payments in the system can be referred to 3rd party dispute resolution parties, who can reference the transaction itself via the RAIL (when provided access/opportunity by the aggrieved parties) or by regulator 3rd parties who may wish to review a transaction. In order to protect payment finality and settlement features, one party or the other can not reverse a transaction once it has been approved and sent, but some payment types could be designed to include a 3rd party, escrow, legal, NAP or other approval before they are settled.

**Justification for S.6:**
Fraud becomes very difficult in the RAIN/RAIL system because transactions and accounts become more intelligent over time. With the RAIL in place, data flows and transaction flows can be used to create probabilities around transactions, so that a new or unusual transaction between two parties could require extra approvals or verification.

**Justification for S.7:**
Security controls for the RAIN system can be enhanced by market participants by enabling them to build security access and control solutions that plug into RAIN – for instance by an NAP on behalf of consumers, as a general open-source application update to the network or by the facilitators of the RAIN/RAIL (such as the Federal Reserve itself). The RAIL at all times provides a data ledger reference for transactions, which acts as a go-to source for managing security around individual accounts, USIs and transactions. The security interface for RAIN and RAIL is based on a layer of transparency that makes it difficult to spoof an account, because the crowd is always able and available to monitor for anomalies.

**Justification for S.8:**
Resiliency in the network can come from a distributed approach to the RAIL, so that no single attack on the system can result in compromising the system at large. USIs and network identities can be backed up and held offline with regular system snapshots, and can be self-healing – using the RAIL data to identify potential issues and alert relevant authorities. Constant monitoring and trend analysis resulting from the large web of RAIL submissions will also provide greater real-time information about payments at large, providing the first unified view of transactions and their relational data at large.

**Justification for S.9:**
End user data protection is built into RAIN and RAIL through the cryptographic tumblers that exist between the network and the ledger. The anonymized data posted to RAIL can therefore only be viewed in context of the transaction participants with regard to their private ledger summaries, available only to themselves. In addition, the request of a 3rd party, such as a regulator or law enforcement, could be digitally enabled, so that both sides know if information is being accessed or requested, and potentially only with the approval of the end-users associated to the transactions.

USI’s could also include tokenized data references that represent underlying data (such as name, location, account affiliations) but in these instances, the legal ownership of the USI rests with the owner of any particular underlying account linked to the USI. As such, the reference to the USI itself could suffice for many transaction types, without risking the underlying data typically transferred between parties for legacy transactions.

**Justification for S.10:**
End-user and provider authentication is greatly simplified in the RAIN/RAIL system due to the existence of the USI. The ability to pool USI’s as multiple personas attached to a particular person, entity or bot across various value holding fields – bank account, phone number, email – means that access to the system becomes easier for the individual end user. Since the big data flows around any particular end-user are more intelligent because of their link to RAIL, additional security preferences could be added as needed by market participants.

**Justification for S.11:**
Participation requirements for the system start with the creation of USIs relative to any aspect of a person’s identity, and become stronger as more USIs are associated to the network and ledger.

4. **Speed (Fast)**
Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: fast approval, fast clearing, fast availability of good funds to payee, fast settlement among depository institutions and regulated non-bank account providers, and prompt visibility of payment status.

**Self-assessed rating:**

<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Criteria Name</strong></td>
<td><strong>#</strong></td>
<td><strong>Consideration Name</strong></td>
</tr>
<tr>
<td>Speed (Fast)</td>
<td>F.1</td>
<td>Fast approval</td>
</tr>
<tr>
<td>Speed (Fast)</td>
<td>F.2</td>
<td>Fast clearing</td>
</tr>
<tr>
<td>Speed (Fast)</td>
<td>F.3</td>
<td>Fast availability of good funds to payee</td>
</tr>
</tbody>
</table>
**Justification for F.1:**
RAIN Transactions occur in real time with instant fund check, approval, transfer and settlement. For instances where the associated USI dictates funds flow out of the RAIN pool and into legacy accounts, parameters may indicate slower settlement times depending on the institution and account type. In all cases, funds transfer could be instantly approved when trading in the RAIN network only.

**Justification for F.2:**
Within RAIN, clearance and settlement occur at the same point as the approval.

**Justification for F.3:**
Within RAIN, funds are instantly available to the Payee upon approval from the Payer of the transaction.

**Justification for F.4:**
Settlement among depository institutions and regulated non-bank account providers (NAPs) would be instant within the context of RAIN. For funds to move out of the RAIN pools into NAPs legacy accounts, it would be up to the individual NAPs to improve or enhance settlement times by matching the USI settlement existing inside their individual RAIN pools to the individual end-user accounts, with a real-time, hourly, or daily sweep and conversion of funds from RAIN pools to individual accounts.

**Justification for F.5:**
In all cases within RAIN accounts, instant funds visibility and availability are available on both the payer and the payee side.

5. **Legal Framework**
Provide a self-assessed rating in the table below and then justify how the solution meets criteria for: legal framework, payment system rules, consumer protections, data privacy, and intellectual property.

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<table>
<thead>
<tr>
<th>Effectiveness Criteria</th>
<th>Effectiveness Criteria Self-Assessment (Check One)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria Name</td>
<td># Consideration Name</td>
<td>VE E SE NE Proposal Page</td>
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```
### Legal Framework

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>L.1</td>
<td>Legal framework</td>
</tr>
<tr>
<td>L.2</td>
<td>Payment system rules</td>
</tr>
<tr>
<td>L.3</td>
<td>Consumer protections</td>
</tr>
<tr>
<td>L.4</td>
<td>Data privacy</td>
</tr>
<tr>
<td>L.5</td>
<td>Intellectual property</td>
</tr>
</tbody>
</table>

**Note:** This proposal addresses the legal criteria in a generic way to allow for a vendor neutral environment—a tenet of ECCHO rules and the concept behind this proposal. Additionally, the ECCHO methodology is based on rules development in a collegial environment. The proposers believe it is premature to write rules without involving key stakeholders. That method of design results in selling of a Faster Payments system/product rather than the collaborative creation of an industry-wide solution.

ECCHO will identify and analyze the relevant laws and regulations that will form the basis of the legal framework for Faster Payments. During that analysis, any weaknesses will be identified, along with plans to address those gaps. In addition to ECCHO’s staff expertise in rules and regulations, we utilize counsel from a premier payment systems legal firm and seek guidance from the Legal Subcommittee comprised of the best payments attorneys in the nation.

Faster Payments rules will be drafted in a collegial setting according to the ECCHO Rules methodology, to incorporate existing law and develop rules to bridge any gaps present in the existing legal environment. Stakeholders will have input into the decision-making process and a voice with the decision-making body/the Board.

It is important to clarify that service provider system rules and legal rules are different. The primary purpose of the legal rules for Faster Payments is to define roles, allocate responsibilities and liabilities, and provide for exception resolution, etc. for all of the parties to the payments transaction. The primary purpose of the service provider system rules is to define how the process works and who will do what and when. Legal rules are specific to each payment system (e.g., Faster Payments, check, ACH, wire) and are layered on top of existing laws, regulation, compliance, and case law to ensure full legal coverage for any payment situation.

**Justification for L.1: Legal Framework**

The legal frameworks for RAIN and RAIL participation are to be partially based on a common set of algorithmic rules and standards, providing a comprehensive legal framework for market participation that resemble a set of terms and conditions. These terms and
conditions would be set forth by community involvement and standardized algorithmic logs, managed in conjunction with ECCHO for big picture rule-making. These rules would be posted and available via RAIL for approved access, and to be linked to as a common rule set for all participants.

Systematic transmission of algorithmic rules and standards from their authoritative source repositories could be optimized once the Xalgorithms Federated Registry and Lichen component become generally available (Appendix). Other authoritative repositories could include bank-led rules or standards from the R3CEV consortium, or smart contracts via Ethereum distributed rule sets.

In this first step, ECCHO, in conjunction with its legal counsel and the Legal Subcommittee, will identify all relevant legal sources in order to understand and set the basis for the Faster Payments Rules. The following items will be researched and identified:

- Applicable existing law and compliance (e.g., Reg Z, Reg E, Reg GG, OFAC, AML, BSA, various federal and state laws, and potentially case law)
- Any unique conditions in which the same functions are subject to different laws depending upon who performs the functions—whether financial institutions, consumers, processors, corporates, etc.
- Gaps in laws that will need to be filled—this is where the Faster Payments rules come into play—to meet these gaps or to clarify liabilities
- All players, their roles and responsibilities—how the entities and payments will be legally bound
- Flow of faster payments from payer to payee that describes the various components of the legal framework and where/how each part of the process is governed by agreements, rules, law, compliance, warranties, indemnifications, etc.
- Specifically analyze the protections and liabilities of the consumer, since consumers will potentially have a broader role in the Faster Payments system

Additional Legal Framework Criterion

- Global agreements template - because Faster Payments is intended to be a global system, work must be done to create a template for correspondent agreements. No single set of rules can bind outside the borders of the United States. Different agreements will be necessary within each country or payments area.

Justification for L.2: Payment System Rules

Payment system rules would follow the guidelines outlined in L.1., with ECCHO, DATA and crowd sourced standards providing the basis for this system, within reason. A standard set of transfer and settlement rules are built directly into RAIN And RAIL itself, providing a limitation to the scope of how transactions are labelled, executed and recorded.

After understanding the existing legal framework and identifying gaps and ambiguities, the rules for Faster Payments can be developed. These rules will identify the legal rights and responsibilities of all end users, providers, payers, and payees. Faster Payments rules will define and address how the system will work legally, and how to manage exceptions. Each
of the following rules components will be specifically detailed and documented during this phase:

- Defining terms
- Authentication of entities, payments, messages to ensure security of the system
- Legal responsibilities, warranties and indemnifications
- Payment initiation/authorization, as well as termination of authorization
- Timing for sending/receipt of payment
- Payment settlement and finality
- Records for proof of payment
- Cancellation of a payment, delayed/failed payments
- Error resolution for disputed payments
- Exceptions processes
- It is also important to develop the legal framework in such a way as to provide financial institutions/payments processors with the ability to make certain decisions for themselves, particularly as it relates to how they conduct business with their customers.

ECCHO is uniquely qualified to facilitate the development of Faster Payments rules because it recently developed the rules for another new payment system (image exchange) from the ground up. The check image exchange system is arguably the most complex payment system legally and operationally. Our experience includes evaluating the best strategy for electronification, creative design that enabled swift industry-wide transition, lobbying and testifying before Congress to change the law, and involving widely disparate stakeholders.

**Additional Legal Rules Criterion**

- Rules commentary – in addition to creating the rules for Faster Payments, ECCHO will create commentary for the rules to put the legal language into layman’s terms that can be understood by everyone.

**Justification for L.3: Consumer Protections**

RAIN and RAIL offer flexibility for consumer protections depending on local needs and preferences. While the basic aspects of the system are standardized and global, much as market participants are able to introduce components and aspects to RAIN to enable ubiquitous use, consumer protections such as refunds, insurance, and more can be introduced as part of the system to address consumer needs on a market oriented basis.

In cases where government or regulators wish to deploy specific rule sets or protections, especially related to NAPs, these protections can be deployed as a smart contract layer between the transaction approval process in the system, enabling flexible, efficient and comprehensive responses by relevant actors.

A legal framework will include consumer protections—natural persons who make Faster Payments transactions for personal, family or household purposes. The consumer protection structure will comprise:

- Legal and financial responsibilities of all parties for claims of unauthorized, fraudulent or erroneous consumer payments
- Rules and procedures for addressing error resolution of consumer claims
- Flexibility to increase consumer protections beyond what is required by law
Faster Payments legal framework for consumer protections has the opportunity to go beyond any other non-cash payment system because consumer representatives will be involved at a different level than ever before.

**Justification for L.4: Data Privacy**
Data privacy is managed around cryptographic security for transactions in the network and on the ledger, with tumblers between data sets that exist at the individual transaction level, the associated NAP, and the RAIL. These cryptographic tumblers ensure data privacy while enabling the transaction participants the ability to monitor and manage their accounts, transactions and relationships securely and in easy to use formats.

Creating an approach and legal framework for data privacy including applicable law, how payment and related information can be collected and disclosed, or protected and not disclosed including:

- Define nature and type of end-user data required for security, legal compliance and authentication purposes
- Approach to data privacy and confidentiality of payment and related data including limitations on end users’ and providers’ collection of data and use/disclosure of payment data to third parties
- Approach and responsibilities of all participants in the case of a data breach—potential allocation of financial and other responsibilities, notifications, etc.
- Operational policies and procedures to secure data within the payment system and at end-user/provider locations
- How end-users can see the data being collected on them and manage their privacy preferences

**Justification for L.5: Intellectual Property**
While the basis of RAIN and RAIL are envisioned as open platform initiatives, some intellectual property around the MBA, the concepts at large and their association to the Federal Reserve would be maintained. Similarly, it is envisioned that applications, API’s integrations and other build-on parts of the system introduced by market participants would remain the intellectual property of those providers. Interestingly, the deployment of USIs and the resultant data streams around transactions are envisioned to be owned by the end user themselves, with enormous market opportunities created around the ability of end users to control, monetize or otherwise use their transaction histories for their own advantage. For instance, a user could choose to contribute their data histories on the RAIL, in identifiable or anonymized formats, and earn value associated to the information provided by that data – enabling personalized micro-payments around use or views of their personal ledgers.

Approach for the Faster Payments system to resolve and manage legal, operational or financial risks associated with intellectual property rights (including rights related to patents, trademarks, etc.) Actions to accomplish these legal criteria include:

- Conduct due diligence review of applicable intellectual property rights
- Approach for managing property rights as necessary from due diligence findings

ECCHO has direct experience with intellectual property rights based on the pervasive image technology lawsuit. ECCHO and its members assisted the industry by providing prior art
and expert witness testimony. ECCHO was present at some of the trials and is equipped to do the research to prevent this situation from occurring again.

6. Governance

Provide a self-assessed rating in the table below and then describe how the solution meets criteria for: effective governance and inclusive governance.

<table>
<thead>
<tr>
<th>Criteria Name</th>
<th>#</th>
<th>Consideration Name</th>
<th>Effectiveness Criteria Self-Assessment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>VE</td>
<td>E</td>
</tr>
<tr>
<td>Governance</td>
<td>G.1</td>
<td>Effective governance</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Governance</td>
<td>G.2</td>
<td>Inclusive governance</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

**Effective and Inclusive Governance**

The Solution’s governance structure will be determined by the bylaws of the Solution’s rules organization. The bylaws of the organization will be developed by interested RAIN stakeholders in the creation of a new legal entity associated with the rules organization and would include considerations for proportional representation in the decision making process. It is anticipated that the Solution’s governance structure would include a Board of Directors comprised of representatives from a wide range of stakeholders. Board size would be anticipated to be sufficiently small to enable effective decision-making. The Board will set policy, objectives and approve the rules and will act in the interests of all stakeholders and pursue long-term objectives.

Board decisions will be based on input received from other substructures/advisory groups such as ad hoc or standing subcommittees. The responsibilities of the substructures would be assigned by the Board of Directors. The substructures would be composed of all interested parties as approved by the Board of Directors.

As issues/considerations become apparent that need solutions, those issues/considerations will be presented to the various substructures/advisory groups that will thoroughly review, vet and develop appropriate initial conclusions. Those conclusions/results will be presented to and further vetted by an operations committee. The size of the operations committee would be sufficiently large to allow participation of representatives from all stakeholder segments. The operations committee would work to achieve consensus recommendations to the Board of Directors. The chair of the operations committee would attend the Board of Directors meetings and present the recommendations of the operations committee to the Board. This process and participation level would ensure transparency of process. No rules or portions of rules will be created behind closed doors.
The appeals process would be determined by and included in the Solution’s organizational bylaws. It is anticipated that the appeals process would begin with a request to the Solution’s governing organization. The Solution’s governing organization would refer the appeal to the appropriate substructure/advisory group for through vetting and consensus building followed by further vetting and consensus building through the operations committee followed by recommendations, as appropriate, to the Board of Directors.

The bylaws of the Solution’s rules organization would include provisions for managing conflicts of interest, both actual and perceived.

**Justification for G.1:**
Effective governance in the RAIN And RAIL model is holonic – which means that governance is provided on as needed basis for the networks within networks. The open nature of the platform, would enable governance flexibility according to the published rule sets either agreed to by the community or established at the outset of the network. Governance will also be able to evolve to new threats and opportunities, allowing the system to remain resilient and flexible as it grows and adapts.

**Justification for G.2:**
The open nature of competition afforded by RAIN and the ability for companies and market participants to contribute to it means that a vast set of community guided, company provided, or regulator mandated solutions can be applied evenly and as a holistic approach. The market will find governance solutions that work. The systems approach creates an ability for developers, consumer watchdogs, or other interested parties to share and integrate those governance characteristics to be considered by the network at large on their own merit, and prevents blanket solutions from being applied without the community’s approval.
RAIN RAIL
Real-time Asset Interchange Network on a Real-time Asset Interchange Ledger

Faster Payments QIAT

PRELIMINARY ASSESSMENT

Proposer: Hub Culture, Synechron, ECCHO, Xalgorithms

SOLUTION OVERVIEW

The RAIN and RAIL system preliminary assessment includes questions according to the effectiveness criteria and covered the Solution proposal in a comprehensive manner. From the analysis, four key themes emerged that would benefit from more specific detail: settlement and movement of funds between legacy accounts and RAIN, information about NAPs and their roles and responsibilities, the general commercial viability of distributed ledger technology (DLT) related to the RAIL, and development and scaling timelines.

1. Settlement and movement of funds (RAIN)

The capacity for large cost reductions and big improvements in speed and settlement for RAIN members relies on the use of a digital asset as the core traded component of the system. This allows for near instant movement, resolution, clearance and settlement of funds. The MBA could be weighted to 100% value of the USD or another fiat currency, or function like the Ven (https://ven vc) as a weighted basket collection of assets. However the base is ultimately structured, the MBA operates exclusively on RAIN, and conversions out of the MBA are required only for settlement into legacy accounts.

This conversion requirement presents an opportunity for NAPs, who become gateways between the MBA pools and the legacy system of commercial currency. End users would be able to transact out of MBA by exchanging it for localized assets with their NAPs, but in all cases, it is expected that the ease, cost-savings and convenience of simply transacting in the Vast Closed Loop of the MBA will be attractive to both end-users and NAPs, reducing the need to convert out of the MBA.

Since the MBA circulation float in the system is 100% backed by its relevant underlying assets held by Federated Authority NAPs or in some cases, NAPs providing exchange or conversion services, the primary responsibility for conversion between legacy assets and the MBA rests with these types of organizations.

So to be clear, MBA funds on RAIN don’t leave RAIN. USIs on the system will allow various end-nodes to hold MBA associated to the account – acting as access points or reference identifiers to the greater USI – and enabling the transactor to send and settle to a piece of data that is fundamentally just a component of the USI of an individual, entity or bot.

MBA funds (which could be branded as ‘digital dollars’) on RAIN can be converted to legacy assets and settled to a primary end user node of varying types, which will almost always be held by an NAP, and the NAP will be able to charge for this service, or provide it as a part of their core value proposition.

It’s likely that NAPs will convert transactions in the pool until certain time points, then sweep out to localized assets. Such sweeps could be done at any time, but usually as end of day or multi day processes.
2. NAP Roles and Responsibilities

NAPs provide many valuable functions for consumers and end users in the Solution, but their presence is not required for the system to operate at the MBA level of transaction viability for end users. They are however essential to the conversion services between account holders from MBA to localized assets. This is one reason the RAIN/RAIL governance organization (a proposed non-profit) would expect to be a part of the correspondent banking system, to provide liquidity services on behalf of system members who for whatever reason may not be served by NAPs. The primary role of RAIN/RAIL is not however to provide these conversion services, but simply to be a network application tool for the community using the Network and Ledger.

For NAPs, many incentives exist to use the MBA as a carrot for incentivized behaviors around data distribution and collection, value-added services, and transaction conversion (both MBA to local asset and general FX). In return for the ability to collect on these incentives, they are also able to provide distributed maintenance services for the network, such as dispute resolution and fraud prevention through enhanced identity intelligence generated by the USI concept. The specific roles and responsibilities are detailed in the QIAT questions below.

3. DLT Viability (RAIL)

While the RAIN benefits from efficiency capabilities of a Vast Closed Loop system, the RAIL ensures the integrity of these network transactions with a distributed ledger technology and smart contract layer for rules automation. DLT technology is indeed new and evolving, and weaknesses have been observed in consensus proof of work and proof of stake technologies, including with Ethereum, the proposed smart contract layer for some automated rules within one aspect of the RAIL component functionalities.

However, the core concepts of blockchain as a means of irrevocable data support in defined circumstances is well proven, and the core functionality of blockchains (whether Bitcoin or Ethereum architecture) have not been compromised. Attacks have happened one ‘layer’ up, in the service architecture of applications built on these core technologies. Fundamentally, a distributed audit ledger like RAIL is different than a distributed transaction ledger like Bitcoin – the RAIL can be thought of as a giant receipt roll, logging the transactions as they occur, and then distributing the data as a distributed file storage service.

RAIL’s distribution would not be entirely grass-roots: the Federated Authority NAPs are the principal nodes of the distributed technology, and NAPs would enjoy own-ledger access without voting power on the integrity of the system. The costs of running the RAIL ledger are not insignificant, but would not be funded through mining or other traditional crypto-currency distributed data processing schemes.

Instead, the Federated Authorities would contribute MBA to cover the cost of hosting and processing distributed nodes for the RAIL. As the system kicks off, the RAIL will be maintained by the first members of RAIN with the costs of data processing related to RAIL borne by these members.

The RAIL becomes valuable as a data resource the longer it exists, but the exponential growth of data processing requirements make it impractical to scale to the level needed as an entirely distributed system. Current DLT technology is also too slow to process transactions – running at best 100 to 1,000 transactions a second theoretically (Bitcoin for example runs about 1 transaction per second). Current DLT technology certainly cannot run fast enough transaction volume to be practical for the needs of the market at scale. To solve this, the core transactions of RAIL can be done via the Vast Closed Loop, then queued up for posting to the RAIL as a part of an Open Audit.
So far, core DLT has proven to be resilient to any number of attacks and exploits. One potential weakness is the use of SHA-256 encryption, which could be compromised if a large enough brute force attack were deployed – for instance at the state level, where the data resources for such an attack exist.

The use of homomorphic technologies for data encryption and processing could be a solution to these vulnerabilities. It should also be noted that SHA-256 vulnerabilities are not unique to blockchains, but span the security spectrum and could affect other technology types across financial services. As such, intrusion monitoring and redundancies become ever more critical, pointing back to the inherent benefits in distributed governance and distributed data processes offered by blockchain technologies.

Regarding smart contracts and Ethereum, simplified contracts for automated processes have long existed, they just aren’t very distributed or easily shared. Adding a layer of Ethereum smart contract options built off Xalgorithms standards could provide strong efficiencies for common contract services that are today incompatible. Since both systems are open source, their ability to provide resilience and evolution to changing circumstances is exceptionally strong.

The recent ‘hard-fork’ of Ethereum to compensate for problem with a favoured application (The DAO) does present complications for Ethereum, but it also demonstrates a democratic approach to dispute resolution by allowing the Ethereum community to vote with their feet on the fork they wish to support. Such consensus crises can be avoided with the RAIL by ensuring the process for hard forks is relegated to the RAIN members, with ultimate governance by the RAIN governance structure.

Despite the benefits of distributed technologies, the ability for the RAIN members to deploy a kind of safety switch in the form of a transparent response to any vulnerability, illegal scenario etc, is advisable, but as seen with other hard forks in distributed systems, the costs should be high enough to deter such pathways where at all possible. Fundamentally, the transactions themselves are occurring on the RAIN, and this is not subject to such vulnerabilities. The RAIL serves as an insurance policy on RAIN transactions, and can afford to be distributed as a result.

The core blockchain system for RAIL will therefore by adaptable and evolutionary, built on a core of approved Federated Authorities providing distributed processing contributions as members of RAIN. Rules oriented transparency will create the terms and requirements for participation as a processing node for the RAIL, but full participation by legacy banks and financial institutions won’t be necessary for the RAIL to operate successfully. However, the more such organizations that use RAIL, the stronger it will be.

4. Development and Scaling Timelines

The core of RAIN is already up and running with somewhat limited scope, and the basics of RAIL are in development. Expansion of the existing system to the status outlined in the Proposal will require significant investment and coordination.

<table>
<thead>
<tr>
<th>Hub Culture and Partners RAIN/RAIL Development High Level Plan</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAIN Adaptation Backend Development</td>
<td>120 Days</td>
</tr>
<tr>
<td>RAIN Front-end interfaces, institutional</td>
<td>60 Days</td>
</tr>
<tr>
<td>RAIN Front-end interfaces, consumer</td>
<td>80 Days</td>
</tr>
<tr>
<td>RAIN API Sets and Open Source Libraries</td>
<td>180 Days</td>
</tr>
<tr>
<td>RAIL Core DLT Development</td>
<td>120 Days</td>
</tr>
</tbody>
</table>
RAIL Front End Data Feeds and Presentation Interfaces 90 Days
RAIL API Sets and Open Source Libraries 180 Days
USI System Development and DUNS Integration 180 Days
Community and Legacy Integration Services Rolling
Smart Contracts Layer Between RAIN and RAIL Rolling
Xalgorithms Standards and Rules Development Rolling

*Work can be done concurrently depending on available financial resources.*

**Complete launch and implementation** 250-360 Days

**ECCHO Rules Development High Level Plan**

**Rules Development Task**

- Create working group and appoint governing board 30 days
- Drafting preliminary rules and agreements 60 days
- Vetting by subcommittees and legal subcommittee, and redrafting based on inputs 60 days
- Approval by operations committees and approval by governing board, including any revisions and subsequent approvals 180 days

**Rules Launch Preparation**

- Publication and training 30 days
- **Complete launch and implementation** 360 days

**Scaling**

The ability to deploy USIs to target nodal end points provides capabilities to enable millions of potential accounts to be linked to the Solution from the beginning. Available data resources point to over 250 million end points from which RAIN can commence operations. Beyond that, the ability to connect and assign USI components at the institutional level points to potential rollout targets as follows:

<table>
<thead>
<tr>
<th>Timing</th>
<th>Theoretical Reach</th>
<th>Practical Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Launch</td>
<td>250 Million Available End Points</td>
<td>0</td>
</tr>
<tr>
<td>Year 1</td>
<td>1 Billion Available End Points</td>
<td>10 Institution NAPs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1M End Users</td>
</tr>
<tr>
<td>Year 3</td>
<td>3 Billion Available End Points</td>
<td>100 Institution NAPs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10M End Users</td>
</tr>
<tr>
<td>Year 5</td>
<td>10 Billion Available End Points</td>
<td>1,000 Institution NAPs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100M End Users/Bots</td>
</tr>
</tbody>
</table>
APPENDIX A: QUESTIONS FOR PROPOSER

Ubiquity

U.1 Accessibility

U.1.2: What is the process to create a USI for end-users who wish to connect directly through the RAIN? How are end users authenticated under both options?

An end user who wishes to connect directly through RAIN would be required to set up an account to do so. The user would access a web/app interface to input registration data in order to start an account, and have the option to add data to their profile to link other existing financial accounts via an API call. By registering an account, they would generate a basic USI. By connecting other information that can be verified, they can strengthen the USI.

U.1.2: If an end user with a USI sends a payment to a recipient that does not have a USI, how can the sender verify that the responsible entity has delivered the payment if the recipient is not part of the network?

Typically a payment sent to a recipient outside the network would be held in escrow by RAIN – debited from the sender’s account, and credited to the recipients account upon signup. The sender’s act of sending a payment would result in a message sent to the input data provided by the recipient, such as a phone number, bank account number, email address, resulting in a message being delivered with the payment information to the end user. If the recipient does not respond or a USI is not available, the transaction could come with a time frame for cancellation and return (failure).

Does the Solution provide UI requirements to ensure that all NAPs provide a consistent user experience and similar functionality is provided across all NAPs?

Presently the solution does not require an identical UI for all NAPs, but the basic UI of the RAIN would guide a base standard for the user. The current system from which the USI system would be adapted includes First and Last Name, Address, Zip Code, Phone Number, Email, social media authenticated connections, Nationality, Domicile, Biometric, Photo, Photo ID, Bank name and account number, and other Vaulted data sources.

U.1.5: Please describe how RAIN will identify potential NAPs and support RAIN’s rapid growth.

Rapid growth for RAIN will come from ease of participation and incentive to participate. The ease of participation comes from two directions – the ability for end users to generate USIs by inputting their own previously existing data to a digital account interface, and the ability for NAPs to use an API to layer and assign USIs over their network, quickly covering their customers.

When duplication occurs or the same piece of data is recognized (such as a phone number, email or bank account) the system would seek to reconcile and merge the data points to a single USI, depending on which was first entered into the system, with the preference toward the first input. As a kind of meta layer of data, the end user could have multiple USIs, but could also seek to compile them into a single identity layer, creating a total account picture if they wish.

U.1.6: RAIN’s value increases as the number of nodes and USIs grows. Please describe how the USI meta-layer will facilitate growth and ubiquity.

The USI meta-layer facilitates growth by automatically assigning identity in a homogenous way across heterogeneous data sets, effectively making them interoperable. This is incredibly important for simplifying payments, but also allows for variety. Rapid network mapping can be done by scraping available data sets and assigning those data sets with USIs.
U.2 Usability

U.2.2: Who is responsible for storing and protecting the USI information?

Distributed storage of USI information, to avoid a single point of failure, is preferable. At the individual level/node, a user would be able to own and store their USI via an online account they setup and maintain, with relative security. However, we expect that for many account types, NAPs would issue and store USI information on behalf of the account holder. This creates market incentives for NAPs to provide enhanced benefits associated with USI data storage, security, and variability.

U.3 Predictability

U.3.1: How will the Solution ensure a consistent experience for end users, regardless of whether they connect directly to RAIN or connect via a NAP? For example, will there be a standardized process to obtain a USI, regardless of how the user is connected? Will there be a standardized process to initiate and receive a payment?

To truly enhance financial inclusion, where some users do not have access to identity data or other verification resources at the same level as others, the barrier to creating a USI is very very low – simply a Name record, email address, or phone number could result in a weak USI. This may not be enough to enable payments – thresholds for data collection as part of a USI may be required to enable a USI account holder to access particular services.

However, this process of creating a USI and the points of data that make up a USI are standardized across the system. Functions or services available to the USI holder may however be vastly different, depending on how their NAP wishes to manage services. For example, a person with a weak USI may only be allowed to make certain types of payments or to receive funds from certain sources, or to be able to receive and trade in non-monetary tokens vs. fiat currency, depending on their level of USI strength.

U.3.2: How does the Solution ensure that all aspects of the payment experience comply with applicable consumer protection requirements, regulations, and commercial laws?

Many rules come into transaction from sources other than the payer, the payee or the intermediary. Rule sets such as duties and taxes, with all their exemption and credits, are very complicated, and are also complex in the sense that they change though time in ways that parties cannot always anticipate.

Laws and consumer protection requirements vary widely by jurisdiction. Fundamentally, the USI’s strength lies in its flexibility, and the ability to unlock benefits as more data is added, allowing the user or the issuing NAP the capability to adjust services based on these considerations. The possession of a USI in its most basic form may not be enough enable a financial payment, but it sets the framework for more data to be added to allow a payment in a consistent format when such requirements are met.

Xalgorithms controls and components (under current applied research, design, prototyping and testing) will enable any digital commerce or payment solution to draw reliably upon standardized external computational rules in a common way.

U3.5: How and when will the Solution define and communicate the error resolution protections, rights and liabilities of Payers and Payees?

Terms and conditions around error resolution and rights and liabilities will vary by use case and payment type. The default capability of the network would be to issue the payment directly, but
works for both sending out and requesting in, so the error resolution capability is defined by the request function. If for instance, information is wrong or the USI is incorrect, a payment would fail and be returned to the sender with a corresponding error report to the sender and published to the RAIL.

**U.4 Contextual data capability**

U4.1: Please provide more details on the structure of the ledger and how the Solution will support contextual data for the different use cases.

Unlike the RAIN, which operates on the Vast Closed Loop, the RAIL operates on DLT (distributed ledger technology) for the purposes of data distribution and irrevocability. All permissioned ledgers come with a data field for information about a transaction. Information about the transaction context, and documentation of any externally-acquired rules (via Xalgorithms or by other methods) can be included directly in the transaction record. The types of data in this field could include USI information tokenizing underlying data, as well as loose format messaging between senders.

The ability for NAPs to develop their own messaging templates is especially important, especially around governmental, social security, veteran or payroll payments which may require unique data. It is not the job of the RAIL to define contextual data beyond the components of USI core identity, and it is recommended to allow flexibility of such data submission formats by the NAPs.

U4.1: How will the Solution support multiple message formats?

The Solution could support multiple message formats by market participants building onramps for such formats, allowing a user to select such pathways. SWIFT or ACH pathways for instance could be referenced with USI components.

U.4.2: What plans does the Solution have to support the integration of contextual data into personal and business finance software or systems for corporate end users that connect directly to RAIN?

The Solution includes a data feed from the RAIL that could search for sender or recipient transactions by USI code, and therefore import such transactions with their contextual data into personal and business finance software. The ability to do so can be made available from public APIs that would allow the software to have approval to pull data by inputting the USI and the USI on the other side adding a the software code to the USI. This two way approval by the USI owner and the finance and business software system wishing to access those transactions would enhance security. The user would be able to add this via their own platform access or via their NAP.

**U.5 Cross-border functionality**

U.5.1: How will the Solution manage conversion of multicurrency funds within RAIN?

The system envisions the use of multiple currency feeds to determine pricing of multi currency assets relative to the MBA. Conversion between the MBA and the multicurrency funds could be enabled via realtime pricing from these feeds. The system is not designed to hold multicurrency local assets in the pool. However once operational, Xalgorithms rule controls and components may be useful towards auto-generating specialized payment instruments in distributed secure client environments, with full recalibration traceability.

U.5.1: Is there a road map to support cross-border functionality that describes target countries and implementation dates?

At launch the system will be global, allowing users from any country (perhaps with the exception of OFAC sanctioned territories and states) to access the system. The primary functionality for the USI adoption interface and the messaging platform would be in English, but local languages capability
could be added to enhance appeal to local markets. The current solution is developing base transaction capability in 13 local languages: English, Spanish, French, German, Arabic, Chinese, Japanese, Swahili, Urdu, Hindu, Bahasa, Brazilian Portuguese, and Turkish. We would aim to launch the system with support for these languages.

U.5.4: Who will provide currency conversion services?

NAPs would provide currency conversion services in this system, especially when settling to local currency accounts associated to their customer base. Currency conversion as a service between local currency market makers and asset holders would offer a vibrant market potential for those who wanted to serve markets of consumers or NAPs wishing to exit MBA assets from the RAIN pool.

U.5.4: How will the Solution ensure that the conversion rates are clearly disclosed to end users, and that any costs associated with currency conversion are provided in advance of the transaction?

One of the limitations of the current system is that these conversion rates and margins are by no means clear, fair, or adequately disclosed. Building upon the Xalgorithms controls and components, RAIL should be able to develop a real-time foreign currency mid-rate feed with the aggregated transactions posting to the RAIL, providing a reliable format for comparison of rates between various conversion providers. Such transparency would benefit all consumers, and provide an incentive for competitive exchange rates being passed on to the end user.

U.6 Applicability to multiple use cases

No questions

Efficiency

E.1 Enables competition

E.1.2: If an end user changes NAPs, can that user keep the same USI?

Some portions of the USI are independent of the NAP and would stay the same in the event of a change. Some components of the USI would however change if the user left. To better understand this, imagine a core USI that remains the same and is developed over time by the user, with similar or shared information between NAPs – such as name, address, etc. (which may indeed also change but would not change the USI). The Extended USI – additional components on the string, may be added or deleted according the changing circumstances of the user. All components are tokenized and represent different data points, some of which will come and go over time.

E.1.2: Can the same identifier be associated with multiple USIs? For example, can a single phone number be used with multiple USIs that are associated with multiple NAPs?

Yes. This data would remain constant to the user and its represented token would remain constant between NAPs. This will do a lot to help reduce fraud and to enhance KYC/AML knowledge sharing without compromising the underlying core data.

E.2 Capability to enable value-added services

E.2.1: Please provide specifics about the languages supported in the development of APIs?

The APIs would focus on Javascript, Angular, PHP and C, C++, capability, with integration to FIX Protocols and other standard protocols as needed. Core programming language syntax would be in English. Incentives for market participants and developers to build solutions relevant to the
market, by accessing the open set of APIs making up the base of the RAIN and RAIL would be available, fostering market innovation and business development use-cases.

E.2.2: It appears that each NAP will have its own sub-ledger that will automatically populate RAIL. Will each NAP have access to all transaction information available in RAIL, or only to its own end users’ transaction information?

Each NAP and indeed all users, would have access to all transaction information in RAIL, providing a real-time picture of ‘the economy’, however this data would be aggregated and anonymous. An NAP would have access to their own users’ transaction information, and the end user would have access to their personal/business information on their sub ledgers.

E.2.2: How will the Solution approach data privacy and data errors in a fully open and accessible model?

Data privacy is maintained by making the publicly available data on the RAIL anonymous and tokenized by information type. The corresponding keys for data identity verification are held with the NAP and the user.

E.3 Implementation timeline

E.3.1: What are the incentives for existing account providers to join RAIN and RAIL as NAPs?

There are three principal incentives for existing account providers to join: lower cost, greater access to data, and new opportunities for monetization. The Solution does not demand an NAP participate – any end user could sign up to become a user or node, and input the corresponding data themselves to generate a USI related to existing account information.

As such, NAPs would be able to participate informally as some customers opt into the system on their own. Conversion from MBA to the core account may not be as rapid, but in many instances, it is hoped the ubiquity of the MBA would preclude such a need for the transfer.

E.3.1: What existing service providers (e.g., banks, PSPs) will the Solution target as potential NAPs?

The Solution would offer an online registration portal for banks and PSPs to gain access to participation agreements, APIs and other information. A team of Access Coordinators would work with consulting firms to develop a road map for implementation for NAPs. Since most components of the system are designed to foster market participation for development, the Governance team would be encouraged to maintain a membership of participating organizations and service providers.

E.3.1: How will the Solution’s implementation be funded?

The Solution is initially funded by Hub Culture. A public network of partners in the closed loop system would be offered the opportunity to provide funding support for the Solution. The Xalgorithms components are free/libre/open source, with development and maintenance covered by the member-funded Xalgorithms Foundation. Development of plug-in components and integrations would be up to market participants seeking to develop products and services for NAPs and consumers as part of the programme.

E.4 Payment format standards Interoperability

E.4.1: With which messages formats is the Solution compatible? Does the Solution require certain message formats?
The Solution is designed to be compatible with ISO20022 and SWIFT messaging formats but would seek to merge consistent or replicant fields where possible as part of the USI components. A USI Standard – called a Synchronized Standard, would seek to expand upon ISO components using the Xalgorithms approach to standards generation to create additional message format compatibility.

E.4.1: Will the Solution translate messages between formats (e.g. from ISO8583 to ISO20022)?

The Solution would translate messages between ISO20022 and ISO8583 in the same way that it integrates components of this information in tokenized format to the USI string. For ISO8583 in particular, credit card number and other payment information could be included, allowing a user to update their USI with new underlying information as it is updated, expires or changes.

E.5 Comprehensive

E.5.1: Please provide more detail regarding the following aspects of the Solution:

By incorporating the (forthcoming) Xalgorithms protocols and software components into the RAIN / RAIL solution, at least a partial, incremental and generally resilient approach involves meeting this challenge with a generic and secure way for computational rules to be brought into any transaction. Such rules would be determined by market participants as they are needed.

Transaction initiation for different types of end users: A) those connecting directly to RAIN, and B) those connecting via a NAP.

Which channels are available?

The Solution would be based on an online channel primarily, but limited SMS / Mobile functionality already exists. Other channel capabilities would be available to be addressed by market participants.

How does the Solution authenticate the end user?

Authentication is done via password, biometric, or dual-factor authentication depending on the level of security desired by the end user or required by the NAP, and concurrent with the capabilities of the device by which a transaction is being conducted.

At what point does the Solution present conversion information (e.g., rates, fees, etc.)?

Some of these information points are inherent to the call information, but it is envisioned that APIs developed as part of the system would provide conversion information. It is not necessarily true that the RAIN core APIs would be the only price, rates, fees, conversion rate information available – market participants could develop similar APIs with their own rates and fees according to their own business models if they did not wish to use the core platform data.

What is the minimum data set required for each transaction type?

For an MBA transaction inside the RAIN pool, the minimum data set includes: First Name, Last Name, Password, and one of either USI, email address, phone number, bank account number or other node end-point (such as SKU, IP address, social security number, etc).

How does the end user move dollars in and out of the RAIN pool?

The end user would link and tokenize a Value Holding Account with an NAP (bank account, paypal, etc) into their USI. A list of accounts would then be available on their account interface to facilitate clearance from their RAIN Pool into an underlying base account after that account is authenticated to the service, with the conversion provided by the NAP.

Attributes of each type of ledger: A) RAIL and B) Private Ledgers
Which transaction types support which data format(s)?

All transaction types support a common but unique data format for the Solution. There is not a formal data format assigned, but the USIs and account structure do present a new data format used across the system. Market participants could develop APIs to connect legacy data formats to the RAIN system for account management and transaction protocols. Such services could be most useful for connection to legacy networks and NAP account structures.

Please describe how an entity would construct a Private Ledger

An NAP would have an authenticated access level in the online RAIN interface to enable the opening and importation of data sets to create accounts and a subsequent private ledger. The private ledger would still post to the RAIL, but the data in the ledger would be decrypted or non-anonymous to the maintenance of the ledger by the NAP.

How do individual nodes access RAIL? Can they download information?

The RAIL will be publicly presented in an online feed and set of APIs which they can access. The information will be downloadable but could be searchable.

How long does RAIL store data?

Data storage time would vary according to the needs of the NAPs relative to their private ledger, and be stored on an ongoing basis for the main RAIL. Data storage costs may require an end point for data storage, after which access to archived data may require payment for retrieval.

Please provide more details on a NAP’s role and responsibilities throughout the payment process. How will the Solution monitor a NAP’s compliance with this role and effectiveness with regard to these responsibilities?

The role of NAPs in the payment process is to act as both aggregator and intermediary on behalf of end users, who in turn may control multiple account node end points. They provide an important role as guardian of core localized assets of whatever type – whether fiat currency or other types of digital assets, like reward points or non-fiat digital currencies. The reserve requirement inherent in the Solution is supported by the existence of the RAIL, which provides public accountability for NAPs operating in the system and a more clear regulatory window than exists today. Because the system is updated in real time and constantly visible, the ability to monitor compliance is improved as well. Depending on the rules associated to the Solution regarding transparency and level access for identification of NAPs on the RAIL, aggregated outputs could be delivered in API format allowing relevant authorities to monitor as needed, whether from the NAP itself, or in reporting structures shared outward.

What minimum information must an end user provide to get a USI? Can the end user or the NAP later modify the data underlying that USI (e.g., change a primary phone number or email address)?

In order to receive a USI, data as simple as a name and email, phone number, or bank account number can be provided. As more data is added, the USI grows in length and complexity via the addition of tokenized information to the string of data making up the USI. In this way, the USI functions similar to a DNS system, offering a unique identity to each end user, but an identity that can also grow over time as more data is associated to it.

What specific requirements will there be for preauthorized payments? What messaging will be required between NAPs and end users?

Pre-authorized and recurring payments could theoretically be enabled by programming transactions to recur or to take place on a specified date. A simple layer in the system is focused on the creation of simplified smart contracts, which auto-execute a transaction according to applied rules. General
rule making via Xalgorithms can provide the infrastructure for associating payments in the future or multiple recurring payments in the future according to a set of variables selected by the end user or the NAP.

E.6 Scalability and adaptability

E.6.2 Please provide more details that help demonstrate the Solution’s capability to handle projected transaction volumes.

The Vast Closed Loop of RAIN utilizing big data structures can handle large volume sets per second – the cost of data storage space is the largest impediment to optimized transaction volume processing. Unlike blockchain DLT systems for transactions, which can presently at most accommodate hundreds of transactions per second, the Ven system and closed loop processing can enable millions of transactions per second on the right data processing architecture. For the RAIL, which does utilize a DLT for processing the transaction records and audits, timing is less of an issue, and these receipts could be posted to the RAIL as a backup from the RAIN. Even if the RAIL receipt appears later for auditing, data mining or reference purposes, it is not conditional for the transaction to be approved by RAIN.

E.6.2: How does the Solution require or otherwise engage NAPs to support transaction volume growth?

The Solution provides market incentives for participation by the NAPs by expanding the ecosystem of potential payment endpoints and vastly improving their interoperability, providing new market capabilities for transactions at large. This should greatly support transaction volume growth.

E.6.3: What will be process and process frequency for implementing system updates? Who will pay for updates?

System updates would move through an approvals process within RAIN’s governance system – especially regarding 3rd party integrations or enhancements to the RAIN or RAIL that are system critical. No system critical updates, features and enhancements would be provided by market participants, with a final review process by RAIN before introduction, much like a current app store system. Such approvals would be managed by the governance entity, and updates would be provided by those service providers providing the integrations. For the core system, the group of network partners would manage ongoing updates based on contribution budgets for ongoing work.

E.7 Exceptions and investigations process

E.7.1: How will the exceptions and investigations process use messages, alerts, and notifications?

The Solution deploys alerts, notifications and messages to confirm transactions and other activities within the network. These are delivered to the user account directly via the associated USI or via the NAP. The Solution includes automated and standardized alerts (such as a payment confirmation, failure, etc).

E.7.3: Which entity/ies are in a position to access all RAIL’s transaction data?

Some of RAIL’s data is available to all via a public feed. Identifying information and contextual data would be available only to the user or NAP posting the transaction data to the RAIL. Authorized law enforcement or regulator access may be required, in which case the end user or NAP would be informed of such access via an alert to their account either directly or from the NAP.

E.7.3: Who owns the data in RAIL?
The data in RAIL could be owned by a non-profit governance organization set up to manage the deployment and future development of the initiative. The organization would use holonic systems to provide distributed governance – assigning data ownership to the individual user from a rights/responsibilities standpoint, but with the data managed by relevant NAPs where necessary, allowing the user to devolve data use to NAPs.

Hub Culture advocates policies conditional to the Windhover Principles – a set of principles for identity, trust and data developed in 2014, which proposed putting individual data ownership and its according rights and responsibilities into the hands of the end user. In such a scenario, NAPs could safeguard or maintain this data on behalf of end users, with conditional terms attached that are provided on an opt-in basis by both parties. The rules could further be enhanced through standard setting using XAlgorithms rules around data ownership.

**Safety and Security**

**S.1 Risk management**

S.1.1: How will RAIN and RAIL address the risk of an unexpected application of law or regulation?

The unexpected application of law or regulation would require compliance by the system, making its flexible and versatile structure a helpful benefit. If limitations were imposed on parts of the system, the system itself would not inherently be destroyed, just certain functions or operations would be limited or reduced. With respect to potential downstream regulatory actions that could impact RAIN/RAIL, consideration should be given to seeking an overarching competent global regulator (who commands widespread reciprocity) who can supervise the RAIN in a similar format as would apply to other financial Clearinghouses.

S.1.2: How will the solution address MBA liquidity risk?

The RAIN is envisioned as 100% asset backed, much like the Ven currently is managed. It is not a monetary creation or quantitative easing solution. As such, there is little liquidity risk, as underlying assets are held by the NAP or the RAIN itself, and end-user funds are held only in the MBA. Conversion risk between MBA and localized assets is the biggest risk, but even this is solved by conversion to an exchange rate at point of exit, vs. association to the ongoing float or fluctuating local asset value.

S.1.2: How will the solution manage conversion risk associated with MBA conversion?

MBA conversion pricing and transfer happens at the point of exit, taking the appropriate rate of conversion supplied by either the Solution from aggregated pricing sources delivered via its core API, or via market services that could adapt pricing according to their own agenda (providing competition). Either way, the RAIN pool conversion to core local asset (fiat) is approved by the transactor with an accepted rate at the point of conversion, whether done by the end user or the NAP.

S.1.2: How long will a payment sit in escrow before it is returned to payer?

The amount of time in escrow could be determined by the NAP associated to the payer, or if by the payer directly, a set time for return could be dictated by the Solution (suggested 7-14 days for pending signups or T+1 or T+3 for pending transactions. Failed transactions would return instantly).

S.1.2: Is there a maximum transaction value for payments?

Theoretically, no, but practically, this could be determined by the NAP. For end users, single transactions over $10,000 would trigger FinCEN or regulatory reporting with a tag on the RAIL.

S.1.3: What are RAIN and RAIL’s requirements for end user authentication?
End user authentication is holonic in this Solution. Holonic means that nesting layers of approvals can be applied to use case transactions. As such, a low value payment (say under $10) could be applied only within the pool and simple verification by the end user, such as account access via password or other basic verification method. Larger transactions could be subjected to higher proof levels of verification. Very large transactions could require NAP secondary review or approval. The aim is to decentralize payment decisions but to verify these transactions holistically, so that in the event of fraud, unauthorized access or other issues, the issue can be remedied.

Recent data breaches and identity hacks have proven that simple passwords are not enough for tight security, but there is a trade-off for end user use case abilities. As such, letting NAPs to set their own verification and authentication levels according to their own risk parameters is important. That said, the Solution for end users would enable multiple cases of user identity access management – including user set levels of security for password, security words or images recognition, two factor authentication via mobile device, mobile enabled biometric fingerprint or iris scan, real-time selfie facial recognition, or other solutions as devised by cyber-security market participants. By creating an open API store for some of these services, the ability and incentive for providers to scale such solutions across the system would ignite new distributed advances in the sector that could be easily scaled as they succeed.

S.1.3: How will the Solution support detection of fraudulent activity from a node’s RAIN pool?

NAPs would be expected to develop their own fraud monitoring and detection capabilities related to the their nodes. The RAIN pool and USI system would benefit from a developing neural net to identity and isolate fraudulent behavior in the system through the RAIL, which will offer exceptional system wide threat detection drawn from the data it contains. For instance, a compromised USI could be reported once, and recognized across the system as a red flag, enabling faster response and investigation to issues that span multiple NAPs. The Solution fundamentally re-orients finance toward end users, giving them more access, control and transparency than before. AT the same time, it offers market incentive opportunities for NAPs to protect and enhance the service propositions available to these end-users.

The reporting system for fraudulent transactions is posted to the RAIL as a type of non-financial transaction data point, which can be referenced as needed by the community. This presents an opportunity for consumer protection advocates to develop policing mechanisms and gives them the ability to map threats and fraud both at the granular level and the 10,000 foot level.

Finally, the existence of core funds in the RAIN pools should make it easier to reverse a transaction if fraud is discovered after the fact on a transaction.

S.1.4: What rules or policies will RAIN and RAIL apply to payments with errors, e.g., incorrect amount, recipient, etc.)?

RAIN includes a push and pull request capability, so that an error can be recalled to the recipient, with funds recalled to escrow status between the sender and recipient, but will require the NAP or the end user to approve the return. This ensures payment finality while providing room for dispute resolution. The amount of time for escrow holding of returns would be until both parties agree on the outcome or the NAPs agree on an outcome on behalf of the end user.

S.1.5: How will the Solution encourage NAPs and directly-connected end users to protect the integrity of the overall network, e.g., access management, user authorization, KYC, AML, etc.)?

One of the great things about RAIN and RAIL is that micro-transactions around desired behaviors can be enabled at the system level. For instance, NAPs could reward end-users for advancing the depth and strength of their USIs by issuing RAIN pool assets at the micro-level to their account
every time they complete a data field in their profile. Or end users could set out to earn MBA by completing incentive based activities, such as enabling 2-factor authentication.

As a means of liquidity and system adoption, the RAIN could even credit new users with base MBA as a means of providing sign-up incentives for inviting friends, family, suppliers, customers and networks to participate and to establish a direct nodal connection. As these connections grow across the system, identity verification and user access control become extremely flexible. Since there is virtually no consumer or NAP end cost for settling a transaction to an account, however small, the ability to issue micro-payments to influence behavior finally becomes possible.

How will RAIN and RAIL manage KYC and AML for end users that connect directly to RAIN?

RAIN and RAIL do not directly or completely manage KYC and AML for the end users connecting directly to the system, but do provide incentives for the end user to manage this themselves, by adding more data to the USI. As the end user’s USI grows, it provides the ability to unlock transaction capabilities, privileges and other benefits in the system, providing a use case for end users to take KYC and AML into their own hands – crowd-sourcing a solution to the issue.

Since the data is cryptographically locked and only available to the end user or an NAP that may need to review the data (with the consent of the end user), a virtuous cycle of data management becomes possible. Furthermore, a user only needs to do this once – because once a field is completed and a USI segment token assigned, the data remains on their USI in codified format for other NAPs and end-users to refer to when making decisions regarding transactions - whether for user identification or for transaction approvals.

In these instances, the data may rest in the end-user’s core account, or the account of the NAP they are associated with. Data supplied to the RAIL is simply a token string representing the data, not the actual data itself, acting as a data signal that the information has been provided.

RAIN and RAIL do not intend to perform direct KYC and AML approval for data supplied to user vaults, but envision a service ecosystem where uploaded data could be reviewed and approved by NAPs. The tokenized data points assigned by that NAP then become part of the approved USI string of the end user.

S.2 Payer authorization

S.2.1: What will be the minimum payer authorization requirements for the network?

Again, this is expected to be a holonic solution, with varying levels of graduated approvals depending on the transaction. Similar to Contactless payments, which enable quick electronic POS payments, a level up to $30 could be provide with ‘possession’ of the account – whether logged in online or via holding an account enabling device such as a mobile. This will create the possibility for innovation of new forms of digital payment devices such as electronic coins that could enable a payment transaction with a fingerprint or other biometric signature.

S.2.2: What rules or regulations will govern setup for pre-authorized payments within the network?

The ECCHO and Xalgorithms rules for the system will help determine such rules or regulations regarding pre-authorized payments. However, The ability to create an Advanced set of tabs for end-user payments to automate these payments according to an approved recipient, to enable a per transaction approval notification, or to provide auto-bill payments are all possible and would be linked to the universe of payers and payees USIs linked to the end user.
S.2.2: Will the end user receive notifications? If so, how frequently? What information will be provided?

Notifications of many types already exist in the base system and are certain to be expanded in the RAIN and RAIL system. Auto-alerts to the user’s account, generated to or from the NAP, and delivered inside the NAP nodes or the wider system are all evident and available. AT the minimum, the user receives notifications to confirm the transaction is initiated, resolved, settled, in escrow pending a new user verification, failed or pending.

S.2.2: Will funds be escrowed when a payment is set up? If there are no funds in the MBA RAIN pool to support the pre-authorized transaction on the payment date, what will happen?

Funds are not escrowed when a payment is setup, only when the payment is attempted to be executed. Many end users in particular operate on limited cash flow and funds availability may limited at certain time points due to a variety of reasons. IF the pre-authorized transaction is not able to execute on the payment date, the transaction will be rejected, and can either be re-tried according to a set schedule (rules like this may be set by the NAP or the end-user at time of setup) or fail completely, alerting the end user requester that the payment has not gone through. Such failures would also be recorded on the RAIL.

S.2.2: How can an end user modify or cancel a pre-authorized payment?

An end user would have the ability to access the payment schedule via the online interface, or to access this function through their NAP interface. As the core Solution for RAIN enables this functionality, the relevant APIs could be extended from the RAIN through to the NAP in a consistent manner, since all the NAPs are basically using holonic replications of the core system at their own level.

S.3 Payment finality

S.3.3: How will the Solution comply with relevant consumer protection requirements?

The Solution does meet or exceed many consumer protection requirements by placing data privacy and responsibility into the hands of the end –user, with the option for the end user to devolve this responsibility to NAPs should they so wish. This provides an improved solution set for consumers on the current system, where they have little input or control into how their data is used or maintained. Since the Solution subscribes to advanced ideas around data ownership and control, it does present new opportunities to enhance consumer protections and consumer choice.

This is also managed via the open source rule sets in development with Xalgorithms, giving consumers the ability to input on rules available to the system.

S.4 Settlement approach

S.4.1: How will the Solution guarantee the real-time availability of commercial funds to end users transacting via a NAP?

Funds held within the user pools in the form of MBA are available in real-time and can clear and settle quickly under 2 seconds. The commercial funds underlying these transactions are maintained as a float and are held in reserve with Federated Authorities of the RAIN. This ‘persistent float’ generally never gets converted out of MBA, and underlying funds simply sit in reserve backing the MBA in circulation. For end users wishing to convert out of MBA to local commercial currency, the conversion can be done by withdrawing from their MBA Pool to a core account held with an NAP. This service is provided by their NAP.

S.4.1: How will directly-connected end users convert MBA to commercial currency?
A directly connected end user does not convert MBA to commercial currency themselves but can transact across the network drawing from their pool (which is able to show realtime currency conversions based on market data supplied to the account – effectively allowing a person to toggle between the MBA they have and the relative value of localized commercial currency it corresponds to) – similar to the currently operating solution. If a user wants to convert MBA to commercial currency, they could execute a transaction with an NAP who provides this service. The conversion rate and timing for these transactions would be a source of competition or value enhancement by various NAPs to attract and retain customers.

S.5 Handling disputed payments

S.5.1: What rules will the Solution implement regarding requirements, processes, and timeframes for addressing unauthorized, fraudulent or other disputed payments?

Unauthorized, fraudulent or other disputed payments are posted to the RAIL as a transaction information type that follows the original payment. Dispute resolution rules can be automated via development of response mechanisms set out by NAPs via the Xalgorithms shared standards and rules system, but basic and inherent capabilities, such as the ability to freeze funds for review by an NAP. For direct end-user payments, this ability would likely be limited to a recall request or escrow status as opposed to an actual stop payment or recall (payment finality). Federated Authority NAPs would be able to refer to Solution standards, but also the capability to submit requirements, processes and timeframes according to their own needs.

S.5.2: Please define ‘federated authority’. What requirements exist for a NAP to be designated as a federated authority? How will the Solution incentivize NAPs to carry out this dispute management?

A Federated Authority NAP enjoys enhanced decision making capability in the Solution, and designation of who becomes a Federated Authority would be dependent on input from the market and the Federal Reserve. Correspondent banks, and other major financial institutions with regulatory approval would serve as the core of this grouping, who would reserve additional responsibility for custody of float reserves in commercial currency, dispute resolution or other system wide services.

As an incentive for providing these ecosystem services, MBA payments around custody, transaction recall fees, redemption, FX to localized commercial currencies and other Authority services can be developed as components of the system, drawing from the MBA for automated execution. It is estimated that less than 5% of NAPs would qualify as Federated Authorities, but the system for determining who provides these services be open, transparent and not focused solely on current payment system incumbents. The Solution could parallel some of the user protection features already resident in Fed Regulation E which governs electronic funds transfers -- http://www.federalreserve.gov/bankinforeg/regecg.htm

S.5.2: What is the general timeline for the dispute process?

The key to the timeline on the dispute process is dependent on the parties making the dispute and the method in which the dispute is to be resolved. It its generally not the role of the RAIN to make decisions about disputes. The RAIL simply serves as a DLT record to analyze transactions and to record the data to verify what happened in the system. The dispute resolution process kicks off initially when a dispute is registered via the system as a flagged transaction – requesting a recall of the payment, or identifying it as fraudulent or unauthorized. If it is an end-user transaction, the request may have to be referred to a dispute specialist service, likely provided by an NAP. If the disputed transaction occurs between the NAPs themselves or is some way paused for resolution, the
system is designed to simply enable transaction of assets and record the transaction of assets. The system could freeze or hold an asset, but the importance of payment finality to prevent recall abuse is important. The USIs provide growing protection around this to prevent abuse. A weak recipient USI for instance, might not be as trusted for the payer as a strongly trusted USI, giving a broad but unspecific trust aura as a transaction is considered. This goes both ways, since party disputes are recorded on the RAIL and can be reviewed by the participating parties in the transaction. In this way, credit and reputation services can emerge to enhance this.

S.5.2: How will the Solution ensure compliance with consumer protection laws related to error resolution and fraudulent and unauthorized payments?

A list of relevant consumer protection laws will form one component of rules creation for the system with the Xalgorithms system, and a reference point for rules development by ECCHO. The aim would be to create standards that keep these protections in view.

S.5.3: Please describe the Dispute Objection filing process for payers, payees, and NAPs.

Dispute objection is available via the RAIN interface for end-users, allowing the end user to flag a transaction and post a dispute to the RAIL immediately. Once the dispute is registered to the RAIL, it can be queued for action if the transaction flowed through an NAP, or referred to a dispute service provider if between two end point users (without an NAP). The end user could potentially choose a dispute resolution service or maintain an account with them in the form of an NAP.

S.6 Fraud information sharing

S.6.5: For NAP ledgers, will there be any requirements for describing how data stored in the PL can be accessed?

The rules and requirements around data stored in the PL for NAP ledgers would be according to the NAPs themselves, subject to any data privacy or data storage rules created by the Solution or governance rules beyond the solution.

S.6.6: What entity will be responsible for all of the data in RAIL?

The RAIN/RAIL governance entity, likely a non-profit organization with elected governance from the NAPs and even end-users, would be responsible for the data in RAIL, but the distributed nature of the RAIL would place this data (with no PII and cryptographically anonymized) into the hands of network participants providing consensus. The end use and ownership of the data in RAIL is envisioned to become the asset of the bilateral or multilateral transactors, with according monetization possibilities attached.

S.7 Security controls

S.7.2: Will the Solution provide rules regarding operations security, monitoring and incident response?

RAIL and RAIN pool monitoring services could easily emerge to provide these services, with NAPs or end users subscribing to these services as part of an expanded security ecosystem.

S.7.2: Transaction information for transactions initiated or received through a NAP will be stored in two locations: the NAP ledger and RAIL. How will the Solution align data retention and controls between the two locations? How will the Solution ensure that any requirements meet or exceed existing regulations?

Data retention for the NAP ledger could be drawn from the RAIL and synchronized to the NAP, but essentially both are drawing from the same data generated by transactions on the RAIL. The NAP
would refer to the RAIL as a reference point for the NAP ledger, simply picking out transactions that are tagged to that particular NAP.

S.8 Resiliency

S.8.1: Please provide target availability metrics for RAIN and RAIL and SLAs for individual NAP nodes.

Currently the system is running at 99.97% up time and has never had a system wide failure other than scheduled maintenance downtime in the early years. Since 2013 the system has been accessible at all times without a recorded access failure.

S.8.2: What mechanisms will there be to limit the impact to the overall network if a node(s) is compromised in a cyber-attack?

Identifying threats in the system is of paramount importance. In the case of RAIN, there is one network, so threat detection can be accomplished with network wide monitoring. In the case of RAIL, the distributed ledger and consensus process between NAPs posting to the ledger would provide a proof system to identify anomalies quickly. In the case of transactions posted in the RAIN, reversal of the transactions or a rewind of the transactions should be possible by transaction reversals. Checkpoints by the NAPs for funds leaving the RAIN Pools to localized assets could require confirmation of transactions by the RAIL if a transaction is deemed suspicious or if it does not match the distributed ledger.

S.8.2: If an offline backup of USIs and/or network identities is compromised, how can the Solution recognize that this has happened and limit its impact?

An offline backup of USIs, transactions and network identities that is compromised would be immediately evident because it would not sync with the RAIL – which relies on distributed consensus for proof of transaction.

S.8.4: Given that there are external commercial money accounts that are funding MBA pools and RAIN transactions, will there be availability requirements for these supporting accounts?

Yes. Such availability requirements would be determined in conjunction with either the commercial money account providers, NAPs, etc. with rules for these supporting accounts covered in the Xalgorithms and ECCHO rule sets.

S.8.3: How will the Solution avoid risk contagion and/or systemic events?

The Solution is fully funded in terms of the RAIN pool, so contagion is less of an issue, nor are systemic events where liquidity is constrained. Even if the RAIN pools ‘drained out’ – the conversion out of the pool to underlying assets off the network should be 100% possible.

S.10 End-user/provider authentication

S.10.2: Can a payer make a payment knowing only the email address or phone number of the payee? Does this single point of information generate a sufficiently higher score to make the payment with confidence?

Yes they can. A single point of information like this presents a lower point of confidence compared to having multiple data points to include with the payment, but the payment is still possible. The UI of the online system would of course allow a user to input a connection for recurring payments, and to add to the strength of that connection as the other connection adds tokenized data strings to strengthen their USI.
S.10.2: In the initial transaction, how many data points must match between the USI and the initiator to ensure that the right connection can be established?

Each USI begins with a unique 10-12 character Anchor String unique to the user, with the extension of additional data according to USI verification data points. The longer the string, the more secure the identity connection for the transaction. From a data point of view those data strings would be associated to particular initial strings, allowing single data points to effectively connect to the right core identity and account.

S.10.4: Please describe minimum authentication requirements by transaction and by channel.

All transactions require a USI, and the components of the USI are variable, beginning with a minimum of First and Last Name, an account end data node (phone number, email, account number, SKU, IP address, etc)

S.10.4: Will the Solution support differentiated end user authentication processes based on the risk attributes of the transaction (channel, value, etc.)?

The Solution does provide differentiated account service capabilities dependent on the strength of the USI. The exact parameters of functional use access would be determined by each NAP, but the ability to transact without the NAP remains possible with minimal attributes as an end user, with the restriction that the transactions could not leave the RAIN pool, and are therefore traceable and potentially recoverable.

S.11 Participation requirements

S.11.1: What requirements must organizations meet in order to participate as a NAP?

The requirements to participate as an NAP would begin with status as a Money Services Provider or regulated Financial Services Provider. It could be possible to segment categories of NAPs to provide distinctions within the network for different categories of participants. Ideally however, technology companies or other non-traditional account service providers would be able to qualify as an NAP – this could include social account networks, mobile phone companies, membership organizations like unions or associations, and others. Some rules around different types of NAPs would be possible to integrate via ECCHO and Xalgorithms.

S.11.1: Please confirm that these requirements address security, resiliency, anti-money laundering (AML), Know your customer (KYC), and data privacy.

The USI inherently accomplishes AML and KYC basics via shared data in the USI string. It does not completely replace the responsibility of NAPs to clear and vet their own user bases. However, the USI system should make tokenized comparison of data points possible, greatly improving and enhancing shared KYC/AML capabilities at the system level.

Speed (Fast)

F.1 Fast approval

F.1.1: Are there capabilities planned to address funding of RAIN Pool accounts dynamically or in near real time as transaction volumes (and values) increase?

Since transactions and transaction volumes are appearing in near-real time on the RAIL, ongoing auditing of funding for Pool accounts is inherent. The Solution locks in full funding to these accounts based on the parameters of the MBA itself, and it is more the conversion of assets from the
Pool to localized assets (like Dollars) that would be affected. For these dollarized assets, funding rules are already in place.

F.1.1: What requirements will the Solution establish to ensure that end users that connect via a NAP have the same payment experience?

The Solution is ubiquitous enough to provide a seamless and identical payment experience within the RAIN network for all users in the system – including both NAPs and end users. The ability for NAPs to extend that same service experience to end users connecting via an NAP is up to the NAP, and presents a point of potential service differentiation in the market.

F.2 Fast clearing

F.2.1: See F.1.1, above.

F.3 Fast availability of good funds to payee

F.3.1: See F.1.1, above.

F.4 Fast settlement among depository institutions and regulated non-bank account providers

F.4.1: How will the Solution ensure that NAPs manage their RAIN pools in order to:

- eliminate exchange risk between MBA and commercial currency
- ensure that transactions are always good funds
- ensure payees can receive payments in fiat currency within a reasonable time frame (i.e., seconds)?

The Solution automatically manages the RAIN pools as part of the network, so all funds in RAIN would be considered “good funds” provided that the rules are maintained around the RAIN pool floats. Since NAPs would theoretically manage their own floats by holding reserve assets relative to the pools, the existing 100% reserve requirement for the Pool would be necessary. (This does not affect core money issuance by banks, which is a matter related to the Federal Reserve and member banks on a different level). The system requirement therefore should ensure fiat currency reserves backing the pool are available. On the exchange rate front, periodic sweeps between the Pool and core fiat currencies would be at the timing and discretion of individual NAPs.

F.4.2: How will the Solution handle differences in opening hours when managing settlement across time zones?

Funds in the RAIN clear effectively instantly within the RAIN Pool and could be visible in the end user accounts, even in local currency equivalent if automated conversion pricing is enabled. Hard conversions out of the Pool into localized assets would be dependent on NAPs own conversion and processing capabilities.

F.4.3: Can NAPs determine different settlement schedules among/between each other within RAIN, or are all transactions on RAIN and RAIL settled immediately?

All transactions are settled immediately.

F.5 Prompt visibility of payment status

F.5.1: How will the Solution ensure that end users have visibility into the status of a payment (initiated, recipient found, approved, cleared, settled, funds deposited by recipient, etc.), whether they connect directly to RAIN or connect via a NAP?
The system delivers an immediate response mechanism for a transaction – showing it as pending, approved, and received. When funds are received to an NAP on behalf of the user, this is also confirmed.
OVERVIEW OF LEGAL FRAMEWORK & GOVERNANCE

This section provides an initial narrative, followed by answers to QIAT questions for the Legal Framework and Governance criteria.

LEGAL FRAMEWORK APPROACH AND STRUCTURE

Given that there is no existing, comprehensive statutory or regulatory law that addresses real-time payments in the U.S., quality agreements among all the parties with an interest in the payment system are critical. The approach to the legal framework assumes that the optimal solution to this void in payments law is a universal set of rules that will apply to all users and providers in a multiple provider/multiple bank environment. A universal set of rules will be provider and product/service independent and will therefore provide uniform rules (Uniform Rules) that will allocate liabilities consistently among the parties using and or providing all solutions.

Without Uniform Rules, financial institutions require separate agreements making ubiquity and rapid adoption of real time payments virtually impossible.

DIAGRAM 1: REAL TIME PAYMENT SYSTEM WITHOUT UNIFORM RULES

While bilateral agreements are reasonable between key payments partners, it is not viable for the nation’s 12,000 financial institutions to have bilateral agreements with every other financial institution. When you consider the number of bilateral agreements that would have to be created, it becomes unwieldy, even with just a very few financial institutions. Diagram 2 below, a spider’s web of a diagram, emphasizes the potential for quickly creating a convoluted environment.
It was precisely this problem, the need for hundreds of millions of agreements, that required the Check Clearing for the Twenty-First Century Act (Check 21) which created federal law to allow paper check truncation through the unilateral decision of each financial institution and thus eliminated the need for every party with an interest in the check to agree to the truncation of the original paper check.

**DIAGRAM 2: REAL TIME PAYMENT SYSTEM WITH ONLY BILATERAL AGREEMENTS**

**Bilateral Agreements**

- For Only 10 Banks to Agree Bilaterally:
  - Requires 90 separate agreements
- For 12,000 Fls, >100 Million Required

**Advantages to Uniform Rules**

Uniform Rules provide many advantages—not just providing a simpler legal agreement environment. The advantages of this approach are numerous and include but are not limited to:

- Minimize the risk associated with expensive litigation to resolve disputes by assigning liabilities among the various parties in advance of any disputes,

- Minimize the risk of uncertainty of dispute resolution by providing consistent, uniform guidelines to the courts adjudicating disputes based on agreements under which the parties were using/providing the payments,

- Uniformly define real-time payments for all solutions,

- Minimize the number of agreements needed to achieve ubiquity while maximizing uniform coverage through one common, uniform, multiparty agreement,

- Minimize bias for one or more solution providers through the application of a common, uniform, multiparty agreement that includes provisions for all solutions and disadvantages none,
• Allow each solution provider to have its own agreements with its customer/users to prescribe the provisions that are unique to its products/services and that are not addressed in the Uniform Rules,

• Allow each financial institution to have its own agreements with its customers/users to prescribe the provisions that are unique to its products/services, and

• Focus the development and maintenance of evolving, detailed, universal legal provisions on a relatively small number of payments experts, while freeing key resources within provider and financial institution organizations to focus on their products and services that create value and make them unique.

Three Types of Agreements Required

The approach to the legal framework also assumes that three types of agreements are needed to achieve consistent, uniform predictable legal coverage with the flexibility to encourage financial institutions and solution providers to implement real-time payments. Those three include:

1) Uniform Rules - Described above. The primary purpose of Uniform Rules is to define the obligations of financial institutions, allocate liabilities among the various parties, define exclusions not addressed in the Uniform Rules, reference the appropriate standards to be used, address errors, develop dispute resolution approaches between the financial institutions, and address payment finality and settlement.

[Diagram 3: UNIFORM RULES, BANK AGREEMENTS & PROVIDER AGREEMENTS]

Real Time Payment Rules

2) Provider Agreements – Provider agreements are needed to define the relationship between the solution provider and its customers. These agreements would typically include definitions of the service(s) provided/offered by the provider to
its customer, service pricing provisions, logistical provisions between the provider and the customer, definition of settlement method, obligations of provider and financial institution, etc. Additional provisions should include:

a. Authentication of entities and payments/messages;
b. Initiation of payment orders/authentication and termination of authorization;
c. Delayed or failed payments;
d. Timing of sending and receipt of payment;
e. Error resolution with the financial institution;
f. Timing of sending and receipt of payment; and
g. Performance standards that the financial institution should expect.

Provider agreements would not change or override provisions in the Uniform Rules but rather would supplement and complement the Uniform Rules with provisions that are unique or specific to that particular provider/customer relationship. The Uniform Rules would avoid, wherever possible, inserting itself between the provider and its customer.

**DIAGRAM 4: UNIFORM RULES AND FINANCIAL INSTITUTION AGREEMENTS**

3) Financial Institution Agreements – Financial institution agreements are needed to define the relationship between the financial institution and its customers. These agreements would typically include definitions of the service(s) provided/offered by the financial institution to its customer, service pricing provisions, logistical provisions between the financial institution and its customer, right of offset provisions, dispute resolution processes, customer notification processes, etc. Additional provisions should include:
Financial institution agreements would not change or override provisions in the Uniform Rules but rather would supplement and complement the Uniform Rules with provisions that are unique or specific to that particular financial institution/customer relationship. The Uniform Rules would avoid wherever possible inserting itself between the financial institution and its customer.

**Real Time Payments Rules**

Under Uniform Rules, the allocation of liabilities is always between ECCHO members, regardless of the number of intermediary providers. Therefore, financial institutions can have as many provider relationships as needed.

**Uniform Rules vs. Agreements**

Not every legal provision needs to be addressed in the Uniform Rules. Some provisions are best addressed in the financial institution’s agreements with its customers; financial institutions may want the flexibility to meet their regulatory/examination requirements differently than do their competitors. The Uniform Rules would not seek to prescribe internal bank procedures nor internal solution provider procedures. The primary relationship between the financial institution and its customers would continue to be the financial institution and not the Uniform Rules. Likewise, the primary relationship between the solution providers and their customers would continue to be the solution providers. Determination of which provisions are best addressed in the Uniform Rules and which are best addressed in provider
agreements and/or financial institution agreements will be decided in discussions within the Subcommittees, RTP Committee, and ultimately by the governance decision structure addressed below under Governance. See Diagram 8.

The approach to the Legal Framework also assumes that a universal governance process is implemented to approve the Uniform Rules, and that the governance process must be vendor/provider independent. Under this assumption, specific rules cannot be developed and implemented until the governance structure and processes have been implemented. The recommended governance approach is addressed later in this narrative under Governance. At the time of this writing, the Faster Payments Task Force is currently still discussing governance considerations.

L.1 Legal framework

No questions

L.2 Payment system rules

L.2.2: Please describe how the Solution will develop and amend Payment System Rules.

Please see Legal Framework Approach and Structure narratives and diagrams for framework for developing and amending Payment system Rules.

Payment System Rules are developed in the context of the solution itself, as a digital network, many of the rules are inherent and built in. Support for extensions of rules or changes in rules would be managed by a Governing Committee for the RAIN, part of a non-profit management service with participation by network members.

L.2.3: Please describe how the Solution will enforce and monitor Payment System Rules across all RAIN and RAIL participants?

Please see Legal Framework Approach and Structure and Governance Approach and Structure narratives and diagrams for framework for developing and amending Payment system Rules. The proposed framework for real-time payments does not include direct enforcement and monitoring but rather relies on a series of warranties that banks make to each other, and that providers make to their customers, and that banks make to their customers.

ECCHO does not currently monitor and enforce the ECCHO Rules for check image exchange in any formal manner (i.e., citations, fines, etc.) There has never been a need for enforcement due in part because of the vast amounts of check case law and the fact that ECCHO facilitates discussion amongst its membership--including an informal dispute process and maintenance of an exceptions contact list for member financial institutions. However, because of the collaborative development of the Uniform Rules, a system of rules enforcement could be created upon consensus request.

L.2.5: Please describe how the error resolution process will address unauthorized transactions and disputes that may arise, and will ensure the rights and obligations of all end users, providers, payers and payees.

The Uniform Rules would designate the financial institution that is responsible for obtaining and maintaining the payer’s authorization; and the agreements between the financial institution and the solution provider(s) would designate the mechanics of how that authorization would be obtained and maintained. This would allow maximum flexibility to incorporate the best practices as those practices evolve and mature without the need to modify the Uniform Rules. This would allow the
providers and/or financial institutions to distinguish their services from other providers and/or financial institutions and thus foster competition which would also benefit consumers.

The Uniform Rules would designate the financial institution that is responsible for resolving payment errors and any required timeframes for resolving those errors. The specific process for resolving those errors would be determined by the financial institution through its customer agreement and its solution provider agreement. The Uniform Rules would not seek to designate the specific processes to meet the financial institution’s obligations under the Uniform Rules. This would allow maximum flexibility for the resolution processes to evolve as improved methods develop without the need to modify Uniform Rules.

L.3 Consumer protections

L.3.1: Please describe how the Solution’s legal framework will allocate legal and financial responsibility for all Entities for losses in the event of a Payer or Payee claim of unauthorized, fraudulent or erroneous Consumer payments?

Please see Legal Framework Approach and Structure and Response L.2.5

The Legal Framework Approach and Structure describes the relationship between Uniform Rules, provider agreements and bank agreements—all of which are needed to optimize the legal framework.

The Uniform Rules would designate the responsibilities of each of the financial institutions in the payments process including the allocation of legal and financial responsibility for unauthorized, fraudulent or erroneous consumer payments. The financial institutions have the flexibility to determine how they meet those responsibilities and those decisions would be reflected primarily in their agreements with their solution providers, if any, and their agreements with their customers.

Please refer to narrative and Diagrams 1-8 that graphically show that ECCHO will base the development of the Real Time Payments Legal framework on its existing process that has been successful for more than twenty-five years. That approach maximizes the value of Uniform Rules for application across all financial institutions, providers and users. It also maximizes the flexibility of financial institutions and providers to provide common as well as unique products and services to their customers without requiring changes to the Uniform Rules and without changing the underlying obligations designated in the Uniform Rules. This allows the providers and/or financial institutions to distinguish their services from other providers and/or financial institutions and thus foster competition, which also benefits both consumer and business customers.

L.3.2: Please describe how the Payment System Rules and procedures will support Error Resolution for Consumer claims arising from payments Fraud, unauthorized payments or errors.

Please see Response L.3.1 and L.2.5, the Legal Framework Approach and Structure. The Uniform Rules would designate the responsibilities of each of the financial institutions in the payments process including the error resolution of consumer claims arising from payments fraud and unauthorized payments. The financial institutions have the flexibility to determine how they meet those responsibilities and those decisions would be reflected primarily in their agreements with their solution providers, if any, and their agreements with their customers.

L.4 Data privacy

L.4.4: How will Payment System Rules provide transparency for end users regarding what data the Solution is capturing?
Please see Legal Framework Approach and Structure. The Uniform Rules would designate the responsibilities of each of the financial institutions in the payments process including how end users may get visibility into the data being collected on them and limits on sharing of data. The financial institutions have the flexibility to determine how they meet those responsibilities and those decisions would be reflected primarily in their agreements with their solution providers, if any, and their agreements with their customers.

L.4.4: How can the end user access their data and set privacy preferences related to the use of end user data?

Access to data and privacy preferences will be available for end users to access via an online account based system, which can be linked to from their relevant NAP or accessed on their own via the end user platform. Account control settings and the ability to review the components of the USI are inherent in this access, which can also be delivered by API to an NAP for embedding into a legacy system or to call data from a legacy system back to the USI. An example of sample USI privacy control settings is attached here.

L.4.5: How will the Solution allocate financial or other responsibility among end users and providers in the event of a data breach?

Please see Legal Framework Approach and Structure. The Uniform Rules would designate the responsibilities of each of the financial institutions in the payments process including data breaches at the payment system or at an end user/provider. The financial institutions have the flexibility to determine how they meet those responsibilities and those decisions would be reflected primarily in their agreements with their solution providers, if any, and their agreements with their customers.

L.5 Intellectual property

No questions
Governance

GOVERNANCE APPROACH AND STRUCTURE

The purpose of governance is to direct and approve the Uniform Rules under which financial institutions and providers service the financial institutions’ customers which include consumers, businesses, financial institutions, government organizations and others. That purpose is best achieved through structures and processes that are inclusive and transparent.

Existing ECCHO Governance for Image Exchange

Since 1990, ECCHO has been using a process that is inclusive and transparent. ECCHO’s processes evolved quickly in an environment in which there was no mandate initially for electronic check presentment and later for check image exchange. Neither of these were/are addressed in statutory or regulatory law so it has been critical to execute processes designed to achieve consensus among a broad base of financial institutions. Today the ECCHO membership holds approximately 80% of all the deposits in the U.S. and approximately 55% of all inter-bank checks are cleared under ECCHO’s Rules (the remainder are cleared under the Federal Reserve’s rules). The membership includes institutions in all segments of the industry from the smallest credit union (holding less than $10 million in total deposits) to the largest institution holding more than $1 trillion in total deposits and all others in between including community banks, bankers banks, corporate credit unions, saving banks, state charter banks, national banks and middle tier institutions. ECCHO’s membership includes approximately 3,000 financial institutions.

The structure and processes that support this successful governance is similar to that described in the Diagram 8. The process includes three levels: subcommittees, ECCHO Operations Committee and the Board of Directors. Participants in the rules creation process include financial institution members described above and other representatives like:

- Providers that support the image deposit, clearing and settlement processes
- Vendors that support, image archive, return and adjustment processes
- Regional Payments Associations
- Consultants with knowledge of and interest in check processes
- Regulators
- Other invited guests where additional specialized knowledge might be needed. One example of guest participation is the inclusion of Payments Canada (formerly the Canadian Payments Association) and a number of Canadian financial institutions. They were included to assist in the development of rules for northbound exchange of images of Canadian cheques.
Structure for Real Time Payments Governance

ECCHO will leverage the governance structure that it utilizes for image exchange which consists of three levels: ad hoc subcommittees, Real Time Payments (RTP) Committee, and Board of Directors.

Level One Uniform Rules Creation: Subcommittees

The subcommittees will initially identify legal issues that are not addressed elsewhere in statutory law/regulations/case law to begin development of the Uniform Rules. Beyond meeting the direct legal requirements, this approach supports the ongoing need to enhance and/or clarify the rules and commentary to address user/participant needs not originally addressed in the initial set of Uniform Rules.

Subcommittees are designed to reach in-depth understandings of issues, consensus positions on what actions, if any, should be taken, and then to bring that learning to the RTP Committee for additional analysis with the objective of reaching broader consensus positions.

![Diagram 6: Governance Structure Enables Stakeholder Input]

This development process also provides the added benefit of educating the participants in the nuances of the existing or proposed laws, regulations and rules. Although Subcommittee meetings are typically accomplished via conference call for efficiency, initially in-person meetings might be more productive for the development of Uniform Rules.

Participants in the Subcommittees would include representatives from all segments of the industry including large and small banks, bankers’ banks, credit unions, corporate credit unions, solution providers, payment legal experts and other interested parties, as appropriate, such as regulators. Because all segments are represented in the subcommittees and RTP Committee process, every rules related issue can be addressed through this process.
Level Two Uniform Rules Creation: RTP Committee

The RTP Committee would meet in person to debate and finalize Rules recommendations for the Board. Some will participate directly in the RTP Committee meeting while other members will be participating indirectly through representatives.

It is important that all issues are discussed with the entire group present at the RTP Committee meetings. In-person meetings seek to be as large as possible while still providing the ability for all to participate in input and debate. Discussions would be facilitated through the use of one microphone for every three participants and a speaker system that allows every attendee to hear everyone and to actively contribute to the discussion.

If consensus positions are not reached, the issues would be tabled or sent back to the subcommittee for additional discussion. If a consensus position is reached, a recommendation to the Board would be agreed to at the in-person RTP Committee meeting with every participant present. Consensus means no substantive disagreement with the recognition and agreement from institutions in all segments of the industry and all providers and regulators at the meeting.

Level Three Uniform Rule Creation: Board of Directors

The Chair of the RTP Committee would take the exact recommendation developed at the RTP Committee meeting to the Board of Directors. This unique step is critical to preserve transparency.

The RTP Chair would be a banker that is elected by the Board of Directors. The Chair would be responsible for delivering a review of the RTP Committee’s discussion and the recommendation of the RTP Committee directly and in person to the Board of Directors. This process is designed to ensure maximum transparency so the broad base of
participants will know that their voices have been heard and represented in the final recommendations as agreed to at the RTP Committee meeting.

ECCHO's Board comprises 21 seats, which is sufficiently large to fairly represent the industry while small enough to effectively discuss and decide the Uniform Rules. Board members are executives from member financial institutions. The size of directors' financial institutions is representative of the industry with large and small member organizations represented (small financial institutions are represented by Bankers’ Bank and Corporate Credit Unions).

Once the Board approves the Uniform Rules and Commentary, notification of the approval would be announced to the membership and the Uniform Rules posted to the ECCHO website where they would be publically available.

**DIAGRAM 8: GOVERNANCE STRUCTURE ENABLES RULES DEVELOPMENT**

![Governance Diagram](image)

**Governance synopsis:** The process will begin with the contribution of a diverse set of stakeholders that participate in ad hoc subcommittees. These ad hoc subcommittees are created to fulfill specific purposes for as long as needed including: rules development, exceptions processing, legal issues, etc. The subcommittee participants would be experts who have the knowledge to create, review, edit and debate the purpose/intention of the Uniform Rules. Subcommittee members would be eligible to participate in the in-person Real Time Payment Committee as well. The RTP Committee exists to take input and strawman rules from the subcommittees, with the intention of producing rules recommendations to the Board of Directors. Finally, the Board will take these rules recommendations and approve them or send them back to the RTP Committee for additional work. Uniform Rules will be made available to the public on the ECCHO website.

**G.1 Effective governance**

**G.1.1:** Please provide a governance diagram for the Solution and outline stakeholder participation/membership of key governance committees, where known.
Please see Governance Approach and Structure narrative and diagrams above.

G.2  Inclusive governance

G.2.5: How will the Solution’s approach to governance manage actual, perceived, or potential conflicts of interest?

Please see Governance Approach and Structure narrative and diagrams. ECCHO’s proposed model of governance for real-time payments is bank-centric. Banks make the warranties to each other, banks make agreements with their providers, and banks make agreements with their customers. This isolates conflicts of interest between the various providers.

Any conflict of interest among the banks is then managed through the Rules development and maintenance processes, and the governance structure and processes that include broad industry participation in a transparent and consensus building process.

Further, because ECCHO’s proposed model for governance requires the participation in subcommittees/committees and the ultimate consensus for Uniform Rules from a very diverse group of financial institutions across the industry, it would be difficult for even the perception of a conflict of interest to arise.
Faster Payments QIAT

DRAFT ASSESSMENT
Faster Payments QIAT

DRAFT ASSESSMENT

Proposer: Hub Culture, Synechron, ECCHO, Xalgorithms

Summary Description of Solution

RAIN/RAIL is a Distributed Ledger Technology (DLT)-like solution. The Real-Time Asset Interchange Network (RAIN) and the Real-Time Asset Interchange Ledger (RAIL) together create a network that enables real-time exchange of value, including fiat currency, digital assets, checks, and other asset types. RAIN does not leverage DLT for transaction processing (throughput is not sufficient), but rather uses what it calls the “Vast Closed Loop.” RAIL leverages DLT to create an Open Audit ledger to capture the details of every transaction. RAIN/RAIL leverages blockchain technology to support the ledger, and blockchain’s proven capability to track and retain data.

This “vast closed loop”—i.e., the solution network—supports P2P, B2B and N2N (node to node) transactions and can support both push and pull payments. Each participant in the network (RAIN) receives a Unique Synchronized Identity (USI), a tokenized personal identifier that is used to route payments. The USI can be layered onto existing depository accounts. For business end-users, the solution will also leverage DUNS numbers issued by Dunn and Bradstreet to create a unique blockchain ID for most DUNS-numbered business entities.

The network (RAIN) is supported by a Master Base Asset (MBA) that exists as a unit of value in all nodes. The proposal states that MBA can be weighted to 100% value of the USD (or any other fiat currency), or it can function as a weighted basket of assets. MBA value converts into other value assets (e.g., U.S. dollars) based on real-time pricing mechanisms to support settlement into legacy accounts. The amount of MBA held in the RAIN is called the RAIN Pool. Each node maintains its own RAIN Pool to support instant, irrevocable transactions in MBA. Approval and clearing of transactions occur simultaneously, and all settlement within the network consists of the exchange of MBA.

The ledger (RAIL) is a distributed audit ledger (as opposed to a distributed transaction ledger like Bitcoin) that records the details of all transactions between network participants (time stamp, value, asset type, sender, receiver, push or pull payment) as they occur. RAIL also uses a smart contract (self-executing contractual states stored on the ledger) capability for rules automation. Providers operate nodes and create their own private ledgers that auto-replicate to the central ledger as transactions occur. End-users can choose to maintain an MBA RAIN pool of their own, or to convert in and out of MBA using existing accounts held at Network Aggregation Players (NAPs). NAPs are essential providers of conversion services between MBA and localized asset(s). Providers (depository institutions, non-bank account providers or financial intermediaries) can act as NAPs and can create nodes and provide multiple end-users with access to RAIN using an existing interface or identifier (online banking profile, account number, credit card number, PayPal account, email address, phone number, etc.).

The solution includes a small number of Federated Authority NAPs, which are the principal nodes of the distributed technology. They contribute MBA to cover the cost of hosting and processing distributed nodes for the RAIL. Federated Authority NAPs enjoy enhanced decision-making and have additional responsibility for custody of float reserves in commercial bank money, dispute resolution, and other system-wide services. Federated Authority NAPS are designated based on input from the market and the Federal Reserve. Correspondent banks and other major financial institutions with regulatory approval
could act as Federated Authority NAPs. It is estimated that less than 5% of NAPs would qualify as Federated Authorities.

RAIN/RAIL will create a payments platform that can enable a robust system of application development around a common core. Individual providers/NAPs control their USI, including how that USI is accessed and/or used.

EXECUTIVE SUMMARY OF THE PROPOSAL

■ Major Strengths
  – RAIN/RAIL can support direct-value payments between any accounts with a USI. The solution, including the RAIN and the RAIL, is inclusive and participative. The network is open and available to credit providers, insurance providers, and others.
  – The solution is expected to drastically lower transaction cost, time, and infrastructure expenditure across the network (p.31).
  – The use of a USI ensures adequate privacy for both payers and payees. The data available in RAIL affords data-mining opportunities using a stream of anonymized data.
  – The solution will rely on ECCHO to support system rule-creation and a governance approach.

■ Areas for Improvement and Enhancement
  – The proposal states that the MBA in circulation within RAIN will be 100% backed by underlying assets. There is no description of how NAPs will manage underlying asset pools to represent the movement of MBA among NAPs within RAIN.
  – The proposal does not describe how the solution will support network-level fraud monitoring (S.1.4). More information and detail regarding the dispute process (S.5) are also suggested. The proposal does not describe how the solution would store, manage, and destroy transaction-related data and PII (personally identifiable information) (S.7). Additional details regarding the authentication of end-users and granting of USIs would be helpful. The solution currently does not include a legal framework or a governance framework.
  – There are some questions regarding adoption of the solution. The solution’s success will be influenced by the number of NAPs that participate. The proposal does not describe a clear plan for engaging NAPs to achieve the required growth. Incentives for NAPs are related to revenue opportunities presented by MBA conversion, data distribution and collection, and other value-added services.

■ Use Cases Addressed
  – The solution supports P2P, P2B, most B2P, B2B P2N, and Node-to-Node (N2N) use cases. (A node is an account or entity.)

■ Proposer’s overall ability to deliver proposed solution
  – The proposal is highly technical and leverages a developing technology (DLT) that has not yet been widely adopted. The proposal describes the value proposition and identifies the entities that would be responsible for certain roles in the solution.
  – Some of the core technology for RAIN/RAIL already exists. The network was built and deployed in 2007 as part of a P2P digital asset transfer system, and the solution was expanded in 2015 to include B2B and N2N payments. The proposal indicates that an expanded prototype can
be built in less than 12 months that would enable any participant to join the system as an individual. The prototype will also enable payment routing to any domestic or international bank account, credit card, email address, phone number, or NAP address in real time. Integration is described as simple for end-users, but the proposal does not describe how it will solicit providers, nor does it define a timeline for reaching critical mass. Legacy users will have to build on-ramps to RAIN/RAIL, but the network itself delivers the necessary connections between the nodes. RAIN proposes to function as a member of the existing correspondent banking system to enhance adoption and integration speeds.
ASSESSMENT

Ubiquity

U.1  Accessibility

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Rationale

The solution allows any participant with a USI to access the solution (whether directly or indirectly) (U.1.1). End-users do not have to have a regulated bank account as long as they have the USI and a Master Base Asset (MBA) account (U.1.4).

MBA is a digital currency that uses cryptography to control the creation of new value and to verify the transfer of its funds. MBA can be weighted to 100% of the value of the USD or other fiat currency, or it can act as a weighted collection of assets. All MBA in circulation within RAIN is 100% backed by assets held by NAPs. As such, the solution can operate independently of a central bank. The solution will be able to change MBA (or Ven, a form of MBA) into other currencies in the future. It currently has foreign-exchange functionality (U.1.3).

It is quite easy for end-users to create a USI by inputting existing data into a digital account interface. When data is entered multiple times into the system, the solution will seek to reconcile and merge common data points into a single USI. Alternatively, end-users can have multiple USIs if they wish. The data sources required to build a robust USI will be the same across all NAPs. The solution includes the availability of APIs to allow NAPs to quickly implement the capabilities needed to create USIs for their customers (U.1.5). The solution does not provide requirements (design, functionality) for the RAIN User Interface, which may result in a different end-user experience across NAPs.

The solution’s closed loop strongly supports interoperability within that loop. Outside of the loop, integration will depend on the NAPs’ level of investment. This interaction will involve initiation, settlement, and reconciliation. The solution plans to expand its coverage of the financial system by identifying new USI categories and using these to expand the network and to increase the number of accounts and connections. RAIN’s presence in the correspondent banking system will support this initiative (U.1.6).

Reaching end-users without a USI is challenging, as it is not clear how these recipients will understand that they have received a payment (U.1.2). When a payment is sent to a recipient without a USI, the funds are held in escrow until the recipient accepts the payment (i.e., obtains a USI either through a NAP or on his/her own). It is unclear how long the payment would remain in escrow.

While there currently is a foreign exchange function, development of conversion rates and a mechanism for exchange will need to be further developed (U.1.3).

It may be challenging for an end-user who does not have access to identity data or other verification resources to create a robust USI that will support payments (U.1.4).

The proposal suggests that the solution (including rules) could be functional within one year. By the end of Year One, there could be one million end-users supported by 10 NAPs. By the end of Year Five, there could be 100MM end-users (including bots) supported by 1,000 NAPs. While the proposal indicates that USIs will grow rapidly, the creation of an adoption plan describing the proposed growth in more detail (e.g., target end-users, number of NAPs required, yearly milestones,
actions, and responsibilities) would be helpful (U.1.5). It would also be beneficial to provide more detail about the APIs that will be available to support NAP integration.

U.2 Usability

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**Rationale**

It is relatively easy and secure to initiate authenticated payments with a USI. The USI can be linked to many data elements (e.g., a bank account, phone number, email, or other options) to initiate the payment. While it is not explicit, the proposal implies that any device or channel can connect to the solution. Encryption delivers transaction security. The solution is accessible 24x7x365 and is completely transparent to all nodes.

As described, the design of the UI is determined by the participants (e.g., NAPs). The solution does not provide any requirements or guidelines but does suggest that the basic UI of the RAIN would act as a base standard for NAPs. The process by which an end-user obtains a USI is unclear, as is how end-users will actually access the network. Although the proposal implies that any device or channel can connect to the solution, it does not explicitly list these or the conditions under which these access points will or will not function (U.2.1). It is also difficult to understand whether the solution supports P2B payments via POS (point of sale) or online; no processes or details are provided (U.2.2).

It would be helpful to have more information regarding ease-of-use and accommodations for those with disabilities, the elderly, and those with limited proficiency. Finally, because the NAPs are responsible for posting end-user transactions to RAIL, which determines the finality and immediate availability of Good Funds, the solution should provide participation requirements and guidelines for the NAPs in this area (U.2.3).

U.3 Predictability

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**Rationale**

The process of creating a USI and the points of data that are required for a robust USI are standardized across the system. The proposal does not provide guidelines to ensure that the end-user’s experience is consistent across different NAPs and for directly-connected users. Functions or services available to the end-user may be different depending on how each NAP opts to manage the required information to support payment, as well as the availability of value-added services (U.3.1 and U.3.3).

The proposal does state that Xalgorithms’ controls and components will enable any digital commerce or payment solution to draw reliably upon standardized, external computational rules in a common way (U.3.4).

The proposal states that the terms and conditions regarding error resolution and rights and liabilities will vary by use case and payment type. It would be helpful to have more information defining the minimum requirements related to transaction timing, funds availability, legal rights, costs, and risks.
of the payment experience for end-users (U.3.2). The solution will rely on the ECCHO process to define rules and governance at a later point, and it is expected that these rules will be clearly defined and easily understood by all parties (U.3.5).

U.4 Contextual data capability

| Very Effective | Effective | Somewhat Effective | Not Effective |

**Rationale**

The solution is designed to be compatible with ISO20022 and SWIFT messaging formats, and will use a proprietary message format (Synchronized Standard) to expand upon ISO to create additional message compatibility. The solution will include some unstructured (i.e., available) space for unique data transmission (e.g., contextual data) to allow contextual data to be transmitted with the transaction. All permissioned ledgers will include a data field for information about a transaction that can support USI information and messaging between transaction participants in an unstructured format.

NAPs will be able to develop their own messaging templates as needed to support use cases. RAIL will not define contextual data beyond the components of USI core identity. There is no description of RAIL’s attributes (e.g., the open receipts ledger) or requirements related to each transaction type (p. 34). It is also unclear how the contextual information will be available to the beneficiary (U.4.1). The proposal does not address direct integration into personal and business finance systems (U.4.2); rather, the solution supports searching for transactions by USI code and importing these transactions (including any contextual data) into personal and business finance software through the use of publicly available APIs. The USI owner would be required to approve the sharing of information. This capability is described as a service that would be provided by NAPs. At this point, the proposal states integration will depend on end-users’ capabilities (if done directly) or NAPs’ internal development (if done indirectly).

U.5 Cross-border functionality

| Very Effective | Effective | Somewhat Effective | Not Effective |

**Rationale:**

RAIN/RAIL appears to be already performing effective cross-border transactions within the closed-loop network (U.5.1). RAIN/RAIL can support multiple currencies through conversion to/from the MBA. The solution is not designed to hold multi-currency local assets in the MBA pool, but it will support conversion to the MBA pool currency. NAPS will provide currency conversion services (U.5.4). To support the disclosure of any fees associated with conversion (U.5.3), the proposer states that a real-time feed of foreign currency mid-rates can be developed, providing a reliable format for comparing various conversion providers’ rates.

At launch the system will be global, allowing multi-country access the system. Local language capabilities can be introduced to appeal to local markets. The current solution will include and support base transaction capability in 13 languages (U.5.2).
The solution does not describe in detail how it would successfully integrate with the different standards and comply with the various laws in different countries or locations in its cross-border transactions (U.5.2). In addition, the proposal does not yet provide a clear outline of its plan to introduce RAIN/RAIL in other countries (U.5.5).

U.6 Applicability to multiple use cases

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**Rationale:**

Efficiency

E.1 Enables competition

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**Rationale:**
RAIN/RAIL strongly enables competition among NAPs. Many different organizations, as well as individual end-users, can become nodes and connect directly to the RAIN. This broad availability of NAPs should provide end users with a choice of providers (E.1.1, E.1.4). End users can use the same identifier (e.g. telephone number) across multiple NAPs, but if they wish to switch between NAPs, a new USI will be required (E.1.2). The solution will provide APIs to NAPs that will support the provision of fee information to end users (E.1.3).

Any of these nodes can develop competitive services. RAIN/RAIL has not yet defined participation requirements for the network (E.1.4). When solution rules are created, RAIN/RAIL should include a rule that requires NAPs to disclose the total costs of a transaction to the end-user in advance (E.1.3).

E.2 Capability to enable value-added services

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**Rationale:**
Application providers can use open APIs from RAIN/RAIL to foster innovation and to support additional use cases (E.2.1, E.2.2). All NAPs and end-users would have access to the transaction information in RAIL in an aggregated, anonymous format. Each NAP will have its own sub-ledger and access to its own users’ transaction information. End-users will have access to their
personal/business information on their sub-ledgers. Data privacy is maintained by making the data on RAIL anonymous and tokenized.

The data associated with RAIL creates opportunities for the development of value-added services (with consideration for all applicable regulation). There are no restrictions on who can connect to RAIN or on who can use RAIL’s transaction data to create such services (E.2.2).

When the solution rules are developed, RAIN and RAIL will need to ensure that system rules require providers to clearly disclose that value-added services are optional to end-users (E.2.3).

E.3 Implementation timeline

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**Rationale:**

The proposal states, “The first aspects of the RAIN system could be available in a matter of months, with basic implementation of the USI available in less than 12 months.” The proposal outlines three main motivations for existing account providers (NAPs) to participate in the solution: reduced cost, greater access to data, and new opportunities for monetization.

The solution will provide an online registration portal for banks and PSPs (payment service providers) to access key documents, APIs, and other important information for the RAIN/RAIL solution. It would be helpful if the proposal included estimates of the investment required for NAPs to participate (architecture, integration with legacy infrastructure, on-ramp build, ledger build, etc.) in RAIN/RAIL. The proposal indicates that an implementation roadmap will be created.

With regards to access to the RAIN, USIs and account structure present a new data format that will be used across the system. Market participants can develop APIs to connect legacy data formats to the RAIN system to support account management and transaction protocols. The solution will initially be funded by Hub Culture; partners in the closed-loop solution will be invited to invest. New value-added services will be developed, funded, and introduced by market participants.

E.4 Payment format standards

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**Rationale:**

The solution is designed to be compatible with ISO 20022 and SWIFT message formats (E.4.1-2,4-5). A proprietary USI standard (called a “Synchronized Standard”) will expand upon ISO components to create additional message format compatibility. The solution will translate messages between ISO 20022 and ISO 8583 using the same methodology that will be used to tokenize information into the USI string. The solution is focused on creating the USI string and the translation of any data components that will support the USI; all other messaging will be provided by NAPs.

The proposal would be strengthened through the provision of details outlining how translation will occur between the Synchronized Standard and other message formats, and where in the transaction flow this translation will occur (E.4.1, E.4.2).
E.5 Comprehensive

**Very Effective**

**Effective**

**Somewhat Effective**

**Not Effective**

**Rationale:**

RAIN and RAIL together provide an open, flexible, end-to-end payment process (E.5.1). End users can access the solution through a NAP or by connecting directly to the solution. The solution is based primarily on online access, and limited SMS/mobile functionality already exists. Other channel opportunities can be developed and introduced by market participants.

NAPs define and provide end-user authentication. Authentication can consist of a password, biometric data, or other dual factors, depending on the device’s capability and the NAP’s requirements. The proposal can strengthen its position by describing more requirements for the specific steps of the payment process—by describing how a transaction is initiated, authenticated, approved, cleared, received, settled, and reconciled (E.5.1). The proposal provides minimum requirements to support transactions inside the RAIN pool, but it would be helpful to understand the minimum requirements associated with all stages of the payment process. This description should cover items such as the channels that would be used, the details and requirements for the MBA account(s) (RAIN pools), conversion notifications, etc. It would be helpful to have more details about how the solution’s modular design enables a provider/NAP to easily upgrade a feature or component without negatively impacting other features (E.5.2).

E.6 Scalability and adaptability

**Very Effective**

**Effective**

**Somewhat Effective**

**Not Effective**

**Rationale:**

The RAIN/RAIL proposal identifies 10 use cases and has an open network that can enable additional use cases (E.6.1). The proposal describes how the solution will support substantial growth in USIs and states that the solution will support approvals of millions of transactions per second (E.6.2). The proposal indicates that core network partners will manage core system upgrades based on contribution budgets for ongoing work. The cost of data storage space is the largest impediment to optimized transaction processing by the Vast Closed Loop of RAIN.

The proposal would be strengthened by providing details regarding NAP growth or transaction volume projections, and by describing the infrastructure required to support volume growth. RAIN’s underlying technology is not described in detail, and risks associated with scaling may exist (E.6.3).
E.7 Exceptions and investigations process

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**Rationale:**

The solution uses alerts, notifications, and messages to confirm transactions (both success and failure) and other activities in the network (E.7.1). The proposal states that RAIL will handle exceptions and use its real-time accounting capability to trace transactions between solution participants. RAIL will store all transaction-related information, and this data is available to all nodes (E.7.2).

For standard dispute resolution, a callback function is available that requires the approval of the account holder of the NAP. Escalated disputes are passed to mediators in the network for resolution. Dispute resolution is described as potential revenue stream for NAPs or other startups in the ecosystem rather than a standardized process that applies to all providers. The proposal does not describe any tools to support mining this data for exceptions (E.7.2), nor tools or protocols to facilitate communication with NAPs or end-users about exceptions and investigations (E.7.1). The proposal does not describe the monitoring of transactions at an aggregated level to identify patterns at a network level (E.7.3). The proposal does indicate that if authorized law enforcement or regulator access is required, the end-user or NAP will be informed of this access through an alert.

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Safety and Security

S.1 Risk management

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**Rationale**

The system is flexible and versatile and could accommodate the unexpected application of law or regulation (S.1.1). It can limit or disengage certain functions or operations if required by law or regulation without destroying the entire system. The proposal suggests that consideration should be given to seeking an overarching, competent, global regulator who can supervise the RAIN in a way similar to the supervision of other financial clearing houses.

With regard to liquidity risk concerns associated with the use of MBA, the solution is 100% asset-backed; the NAP or RAIN itself holds all underlying assets. In the unlikely event that a NAP becomes insolvent, it is unclear whether the RAIN pool will be protected. The conversion risk arising from conversion between MBA and localized assets is mitigated by conversion to an exchange rate at point of exit rather than a fluctuating asset value inside RAIN. It is possible to weight MBA to 100% fiat currency, which would further address conversion risk.

NAPs will determine how end-users will be authenticated, manage KYC and AML, determine how long payments will be held in escrow, define a maximum transaction value for RAIN/RAIL payments (if any), and will be expected to develop their own fraud monitoring and detection capabilities related to their nodes (S.1.4). Minimum requirements would be helpful to provide consistency and to address risk across participants.
Regarding payment errors, the solution includes a push-and-pull request capability so that a payment made in error can be recalled from the recipient. Recalled funds are held in escrow and require the NAP or end-user to approve the return. The escrow period can be as long as required for agreement to be reached between the involved parties. It would be helpful for the proposer to describe the process and accountabilities more clearly as system rules and legal framework are developed.

Poor governance can weaken Distributed Ledger Technology (DLT) structures, thus leading to hard forks (a permanent divergence in the blockchain) that contravene DLT’s immutability and irrevocability. The proposal suggests that the process for hard forks will be relegated to RAIN members, with the overarching RAIN governance structure providing ultimate governance.

S.2 Payer authorization

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**Rationale:**
The NAP is responsible for payer authorization and security, as well as for determining levels of access and any transaction value tiers (S.1.1). The solution allows for pre-authorization of payments through NAPs using smart contracts (S.2.2). End-users can access a preauthorized payment schedule through an online interface provided by the NAP or RAIN (S.2.3). The core solution enables this functionality, and APIs can be extended from RAIN through to the NAP.

S.3 Payment finality

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**Rationale:**
The solution clearly defines when a payment becomes final. Transactions occur within the pre-funded, closed-loop network without the need for FIs’ authorization; instead, end-users’ DLT balances are checked (S.3.1). It would be beneficial for the proposers to develop a supporting legal framework for payment irrevocability (S.3.2). The proposal should also describe the “mechanisms and processes [it would use] to protect and compensate the payer in [the] event that the payment is disputed... [ensuring that these] ...comply with relevant consumer protection regulations, including Regulation E” (S.3.3). These mechanisms and processes may differ for end-users who connect through NAPs versus those who connect to RAIN directly.

S.4 Settlement approach

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**Rationale:**
Clearing and settlement within RAIN leverage the MBA occurring within the Vast Closed Loop in real time (S.4.1); there is minimal inter-provider credit and liquidity risk, as each transaction is
prefunded (S.4.2-3). If MBA funds are not available, the transaction does not occur. The commercial funds underlying MBA are maintained as a float and are held in reserve with NAPs and Federated Authorities of the RAIN. This “persistent float” sits in reserve to back the MBA in circulation.

NAPs manage the end-users’ accounts and their MBA balances and handle the conversion of MBA to or from commercial currency. NAPs will use infrastructure currently in the market to support conversion of MBA to commercial currency. As real-time options are introduced to the market, the customer experience will depend on the system selected by a NAP to support conversion. It is not clear from the proposal how many Federated Authorities will be named as part of the solution. As these Federated Authorities will have responsibility for the custody of the float reserves in commercial currency, these entities will be an important component of settlement risk management. The proposal would be strengthened through the provision of additional details as to their responsibilities and accountabilities in this role (S.4.2)

S.5 Handling disputed payments

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**Rationale:**
Unauthorized, fraudulent or other disputed payments are posted to the RAIL as a transaction information type that follows the original payment. The proposal indicates that Federated Authority NAPs will define dispute resolution rules and suggests that the solution could parallel some of the user protection features already resident in Reg E (S.5.1). The proposal indicates that a list of relevant consumer protection laws will form one component of the rules for the system (S.5.2).

The proposal could be strengthened by providing minimum requirements related to disputed payments to ensure that the requirements of Reg E, Reg Z, and other relevant laws and regulations are met (S.5.5) and to guide the Federated Authorities in creating dispute management services (S.5.1).

S.6 Fraud information sharing

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**Rationale:**
RAIL serves as an open, central ledger that captures all transaction details at the network level. Any node can access RAIL data to support fraud management. The data stored in RAIL will be overseen by the RAIN/RAIL governance entity (S.6.3). The solution supports the capability to aggregate fraud information to spot patterns that may not be visible at the level of an individual participant” (S.6.7). NAPs are expected to develop their own fraud monitoring and detection capabilities related to their nodes. The proposal does suggest but does not require that RAIN pool and USI systems develop a neural net to identify and isolate fraudulent behavior in the system through the use of RAIL data.

The solution would be strengthened through the required sharing of information across providers to facilitate the monitoring and management of fraud (S.6.1) and by ensuring that access to content is
controlled and monitored (S.6.5). This data can then be aggregated (perhaps by a third party or RAIN/RAIL itself) and shared across NAPs (S.6.6).

**S.7 Security controls**

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**Rationale:**
The solution itself delivers security, in part through the intrinsic security capabilities of DLT and crypto-currencies. The proposal would be strengthened by providing details regarding the other elements of operational and procedural components and controls (S.7.2), the elements of technical access components and controls (S.7.1), and managerial policies and oversight (S.7.3). The solution should provide clear direction and define minimum requirements (operating rules) for NAPs related to identity verification and access management, data encryption in transit and at rest, data quality and integrity controls, and data breach prevention and detection. The proposal states that it is difficult to spoof an account because the crowd is always able and available to monitor for anomalies (p.38), but it does not provide any requirements related to the identification and broad communication of anomalies (S.7.1).

**S.8 Resiliency**

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**Rationale:**
Because the solution is a widely distributed model, it should always be available. The proposal states that the solution has been operating at 99.97% availability. RAIL’s distributed solution should have resiliency, as any attack on individual nodes should not compromise the entire system (S.8.3). Because there is a single network, threats can be detected and counteracted through network-wide monitoring of anomalies in the consensus process, transaction reversals, and conversion of funds, leaving the RAIN pools to localized assets. The proposal does not indicate whether the solution includes a network monitoring capability.

The proposal could be strengthened by defining how it will achieve availability metrics (S.8.1). Availability requirements should also be defined for each node. The proposal does not provide any details on DRP (disaster recovery plans) or BCP (business continuity plans) for the network, the ledger, or for individual nodes (S.8.2, S.8.4).

**S.9 End-user data protection**

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**Rationale:**
The solution supports payment using an alias (S.9.2) and there is no need for transactions participants to learn of one another’s account numbers (S.9.3). The solution has robust controls and
mechanisms to protect end-user data, including cryptographic tumblers that link the ledger and the network, as well as tokenization of the USI. Encryption protects all user information.

There are mechanisms in place to protect sensitive, payment-related information based on the inherent cryptography (S.9.3). The solution states that distributed storage of USI information is preferable to avoid a single point of failure. Individual end-users will be able to own and store their USI via an online account with RAIN that they set up and maintain relatively securely. (It is expected that NAPs will issue and store USI information on most account-holders’ behalf.)

S.10 End-user/provider authentication

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Rationale:
The proposal describes the authentication/validation of a USI for both payer and payee, as well as the validation of available funds, but it does not describe any end-user authentication requirements related to setting up and accessing a USI to initiate or receive a payment. NAPs are responsible for end-user authentication. The proposal should define minimum requirements to support authenticating the end-user to RAIN (S.10.1). The USI framework ensures that payments reach the intended recipient (S.10.2). The solution supports differentiated account service capabilities, depending on the USI’s strength (the more robust the USI, the greater the functionality permitted to the end-user). Each NAP can define differentiated access, including differentiating access by transaction value and channel (S.10.4).

The proposal would be enhanced by providing minimum requirements for end user authentication that meet regulatory standards (S.10.1, S.10.3), including a requirement for an end user to authenticate to the solution prior to multiple transactions (S.10.5).

S.11 Participation requirements

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Rationale:
Minimum requirements to participate as a NAP at solution launch begin with status as a Money Services Provider or a regulated FI. The solution states that NAPs could be segmented into different categories of participants within the network. The proposal envisions technology companies and other non-traditional account-providers (social networks, MNOs, unions, associations, etc.) qualifying as NAPs (S.11.2).

The solution would be strengthened by defining the capabilities that each type of NAP must provide (e.g., social networks cannot directly support conversion of MBA to fiat currency, but they can support transactions within RAIN) and to establish minimum participation criteria. The proposal does not describe how its participation requirements will ensure that all providers adhere to the solution’s rules and requirements for their role (S.11.1), and that all compliant providers have the operational, financial, and legal capacity to fulfill their obligations on a timely basis (S.11.2). Additionally, details regarding monitoring NAPs for compliance with participation requirements would be helpful (S.11.3).
**Speed (Fast)**

F.1 **Fast approval**

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**Rationale:**

This rating is based on transaction speed within the RAIN network. RAIN meets the Task Force’s criteria for Very Effective fast approval when transactions occur within the closed loop (Very Effective = within two seconds). The evaluation does not consider timelines associated with funding the RAIN/RAIL account or converting MBA to commercial currency. The proposal states that availability of MBA funds is a point of potential service differentiation in the market. It is expected that the time needed to convert commercial currency to and from MBA will vary by NAP.

F.2 **Fast clearing**

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**Rationale:**

RAIN meets the Task Force’s criteria for Very Effective fast clearing when transactions occur within the closed loop (Very Effective = within 2 seconds). It is unclear how long clearing will take when transactions requiring conversion to/from MBA are conducted through legacy systems with NAPs. As stated in the proposal, conversion presents an opportunity for service differentiation in the market.

F.3 **Fast availability of good funds to payee**

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**Rationale:**

RAIN provides instant availability of MBA (not commercial currency) to the payee or to a NAP (if the payee uses a NAP) within RAIN. The availability of funds when converted to commercial currency from MBA will depend on when end-users choose to convert MBA, as well as NAPs’ capabilities to support conversion.

F.4 **Fast settlement among depository institutions and regulated non-bank account providers**

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**Rationale:**

This criterion evaluates settlement in commercial currency between FIs to support transactions within RAIN. The proposal indicates that it will be up to the individual NAPs to manage settlement.
by matching settlement within RAIN with existing settlement capabilities. Although settlement is instant within RAIN’s closed loop, there are no requirements to define settlement of funds between FIs which can result in risk exposure (F.4.1). RAIN does not manage the risk of settlement in commercial currency, only in MBA.) NAPs manage their own floats by holding reserve assets relative to their RAIN pools. RAIN is always available, so time zones are not an issue (F.4.2).

F.5 Prompt visibility of payment status

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**Rationale:**
The system responds immediately to each transaction—showing it as pending, approved, and received. The system also confirms when a NAP receives funds on a user’s behalf. The RAIL may not update as quickly as transactions are processed, and it is unclear whether the RAIN or the RAIL generates responses to end-users. It would be beneficial if the solution defined requirements related to end-user notification as part of governance or legal framework efforts.

Legal

**L.1 Legal framework**

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**Rationale:**
There is currently no existing, comprehensive, statutory or regulatory law that addresses real-time payments in the U.S. (L.1.1). The proposer assumes that a universal set of rules (rather than bilateral agreements) will be created to govern all users and providers of real-time payments. These rules (Uniform Rules) will allocate liabilities among all parties using and providing all solutions. In addition to the Uniform Rules, solution providers and their customers will establish Provider Agreements that describe the services provided, pricing, disputed payments, availability, etc. Last, FIs and their customers will establish Financial Institution Agreements that describe the service provided, pricing, dispute resolution procedures, FI responsibilities, and customer responsibilities.

The proposal suggests that creating rules without involving key stakeholders would be premature. However, the proposal could identify core guidelines and principles, as well as an intended approach (L.1.1).

**L.2 Payment system rules**

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**Rationale:**
The proposal provides a summary list of components of the Payment System Rules that will be specifically detailed and documented once ECCHO has developed the legal framework and rules for Faster Payments (L.2.1). A Governing Committee for the RAIN—part of a non-profit
management service with participation by network members—will manage rule extensions or changes (L.2.2). For monitoring and enforcement, the Proposer believes that the system will rely on a series of warranties that 1) banks make to each other, 2) providers make to their customers, and 3) banks make to their customers (L.2.3).

L.3 Consumer protections

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
The proposal states that the envisioned Uniform Rules will designate the responsibilities of each of the Financial Institutions in the payments process, including the allocation of legal and financial responsibility for unauthorized, fraudulent, or erroneous payments (L.3.1). The Provider Agreement and FI agreements with end-users will address the actual process for error resolution (presumably through operating regulations describing solution requirements). The solution states that it will offer flexibility in RAIN for consumer protection based on local preferences—i.e., “consumer protections such as refunds, insurance, and more can be introduced as part of the system to address consumer needs on a market-oriented basis” (L.3.3).

L.4 Data privacy

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
The cryptographic nature of the USIs in RAIL protects end-users from the impact of a data breach, as no PII is stored in RAIL (L.4.5). It is understood that all nodes have complete access to the data stored in RAIL. The proposal describes key attributes of the approach to data privacy that will be considered as part of the legal framework (L.4.1). End-users will have access to their data and privacy preferences through an online, account-based system that can be linked by their NAP or accessed through the RAIN end-user platform (L.4.4). It is expected that data privacy requirements (for example, end-users’ access to their data) will be developed as part of the Uniform Rules and implemented through Provider Rules and FI Rules.

The proposal does not provide any details as to the architecture of the system (hardware, security, etc.) (L.4.2), where the main ledger will reside, or how access to RAIL will be managed and monitored in accordance with applicable regulation (L.4.2). Also, no requirements of any kind are provided regarding the individual ledgers that will reside within each node.

L.5 Intellectual property

| Very Effective | Effective | Somewhat Effective | Not Effective |

Rationale:
The proposal outlines an approach to ownership of Intellectual Property (IP) for RAIN and RAIL and their build-on services. However, it does not currently have “a proposed approach for RAIN
and RAIL, end-users, and providers to resolve or manage, prior to implementation, any legal, operational or financial risks arising from third-party intellectual property rights” (L.5.1). The solution will work with ECCHO, which has already had direct experience with IP rights through its image technology lawsuit. ECCHO will do the research needed to prevent a similar situation from happening with RAIN and RAIL.

**Governance**

**G.1 Effective governance**

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**Rationale:**
The proposal describes governance related to the Uniform Rules for real-time payments, along with the structure and processes to support this governance as implemented by ECCHO for Image Exchange. The proposal describes a reasonable approach to effective governance, with governance arrangements (e.g., Board of Directors, ad hoc and standing subcommittees) and representation from a wide range of stakeholders. More detail regarding governance at the provider level is needed to satisfy the sub-criteria. The ongoing process to handle appeals from NAPs “related to specific decisions or their implementation” (G.1.3) needs to be described more completely. The proposal should address how RAIN’s governance will provide for “independent validation of compliance with RAIN’s rules, compliance with applicable law, and achievement of both RAIN’s objectives and public policy objectives” (G.1.4).

**G.2 Inclusive governance**

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**Rationale:**
RAIN will employ ECCHO’s legal framework rules, which are collaborative and inclusive, as it considers the public interest when making decisions (G.2.1) and gathers input from stakeholders through its governance and advisory bodies (G.2.2). A more detailed discussion of both of these criteria is needed.

The proposal states that contractual warranties will minimize conflicts of interest among participants (G.2.5). If conflicts of interest arise, they will be addressed through rules developed at the industry level (Uniform Rules). A diverse group of stakeholders will be responsible for decision-making (G.2.3).
# APPENDIX A: ASSESSMENT SUMMARY

<table>
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<tr>
<th>UBIQUITY</th>
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<td><strong>U.1: Accessibility</strong></td>
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<td><strong>U.2: Usability</strong></td>
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<td><strong>U.3: Predictability</strong></td>
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<td><strong>U.4: Contextual data capability</strong></td>
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<td><strong>U.5: Cross-border functionality</strong></td>
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<td><strong>U.6: Multiple use case applicability</strong></td>
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<tr>
<th>EFFICIENCY</th>
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<tr>
<td><strong>E.1: Enables competition</strong></td>
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<td>○</td>
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<td><strong>E.2: Capability to add value-added services</strong></td>
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<tr>
<td><strong>E.3: Implementation timeline</strong></td>
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<td><strong>E.4: Payment format standards</strong></td>
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<td><strong>E.5: Comprehensive</strong></td>
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<td><strong>E.6: Scalability and adaptability</strong></td>
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<td><strong>E.7: Exceptions and investigations process</strong></td>
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<tr>
<th>SAFETY AND SECURITY</th>
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<tr>
<td><strong>S.1: Risk management</strong></td>
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<td><strong>S.2: Payer authorization</strong></td>
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<td><strong>S.3: Payment finality</strong></td>
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<td><strong>S.4: Settlement approach</strong></td>
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<td><strong>S.5: Handling disputed payments</strong></td>
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<td><strong>S.6: Fraud information sharing</strong></td>
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<td>Element Description</td>
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<td><strong>SAFETY AND SECURITY (cont’d)</strong></td>
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<td>S.7: Security controls</td>
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<td>S.8: Resiliency</td>
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<td>S.9: End-user data protection</td>
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<td>S.10: End-user/provider authentication</td>
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<td>S.11: Participation requirements</td>
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<td><strong>SPEED (FAST)</strong></td>
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<td>F.1: Fast approval</td>
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<td>F.2: Fast clearing</td>
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<td>F.3: Fast availability of good funds to payee</td>
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<td>F.4: Fast settlement</td>
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<td>F.5: Prompt visibility of payment status</td>
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<td><strong>LEGAL</strong></td>
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<tr>
<td>L.1: Legal framework</td>
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<td>L.2: Payment system rules</td>
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<td>L.3: Consumer protections</td>
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<td>L.4: Data privacy</td>
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<td>L.5: Intellectual property</td>
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<td><strong>GOVERNANCE</strong></td>
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<tr>
<td>G.1: Effective governance</td>
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<td>G.2: Inclusive governance</td>
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APPENDIX B: PROPOSER RESPONSE TO QIAT ASSESSMENT

Hub Culture, ECCHO, Xalgorithms and other contributors to the RAIN/RAIL System Proposal wish to thank the Faster Payments QIAT Taskforce for their time and energy in review of the proposal. The development of a proposal that truly covers every aspect of the US payment system is probably not realistic, so the proposers have worked to build a responsive and resilient system open to innovation and adaptation as a core principle. As such, we believe areas that are deemed only somewhat effective by the reviewers are also areas that the system participants can improve on rapidly, because of the structural approach to develop open components of the system.

These components are designed to foster innovation and progress by turning the payment network (RAIN) and payment record ledger (RAIL) into platforms that anyone can access and innovate toward. This fundamental structure will allow for innovation and expansion, while providing market incentives for these evolving traits among competing service providers.

At its core, RAIN and RAIL also do a good job of enhancing safety and security by creating records that can be independently accessed and reviewed, and stored in an effective, distributed and resilient format. This is certainly an enhancement on current systems, which are federated and opaque, with no ability to cross – reference or monitor at large. The data intelligence and insured safety capabilities of a system that can generate systemic and real-time auditing is highly valuable, and can be used in both consumer safety and resilience based initiatives. RAIL delivers this.

The proposers also conclude that the legal and governance issues surrounding the solution provide a unique balance, tapping decades long industry experts on governance structures through ECCHO, who have created rules overseeing trillions of dollars in transactions, but supported by crowd sourced governance and standards available from newer technologies and the emergence of smart contracts, represented by Xalgorithms. Together, a set of conclusive and adaptable legal and governance frameworks can operate and evolve in real-time, with input from both trusted advisors and stakeholders and the wider community. The proposal plan is to deliver these legal and governance capabilities in the format of APIs, to better allow wider adoption and innovation on top of them.

Similarly, Hub Culture’s community led approach, with input on the system from over 10 technology and service providers, including blockchain, identity service, cyber security, strategic consulting and financial services companies demonstrates an open and inclusive approach that is more resilient than a traditional closed service-provider approach, and more suited to the rapid innovation age of technology and payments the US payment system must now face. This approach is highlighted by the open nature of USIs and the long-tail of federated independence and P2P connectivity provided by the RAIN format.

In addressing areas of perceived weakness in the proposal, the following clarifications may be helpful.

1. NAPs would be expected to settle underlying backing of RAIN pools periodically between each other at their own discretion and risk tolerance. The master pool would calculate reserves held across the system, but dependencies between NAPs – with set clearance or transfer schedules, could be developed individually. For instance, two trusted institutions may allow credit or debit balances between each other, with periodic settlement between themselves according to their own risk tolerances. A lesser trusted institution however may be required to transfer and settle underlying assets without these relationships, according to schedules put forward by their transacting partners.

2. Due to the system wide view enabled by RAIL, network-level fraud monitoring becomes more intelligent. A fraud report function to highlight flagged or suspicious transactions on the RAIL (coming after the fact from the data provider) or by aggregated alert for particular types of
transactions, would give an enhanced view of network level issues. The ability to create rules or alerts in real-time related to the governance system should also enhance capabilities for data usage and fraud prevention. The RAIL does not hold PII but would hold transaction data indefinitely, allowing trends to be compared over time and providing valuable data. The distributed nature of the RAIL would enable it to exist in the cloud and in backup repositories for anyone in the network interested to hold a record of the data. USIs are designed to be granular, and could exist as a very weak USI with few data points, to rich USIs featuring lots of data points and ‘confirmations’ around authenticity and viability. The richer the USI, the greater the functionality that could be applied to the value node.

3. The proposers feel that both use cases and ability to deliver the proposal are fairly covered. To solicit providers, a digital interface for signups would be created, allowing NAPs to join via an easy to access system. NAPs and potential participants would also have open access to APIs available via the web to encourage innovation and adoption.

4. U.3. Predictability – Predictable outcomes for users at all levels of the system are consistent across the USIs and the exchange of MBA. For conversion into localized assets via legacy systems, which are expected to become less frequent over time, the predictability would be similar to the current state of affairs. As such, the system presents a net improvement in predictability.

5. U.5 Cross Border Functionality – The RAIN/RAIL system would be available on a global basis immediately, and enable the transfer of MBA assets and acquisition of an USI without prejudice to geography. Settlement in and out of MBA can be provided by local institutions. This creates a market incentive to serve as RAIN/RAIL NAPs early on.

6. E.6 – Scalability – The current system utilizing a Vast Closed Loop is a cloud based technical architecture using mysql/nosql/mongo databases and horizontal scaling structures with integrated languages for high level performance. Some aspects of the system currently generate data points up to 2 billion per month, and the system can theoretically handle trillions of data points using relational database structures (i.e. federated by NAPs, or extended in some cases to individual users transaction histories). All of this would be federated and tokenized onto RAIL and distributed for resiliency.

7. E.7 – Exceptions – The proposers expect this area to be rich for NAPs and participants to develop data mining tools and aggregated patterns. The system does not provide specialized regulator or law enforcement action, as this could be abused by such authorities in regime states, but does provide open and equal access to this transaction data via the RAIL, on the democratic assumption that if some should have it everyone should have it (in the sense of tokenized transaction data). NAPs could however provide their own records with additional information, as they do now.

8. S.1 – Risk Management – NAP liquidity risk is designed to be reduced via the reserve allocation backing of the MBA. Institutions participating as NAPs would be expected to comply with this rule, and could be subjected to periodic review to ensure such rules were being followed, as part of the governance and legal structures outlined for participation. Regarding hard forks and DLT, as the RAIN network of Federated NAPs manages this in a closed loop, hard forks are not a risk. For the RAIL it would be a matter of amending receipt ledgers, and without the network being affected, little incentive would exist to do so, and if it did occur, would require the Federated NAPs to conclusively agree.

9. S.4 – Settlement Approach – The number of Federated Authorities is not set by the proposal, and will depend on market response to the initiative.

10. S.5 – Handling Disputed Payments – The legal and governance frameworks to be developed with ECCHO and Xalogrithms could take into account Reg E, Reg Z and other relevant laws and regulations for dispute management. The recall and escrow functions would initially provide
basic dispute management architecture, but the open nature of the RAIN and the ability to add APIs to NAP function sets would allow for service provision in this area.

11. S.6 – Fraud Information Sharing – The RAIL should provide real time fraud information that greatly exceeds the capabilities of the current system.

12. S.7 – Security Controls – The RAIN will provide sets of criterion for participation dependent on the risk level of the participant – with different criteria for participation provided depending on if they are an individual, node, entity, NAP, or Federated Authority participant. The specific criteria for these levels will be baked into the onboarding process. Operating rules would need to be created and agreed as part of the governance framework.

13. S.8 – Resiliency – The provision of 100% uptime for any payment system is a requirement, and the system should work as well as the base internet. This would involve replicating data and distributing it to avoid a single point of failure, if even just among Federated Authorities. Building data snapshots and offline storage of such snapshots can provide an added layer of resiliency and disaster recovery capability in the event of a catastrophic failure of the Internet itself. BCP plans would be developed as part of the system and involve the oversight of a RAIN/RAIL non-profit, who would provide backup capabilities in case of such an event.

14. S.10 – End user /provider authentication – Certain types of transactions including di minimus and non – fiat currency related value transfers may be enabled using the system without extensive data provision, and with the ability of the RAIL to record the transaction for later reference if needed. For regulated transactions, the USI and authentication process for the USI (provision of identity verification for instance) can be provided as part of the system at an integral level, or via the NAPs on a distributed level.

15. S.11 – Participation requirements – The wide variety of participant NAPs desired for the system does rely on adherence to rules and requirements for participation. Depending on the service type desired, the plan is to fit these requirements to existing regulations – for instance dealing in fiat currency transactions may require a Money Transmitter or banking proof of license. However, for closed loop transactions or non-monetary transfers, it is envisioned that the system itself would maintain proof of compliance by developing the USIs associated to NAPs and via the existence of the RAIN pools and master pool on the network. For settlement services to fiat, the organizations would be subjected to the existing rules and frameworks that apply to other legacy networks.

16. L.4 – Data privacy – The system architecture would include cloud based storage with public and private key data access to information at the RAIN/RAIL level, with the ability for additional decentralized storage of data by nodes, drawn from the main network. Variable conditions would exist for data provision, depending on the risks associated to the particular data associated. Some information, for instance, could be public or near-public, while other information could be selectively available via public and private keys held by the individual, NAP or federated authority. The goal would be to minimize risk of data breaches by eliminating the need to hold PII in most situations, having that PII instead represented by a tokenized USI string that cannot be amended or changed by the owner, viewer or recipient.
HUBCULTURE-ECCHO-XALGORITHMS PROPOSAL

TASK FORCE ASSESSMENT COMMENTS

Please share your concerns about this proposal’s assessment against the Effectiveness Criteria.

As stated, this is a very technical, complex solution. The QIAT results, noting several effectiveness criteria as being "somewhat effective," are reasonable given the proposed solution.

Based on the points made in “areas for improvement,” I would rate S1, risk management, lower, to "not effective.” Other criteria open for a lower rating are: L1, legal framework; L2, rules; G1, effective governance; G2, inclusive governance. There is too much unsettled in these areas to support an "effective" rating.

Ratings for Legal and Governance structure are overly generous in light of their absence in proposal references.

Interesting technology, but it has some challenges with key players: Network Aggregation Players and the support(ed) needed by a Master Base Asset (MBA). There are many key Effectiveness Criteria that would need to be more solid in order to make this an end-to-end solution for Faster Payments. In addition, there is a heavy reliance on ECCHO and it seems to be a forced fit.

Old technology, partially solve the problem of the US payment system.

U.2. Usability: We would rate this “very effective,” rather than “effective.” There are wide ranges of alias choices.

U.4. Contextual Data Capability: This should be “very effective,” rather than “effective.” ISO 20022 is the gold standard for messaging. Moreover, the system allows for customization of messaging content. ISO 20022 supports plenty of characters, so this is a realistic intention. We would also state ISO 20022 capability would support a very effective ranking for E.4 Payment Format Standards.

E.3. Implementation Timeline: “Effective.” Short of the fact that FIs will have to sign up for the system, it can be rolled out in less than 12 months. The main shortcoming is probably regarding how it is perceived, rather than its technical capacity. This solution depends upon the involvement of the Fed or at the very least, other large FIs.

S.4. Settlement approach: This can be rated as “effective,” instead of “somewhat effective.” The statement that the system would not work were there not enough MBA to satisfy settlement risk reflects the assumption that the Federal Reserve would not support the system. If there were support services from the Fed, then working capital issues would be immaterial. The problem in this example is a product of Fed policy, not solution quality. Reinvestment Partners also believes that the shortcomings noted by the QIAT in F.4 Fast Settlement would be mitigated if FIs provided capital to eliminate counterparty risk.
E.7. Exceptions and Investigation Processes: This should be scored as “not effective,” rather than “somewhat effective.” It is not reasonable to imagine that a privately-funded system of mediation would function in an adequate manner. There are many problems with arbitration. Consumers find it very difficult to work with arbitrators, especially when they cannot use a class-action network to fund the cost of attorneys. As a result, low-value disputes are rarely contested with an FI that requires arbitration. It would be wrong to include the same expectation here.

S.3. Payment Finality: This should be “not effective.” The system must provide transactors with Regulation E protections.

S.6. Information sharing: The QIAT is correct to be skeptical of a system that does not provide global fraud analysis. However, the system might be made more effective were it to be the case that FIs involved in the transaction were given access to transaction data.

The proposal is not in conformance with the requirements of a full solution proposal. The requirements were designed to ensure that McKinsey and Task Force time and resources are focused on end-to-end solution proposals that can be thoroughly and credibly assessed against the criteria. This proposal does not meet the requirements. Proposal has answered all sections of the template but in many cases the response does not provide information that would allow the QIAT to evaluate the proposal. The Proposal Template included instructions for Part C: Self-Assessment against Effectiveness Criteria that asked proposers to include a "detailed discussion of why the rating is justified and how the solution meets each criterion" (page 22 of template). It does not include specific information in Part C as to how or why the proposed solution meets each of the criteria. As a result, the QIAT is unable to evaluate the solution with the information provided. Altering the existing process defined to offer an opportunity for the proposer to include more explicit information in its submission to make the proposal “assessable” would be unfair to proposers who provided complete proposals before the submission deadline. A few of the reasons why the proposal did not meet the requirements are as follows: The solution does not address the unbanked. The solution has no disaster recovery or business recovery plans. The solution has no network participation requirements and no rules are created. The solution has no legal or governance framework. The solution has no clear cross-border plan.

Please submit any comments about this proposal’s assessment against the Effectiveness Criteria.

A good technical solution, but in general, as assessors note in many cases, the proposal lacks details on some of the non-technical aspects

McKinsey's assessment relative to the criteria seemed to be somewhat at odds with the proposer's own self-assessment. I would submit that McKinsey's assessment fairly represented the proposal against the criteria.

Several of the key components of the effectiveness criteria associated with legal and governance were missing from the proposal to be effective.
Needs development in area of safety/security criteria as noted by QIAT

Overall the assessment is accurate. We see some disconnect with Effective Criteria in that the solution is confusing and complicated.

The use of USI accounts and integration with existing systems is not clear. Ubiquity may be difficult to achieve.

Meets criteria, proposer has experience, fraud sharing service, Federal Reserve is the FPS regulator; meets some unbanked criteria and needs

The proposal operates in such a conceptual mode it is hard to assess true readiness as a potential solution.

Overall I think the assessment was good. There are a few areas such as ubiquity, scalability, legal and governance that may be rated higher than I would have given, but overall it was good.

Accessibility (and overall ubiquity) seems rated too high, as it is not evident as to how individuals could actually utilize the system without fully integrated support by a bank or other similar entity with completely new processes and interfaces. Contextual data capability is rated too high – simply being compatible with another format doesn’t make it effective – requires definition and agreement across multiple parties to be useful. Legal framework and rules rated too high given entire new roles, participants, and new asset types with rules yet to be defined.

If anything, the QIAT may have been overly positive with respect to issues like data privacy and scalability. However, it may have been equally less generous to the subject of governance. I can’t argue the later point since the two agree, but I read more capabilities in the proposal than others may have seen on governance.

Cost-effective. RAIN establishes an overlay directory for account #s, emails, tele #s, etc. Very open to all participants. Includes ECCHO, a scheme operator, rules provider. Cutting-edge technology not widely adopted yet. Does not appear to be a complete solution, lacks fraud & security methods. Dependent on number of participants (NAPS) and underlying assets (MBA). Covers all major use cases. Unclear if there is a user interface. Directory is a positive.

The proposal is very conceptual, and I struggle with how a closed-loop system with proprietary implementations (USIDs) will be able to achieve ubiquity and be interoperable with other payment systems. The solution relies upon NAPS but I am unsure as to the value prop for NAPs to join.

I appreciate the QIAT’s assessment on the governance issues for this proposal.
TASK FORCE SOLUTION-ENRICHING COMMENTS

Ubiquity

Interesting solution concept with improvement suggestions noted in QIAT; network-level fraud monitoring and storage/management/of transaction related data. Thank you for your submission.

Enhance the proposal to help us understand how this solution would be usable by anyone. It appeared to me that some potential end-users wouldn’t have access to the system.

The proposal could be enriched if the solutions' commentary addressed the overall adoption of digital currency within the payments industry, both domestically and internationally.

Technology is not widely adopted.

Since Federal Reserve and a few major players would be the hubs or main nodes, this would encompass a large population of the banked, and since other companies such as mobile phone providers, etc. can be NAPs, then this would encompass others as well making it easier to implement/adopt if these players all agreed...

U.1 Accessibility - Somewhat Effective, reaching an end-user without a USI is challenging and funds will be held in an escrow account with no guidance as to the time frame funds will be held. Recipients don’t know they have funds waiting until a USI is obtained. There is risk that the funds could remain in escrow for an extended time.

U.2 Usability – Somewhat Effective, how a user obtains a USI and accesses the network is not clear use cases of and not clear on the support of P2B uses cases at point of sale, and participation requirements guidelines for the NAPs are pending.

U.3 Predictability – Somewhat Effective, guidelines needed for creating USI “standardized across the system, end-user’s experience consistent with different NAPs and for directly-connected users” and right & liabilities along with terms and conditions related to various uses cases and payment types “vary” and is not specific, which could pose a risk to the parties involved in the transaction.

U.5 Cross-border functionality –Somewhat Effective, transactions are supported in the most common traded currencies, and other currencies are in the development stage and integration with other global standards and laws is not yet defined. The proposer says that today they work with Magento and the Gates Foundation, and, since they support 12 languages, they are capable of reaching 80% of the world's population.

U.6 Applicability to Multiple Use Cases – Somewhat Effective, solution identifies 10 uses cases, but B2P can’t be used for ad hoc legal and insurance, and cross-border is still a challenge “are non-geo specific but include level designations within the USI data sets.”
It would be helpful to include some comments on how this solution could become used by all – adoption by more, and the ability to actually reach all accounts when you want to make a payment. Not sure how numbers are achieved as described in proposal.

I would like to see a NAP implementation plan and a road map for how you will be able to work with networks and core providers in rolling out your solution and thus have it used by small to medium-sized financial institutions. Although perhaps not feasible, it would be interesting to see if the system could be rolled out with a more standardized, already issued identifier instead of the proprietary USID that is mentioned.

While your solution presents a strong, compelling case with a fresh approach to current rails, implementation may prove to be an uphill battle. The inherent complexity of your system and consumer perceptions around distributed ledger systems could translate into extended consumer education and a prolonged need to ease reluctance for adoption.

Would appear to be a difficult task to build to ubiquity, but feasible.

**Efficiency**

Implementation timeline seems overly optimistic.

Unclear on how NAPs back up RAIN pools and how overall MBA is handled.

E.1 Enables competition – Effective, pending development of user requirements for the network.

E.2 Capability to enable value-added services – Somewhat Effective, as solution’s rules are not yet developed, and the value-added services will be optional to the end-users.

E.3 Implementation timeline – Somewhat Effective, estimates of investment for NAPs is not provided and road map is not created; this could be risky not knowing a realistic/estimated time frame for implementation.

E.4 Payment format standards – Effective: ISO 20022 and SWIFT message formats are supported, along with a proprietary message format to expand upon ISO and provide open space for extended message capability and some free space for contextual data.

E.6 Scalability & adaptability – Somewhat Effective, more information on the projected transactions volume is important as the solution has the capability to be able to process and support approval “millions of transactions per second” and thereby the scalability is not impacted.

E.7. Exceptions and investigations process – Somewhat Effective, tools are necessary to complement the processing of the exceptions and investigations and monitoring of transactions to assist in identifying patterns, and regulation law and enforcement the proposer states that “if authorized law enforcement or regulator access is required, the end-user or NAP will be informed through an alert. Information is not provided as to how the proposers will monitor the laws/regulations.
It would be helpful to describe what a financial institution would have to specifically do to integrate this solution directly into the rest of its infrastructure, along with its other existing capabilities/systems – and including user interfaces (either with a bank or as an individual).

**Safety and Security**

Addressing concerns about settlement would be important, it seemed to be a topic we spent much time discussing during the development of the effectiveness criteria.

Need development in this area to strengthen proposal.

Provide minimum KYC and AML responsibilities to all stakeholders to ensure even better risk mitigation; overall safety/security concerns

S.1 Risk Management – Somewhat Effective, the NAPs seemed to have full control of authenticating the end-user, KYC, AML and the time frame funds will be held in an escrow account which could become an inherent and external risk, if different guidelines and timeframe for holding funds and could create over time reputational risk if the funds are held in the escrow accounts for an unknown time frame at this point, eventually impacting faster real-time payment.

S.3 Payment finality – Somewhat Effective, no legal framework for payment irrevocability is available and no compensation process to protect the payer.

S.4 Settlement Approach – Somewhat effective, settlement occurred in a closed-loop pre-funded environment, posing a risk that Federal Authorities may or may not all participate in the solution as custodians of float reserves.

S.5 Handling disputed payments - Somewhat Effective, need to expand on the requirements to handle disputes, while taking into account regulations and laws.

S.6 Fraud information sharing – Not Effective, the responsibility is shifted to the NAPs who are the ones expected to develop and monitor their own fraud, but there is not a solid frame work to share within the network.

S.7 Security controls- Not Effective, many key critical security items are shifted to the NAPs but without direction as to what the solution provider considers to be minimal which, without a framework, can easily take the faster payments effectiveness criteria out of the framework – there is no consistency within the NAPs’ security controls.

S.8 Resiliency – Not Effective, although there is a 99.97% high confidence level that the solution will be operational regardless if one of the nodes is affected, there is no disaster recovery plan, business recovery plan, ledger or node recovery, posing an inherent risk to all participants within the solution.

S.10 End-User / provider authentication – Somewhat Effective, missing minimum requirements for end-user authentication.
S. 11 Participation requirements – Somewhat Effective, minimum requirements and criteria for the 2 envision types of NAPs and details of how the participants will abide by the agreement.

Describe what baseline set of security processes will be required of all utilizing the system or of all holding a USI.

The proposal includes novel and state-of-the-art safety and security features. It’s unclear to me whether the approach specific to end-user authentication would be more robust if two-factor authentication was specifically required.

**Speed (Fast)**

F.1 Fast approval- Somewhat Effective, although the approval can happen within the RAIN network within “2 seconds,” there is a inherent risk that the NAPs will not be able to approve transaction within this 2 seconds, and currency conversion can also impact the approval, thereby creating unknown approval timeframe that differs among the NAPs participants.

F.2 Fast clearing –Somewhat Effective, the conversion of currencies does impact the clearing process of the transaction, that is dependent on the balances at the MBA level and at each NAPs. A minimum set of criteria could be set for these two items that could set a guidance for the clearing due to these elements.

F.3 Fast availability of good funds to payee – Somewhat Effective, is dependent on the MBA balance and the NAPs having the ability to convert currency, which can become an inherent risk.

F.4 Fast settlement among depository institutions & regulated non-bank account providers, Somewhat Effective, within closed loop settlement is instant, but the challenge is for the settlement of funds “between FIs” and risk settlement is managed in MBA, not in RAIN, exposing an inherent risk to the FIs.

F.5 Prompt visibility of payment status – Somewhat Effective, end–user notification is not clear, as well as when the funds go into an escrow account the originator is not notified.

Use of new infrastructure with ties into legacy systems only when necessary makes a lot of sense, and greatly enhances the ability of services on the new platform to provide real-time payments.

**Legal**

Having ECCHO write the rules is great; however, there are so many rules to understand across many channels, it would be great to consolidate payments rules into one package. The ECCHO rules are extensive, and I would suspect many check exchangers don't really understand all these rules.

The proposal could be expanded to include the legal framework and rules that will be needed to support the solution associated with digital currency and distributed ledger technology.
L.1 Legal framework—Somewhat Effective, disagree that a “universal set of rules” could be agreed upon at any near time, thereby agreements (participants, FIs), liabilities, disputes, are important part that the proposer should try to be in place at least an initial framework that is part of the solution, and the evolution of the same can be developed with a wider stakeholder timeframe in place.

L.2 Payment system rules—Somewhat Effective, Unsure how well a system can work relying on “series of warranties” as the proposer is suggesting.

L.4 Data privacy—Somewhat Effective, no information provided on architecture of the system, storage of main ledger, accessibility & management of RAIL, and individual ledgers within each node and how they will be managed and protected.

L.5 Intellectual property—Not Effective, RAIN, RAIL, participants, currently do not have ways to resolve, manage any “legal, operational, or financial risks” related to 3rd party intellectual property.

It would be helpful to have more details in addition to stating that “existing regulations would be analyzed and gaps filled.” Describe the standard set of rules built into RAIN/RAIL (p. 42).

Governance

The solution could be enriched to include information regarding the overall governance of the solution being proposed, including a better understanding of the role of the Network Aggregation Players (NAPs) and the governance body needed to support the proposed solution.

G.1 Effective governance, Not Effective & and G.2 Inclusive governance - Not Effective, it will be challenging to find a consensus for a governance approach based on ECHHO “to support system rules and creation and governance approach.” Solution currently does not include a legal nor governance frameworks.

Proposed model of governance for real-time is bank-centric, and participation of subcommittees/committees and ultimate consensus for Uniform Rules. However, the proposal does say that no rules or portions of rules will be made behind closed doors. Consumer representation is not addressed.

Not a solution-enriching comment, but thank you for at least having a plan for a legal and governance framework.

Best-in-class governance structure that anticipates a specific mechanism for including all stakeholders on the Board of Directors.
Proposer responses to the Task Force comments were optional and not all proposers chose to respond
Faster Payments QIAT

FINAL ASSESSMENT

Proposer: Hub Culture, Synechron, ECCHO, Xalgorithms

Summary Description of Solution:

RAIN/RAIL is a Distributed Ledger Technology (DLT)-like solution. The Real-Time Asset Interchange Network (RAIN) and the Real-Time Asset Interchange Ledger (RAIL) together create a network that enables real-time exchange of value, including fiat currency, digital assets, checks, and other asset types. RAIN does not leverage DLT for transaction processing (throughput is not sufficient), but rather uses what it calls the “Vast Closed Loop.” RAIL leverages DLT to create an open audit ledger to capture the details of every transaction. RAIN/RAIL leverages blockchain technology to support the ledger, as well as blockchain’s proven capability to track and retain data.

This “vast closed loop”—i.e., the solution network—supports P2P, B2B and N2N (node to node) transactions and can support both push and pull payments. Each participant in the network (RAIN) receives a Unique Synchronized Identity (USI), a tokenized personal identifier that is used to route payments. The USI can be layered onto existing depository accounts. For business end-users, the solution will also leverage DUNS numbers issued by Dunn and Bradstreet to create a unique blockchain ID for most DUNS-numbered business entities.

The network (RAIN) is supported by a Master Base Asset (MBA) that exists as a unit of value in all nodes. The proposal states that MBA can be weighted to 100% value of the USD (or any other fiat currency), or it can function as a weighted basket of assets. MBA value converts into other value assets (e.g., U.S. dollars) based on real-time pricing mechanisms to support settlement into legacy accounts. The amount of MBA held in the RAIN is called the RAIN Pool. Each node maintains its own RAIN Pool to support instant, irrevocable transactions in MBA. Approval and clearing of transactions occur simultaneously, and all settlement within the network consists of the exchange of MBA.

The ledger (RAIL) is a distributed audit ledger (as opposed to a distributed transaction ledger like Bitcoin) that records the details of all transactions between network participants (time stamp, value, asset type, sender, receiver, push or pull payment) as they occur. RAIL also uses a smart contract (self-executing contractual states stored on the ledger) capability for rules automation. Providers operate nodes and create their own private ledgers that auto-replicate to the central ledger as transactions occur. End-users can choose to maintain an MBA RAIN pool of their own, or they can convert in and out of MBA using existing accounts held at Network Aggregation Players (NAPs). NAPs are essential providers of conversion services between MBA and localized asset(s). Providers (depository institutions, non-bank account providers or financial intermediaries) can act as NAPs and can create nodes and provide multiple end-users with access to RAIN using an existing interface or identifier (online banking profile, account number, credit card number, PayPal account, email address, phone number, etc.).

The solution includes a small number of Federated Authority NAPs, which are the principal nodes of the distributed technology. They contribute MBA to cover the cost of hosting and processing distributed nodes for the RAIL. Federated Authority NAPs enjoy enhanced decision-making and have additional responsibility for custody of float reserves in commercial bank money, dispute resolution, and other system-wide services. Federated Authority NAPs are designated based on input from the market and the Federal Reserve. Correspondent banks and other major financial institutions with regulatory approval could act as Federated Authority NAPs. It is estimated that less than 5% of NAPs would qualify as Federated Authorities.
RAIN/RAIL will create a payments platform that can enable a robust system of application development around a common core. Individual providers/NAPs control their USI, including how that USI is accessed and/or used.

**EXECUTIVE SUMMARY OF THE PROPOSAL**

- **Major Strengths**
  - RAIN/RAIL can support direct-value payments between any accounts with a USI. The solution, including the RAIN and the RAIL, is inclusive and participative. The network is open and available to credit providers, insurance providers, and others.
  - The solution is expected to drastically lower transaction cost, time, and infrastructure expenditure across the network (p.31).
  - The use of a USI ensures adequate privacy for both payers and payees. The data available in RAIL affords data-mining opportunities using a stream of anonymized data.
  - The solution will rely on ECCHO to support system rule-creation and a governance approach.

- **Areas for Improvement and Enhancement**
  - The proposal states that the MBA in circulation within RAIN will be 100% backed by underlying assets. NAPs will be expected to define clearance and transfer schedules to settle underlying backing of RAIN pools periodically among each other at their own discretion based on risk tolerance. The master RAIN pool will calculate reserves held across the system. It would be helpful to understand how risk across the solution will be monitored and managed, and whether any minimum requirements will be prescribed regarding exchanges between NAPs.
  - The proposal would be enhanced by providing more information and detail regarding the dispute process (S.5). The proposal does not describe how the solution would store, manage, and destroy transaction-related data and PII (personally identifiable information) (S.7). Additional details regarding the authentication of end-users and granting of USIs would be helpful. The solution currently does not include a legal framework or a governance framework.
  - There are some questions regarding adoption of the solution. The number of NAPs that participate will influence the solution’s success. The solution will include a digital interface for sign-ups that will solicit providers and allow NAPs to join via easy access to the system. It would be helpful if the proposal described a clear plan and roadmap for engaging NAPs to achieve the required growth. Incentives for NAPs arise from revenue opportunities presented by MBA conversion, data distribution and collection, and other value-added services.

- **Use Cases Addressed**
  - The solution supports P2P, P2B, most B2P, B2B P2N, and N2N use cases. (A node is an account or entity.)

- **Proposer’s overall ability to deliver proposed solution**
  - The proposal is highly technical and leverages a developing technology, DLT, which has not yet been widely adopted. The proposal describes the value proposition and identifies the entities that would be responsible for certain roles in the solution.
  - Some of the core technology for RAIN/RAIL already exists. The network was built and deployed in 2007 as part of a P2P digital asset transfer system, and the solution was expanded in 2015 to include B2B and N2N payments. The proposal indicates that an expanded prototype can...
be built in less than 12 months that would enable any participant to join the system as an individual. The prototype will also enable payment routing to any domestic or international bank account, credit card, email address, phone number, or NAP address in real time. Integration is described as simple for end-users, but the proposal does not describe how it will solicit providers, nor does it define a timeline for reaching critical mass. Legacy users will have to build on-ramps to RAIN/RAIL, but the network itself delivers the necessary connections between the nodes. RAIN proposes to function as a member of the existing correspondent banking system to enhance adoption and integration speeds.
ASSESSMENT

Ubiquity

U.1 Accessibility

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Rationale

The solution allows any participant with a USI to access the solution (whether directly or indirectly) (U.1.1). End-users do not have to have a regulated bank account as long as they have the USI and a Master Base Asset (MBA) account (U.1.4).

MBA is a digital currency that uses cryptography to control the creation of new value and to verify the transfer of its funds. MBA can be weighted to 100% of the value of the USD or other fiat currency, or it can act as a weighted collection of assets. All MBA in circulation within RAIN is 100% backed by assets held by NAPs. As such, the solution can operate independently of a central bank. The solution will be able to change MBA (or Ven, a form of MBA) into other currencies in the future. It currently has foreign-exchange functionality (U.1.3).

It is quite easy for end-users to create a USI by inputting existing data into a digital account interface. When data is entered multiple times into the system, the solution will seek to reconcile and merge common data points into a single USI. Alternatively, end-users can have multiple USIs if they wish. The data sources required to build a robust USI will be the same across all NAPs. The solution includes the availability of APIs to allow NAPs to quickly implement the capabilities needed to create USIs for their customers (U.1.5). The solution does not provide requirements (design, functionality) for the RAIN user interface, which may result in a different end-user experience across NAPs.

The solution’s closed loop strongly supports interoperability within that loop. Outside of the loop, integration will depend on the NAPs’ level of investment. This interaction will involve initiation, settlement, and reconciliation. The solution plans to expand its coverage of the financial system by identifying new USI categories and using these to expand the network and to increase the number of accounts and connections. RAIN’s presence in the correspondent banking system will support this initiative (U.1.6).

Reaching end-users without a USI is challenging, as it is not clear how these recipients will understand that they have received a payment (U.1.2). When a payment is sent to a recipient without a USI, the funds are held in escrow until the recipient accepts the payment (i.e., obtains a USI either through a NAP or on his/her own). It is unclear how long the payment would remain in escrow.

While the solution currently has a foreign exchange function, conversion rates and a mechanism for exchange still need to be further developed (U.1.3).

It may be challenging for an end-user who does not have access to identity data or other verification resources to create a robust USI that will support payments (U.1.4).

The proposal suggests that the solution (including rules) could be functional within one year. By the end of Year One, there could be one million end-users supported by ten NAPs. By the end of Year Five, there could be 100MM end-users (including bots) supported by 1,000 NAPs. While the proposal indicates that USIs will grow rapidly, the creation of an adoption plan describing the proposed growth in more detail (e.g., target end-users, number of NAPs required, yearly milestones,
actions, and responsibilities) would be helpful (U.1.5). It would also be beneficial to provide more
detail about the APIs that will be available to support NAP integration.

U.2 Usability

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**Rationale**

It is relatively easy and secure to initiate authenticated payments with a USI. The USI can be linked
to many data elements (e.g., a bank account, phone number, email, or other options) to initiate the
payment. While it is not explicit, the proposal implies that any device or channel can connect to the
solution. Encryption delivers transaction security. The solution is accessible 24x7x365 and is
completely transparent to all nodes.

As described, the participants (e.g., NAPs) determine the design of the UI (user interface). The
solution does not provide any requirements or guidelines but does suggest that the RAIN’s basic UI
would serve as a base standard for NAPs. The process by which an end-user obtains a USI is
unclear, as is how end-users will actually access the network. Although the proposal implies that
any device or channel can connect to the solution, it does not explicitly list these or the conditions
under which these access points will or will not function (U.2.1). It is also difficult to understand
whether the solution supports P2B payments via POS (point of sale) or online, as no processes or
details are provided (U.2.2).

It would be helpful to have more information regarding ease-of-use and accommodations for those
with disabilities, the elderly, and those with limited proficiency.

Finally, because the NAPs are responsible for posting end-user transactions to RAIL, which
determines the finality and immediate availability of good funds, the solution should provide
applicable participation requirements and guidelines for the NAPs (U.2.3).

U.3 Predictability

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**Rationale**

The process of creating a USI and the points of data that are required for a robust USI are
standardized across the system. The proposal does not provide guidelines to ensure that the end-
user’s experience is consistent across different NAPs and for directly connected users. Functions or
services available to the end-user may be different depending on how each NAP opts to manage the
required information to support payment, as well as the availability of value-added services (U.3.1
and U.3.3).

The proposal does state that Xalgorithms’ controls and components will enable any digital
commerce or payment solution to draw reliably upon standardized, external computational rules in
a common way (U.3.4).

The proposal states that the terms and conditions regarding error resolution and rights and liabilities
will vary by use case and payment type. It would be helpful to have more information defining the
minimum requirements related to transaction timing, funds availability, legal rights, costs, and risks
of the payment experience for end-users (U.3.2). The solution will rely on the ECCHO process to define rules and governance at a later point, and it is expected that these rules will be clearly defined and easily understood by all parties (U.3.5).

U.4 Contextual data capability

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**Rationale**

The solution is designed to be compatible with ISO 20022 and SWIFT messaging formats and will use a proprietary message format (Synchronized Standard) to expand upon ISO to create additional message compatibility. The solution will include some unstructured (i.e., available) space for unique data transmission (e.g., contextual data) to allow contextual data to be transmitted with the transaction. All permissioned ledgers will include a data field for information about a transaction that can support USI information and messaging between transaction participants in an unstructured format.

NAPs will be able to develop their own messaging templates as needed to support use cases. RAIL will not define contextual data beyond the components of USI core identity. There is no description of RAIL’s attributes (e.g., the open receipts ledger) or requirements related to each transaction type (p. 34). It is also unclear how the contextual information will be available to the beneficiary (U.4.1).

The proposal does not address direct integration into personal and business finance systems (U.4.2); rather, the solution supports searching for transactions by USI code and importing these transactions (including any contextual data) into personal and business finance software through the use of publicly available APIs (application programming interfaces). The USI owner would be required to approve the sharing of information. This capability is described as a service that would be provided by NAPs. At this point, the proposal states that integration will depend on end-users’ capabilities (if done directly) or NAPs’ internal development (if done indirectly).

U.5 Cross-border functionality

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**Rationale:**

RAIN/RAIL appears to be already performing effective cross-border transactions within the closed-loop network (U.5.1). RAIN/RAIL can support multiple currencies through conversion to/from the MBA. The solution is not designed to hold multi-currency local assets in the MBA pool, but it will support conversion to the MBA pool currency. NAPs will provide currency conversion services (U.5.4). To support the disclosure of any fees associated with conversion (U.5.3), the proposer states that a real-time feed of foreign currency mid-rates can be developed, providing a reliable format for comparing various conversion providers’ rates.

At launch the system will be global, allowing multi-country access the system. Local language capabilities can be introduced to appeal to local markets. The current solution will include and support base transaction capability in 13 languages (U.5.2).
The solution does not describe in detail how it would successfully integrate with the different standards and comply with the various laws in different countries or locations in its cross-border transactions (U.5.2). In addition, the proposal does not yet provide a clear outline of its plan to introduce RAIN/RAIL in other countries (U.5.5).

U.6 Applicability to multiple use cases

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**Rationale:**


Efficiency

E.1 Enables competition

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**Rationale:**

RAIN/RAIL strongly enables competition among NAPs. Many different organizations, as well as individual end-users, can become nodes and connect directly to the RAIN. This broad availability of NAPs should provide end-users with a choice of providers (E.1.1, E.1.4). End-users can use the same identifier (e.g., a telephone number) across multiple NAPs, but if they wish to switch between NAPs, a new USI will be required (E.1.2). The solution will provide APIs to NAPs that will support the provision of fee information to end-users (E.1.3).

Any of these nodes can develop competitive services. RAIN/RAIL has not yet defined participation requirements for the network (E.1.4). When solution rules are created, RAIN/RAIL should include a rule that requires NAPs to disclose the total costs of a transaction to the end-user in advance (E.1.3).

E.2 Capability to enable value-added services

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**Rationale:**

Application providers can use open APIs from RAIN/RAIL to foster innovation and to support additional use cases (E.2.1-2). All NAPs and end-users will have access to the transaction information in RAIL in an aggregated, anonymous format. Each NAP will have its own sub-ledger and access to its own users’ transaction information. End-users will have access to their
personal/business information on their sub-ledgers. Data privacy is maintained by making the data on RAIL anonymous and tokenized.

The data associated with RAIL creates opportunities for the development of value-added services (with consideration for all applicable regulation). There are no restrictions on who can connect to RAIN or on who can use RAIL’s transaction data to create such services (E.2.2).

When the solution’s rules are developed, RAIN and RAIL will need to ensure that system rules require providers to clearly disclose that value-added services are optional to end-users (E.2.3).

**E.3 Implementation timeline**

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**Rationale:**

The proposal states, “The first aspects of the RAIN system could be available in a matter of months, with basic implementation of the USI available in less than 12 months.” The proposal outlines three main motivations for existing account providers (NAPs) to participate in the solution: reduced cost, greater access to data, and new opportunities for monetization.

The solution will provide an online registration portal for banks and PSPs (payment service providers) to access key documents, APIs, and other important information for the RAIN/RAIL solution. It would be helpful if the proposal included estimates of the investment required for NAPs to participate (architecture, integration with legacy infrastructure, on-ramp build, ledger build, etc.) in RAIN/RAIL. The proposal indicates that an implementation roadmap will be created.

With regards to access to the RAIN, USIs and account structure present a new data format that will be used across the system. Market participants can develop APIs to connect legacy data formats to the RAIN system to support account management and transaction protocols. The solution will initially be funded by Hub Culture; partners in the closed-loop solution will be invited to invest. New value-added services will be developed, funded, and introduced by market participants.

**E.4 Payment format standards**

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**Rationale:**

The solution is designed to be compatible with ISO 20022 and SWIFT message formats (E.4.1-2.4-5). A proprietary USI standard (called a “Synchronized Standard”) will expand upon ISO components to create additional message format compatibility. The solution will translate messages between ISO 20022 and ISO 8583 using the same methodology that will be used to tokenize information into the USI string. The solution is focused on creating the USI string and the translation of any data components that will support the USI; all other messaging will be provided by NAPs.

The proposal would be strengthened by detailing how the solution will translate between the Synchronized Standard and other message formats, and by indicating where in the transaction flow this translation will occur (E.4.1, E.4.2).
E.5  Comprehensiveness

Very Effective  Effective  Somewhat Effective  Not Effective

Rationale:
RAIN and RAIL together provide an open, flexible, end-to-end payment process (E.5.1). End-users can access the solution through a NAP or by connecting directly to the solution. The solution is based primarily on online access, and limited SMS/mobile functionality already exists. Market participants can develop and introduce other channel opportunities.

NAPs define and provide end-user authentication. Authentication can consist of a password, biometric data, or other dual factors, depending on the device’s capability and the NAP’s requirements. The proposal can strengthen its position by describing more requirements for the specific steps of the payment process—by describing how a transaction is initiated, authenticated, approved, cleared, received, settled, and reconciled (E.5.1). The proposal provides minimum requirements to support transactions inside the RAIN pool, but it would be helpful to understand the minimum requirements associated with all stages of the payment process. This description should cover items such as the channels that would be used, the details and requirements for the MBA account(s) (RAIN pools), conversion notifications, etc. It would be helpful to have more details about how the solution’s modular design enables a provider/NAP to easily upgrade a feature or component without negatively impacting other features (E.5.2).

E.6  Scalability and adaptability

Very Effective  Effective  Somewhat Effective  Not Effective

Rationale:
The RAIN/RAIL proposal identifies ten use cases and has an open network that can enable additional use cases (E.6.1). The proposal describes how the solution will support substantial growth in USIs and states that the solution will support approvals of millions of transactions per second (E.6.2). The proposal indicates that core network partners will manage core system upgrades based on contribution budgets for ongoing work. The proposal states that the system is cloud-based and can theoretically handle trillions of data points. This data would be federated, tokenized onto RAIL, and distributed for resiliency. The cost of data storage space is the largest impediment to optimized transaction processing by RAIN’s Vast Closed Loop.

The proposal would be strengthened by providing details regarding NAP growth or transaction volume projections, and by describing the infrastructure required to support volume growth. RAIN’s underlying technology is not described in detail, and risks associated with scaling may exist (E.6.3).
E.7 Exceptions and investigations process

Very Effective, Effective, Somewhat Effective, Not Effective

Rationale:

The solution uses alerts, notifications, and messages to confirm transactions (both success and failure) and other activities in the network (E.7.1). The proposal states that RAIL will handle exceptions and use its real-time accounting capability to trace transactions between solution participants. RAIL will store all transaction-related information, and this data will be available to all nodes (E.7.2).

For standard dispute resolution, a callback function is available that requires the approval of the NAP’s account-holder. Escalated disputes are passed to network mediators for resolution. Dispute resolution is described as a potential revenue stream for NAPs or other start-ups in the payment system rather than as a standardized process that applies to all providers. The proposal does not describe any tools to support mining this data for exceptions (E.7.2), nor tools or protocols to facilitate communication with NAPs or end-users about exceptions and investigations (E.7.1). The proposal does not describe transaction-monitoring at an aggregated level to identify patterns in the network (E.7.3). The proposer trusts that opportunities to provide exception services will prompt NAPs and participants to develop satisfactory solutions for transaction monitoring. The proposal does indicate that if authorized law enforcement or regulators need access to the solution, the end-user or NAP will be informed of this access through an alert.

Safety and Security

S.1 Risk management

Very Effective, Effective, Somewhat Effective, Not Effective

Rationale

The system is flexible and versatile and could accommodate the unexpected application of law or regulation (S.1.1). It can limit or disengage certain functions or operations if required by law or regulation without destroying the entire system. The proposal suggests that consideration should be given to seeking an overarching, competent, global regulator who can supervise the RAIN in a way similar to the supervision of other financial clearing houses.

With regard to liquidity risk concerns associated with the use of MBA, the solution is 100% asset-backed, and NAPs are expected to maintain a reserve allocation to the MBA to guarantee liquidity. The NAP or RAIN itself will be expected to hold all underlying assets. NAP liquidity risk is designed to be mitigated via the reserve allocation backing of the MBA. As part of the governance and legal structures outlined for participation, institutions participating as NAPs would be expected to comply with this rule and could be subjected to periodic review to ensure such rules were being followed. In the unlikely event that a NAP becomes insolvent, it is unclear whether the RAIN pool will be protected.
The conversion risk arising from conversion between MBA and localized assets is mitigated by conversion to an exchange rate at point of exit rather than a fluctuating asset value inside RAIN. It is possible to weight MBA to 100% fiat currency, which would further address conversion risk.

NAPs will determine how end-users will be authenticated, manage KYC and AML, determine how long payments will be held in escrow, and define a maximum transaction value for RAIN/RAIL payments (if any). They will be expected to develop their own fraud monitoring and detection capabilities related to their nodes (S.1.4). Minimum requirements would be helpful to provide consistency and to address risk across participants.

Regarding payment errors, the solution includes a push-and-pull request capability so that a payment made in error can be recalled from the recipient. Recalled funds are held in escrow and require the NAP or end-user to approve the return. The escrow period can be as long as required for agreement to be reached between the involved parties. It would be helpful for the proposer to describe the process and accountabilities more clearly as system rules and legal framework are developed.

Hard forks (a permanent divergence in the blockchain) are not a risk with this solution.

S.2 Payer authorization

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Rationale:

The NAP is responsible for payer authorization and security, as well as for determining levels of access and any transaction value tiers (S.1.1). The solution allows for pre-authorization of payments through NAPs using smart contracts (S.2.2). End-users can access a pre-authorized payment schedule through an online interface provided by the NAP or RAIN (S.2.3). The core solution enables this functionality, and APIs can be extended from RAIN through to the NAP.

S.3 Payment finality

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Rationale:

The solution clearly defines when a payment becomes final. Transactions occur within the pre-funded, closed-loop network without the need for FIs’ authorization; instead, end-users’ DLT balances are checked (S.3.1). It would be beneficial for the proposers to develop a supporting legal framework for payment irrevocability (S.3.2). The proposal should also describe the “mechanisms and processes [it would use] to protect and compensate the payer in [the] event that the payment is disputed… [ensuring that these] ...comply with relevant consumer protection regulations, including Regulation E” (S.3.3). These mechanisms and processes may differ for end-users who connect through NAPs versus those who connect to RAIN directly.
S.4 Settlement approach

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Rationale:

Clearing and settlement within RAIN leverage the MBA occurring within the Vast Closed Loop in real time (S.4.1); there is minimal inter-provider credit and liquidity risk, as each transaction is prefunded (S.4.2-3). If MBA funds are not available, the transaction does not occur. The commercial funds underlying MBA are maintained as a float and are held in reserve with NAPs and Federated Authorities of the RAIN. This “persistent float” sits in reserve to back the MBA in circulation.

NAPs manage the end-users’ accounts and their MBA balances and handle the conversion of MBA to or from commercial currency. NAPs will use infrastructure currently in the market to support conversion of MBA to commercial currency. As real-time options are introduced to the market, the customer experience will depend on the system selected by a NAP to support conversion. The proposal states that the number of Federated Authorities is not defined, but rather will be determined by market response to the initiative. As these Federated Authorities will have responsibility for the custody of the float reserves in commercial currency, these entities will be an important component of settlement risk management. The proposal would be strengthened by providing additional details as to these entities’ responsibilities and accountabilities in this role (S.4.2).

S.5 Handling disputed payments

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Rationale:

Unauthorized, fraudulent, or other disputed payments are posted to the RAIL as a transaction information type that follows the original payment. The proposal indicates that Federated Authority NAPs will define dispute resolution rules and suggests that the solution could parallel some of the user protection features already resident in Regulation E (S.5.1). The proposal indicates that a list of relevant consumer protection laws will form one component of the rules for the system (S.5.2).

The proposal indicates that the legal and governance frameworks to be developed with ECCHO and Xalgorithms could take into account Regulation E, Regulation Z, and other relevant laws and regulations for dispute management. The proposal could be strengthened by ensuring that the requirements of Regulations E and Z and other relevant laws and regulations are met (S.5.5) and by guiding the Federated Authorities in creating dispute management services (S.5.1).
S.6  **Fraud information sharing**

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**Rationale:**

RAIL serves as an open, central ledger that captures all transaction details at the network level. Any node can access RAIL data to support fraud management. The data stored in RAIL will be overseen by the RAIN/RAIL governance entity (S.6.3). The RAIL should provide real-time fraud information that greatly exceeds the capabilities of current systems. The solution supports the capability to “aggregate fraud information to spot patterns that may not be visible at the level of an individual participant” (S.6.7). NAPs are expected to develop their own fraud monitoring and detection capabilities related to their nodes. The proposal states that network-level fraud monitoring will be supported through the provision of reports (prepared by the data provider after the fact) or by aggregated alerts that can be established to identify certain types of transactions. The proposal suggests but does not require that RAIN pool and USI systems develop a neural net to identify and isolate fraudulent behavior in the system through the use of RAIL data.

The solution would be strengthened requiring information-sharing across providers to facilitate fraud monitoring and management (S.6.1) and by ensuring that access to content is controlled and monitored (S.6.5). This data could then be aggregated (perhaps by a third party or RAIN/RAIL itself) and shared across NAPs (S.6.6).

S.7  **Security controls**

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**Rationale:**

The solution itself delivers security, in part through the intrinsic security capabilities of DLT and crypto-currencies. The proposal states that the RAIN will provide criteria for participation; the criteria will depend on the risk level of the participant. Participation criteria will differ for individuals, nodes, entities, NAPs, and Federated Authorities. The proposal would be strengthened by providing details about these criteria (S.7.2), the elements of technical access components and controls (S.7.1), and managerial policies and oversight (S.7.3). The solution should provide clear direction and define minimum requirements (operating rules) for NAPs related to identity verification and access management, data encryption in transit and at rest, data quality and integrity controls, and data breach prevention and detection. Security will be partly embedded into the onboarding process, with different admission criteria for different types of participants. The proposal states that it is difficult to spoof an account because “the crowd” is always able and available to monitor for anomalies (p.38), but it does not provide any requirements related to identifying and broadly communicating anomalies (S.7.1).
S.8  Resiliency

Very Effective  Effective  Somewhat Effective  Not Effective

**Rationale:**

Because the solution is a widely distributed model, it should always be available. The proposal states that the solution has been operating at 99.97% availability. RAIL’s distributed solution should have resiliency, as any attack on individual nodes should not compromise the entire system (S.8.3). Because there is a single network, threats can be detected and counteracted through network-wide monitoring of anomalies in the consensus process, transaction reversals, and conversion of funds, leaving the RAIN pools to localized assets. The proposal does not indicate whether the solution includes a network monitoring capability.

The proposal could be strengthened by defining how it will achieve availability metrics (S.8.1). Availability requirements should also be defined for each node. The proposal does not provide any details on DRP (disaster recovery plans) or BCP (business continuity plans) for the network, the ledger, or individual nodes (S.8.2, S.8.4) but indicates that BCP will be developed and will involve the oversight of a RAIN/RAIL non-profit that could provide back-up capabilities in the event of a significant event.

S.9  End-user data protection

Very Effective  Effective  Somewhat Effective  Not Effective

**Rationale:**

The solution supports payment using an alias (S.9.2); transaction participants do not need to know one another’s account numbers (S.9.3). The solution has robust controls and mechanisms to protect end-users’ data, including cryptographic tumblers that link the ledger and the network, as well as tokenization of the USI. Encryption protects all user information.

There are mechanisms in place to protect sensitive, payment-related information based on the inherent cryptography (S.9.3). The solution states that distributed storage of USI information is preferable to avoid a single point of failure. Individual end-users will be able to own and store their USI via an online account with RAIN that they set up and maintain relatively securely. (It is expected that NAPs will issue and store USI information on most account-holders’ behalf.)

S.10  End-user/provider authentication

Very Effective  Effective  Somewhat Effective  Not Effective

**Rationale:**

The proposal describes the authentication/validation of a USI for both payer and payee, as well as the validation of available funds, but it does not describe any end-user authentication requirements related to setting up and accessing a USI to initiate or receive a payment. NAPs are responsible for end-user authentication. The proposal should define minimum requirements to support authenticating the end-user to RAIN (S.10.1). The USI framework ensures that payments reach the intended recipient (S.10.2). The solution supports differentiated account service capabilities,
depending on the USI’s strength (the more robust the USI, the greater the functionality permitted to the end-user). Each NAP can define differentiated access, including differentiating access by transaction value and channel (S.10.4).

The proposal would be enhanced by providing minimum requirements for end-user authentication that meet regulatory standards (S.10.1, S.10.3), including a requirement for an end-user to authenticate to the solution prior to multiple transactions (S.10.5).

### S.11 Participation requirements

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**Rationale:**

Minimum requirements to participate as a NAP at solution launch begin with status as a Money Services Provider or a regulated FI. The solution states that NAPs could be segmented into different categories of participants within the network. The proposal envisions technology companies and other non-traditional account-providers (social networks, MNOs, unions, associations, etc.) qualifying as NAPs (S.11.2). NAPs that would transfer funds into fiat currency would have to comply with existing rules for these services. For closed-loop and non-monetary transactions, the proposer anticipates establishing proof of compliance internally to the solution.

The solution would be strengthened by defining the capabilities that each type of NAP must provide. (For example, social networks cannot directly support conversion of MBA to fiat currency, but they can support transactions within RAIN.) Rules and requirements for participation will leverage existing regulations where applicable. The proposal does not describe how it will ensure that all providers adhere to the solution’s rules and requirements for their role (S.11.1), or how it will ensure that all compliant providers have the operational, financial, and legal capacity to fulfill their obligations on a timely basis (S.11.2). Additionally, details regarding monitoring NAPs for compliance with participation requirements would be helpful (S.11.3).

### Speed (Fast)

**F.1 Fast approval**

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**Rationale:**

This rating is based on transaction speed within the RAIN network. RAIN meets the Task Force’s criteria for Very Effective fast approval when transactions occur within the closed loop (Very Effective = approval within two seconds). The evaluation does not consider the timelines associated with funding the RAIN/RAIL account or converting MBA to commercial currency. The proposal states that availability of MBA funds is a point of potential service differentiation in the market. It is expected that the time needed to convert commercial currency to and from MBA will vary by NAP.
F.2 Fast clearing

**Very Effective**        Effective        Somewhat Effective       Not Effective

**Rationale:**
RAIN meets the Task Force’s criteria for Very Effective fast clearing when transactions occur within the closed loop (Very Effective = clearing within two seconds). It is unclear how long clearing will take when transactions requiring conversion to/from MBA are conducted through legacy systems with NAPs. As stated in the proposal, conversion presents an opportunity for service differentiation in the market.

F.3 Fast availability of good funds to payee

**Very Effective**        Effective        Somewhat Effective       Not Effective

**Rationale:**
RAIN provides instant availability of MBA (not commercial currency) to the payee or to a NAP (if the payee uses a NAP) within RAIN. The availability of funds when converted to commercial currency from MBA will depend on when end-users choose to convert MBA, as well as NAPs’ capabilities to support conversion.

F.4 Fast settlement among depository institutions and regulated non-bank account providers

Very Effective        Effective        **Somewhat Effective**        Not Effective

**Rationale:**
This criterion evaluates settlement in commercial currency between FIs to support transactions within RAIN. The proposal indicates that it will be up to the individual NAPs to manage settlement by matching settlement within RAIN with existing settlement capabilities. Although settlement is instant within RAIN’s closed loop, there are no requirements to define settlement of funds between FIs, which can result in risk exposure (F.4.1). RAIN does not manage the risk of settlement in commercial currency, only in MBA. NAPs manage their own floats by holding reserve assets relative to their RAIN pools. RAIN is always available, so time zones are not an issue (F.4.2).

F.5 Prompt visibility of payment status

**Very Effective**        Effective        Somewhat Effective       Not Effective

**Rationale:**
The system responds immediately to each transaction—showing it as pending, approved, and received. The system also confirms when a NAP receives funds on a user’s behalf. The RAIL may not update as quickly as transactions are processed, and it is unclear whether the RAIN or the RAIL generates responses to end-users. It would be beneficial if the solution defined requirements related to end-user notification as part of governance or legal framework efforts.
Legal

L.1  Legal framework

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**Rationale:**

There is currently no existing, comprehensive, statutory, or regulatory law that addresses real-time payments in the U.S. (L.1.1). The proposer assumes that a universal set of rules (rather than bilateral agreements) will be created to govern all users and providers of real-time payments. These rules (Uniform Rules) will allocate liabilities among all parties using and providing all solutions. In addition to the Uniform Rules, solution providers and their customers will establish Provider Agreements that describe the services provided, pricing, disputed payments, availability, etc. Last, FIs and their customers will establish Financial Institution Agreements that describe the service provided, pricing, dispute resolution procedures, FI responsibilities, and customer responsibilities.

The proposal suggests that creating rules without involving key stakeholders would be premature. However, the proposal could identify core guidelines and principles, as well as an intended approach (L.1.1).

L.2  Payment system rules

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**Rationale:**

The proposal provides a summary list of components of the payment system rules that will be specifically detailed and documented once ECCHO has developed the legal framework and rules for Faster Payments (L.2.1). A governing committee for the RAIN—part of a non-profit management service with participation by network members—will manage rule extensions or changes (L.2.2). For monitoring and enforcement, the proposer believes that the system will rely on a series of warranties that 1) banks make to each other, 2) providers make to their customers, and 3) banks make to their customers (L.2.3).

L.3  Consumer protections

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**Rationale:**

The proposal states that the envisioned Uniform Rules will designate the responsibilities of each of the financial institutions in the payments process, including the allocation of legal and financial responsibility for unauthorized, fraudulent, or erroneous payments (L.3.1). The Provider Agreement and FI agreements with end-users will address the actual process for error resolution (presumably through operating regulations describing solution requirements). The proposal states that it will offer flexibility in RAIN for consumer protection based on local preferences—i.e., “consumer
protections such as refunds, insurance, and more can be introduced as part of the system to address consumer needs on a market-oriented basis” (p. 43) (L.3.3).

L.4 Data privacy

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**Rationale:**

The cryptographic nature of the USIs in RAIL protects end-users from the impact of a data breach, as no PII is stored in RAIL. The solution will minimize the risk of data breaches by eliminating the need to hold PII in most situations by replacing PII with a tokenized USI string that cannot be amended or changed (L.4.5). It is understood that all nodes have complete access to the data stored in RAIL. The proposal describes key attributes of the approach to data privacy that will be considered as part of the legal framework (L.4.1). End-users will have access to their data and privacy preferences through an online, account-based system that can be linked by their NAP or accessed through the RAIN end-user platform (L.4.4). It is expected that data privacy requirements (for example, end-users’ access to their data) will be developed as part of the Uniform Rules and implemented through provider rules and FI rules.

The proposal states that the system architecture will include cloud-based storage with public and private key data access to information at the RAIN/RAIL level. The solution will also support additional, decentralized data storage by nodes populated from the main network. No details are provided to indicate where the main ledger will reside, or how access to RAIL will be managed and monitored in accordance with applicable regulation (L.4.2). Also, no requirements of any kind are provided regarding the individual ledgers that will reside within each node.

L.5 Intellectual property

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**Rationale:**

The proposal outlines an approach to ownership of intellectual property (IP) for RAIN and RAIL and their build-on services. However, it does not currently have “a proposed approach for [RAIN and RAIL], end-users, and providers to resolve or manage, prior to implementation, any legal, operational or financial risks arising from third-party intellectual property rights” (L.5.1). The solution will work with ECCHO, which has already had direct experience with IP rights through its image technology lawsuit. ECCHO will do the research needed to prevent a similar situation from arising with RAIN and RAIL.
Governance

G.1 Effective governance

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**Rationale:**
The proposal describes governance related to the Uniform Rules for real-time payments, along with the structure and processes to support this governance as implemented by ECCHO for image exchange. The proposal describes a reasonable approach to effective governance, with governance arrangements (e.g., board of directors, ad hoc and standing subcommittees) and representation from a wide range of stakeholders. More detail regarding governance at the provider level is needed to satisfy the sub-criteria. The ongoing process to handle appeals from NAPs “related to specific decisions or their implementation” (G.1.3) needs to be described more completely. The proposal should address how RAIN’s governance will provide for “independent validation of compliance with RAIN’s rules, compliance with applicable law, and achievement of both RAIN’s objectives and public policy objectives” (G.1.4).

G.2 Inclusive governance

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**Rationale:**
RAIN will employ ECCHO’s legal framework rules, which are collaborative and inclusive, as it considers the public interest when making decisions (G.2.1) and gathers input from stakeholders through its governance and advisory bodies (G.2.2). A more detailed discussion of both of these criteria is needed.

The proposal states that contractual warranties will minimize conflicts of interest among participants (G.2.5). If conflicts of interest arise, they will be addressed through rules developed at the industry level (Uniform Rules). A diverse group of stakeholders will be responsible for decision-making (G.2.3).