TandaPay Hyperlocal Insurance Architecture

Background - what is a Tanda

A Tanda is a group of individuals who agree to meet for a defined period in order to save and borrow together, a form of combined peer-to-peer banking and peer-to-peer lending. Members are required to meet in the same physical location at regular intervals typically once or twice per month. Each member contributes the same amount at each meeting, and one member takes the whole sum once. Once a member takes the pool they return to make their contributions until all members have had a chance to take their portion. This process continues until the Tanda disbands after **each member** has had the opportunity to receive the pool **exactly once**.

Social pressure and the unwillingness to neglect agreements made to friends and family result in low default rates. This arrangement still requires the participants to both know and trust each other.

Tandas are formed for many reasons, but often because at least one member is in need of money to pay a debt right away, or an emergency arises. This also provides a means by which migrants can pool their funds enabling them to start projects more quickly which require a large sum of initial capital. In general these groups assist migrants to save money.

Savings clubs are mainly used in other countries as an alternative means of accessing capital when traditional lending is not readily available. As cultures migrated to the United States, they brought the savings tradition with them. Not surprisingly, the underbanked will turn to the lending club model in more financially affluent countries to escape the same lack of access to capital which existed in their country of origin.

But they can also be formed with no pressing financial obligations. While tandas may play important economic roles in the lives of people, they also serve an important social and emotional role in the everyday lives of people. For migrants tandas may facilitate social networks making them feel less isolated.

This type of lending club provides the following benefits:

- Contributions of funds to the community pool are verifiable by everyone
- Receipt of funds from the community pool is verifiable by everyone
- The funds are never held by a custodian of the group or another institution
- The amount of loss is reduced should someone take funds early and later fail to pay them back.

Development - what is TandaPay?

TandaPay is described in this slide deck as being a supplemental insurance product based off of the concept of shared community finance. TandaPay is described in this blog post as being a means by which communities can cover the cost of an insurance deductible. Additional blog posts here.

Overview

A Tanda is a group of individuals who agree to meet for a defined period in order to save and borrow together, a form of combined peer-to-peer banking and peer-to-peer lending. TandaPay is a supplemental insurance product based off of the concept of shared community finance. TandaPay is a means by which communities can cover the cost of an insurance deductible.

Timeline

Our effort estimation for product development of TandaPay will take four months in total. This total project effort covers all currently defined deliverables. The following estimation can be divided into phases to define an MVP version of the product and the logical follow on Phase two and three upgrades. Project progress will be tracked through sprint reports and regular sync up calls with the TandaPay team. TandaPay will receive beta versions of the TandaPay app, web site and smart contracts to review and sign off on functionality as the project progresses.

Software Engineering - **TandaPay Administrator Website**

Requires Senior Web Developer **160 hours**

- When Administrators login they can view all TandaGroups along with current loan and repayment status.
- Administrators can initiate notifications to TandaPay Groups using email or SMS with Twilio API integration.
- Can view funds received by TandaPay groups to track exchanges of USD for Ethereum/DAI. Administrators can confirm which ACH/Debit payments they have completed the Ethereum/DAI exchange transfer to help track settlement.
- Administrators will manually send Ethereum/DAI using the Ethereum wallet of their choice.

Software Development - **TandaPay Secretary web portal**

Requires Senior Web Developer **136 hours**

- Enable signup and creation of new Tanda Groups. Secretaries will initiate this process when they create their account.

- Allow TandaGroups to transact through their secretary as the Human ATM with TandaPay site handling exchanges from Fiat US to
- Ethereum/USD or DAI tokens.
- Enable communication between TandaPay Groups for notifications from TandaPay admins for group, payment and other statuses. As well as support request.
- Serve as a repository to retain and display group documents for formation, charter rules and claims documents. Consider google drive integration for claim documents.

Software Engineering - **Web Site - Auth0 Authentication**

Requires Senior Web Developer **80 hours**

- Implement Single Sign on through Autho into TandaPay Website.
- Enable user role management across networks for Administrators, Secretaries and Policyholders.

Software Engineering - **Website Settlement Layer**

Requires Senior Web Developer **248 hours**

- Implement Stripe payment system to allow TandaPay Group Secretaries to initiate ACH or Debit card payment to TandaPay.
- The repayment status of Groups will be tracked through a TandaPay database which tracks repayments and captures TandaPay defined KYC for each user.

Software Engineering - **TandaPay Mobile App** - In-App Messaging

Requires Senior Mobile Developer - **React Native 160 hours**

- Once users are registered and their account created they can communicate with their TandaGroup at any time.
- WhatsApp Integration using Twilio SDK for iOS and Android.
- Enable private group and subgroup chats within a TandaPay Group.
- Enable basic group management features for Secretaries to remove users.

Software Engineering - **TandaPay Mobile App** - Trust Wallet Integration

Requires Senior Mobile Developer - **React Native 180 hours**

- Enable the Secretary to create an account and invite policy holders.

- Generating an Ethereum Wallet address for each member when they sign up.
- Enable members to send and receive payments both to the secretary and TandaGroup smart contract holding address.
- Remind users when action must be taken on payments, view claims and other actions which may be required in participation of the TandaGroup.

Software Engineering - **Agile Project Manager 160 hours**

This role will track and convey project progress as well as maintain developer progress tracking by sprint setting up each deliverable and helping identify any timeline risk and needs for deliverables. Zenhub or Jira can be used for Epic and Story tracking.

Software Engineering - **QA and Regression Testing 320 hours**

As part of code base quality management each Pull Request for a completed feature within Github must first have code review and quality assurance test to assure the features required are completed to satisfaction of the requirements.

Software Engineering Smart Contract Deliverables **280 hours**

To be performed by **Anthony Akentiev** https://github.com/AnthonyAkentiev

- Use best practices found in OpenZeppelin Solidity guidelines and ConsenSys guidelines.
- Track multiple TandaGroups storing the GroupID, member address along with auditing of payments received and owed as well as acting as the smart holding address for payments into and rebates from the system.
- The Smart Contract will store TandaGroup funds as a holding address.
- Policy holders will be automatically repaid unused funds at the end of each payment period. This will be a set number of blocks based on Ethereum block time to happen roughly every 30 days.
- Store white list of active policy holders, the group secretary and track payments made by members.
- Enable freezing and unfreezing of specific policy holder addresses.
- A centralized database will allow cron jobs (automated bot scripts) interactions to check payment statuses of group members and initiate notifications and account actions.

TandaPay Group Formation - Overview

Forming a TandaPay Group requires multiple steps and is initiated by the Secretary submitting through a TandaPay portal to begin the group formation process. We define below each step of the initial group formation process, requirements and assumptions.

Tanda Group Requirements

- Group appointed secretary signs up via the TandaPay Web portal.
- Upon Approval by TandaPay the Secretary will receive a confirmation email and link to download the TandaPay app.
- The Secretary can then invite group members through the mobile app.
- A TandaPay group must reach **at least 50 members** before it can activate.
- Secretary post Official Charter which details:
    - What deductibles are eligible for coverage
    - What is the **cost** of a premium
    - What is the **value** of a claim award
    - What documentation is required to submit a claim request
    - What would disqualify a claim from receiving an award
    - What would disqualify a policyholder from participating in the Tanda
- Each member needs to agree to the charter and they need to join an overpayment subgroup of 4 to 7 people that has a single group leader
- Once **a group of 50 individuals** is formed the secretary needs to be granted a loan to generate initial liquidity.
- Charter identifies addresses for official blockchain contracts
    - Time lock contract template specifying address for claim payout contract
    - Claim payout contract
    - Contract coordinating an overpayment scheme

Product Requirements

- The TandaPay Mobile app will be developed in React-Native to allow a single code base that works for Android and iOS as a native application. This reduces overhead of updating and maintaining the TandaPay codebase over time.
- Smart Contract development will be in Solidity for Ethereum being the platform which supports the required logic functionalities needed for managing funds and group based payments.

Assumptions

- It is assumed basic KYC will be required to capture name, email and address of secretaries since TandaPay will provide loans to the group. Legal will determine if each group member may also have this requirement.

Tanda Website - Technical Specification

Enable TandPay Secretary's to sign in and interact with TandaPay for setting up their group as well as initiate exchanges of USD to ETH/USD or DAI tokens. Enable TandaPay admin to interact with and manage TandaPay groups including sending messaging to the group and monitoring their TandaGroup Id smart contract status.

Goals

- Enable signup and creation of new Tanda Groups. Secretaries will initiate this process when they create their account.
- Allow TandaGroups to transact through their secretary as the Human ATM with TandaPay site handling exchanges from Fiat US to Ethereum/USD or **DAI** tokens.
- Enable communication between TandaPay Groups for notifications from TandaPay admins for group, payment and other statuses. As well as support request.
- Serve as a repository to retain and display group documents for formation, charter rules and claims documents.

Product Requirements

- Login / Registration will use Auth0 to handle authentication and user role management which initially for the web portal is only Admin and Secretary roles.
- ReactJS with a NodeJS backend in the suggested technical architecture which provides a platform which is responsible for mobile browsers and compatible with React-Native if the web portal may one day be a native application for on-boarding the same codebase could be used.
- User roles which can use the site are Administrators, Secretaries and Policyholders. The Access Control List of user roles will be maintained through Auth0.
- Stripe has been identified as the best solution that covers all of requirements identified for direct ACH and Debit card payment to TandaPay. This includes repayment of loans and when Secretaries initiate an exchange by sending USD to TandaPay to exchange for Ethereum/DAI..
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Assumptions

- The website for TandaGroups will mostly be for the initial setup process and then for transactions to and from the Secretary handling Fiat to Ethereum/**DAI** conversions. Primary interactions after setup will be through the mobile app.

Risk

The website may retain some user account information although primary payment data will be using Stripe platform to help mitigate the risk and authentication will use web standards through Auth0 it is still recommended to have a security audit completed.

Tanda Administrator Website - Technical Specification

Enable TandPay Administrators to view TandaPay Group statuses viewing Loan, Repayment and Fiat ACH payments for Ethereum/DAI exchanges.

Goals

- When Administrators login they can view all Tanda Groups along with current loan and repayment status.
- Administrators can initiate notifications to TandaPay Groups using email or SMS with Twilio API integration.
- Can view funds received by TandaPay groups to track exchanges of USD for Ethereum/DAI. Administrators can confirm which ACH/Debit payments they have completed the Ethereum/DAI exchange transfer for to help track settlement.
- Administrators will manually send Ethereum/DAI using the Ethereum wallet of their choice outside of the administrator website. Reason for this listed in Assumptions.

Product Requirements

- Login / Registration will use Auth0 to authenticate the user administrators access and role.
- ReactJS with a NodeJS backend in the suggested technical architecture which provides a platform which is responsible for mobile browsers and compatible with React-Native if the web portal may one day be a native application for on-boarding the same codebase could be used.
- User roles which can use the site are Administrators, Secretaries and Policyholders. The Access Control List of user roles will be maintained through Auth0.
- Stripe has been identified as the best solution that covers all of requirements identified for direct ACH and Debit card payment to TandaPay. This includes repayment of loans and when Secretaries initiate an exchange by sending USD to TandaPay to exchange for Ethereum/DAI.
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Assumptions

- The Administrator site is to view the status of groups and payments received but does not handle sending Ethereum/DAI from TandaPay Admin controlled Ethereum accounts. One this saves integration cost and second part removes risk since this account will hold a larger value than other accounts that interact with the TandaPay platform.

Risk

The website may retain some user account information although primary payment data will be using Stripe platform to help mitigate the risk and authentication will use web standards through Auth0 it is still recommended to have a security audit completed.

Tanda Smart Contract - Technical Specification

Smart Contracts for TandaPay handle the functionality of a smart holding address, tracking and holding Tanda Group funds and repayment to Policyholders as well as payouts to Claimants.

Goals

- The Smart Contract will store TandaGroup funds as a holding address.
- Policy holders will be automatically repaid unused funds at the end of each payment period. This will be a set number of blocks based on Ethereum block time to happen roughly every 30 days.
- Store white list of active policy holders, the group secretary and track payments made by members.
- Enable freezing and unfreezing of specific policy hodler addresses.
- Track multiple TandaGroups storing the GroupID, member address along with auditing of payments received and owed as well as acting as the smart holding address for payments into and rebates from the system.
  A centralized database makes sense to pair with this smart contract to allow cron jobs (automated bot scripts) interactions to check payment statuses of group members and initiate notifications and account actions. Handling this all through the smart contract has more limitations and cost of computation.

Product Requirements

- Ethereum Smart Contracts will require Solidity development and be based on open standards set by OpenZepplin and other leaders in the blockchain space defining smart contract standards such as Consensys.
- Smart Contracts will require some additional Ethereum for processing transactions. This fee can vary between 1 cent to 10 cents commonly with occasional spikes.

Assumptions

Risk

Since the Smart Contract will handle user and group funds a smart contract audit is recommended as there is a custodial risk in any smart contract which will hold or direct user funds.

Tanda Messenger - Technical Specification

Enable Group chat through the application allowing Tanda Groups to communicate remotely and stay in touch easily through the mobile application.

Goals

- Once users are registered and their account created they can communicate with their TandaGroup at any time.
- Messaging may contain personal information so private chat groups are important.
- A service like WhatsApp makes sense for communication since it does not incur text messaging fees associated with normal group text.

Product Requirements

- Integrate private group messaging for each TandaPay Group. WhatsApp SDK has been identified as the most robust messaging protocol available for third party application integration through Twilio SDK. The features include the ability for private group messaging for both iOS and Android.

Assumptions

- Privacy is important since members may discuss important personal details. A private messaging platform is required and this is an additional reason messaging may be limited to 1 to 1 with the Secretary and group members not allowing an open group chat.

Risk

Users may discuss private matters with their Tanda Group so it may be smart to audit this part of the system as well. WhatsApp is known for being top notch as far as its security protocol.

Mobile Wallet - Technical Specification

After a TandaGroup is created the secretary can invite members via email. Once the Policy holders sign up their public address is shared with the secretary and TandaGroup smart contract to whitelist. This enables the secretary to see when all members are setup. Members will be able to view and track their TandaGroup, make payments and view claim documents.

Goals

- Enable the Secretary to create an account and invite policy holders. Generating an Ethereum Wallet address for each member when they sign up.
- Enable members to send and receive payments both to the secretary and TandaGroup smart contract holding address.
- Remind users when action must be taken on payments, view claims and other actions which may be required in participation of the TandaGroup.

Product Requirements

- The Mobile SDK will be Ethereum specific and support ERC20 tokens. We have selected TrustWallet as the current leading open source Ethereum Wallet as they were recently acquired by Binance and offer the most robust wallet toolkit on the market as well as support for both iOS and Android.
- React-Native will be used if possible with compatible wallet that is selected to allow one code base that works on Android and iPhone.
- User roles will include Secretary and Policy holder. The wallet functionality adjusted based on which role the user is.
- Push notifications will use a NodeJS service which is cross platform compatible. This is key for reminding users to make payments and enable group communication through messaging.
- Messaging integration which is defined in the Messaging specification.

Assumptions

- Members have already signed their Official Charter and any documents required by the TandaGroup prior to creating their account. The secretary ultimately handles this on-boarding process for members of each Tanda.
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Risk

Since TrustWallet will be used for interacting with the TandaPay platform. There is some custodial risk if any security vulnerability is found in the wallet, Ethereum platform or nodes themselves. A security audit is recommended as well as insurance policy to cover worst case scenario based on amount of funds that may be at risk.

I. PREPARATION

Roles

1. **Secretary** - Underwriter, Claims adjuster
   - Responsible for creation of the group by first creating the groups charter via auto template that asks the secretary a few questions and then based off of his answers creates the charter. This should be done via online portal not through app to permit more complex questionnaires and easier customization of a group's charter.
     This involves setting the **cost of premiums** and the **value of claim awards**
   - Sends invites via text message or email allowing people to join group
   - Provides conversion of fiat dollars for ETH-USD so people can pay their premiums
   - Provides conversion of ETH-USD to fiat dollars so that people can redeem their claim awards
   - Approves claims for awards
   - Trains members how to use the app
2. **Community members** - Policyholders
   - Should all be local to each other. Allows **exactly 50** people to start a group together, after which some people can leave so long as the group is at least **30 people**.
   - Must be added to subgroups of 4 to 7 individuals each having one group leader. Not allowed to participate as individuals.
   - Pays premiums in dollars to secretary and receives ETH-USD through the app
   - Commits ETH-USD premium to smart contract until end of month
     Also commits overpayment
     Also pays down loan granted to secretary to initiate community
   - Reviews approved claims
   - Finalizes claim awards by forwarding premium payment to claimants

Initial setup

3. For ***messaging*** and ***payment*** features of app please see **III**. and **IV.**
4. Secretary publishes the official charter which defines the following items:
   - What deductibles are eligible for coverage
   - What is the **cost** of a premium
   - What is the **value** of a claim award
   - What documentation is required to submit a claim request
   - What would disqualify a claim from receiving an award
   - What would disqualify a policyholder from participating in the Tanda
5. Each member needs to agree to the charter and they need to join an overpayment subgroup of 4 to 7 people that has a single group leader.
6. Once a group of 50 individuals is formed the secretary needs to be granted a loan to generate initial liquidity. This is explained in this document here.
   The value of the loan is determined to be based on the groups global values:
   Months to repay loan = **MTR**
   Monthly premium value * Number of group members = **premium**
   premium * 0.25 overpayment multiple = **overpayment**
   (premium + overpayment) / (MTR - 1) = **global repayment**
   premium + **overpayment** + **global repayment** = **Loan amount in ETH-USD**
7. Charter identifies addresses for official blockchain contracts
   - Time lock contract template specifying address for claim payout contract
   - Claim payout contract
   - Contract coordinating an overpayment scheme

Overpayment scheme rules

7. All participants must join a sub-group within the community to be qualified to participate as an eligible policyholder.
8. Sub groups can be composed of anywhere between 4 to 7 members.
9. Participation in a subgroup requires that each participant make an overpayment which would allow the group to compensate for a single member who reneged on their agreement to finalize their premium payment at the end of the policy period.
10. Overpayments are always returned in full at the end of a policy period provided that every group member commits to paying their previously locked premiums at the end of the policy

period. If any member fails to pay their previously locked premium then the overpayment is confiscated and sent to the claim payout contract address.

11. Overpayment values are determined by the following **overpayment table**:

# of members in sub-group	Overpayment multiple	# of members in sub-group	Overpayment multiple
4	0.333	6	0.2
5	0.25	7	0.167

II. Payment of premiums, awarding claims and finalizing payments

Payment of premiums

1. Premium payment period begins
2. Premium cost is announced by the secretary to all the members.
3. Members pay their **premium** + **overpayment** + **individual** **loan payment** in dollars to the secretary. The secretary functions as a human ATM for the conversion of dollars to cryptocurrency or vice versa. See the section entitled:
   How can this work for people who don't use Ethereum?
4. The secretary then sends members this value ETH-USD
5. Members then send that ETH-USD to the TandaPay smart contract for holding:
   Premium - For claim awards, if no claim awards returned as rebates
   Overpayment - To discourage defectors, if there are no defectors in a sub-group then the overpayment is returned to members
   Individual **loan payment** - Smart contract relays these funds back to TandaPay. Loan for initial liquidity provided to secretary is paid back over three months. After the loan is repaid this cost is removed.
6. To calculate the value of an individual overpayment consult the overpayment table:
   Individual premium * overpayment multiple = **overpayment value**
7. To calculate the value of an **individual** loan payment do the following:
   Loan amount / (MTR * number of members) = **individual** **loan payment**
   Months to Repay loan = **MTR**
8. Once this value is paid to the smart contract a time lock begins
9. Time lock rules:

- Premiums must be locked prior to start of policy period for someone to be considered eligible for a claim award.
- Once locked the policyholder **can not access these funds** under any circumstance until the end of policy period.
- Only the person who initiates a time lock of premium funds is eligible to release those funds back to themselves.
- A policyholder cannot release funds to any other address other than the address which commited the funds
- No person other than the policyholder themselves can determine the ownership of funds.

10. Time lock contract template locks premium funds until the end of the policy period and then provides two options to a policyholder if there are valid claims that need to be paid:
    Option 1 LOYALIST - pay premium to previously decided claim payout contract address
    Option 2 DEFECTOR - return premium back to policyholder *not selectable by secretary*
11. In addition it always returns the overpayment if
    - The policyholder chooses option 2
    - All group members choose option 1

    It never returns the overpayment if
    - X > 1 group member(s) decides to choose option 2 and option 1 is chosen
12. If there are no valid claims then premiums are paid back to members as rebates.

Approval of claims

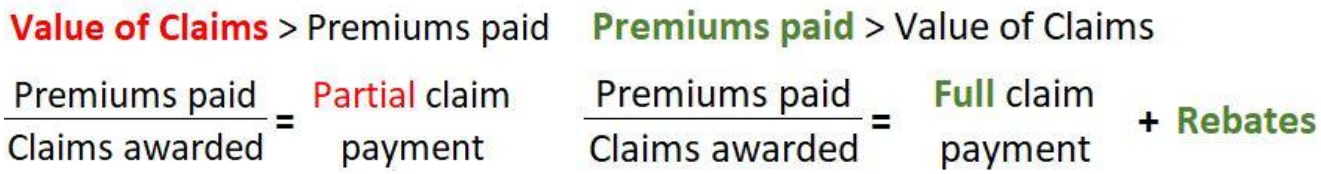
13. Policy period begins
14. If a claim comes in prior to the end of the policy period then the secretary checks if it is eligible for a claim award according to the rules of the charter:
    - If required the secretary and policyholder submit the necessary documentation
    - The secretary whitelists the claimants address for receiving a claim award
15. Policy period ends
16. All policyholders receive a list of eligible claimants (awards) and a notification if they will be receiving any of their funds back as rebates. This should also include a link to any of the necessary documentation required by the charter for a valid claim award.

Finalization of premium payment and payment of claims

17. Finalization period begins

18. If there are no valid claim awards then all premiums are returned as rebates and the finalization period ends. If there are valid claim awards then premiums need to be finalized for claimants to receive a claim payment.
19. If there are partial rebates available then award partial rebates at the start of the period.
20. All members of a TandaPay group are local to each other. If there is any dispute as to the legitimacy of a claim award then the members can speak directly to the claimant or the secretary.
21. At end of time lock contract period each member has the following choices
    - **Option 1** pay locked premium to previously decided claim payout contract address.
    - **Option 2** defect, resulting in the return of the locked premium + overpayment back to the policyholder.
    - **Option 3** do nothing. In 3 days the premium is automatically paid to the claim payout contract.
22. If claimants do not finalize their premium payment then they are not eligible to receive a claim payment.
23. If more than one person from a claimants sub-group defects then the claimant is not eligible to receive a claim payment. This is because a group can only compensate for a single defector with their existing overpayment. Any additional defectors could potentially negatively impact other claimants.
24. If any sub-group has defectors then they are notified via the app that someone within their group has defected.
25. A defection always results in confiscation of one's overpayment unless the entire sub-group defects together.
26. A low defection rate guarantees that claimants will be fairly paid their claim award. This is not secured by the protocol, but instead the social dynamic of the group guarantees the fair payment of claims.
27. Releasing funds to claimants is voluntary to mitigate fraud, unfairly withholding payments has social consequences to mitigate defaults. Any defector would therefore likely not be allowed to participate once they decided to defect.
28. If the value of awarded claims in a given month is greater than the value of premiums paid then the recipients each receive a partial payment of **Premiums / # of claimants**.
29. Overpayments are not considered to be premiums and are always returned to participants if there are no defectors within a community's sub-group regardless if the value of premiums is less than the value of all claims.

30. If members have ETH-USD and they wish to convert these funds to dollars then the secretary is able to convert these funds for them as shown here and here.
31. If for whatever reason the secretary cannot or will not provide conversion then members need to attempt to use the TandaPay portal to create an account which links with their bank account such that ETH-USD deposited through the portal can be converted to dollars and sent via ACH to their checking or savings account.



Some considerations

- If policyholders have enough ETH-USD in their TandaPay wallet then some form of auto pay feature to simplify the payment of monthly premiums would be very valuable.

III. Messaging features of app

Invite - Sent by secretary to member

Sign up - Link received by secretary to download and install app. Secretary gets notification if link is sent but member fails to sign up within 24 hours.

Associate - Member to right group

Create - Sub-groups by self election of sub-group leader and free association based on member choice.

Will you **lead** your own sub-group of 4-7 people?

* If selected then create group named after individual member that other people can pick
* Show the leader select screen to permit them to join a sub-group as a member
* Once 4 people join their sub-group remove the ability for them to join another sub-group
* As a leader to disband and join another sub-group their sub-group must have either 1, 2, or 3 members.
* they need to ask members to leave via the chat if they really want to disband.
* If they join another sub-group then their name will no longer be selectable from the sub-group leader select screen.
* Any members who joined that sub-group prior to its having 4 members will be forced to pick again.

Will you **join** another sub-group?

* show the leader select screen to permit them to join a sub-group as a member.

Message function - Item on the list means that this role can initiate these messages. Once channel is initiated then member can respond but cannot open up new channel if closed.

1. **TandaPay admin capability**:
   Secretary
   All TandaPay group members broadcast
   Individual members
   Receives TandaPay help escalation path messages
   Can monitor all messages sent by all participants
2. **Member capability:**
   Secretary
   Self sub-group broadcast
   TandaPay help escalation path
3. **Sub-group leader capability**:
   Same as member
   Receives TandaPay help escalation path messages
4. **Secretary capability**:
   TandaPay admin
   Individual members
   Specific Sub-group broadcast
   All TandaPay group members broadcast
   Receives TandaPay help escalation path messages

TandaPay help escalation path:

1. Sub-group leader
2. Secretary
3. TandaPay admin

IV. Payment features of app

1. **Member capability**:
   Pay smart contract - premiums
   Pay secretary

Request smart contract to pay self - **defection**

TandaPay payment portal - Not natively available. TandaPay Admin can unlock the ability to send to payment portal account with TandaPay website for ETH-USD conversion.

2. **Secretary capability**:

   Two wallets - Secretary wallet + member wallet

   Member: Pay smart contract - premiums

   Secretary: Pay self - Secretary's member wallet for premiums / claims

   Secretary: Pay policyholder / claimant for dollar conversion

   Secretary / Member: TandaPay payment portal

   Secretary: TandaPay holding address

3. **Smart Contract capability**:

   Pay member - **defection**

   Pay claimant - claim payment

   Pay member - rebate

   Pay TandaPay admin - loan repayment

4. **TandaPay Portal capability**:

   Issue loan - to secretary

   Pay secretary - for conversion purposes

   Pay member with portal account - for conversion purposes

   Receive loan repayment from smart contract

5. **TandaPay Holding address capability**:

   Receive money from secretary + Release funds to secretary

V. Issues TandaPay architecture doesn't natively solve

1. Premium payments may be inadequate relative to the value of outstanding claims, this results in the underpayment of claims
   - Tanda pay provides supplemental insurance coverage to partially cover a loss which is different than pure loss coverage.
   - The charter underwrites what risk is eligible for coverage and it can only be used to award claims that have specific values which are listed in the charter that are tied to specific triggering events.
   - TandaPay is only suitable for certain types of coverage from a limited scope of risks, even then it frequently is only able to provide supplemental coverage in the event of a loss.

- Actual coverage is determined by how many claims can be awarded in a policy period relative to the number of actual claims to be paid.
- This depends upon the size of the premium members choose to pay as well as the frequency of a claim event given a TandaPay groups profile.
- TandaPay groups are not mandated to pay specific premiums for coverage, rather the group has the flexibility to decide these matters for themselves.
- What matters most is that the system is transparent and that everyone has the ability to calculate ***how much coverage they are likely to have*** if they themselves open up a claim.
- Members pay the premiums they want to pay and as a trade-off they receive the coverage they chose relative to the premiums they paid.
- Any excess premiums remaining after all claim awards have been paid are guaranteed to be returned as rebates at the end of the claim payment period. This rebate mechanism should make communities more willing to pay higher premiums thereby providing better coverage.
- If members want better coverage they should pay higher premiums. Since they are likely to receive rebates each month this doesn't really mean that their coverage becomes more expensive when they pay higher premiums.

2. Claimants cannot receive a claim payment until the policy period has ended
    - This is a necessary trade-off to provide security guarantees.
    - There is a way to provide immediate benefits if you tokenize claim awards and allow anyone who holds the token to receive that award.
    - A broker may be willing to provide payment immediately for the potential of receiving a future tokenized claim.
    - If a TandaPay group underpays claims on a regular basis then there is no good reason why a broker would take the risk of being underpaid.
    - Communities who wish to tokenize claims are therefore incentivized to pay high enough premiums that brokers would be willing to accept the risk of being underpaid.

3. There is no dispute resolution mechanism
    - It is very important that everyone abides strictly by the charter.
    - Failure to follow the charters rules can invalidate a claim or result in a policyholder being removed from a TandaPay group.

- The secretary is the only person who can determine if a claim meets the standards set forth by the charter. This means that they are the only ones who can approve claims and add or remove policyholders allowing them to participate in a TandaPay group.
- Since a secretary's decision is final, no policyholder should ever join a TandaPay group if they do not trust the secretary.

As a check to the power of secretaries the following is true:

- If a member disagrees with a secretary their best recourse is to reason with the secretary.
- This may require that a member use their social capital within the group to apply social pressure such that the secretary changes his mind.
- As a final recourse a member always has the option to defect from a TandaPay group.
- If a ***fraudulent claim is approved*** by a secretary, then it is easy for policyholders to defect with their premiums to avoid paying a fraudulent claim. In fact they are required to do so by the TandaPay pledge.
- If a ***valid claim is denied*** by the secretary, there is no recourse other than a claimant attempting to convince other policyholders to defect with their premiums.
- This does not guarantee that the claimant will receive a claim payment however, as each defector would need to manually decide to send their payment to the claimant directly.
- If an entire overpayment sub-group disagrees with the secretary, then they can coordinate and decide to defect together. In this way their overpayment is not forfeit.
- If a single member of a sub-group is unfairly denied their claim then hopefully all the members of their sub-group will pull together to offer minimal support to the denied party by redirecting their premiums and overpayments to the unfairly denied member.