DigixDAO 1.0 Governance Model [Draft]

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1. Overview

DigixDAO 1.0 refers to the first iteration of DigixDAO that will be deployed as a set of smart contracts on the Ethereum 's mainnet. This document decribes how the governance model in DigixDAO 1.0 works.

2. Roles in DigixDAO

2.1 The roles

There are 4 types of roles in DigixDAO 1.0 governance model:

- $Participants$: DGD holders who lock up more than a minimum amount of $minimumDgdToParticipate$ DGDs in the quarter.
- $Moderators$: $participants$ who:
  - Lock up more than a minimum amount of $minimumDgdToModerate$ DGDs in the quarter
  - Has a minimum $ReputationPoint$ of $minimumRpToModerate$ ($ReputationPoints$ will be discussed later)
- $Founders$: addresses controlled by the Digix team
- $PolicyandRegulatoryLegalDepartment$ members ($PRLs$): addresses who can be set/unset by the $Founders$, and are in charge of pausing/stopping proposals due to policy, regulatory or legal reasons. Note that these roles are not mutually exclusive. For example, a $moderator$ is always a $participant$ at the same time.

The exact responsibilities of the roles will be discussed in more details in subsequent sections.

2.2 Reputation Point redemption for DigixDAO Badges

- A DigixDAO Badge holder can redeem a DigixDAO Badge to get exactly $minimumRpToModerate$ $ReputationPoints$, making him/her eligible to be a $moderator$ right away (provided that he/she also lock in at least $minimumDgdToModerate$)
- Only one DigixDAO Badge can be redeemed for a specific address. This is to prevent a case where multiple Badges can be redeemed for the same address, making the $ReputationPoint$ of the address so big that it can remain as a $moderator$ for a long time without contributing to DigixDAO governance.

3. DAO's timeline

DigixDAO operates in terms of quarters, which last for exactly 90 days, from $t = 0$ to $t = 90$ ($t = 90.0..01$ is considered the next quarter). From $t = 0$ to $t = 10$ is the $LockingPhase$, where:

- DGD holders who have not locked their DGDs can lock up their DGDs in a contract to become a $participant$ in DigixDAO governance for that quarter.
- $Participants$ in the previous quarter can:
  - Withdraw some or all of their DGD balance that was locked in the previous quarter
  - Just keep the DGD balance unchanged or top-up some more DGDs
- At the end of this phase, each $participant$ is deemed to have a $LockedDGDStake$ which is exactly equal to the amount of DGDs locked in this phase.

From $t = 10$ to $t = 90$ is the $MainPhase$, where:

- Locked DGDs cannot be withdrawn
- All the governance activities will take place
- DGD holders can also lock more DGDs during this phase, at time t. However, the addition to $LockedDGDStake$ will be weighted accordingly to the time remaining in the quarter compared to the full duration of 80 days

$$LockedDGDStake = LockedDGDStake + AdditionalDGDs \times \frac{90 - t}{80}$$

4. Proposals

4.1 Details of a proposal

The proposal should include the following details:

- A title
- A description
- Any other supporting documents
- The number of milestones and details for each milestone:
  - An estimate on how long the milestone would take (non-binding)
  - The amount of funding in Ethers (ETH) needed for the milestone
  - Some forms of Key Performance Indicators (KPIs). These are off-chain measures to help the community evaluate the success of the milestone.
- A final reward, in terms of ETH, for the $proposer$ if he/she completes all the milestones.

4.1.1 Limits on free proposals

In this first iteration of DigixDAO, there will be certain limits on proposals:

- The total funding for the proposal cannot exceed a certain amount of Ethers ($MaxPossibleFunding$)
- The total number of milestones in a proposal cannot exceed $MaxMilestoneCount$

There are multiple reasons for introducing these limits:

- To limit unforseen exploitations of the DAO, which could be in the form of contract vulnerabilities, game theory based attacks (for example: vote buying), or other types of exploitations
- The initial DAO configs could make it relatively easy to pass a proposal, however poor or malicious it is. For example, the quorum/quota could be too lax. The configs would need to be tested out in the first quarters, and be fine-tuned accordingly.

These limits would not apply on proposals that are initiated by the Digix team.

4.2 Collateral for a proposal

When starting a proposal, the proposing participant will need to lock up a certain amount of Ethers ($ProposalCollateral$) as collateral. This participant can only get back the collateral in 3 scenarios:

- Before the proposal is finalized for voting, by the proposer explicitly canceling the proposal
- The proposal fails in either the $DraftVotingPhase$ or $VotingPhase$ (hence, no funding has been released)
- The proposal gets through to the end, and the final voting round passes

The details of the voting rounds mentioned will be elaborated in the next sub-section

4.3 Phases in the lifetime of a proposal

4.3.1 Endorsement Phase

- Any $participant$ who is interested in starting proposals need to pass know-your-customer (KYC) check first.
- Any kyc-approved $participant$ can start a proposal, which has an initial status as a $pre-proposal$. The $participant$ will then be referred to as the $proposer$. Note that when creating the proposal, the $proposer$ will need to send the collateral as well.
- The $proposer$ needs to start a new thread on the DAO Forum to introduce their $pre-proposal$

- Any $participant$ can comment on the DAO Forum's thread to talk about the $pre-proposal$
- The $proposer$ can cancel the proposal and get back the collateral
- Any $moderator$ can endorse the $pre-proposal$, making it a $DraftProposal$ and takes it to the $DraftPhase$

4.3.2 Draft Phase

- $Participants$ can comment on the DAO Forum's proposal thread to suggest improvements/modifications to the $DraftProposal$
- The $proposer$ is free to update the details of the $DraftProposal$ by adding a new version of the proposal details.
- The history of all the proposal versions is publicly viewable.
- The $proposer$ can cancel the proposal and get back the collateral
- When the $proposer$ thinks his $DraftProposal$ is ready for voting, he/she can choose to finalize it, moving it to the $DraftVotingPhase$
- There is a maximum duration of tentatively 2 quarters that a proposal can remain in the $DraftPhase$. After that, they will be deemed inactive and discarded. $Proposers$ of these discarded proposals do not get back their collaterals.

4.3.3 Draft Voting Phase

- Lasts for 14 days (is subject to change)
- From this phase onwards, the $proposer$ can only change fundings in the subsequent milestones, and append more documents to the proposal.
- Only $moderator$ can vote in this phase (either "yes" or "no"). Votes are publicly viewable.
- $moderators$ can change their vote any time for the duration of the $DraftVotingPhase$
- The $DraftProposal$ is considered passed and becomes a $FinalizedProposal$ if and when:
  - The $quorum$ (or number of votes registered) is greater than or equal to a $MinimumDraftQuorum$ (which is determined by the Minimum quorum size formula in section 6.3)
  - The $quota$ (or the ratio of the number of "yes" votes to the $quorum$) is greater than or equal to a $MinimumDraftQuota$ (which is just a constant)

4.3.4 Voting Phase

- Lasts for 30 days (is subject to change)
- All $participants$ can vote in this phase (either "yes" or "no")
- The voting follows the commmit-reveal scheme, which is explained in section 6.1
- The $FinalizedProposal$ is considered passed when:
  - The $quorum$ (or total amount of DGD stake of people who voted) is greater than or equal to a $MinimumVotingQuorum$ (which is determined by the Minimum quorum size formula in section 6.3)
  - The $quota$ (or the ratio of the DGD stake in the "yes" votes to the $quorum$) is greater than or equal to a $MinimumVotingQuota$ (which is just a constant)
- If the voting passes and the PRL has approved the proposal, the $proposer$ can withdraw the funding for the first milestone.
- If the voting fails, the collateral is returned to the $proposer$

4.3.5 Milestone Delivery Phase

- After getting funded for the milestone, the $proposer$ is supposed to work on delivering on his milestone within the duration that he/she has specified in the proposal details
- The $proposer$ and all $participants$ can still communicate through the DAO Forum
- The $proposer$ can change the fundings for the subsequent milestones. He/she can also add more milestones.
- The $proposer$ is supposed to call a function to signal that he/she has done the milestone, which will start the next Interim Voting Phase.

4.3.6 Interim Voting Phase

- Starts right after the $proposer$ confirming that he/she has done the previous milestone, and lasts for 20 days (is subject to change)
- All $participants$ can vote in this phase (either "yes" or "no"), on whether to release the next funding for the proposal.
- The voting follows the commmit-reveal scheme, which is explained in section 6.1
- The voting is considered passed when:
  - The $quorum$ (or total amount of DGD stake of people who voted) is greater than or equal to a $MinimumInterimVotingQuorum$ (which is determined by the Minimum quorum size formula in section 6.3)

  - The $quota$ (or the ratio of the DGD stake in the "yes" votes to the $quorum$) is greater than or equal to a $MinimumInterimVotingQuota$ (which is just a constant)

- If the vote passes and the PRL has approved the proposal, the $proposer$ can withdraw the funding for the next milestone.
- There is also an Interim Voting Phase after the last milestone has ended, and it is to decide whether the $proposer$ has completed everything and should receive the $FinalReward$ that was specified in the proposal details. If the final voting round passes, the collateral is returned to the $proposer$ as well.

4.4 The Policy, Regulatory and Legal Department

- The Policy, Regulatory and Legal Department (PRL) can either pause or stop the funding of proposals due to policy, regulatory or legal reasons.
- $Proposers$ of paused/stopped proposals will not be able to withdraw the proposal fundings.
- The $PRLs$ can choose to unpause the funding of a paused proposal at a later time.
- Stopped proposals cannot be unpaused and will be deemed as over.

5. Special Proposals

- This is a special class of proposals that can only be started by the $founders$.
- This proposal can propose changes to all the parameters used in the governance model.
  - There will only be one voting phase, which lasts for 4 weeks: 3 weeks for committing votes and 1 week for revealing votes.
  - Minimum quorum needed will be 70% of the total $LockedDGDStake$ and the minimum quota will be 60%. These numbers are tentative and are subject to change.

6. Voting mechanics

6.1 Voting power

In all voting rounds, the voting power is always exactly the same as the $LockedDGDStake$ of the $participant$ (or $moderator$)

6.2 Commit-reveal voting scheme

- In the commit period:
  - $participants$ can commit their "yes" or "no" together with a random word $CommitSecret$
  - The votes remain secret to all the other $participants$. As such, no one can tell whether there have been more "yes" or "no" votes during the commit period
  - $participants$ can change their vote by committing again.
- In the reveal period:
  - $participants$ who voted need to provide the $CommitSecret$ to reveal their committed vote.
  - only the last commited vote can be revealed
- Only votes which are successfully revealed are counted.

6.3 Minimum quorum size formula

Except for $SpecialProposal$ voting, the minimum quorum (in terms of DGD Stake) for all voting rounds follow this formula(although the parameters for each voting phase might be different):

$$MinimumQuorum = TotalStake \times \left(x\% + \frac{ETHAskedByProposal}{ETHinDAO} \times ScalingFactor \right)$$

- The $TotalStake$ is the sum of every $participant$'s $LockedDGDStake$ in the quarter
- The $x\%$ portion is fixed for all proposals. It is the absolute minimum percentage of $LockedDGDStake$ that need to vote on any proposal for the voting to be valid.
- $ETHAskedByProposal$ is the amount of ETH that the voting round is concerned with
  - If it is a $DraftVotingPhase$, this is the total amount of ETHs asked in all the milestones
  - If it is a $VotingPhase$ or $InterimVotingPhase$, this is the amount of ETHs asked for the next milestone.
- The second portion is directly proportional to the $ETHAskedByProposal$, relative to the ETH holding of the DAO. This importance of the portion is adjusted by the $ScalingFactor$

This formula achieves the following effects we desire:

- A proposal who asks for n ETHs in quarter 100 will need a bigger quorum size (in terms of percentage of all $LockedDGDStake$) than a proposal who asks for exactly n ETHs in quarter 1, because the remaining ETH in DAO is less.

- Even if a proposal asks for very minimal funding, it will still need at least a quorum size of $x\%$ of the total $LockedDGDStake$.

7. Point System

There are three classes of points in DigixDAO 1.0: $QuarterPoints$, $ModeratorQuarterPoints$ and $ReputationPoints$.

- These points are awarded to $participants$ depending on their contribution to DigixDAO
- The points are non-transferrable and tied to the address of the $participant$.

7.1 Quarter Points (QP)

- $QuarterPoints$ are a direct measure of the participation of a $participant$ in a specific quarter
- $QuarterPoints$ will be awarded when:
  - A $participant$ votes in any voting round
  - A $proposer$ successfully gets his proposal past any voting round
- The $QuarterPoints$ will be reset to 0 at the beginning of a new quarter.

7.2 Moderator Quarter Points (Moderator QP)

- $ModeratorQuarterPoints$ are a direct measure of the moderating activity of a $moderator$ in a specific quarter
- $ModeratorQuarterPoints$ will be awarded when a $moderator$ votes in a $DraftVotingPhase$
- The $ModeratorQuarterPoints$ will be reset to 0 at the beginning of a new quarter.

7.3 Reputation Points (RP)

- $ReputationPoints$ are a cumulative measure of how actively a $participant$ has contributed to the governance across quarters
- At the end of each quarter, a $participant$ gains or loses $ReputationPoint$:
  - If his/her $QuarterPoint$ is less than a $MinimalQP$ threshold:

$$changeInRP = -\frac{MinimalQP - QP}{MinimalQP} \times MaxRPDeduction$$

    * $MinimalQP$ is basically the amount of $QuarterPoints$ that we expect most $participants$ should get, by doing some minimal voting activity.

    - $MaxRPDeduction$ is the amount of $ReputationPoint$ that would be deducted if a $participant$ has 0 $QuarterPoint$ for the quarter.
  - If his/her $QuarterPoint$ is more than or equal to the $MinimalQP$ threshold:

$$changeInRP = (QP - MinimalQP) \times RPperExtraQP$$

    - $RPperExtraQP$ is the amount of $ReputationPoint$ awared per one extra $QuarterPoint$
  - If a DGD holder does not participate in a quarter, his/her $ReputationPoint$ will be deducted a fixed amount:

$$changeInRP = MaxRPDeduction + ExtraPunishmentForNotLocking$$

    - $ExtraPunishmentForNotLocking$ is the extra $ReputationPoint$ deduction when a DGD holder does not lock his DGDs, on top of the deduction due to zero contribution to DigixDAO governance

- $Participants$ also receive a minimal bonus in $ReputationPoints$ if their voting in the n^{th} voting round turns out to be consistent with the result of the $(n+1)^{\text{th}}$ voting round.
  - A vote will get a bonus if:
    - It is a "yes" vote for a proposal P in a certain voting round; The voting round passes; proposal P goes through the milestome; AND the next voting round also passes.
    - It is a "no" vote for a proposal P in a certain voting round; The voting round passes; proposal P goes through the milestome; AND the next voting round does not pass.
  - The bonus $ReputationPoint$ is:

$$QPforOneVote \times p\% \times RPperExtraQP \tag{1}$$

    - Basically, p% bonus is awarded, in terms of $ReputationPoint$. This number is tentatively very small (like 1%)
  - This scheme is to counter "lazy voting" and incentivize more careful consideration when it comes to voting.

8. Reward System

The DGX fees collected by the DAO every quarter will be divided into a $ModeratorRewardPool$ of $k\%$ and a $ParticipantRewardPool$ of $(100-k)\%$.

8.1 Participant Reward Pool

After every quarter, a $RewardableDGDBalance$ (or $rewardableBal$) is calculated for every $participant$. The DGX rewards in the $ParticipantRewardPool$ are distributed proportionally to the $RewardableDGDBalance$.
This is how $RewardableDGDBalance$ is calculated:

1. Get the $participant$'s $BaseDGDBalance$ (or $base$):
   - if $QuarterPoint >= MinimalQP$:
   $$base = LockedDGDStake$$
   - else:
   $$base = \frac{QP}{MinimalQP} \times LockedDGDStake$$
2. "Buff" the $base$ based on excess $QuarterPoints$ and $ReputationPoints$ to get the $RewardableDGDBalance$:
   $$rewardableBal = base \times \left(1 + \frac{QP - MinimalQP}{QPScalingFactor}\right) \times \left(1 + \frac{RP}{RPScalingFactor}\right)$$
   - The $QPScalingFactor$ and $RPScalingFactor$ are to adjust how much $QuarterPoint$ and $ReputationPoint$ would "buff" the user's $RewardableDGDBalance$ relative to his actual $BaseDGDBalance$
   - These "buffs" would be configured to be a small percentage, such that the primary factor determining a $participant$'s DGX rewards is still his/her $LockedDGDStake$

8.2 Moderator Reward Pool

After every quarter, a $ModeratorRewardableDGDBalance$ (or $modRewardableBal$) is calculated for every $moderator$. The DGX rewards in the $ModeratorRewardPool$ are distributed proportionally to the $ModeratorRewardableDGDBalance$.
This is how $ModeratorRewardableDGDBalance$ is calculated:

1. Get the $moderator$'s $BaseDGDBalance$ (or $base$) as described in the previous section
2. "Buff" the $base$ based on $ModeratorQuarterPoints$ and $ReputationPoints$ to get the $ModeratorRewardableDGDBalance$:
   $$modRewardableBal = base \times \left(1 + \frac{ModeratorQP}{ModQPScalingFactor}\right) \times \left(1 + \frac{RP}{ModRPScalingFactor}\right)$$

9. DigixDAO 1.0's Parameters

There are multiple parameters involved in DigixDAO's governance model. The values of these parameters would greatly determine how well the model will work. The Digix team will carefully consider the initial set of parameters to be used as the default parameters. After that, Special Proposals could be made to propose changes to the parameters.

There are, however, two important parameters that would be decided by a carbon vote by DGD holders, before DigixDAO 1.0 is deployed:

- The value of $k\%$ for the $ModeratorRewardPool$
- $MinimumDGDToModerate$, or the minimum amount of DGD Stake needed to qualify as a $moderator$

The other parameters include:

- Locking phase duration (tentatively 10 days)
- $DraftVotingPhase$ duration (tentatively 14 days)
- $VotingPhase$ duration (tentatively 4 weeks)
- $VotingPhase$'s commit period duration (tentatively 3 weeks)
- $InterimVotingPhase$ duration (tentatively 20 days)
- $InterimVotingPhase$'s commit period duration (tentatively 13 days)
- $x\%$ for $DraftVotingPhase$'s minimum quorum size
- $ScalingFactor$ for $DraftVotingPhase$'s minimum quorum size
- $x\%$ for $VotingPhase$'s minimum quorum size
- $ScalingFactor$ for $VotingPhase$'s minimum quorum size
- $x\%$ for $VotingPhase$'s minimum quorum size
- $ScalingFactor$ for $VotingPhase$ and $InterimVotingPhase$'s minimum quorum size
- $quota$ for $DraftVotingPhase$
- $quota$ for $VotingPhase$ and $InterimVotingPhase$
- Amount of $ModeratorQuarterPoint$ for a vote in $DraftVotingPhase$
- Amount of $QuarterPoint$ for a vote in $VotingPhase$
- Amount of $QuarterPoint$ for a vote in $InterimVotingPhase$

- Amount of $QuarterPoint$ for the $proposer$ for getting past through a milestone voting.
- $p\%$ bonus in $ReputationPoint$ for the vote as mentioned in section 7.3
- Duration for $SpecialProposals$ to change configs (tentatively 4 weeks)
- Duration for commit round of $SpecialProposals$ to change configs (tentatively 3 weeks)
- Duration for $SpecialProposals$ to dissolve DigixDAO (tentatively 8 weeks)
- Duration for commit round of $SpecialProposals$ to dissolve DigixDAO (tentatively 5 weeks)
- $MinimumQuorum$ for $SpecialProposals$ to change configs (tentatively 70%)
- $Quota$ for $SpecialProposals$ to change configs (tentatively 60%)
- $MinimumQuorum$ for $SpecialProposals$ to dissolve DigixDAO (tentatively 80%)
- $Quota$ for $SpecialProposals$ to dissolve DigixDAO (tentatively 70%)
- $MaxRPDeduction$
- $ExtraPunishmentForNotLocking$
- $RPperExtraQP$
- $MinimalQP$
- $QPScalingFactor$
- $RPScalingFactor$
- $ModQPScalingFactor$
- $ModRPScalingFactor$
- $minimumRpToModerate$
- Maximum duration for $DraftPhase$ (tentatively 2 quarters)
- $MaxPossibleFunding$
- $MaxMilestoneCount$