Diffchecker

List of changes from v1.00 to v2.00

214 removals	1099 lines	255 additions	1146 lines

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CARDANO BLOCKCHAIN ECOSYSTEM CONSTITUTION
PREAMBLE
Cardano is a decentralized ecosystem of blockchain technology, smart contracts, and community governance, committed to improving economic, political, and social systems for everyone, everywhere. By offering this foundational infrastructure, Cardano empowers individuals and communities to manage their identity, value and governance, fostering the emergence of decentralized applications, businesses and network states.

Through unbiased processing of immutable data, we, the participants of the Cardano Community, consisting of individuals, organizations, contributors and others, choose to follow in the footsteps of the early Internet and cryptocurrency pioneers, who first forged bonds of community through digital technologies. We are guided by our shared principles and tenets as we exercise our self-governance by balancing decentralized decision-making with accountability and safeguarding the security of the Cardano Blockchain.

Recognizing the need for a more robust and dynamic governance framework, that neither relies nor depends upon traditional nation-state governance systems, but instead relies on self-
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Recognizing the need for a more robust and dynamic governance framework, that neither relies nor depends upon traditional nation-state governance systems, but instead relies on self-
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governance by the Cardano Community, utilizing, wherever possible and beneficial, blockchain technology in the governance process, we hereby establish this Cardano Constitution to govern the Cardano Blockchain ecosystem, ensure the continuity of the Cardano Blockchain, and guard the rights of those who utilize it.

With these purposes in mind, we, the Cardano Community, affirm our intention to abide by this Constitution in order to participate in the governance of the Cardano Blockchain ecosystem. We invite all who share our values to join us but stand not in the way of any who wish to take another path.

governance by the Cardano Community, utilizing, wherever possible and beneficial, blockchain technology in the governance process, we hereby establish this Cardano Constitution to govern the Cardano Blockchain ecosystem, ensure the continuity of the Cardano Blockchain, and guard the rights of those who utilize it and the rights of those who own ada.

With these purposes in mind, we, the Cardano Community, affirm our intention to abide by this Constitution in order to participate in the governance of the Cardano Blockchain ecosystem. We invite all who share our values to join us for as long as they wish, while honoring the freedom to take another path.

DEFINED TERMS

Active Voting Stake. The total amount of lovelace that is delegated to active DReps or SPOs. This stake is used as the basis for calculating voting thresholds and adjudicating proposed Governance action outcomes. It excludes stake delegated to inactive DReps, the predefined abstain voting option, unregistered stake, and registered undelegated stake.

Ada Holders. Persons who directly control the private key(s) to ada token(s).

Cardano Community. The collective group of all individuals and organizations that, in embracing the shared principles and objectives set forth in the Cardano Blockchain Ecosystem Constitution, own ada, develop, build on, support, maintain,

contribute to, and use the Cardano Blockchain.

Cardano Community member. Means any participant, individual or organization in the Cardano Community, including the CC.

Constitutional Committee (CC). The governing body and its component elected seats charged with ensuring that applicable governance actions take effect on the Cardano Blockchain only if in alignment with the principles and provisions set forth in the Cardano Blockchain Ecosystem Constitution.

Constitutional Committee member (CC member). A person, whether an individual or organization, that serves as a member of the Constitutional Committee.

Delegated Representative (DRep). The individual or entity registered to vote with respect to on-chain governance actions for its own behalf or on behalf of other owners of ada.

Net Change Limit. Means the maximum amount or percentage by which the Cardano Treasury may not be reduced by in a given period.

Stake Pool Operator (SPO). An individual or entity that manifests intent through the signed transactions of a Stake Pool.

Stake Pool. A Stake Pool Operator's Block producing node, identified by a unique Stake Pool ID, which aggregates applicable Delegator stake, forges and validates Blocks, and facilitates contributions of the SPO to the Cardano Blockchain's security,

decentralization, consensus mechanism, and governance process.

Treasury Withdrawal Recipient. A person or entity who is indicated as the recipient of ada from the Cardano Treasury in the relevant treasury withdrawal governance action

ARTICLE I. CARDANO BLOCKCHAIN TENETS AND GUARDRAILS

Section 1
These below Tenets shall guide all participants of the Cardano Community, including the Constitutional Committee, and proposed governance actions shall be evaluated in accordance with these Tenets. The order in which the below Tenets appear is not intended to represent a priority among Tenets.

TENET 1 Transactions on the Cardano Blockchain shall not be slowed down or censored and shall be expediently served for their intended purpose.

TENET 2 The cost of transactions on the Cardano Blockchain shall be predictable and not unreasonable.

TENET 3 Anyone desiring to develop and deploy applications on the Cardano Blockchain shall not unreasonably be prevented from developing and deploying such applications as intended.

TENET 4 Contributions by the Cardano Community on the Cardano Blockchain shall be recognized, recorded and assessed fairly through reward sharing with SPOs, potential compensation to DReps and CC members, and appropriate tokenomics.

ARTICLE I. CARDANO BLOCKCHAIN TENETS AND GUARDRAILS

Section 1 Guiding Tenets
These below Tenets shall guide all Cardano Community members and proposed governance actions shall be evaluated in accordance with these Tenets. The order in which the below Tenets appear is not intended to represent a priority among Tenets.

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TENET 5 The Cardano Blockchain shall not lock in an ada owner's value or data without the owner's consent.

TENET 6 The Cardano Blockchain shall not unreasonably impede interoperability.

TENET 7 The Cardano Blockchain shall preserve in a safe manner any value and information stored on the Cardano Blockchain.

TENET 8 The Cardano Blockchain shall not unreasonably spend resources.

TENET 9 All users of the Cardano Blockchain shall be treated fairly and impartially, taking into account the collective desires of the Cardano Blockchain Community, consistent with the long-term sustainability and viability of the Cardano Blockchain.

TENET 10 Financial stability shall be maintained and the total supply of ada shall not exceed 45,000,000,000 (45,000,000,000,000,000 lovelace).

Section 2

The Cardano Blockchain shall operate in accordance with the Guardrails for the Cardano Blockchain as set forth in the Cardano Blockchain Guardrails Appendix to this Constitution. The Cardano Community may from

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TENET 9 All users of the Cardano Blockchain shall be treated fairly and impartially, taking into account the collective desires of the Cardano Community, consistent with the long-term sustainability and viability of the Cardano Blockchain.

TENET 10 The Cardano Blockchain's monetary system shall promote financial stability. This shall include seeking to preserve the value and utility of ada as a medium of exchange, store of value, and unit of account. The total supply of ada shall not exceed 45,000,000,000 (45,000,000,000,000,000 lovelace).

Section 2 Implementation of Guardrails

The Cardano Blockchain shall operate in accordance with the Cardano Blockchain Guardrails Appendix to this Constitution. The Cardano Community may digitally codify certain Guardrails such that the

time to time digitally codify certain Guardrails such that the Guardrails are directly programmed and implemented on the Cardano Blockchain using on-chain Guardrails Scripts or built-in ledger rules.

Guardrails are directly programmed and implemented on the Cardano Blockchain using on-chain Guardrails Script or built-in ledger rules.

In the event there are inconsistencies between a Guardrail as set forth in the Cardano Blockchain Guardrails Appendix and any such Guardrail that has been programmed and implemented on the Cardano Blockchain, the version of such Guardrail that has been deployed directly on the Cardano Blockchain shall prevail unless and until replaced or revised pursuant to an on-chain governance action. The Constitutional Committee shall seek to reconcile such inconsistencies through the encouragement of an appropriate on-chain governance action.

In the event there are inconsistencies between a Guardrail as set forth in the Cardano Blockchain Guardrails Appendix and any such Guardrail that has been programmed and implemented on the Cardano Blockchain, the version of such Guardrail that has been deployed directly on the Cardano Blockchain shall prevail unless and until replaced or revised pursuant to an on-chain governance action. The CC shall seek to reconcile such inconsistencies through the encouragement of an appropriate on-chain governance action.

ARTICLE II. THE CARDANO BLOCKCHAIN COMMUNITY

Section 1

No formal membership shall be required to use, participate in and benefit from the Cardano Blockchain. Instead, all owners of ada, all developers of, all those building on, and all those otherwise supporting, maintaining or using the Cardano Blockchain are considered to be participants in the Cardano Community and are therefore recognized as beneficiaries of the Cardano Blockchain ecosystem. All participants in the Cardano Community are accordingly beneficiaries of this Constitution, entitled to its rights, privileges and protections and, as such, are

ARTICLE II. COMMUNITY AND GOVERNANCE

Section 1 The Cardano Community

Cardano Community members are entitled to the rights, privileges, and protections of this Constitution, and are accordingly expected to support and uphold this Constitution, maintain the integrity of the ecosystem, participate in governance, and resolve disputes transparently.

expected to support and uphold this Constitution.

Section 2

Participants in the Cardano Community who own ada are entitled to access and participate in the on-chain decision-making processes of the Cardano Blockchain ecosystem, including voting and taking part in on-chain governance actions regarding the Cardano Blockchain.

Section 3

The Cardano Community has a responsibility to maintain the integrity of the Cardano Blockchain ecosystem by following this Constitution, operating the Cardano Blockchain, participating in Cardano Blockchain governance activities, and resolving disputes in a fair and transparent manner.

Section 4

The Cardano Community is entitled and encouraged through the provisions of this Constitution to collaborate in developing, maintaining and building applications for the Cardano Blockchain, and to form temporary and permanent organizations, associations and other entities as the Cardano Community deems desirable or appropriate in

Cardano Community members are encouraged to collaborate on developing applications and to form organizations that support the Cardano Blockchain and the Cardano Community.

Section 2 Participation Rights of Ada Holders

Ada Holders are entitled to access and participate in the on-chain decision-making processes of the Cardano Blockchain ecosystem, including voting, proposing changes to the governance structure in accordance with the Guardrails, and otherwise taking part in on-chain governance actions.

Ada Holders can directly participate in governance actions by registering as DReps themselves or by delegating their voting rights to other registered DReps.

support of the Cardano Blockchain ecosystem.

ARTICLE III. PARTICIPATORY AND DECENTRALIZED GOVERNANCE

Section 1

The Cardano Blockchain shall be governed by a decentralized, on-chain governance model, utilizing, to the extent possible and beneficial, smart contracts and other blockchain based tools to facilitate decision-making and ensure transparency. On-chain voting for governance actions shall follow the process outlined in this Constitution, including the Cardano Blockchain Guardrails Appendix. On-chain governance actions shall be effected through a collective decision-making process, with specific consensus threshold requirements, as required by the Cardano Blockchain Guardrails.

Section 2

Three independent governance bodies shall participate in voting for on-chain governance actions to provide checks and balances for the Cardano Blockchain, consisting of Delegated Representatives (DReps), Stake Pool Operators (SPOs) and the Constitutional Committee (CC).

Section 3

All owners of ada shall have the right to vote in on-chain governance decision-making processes, as provided for in

Any Ada Holder shall be allowed to register as a DRep. A DRep may act in the interest of one or more Ada Holders.

Any Ada Holder shall be allowed to delegate their voting stake to one or more registered DReps, including themselves.

Ada Holders shall be allowed to change the delegation of their voting stake at any time.

this Constitution and the Cardano Blockchain Guardrails Appendix. All owners of ada shall have the right to propose changes to the governance structure of the Cardano Blockchain ecosystem in accordance with the Guardrails. Owners of ada who use third-party custodians or other designees to hold their ada, may authorize or may withhold authorization for, such third-parties to vote on their behalf.

Section 4

A special form of on-chain governance action, an "Info" action, exists to allow the Cardano Community to propose potential future on-chain governance actions and to allow community sentiment to be gauged without committing to any on-chain change to the Cardano Blockchain. Such "Info" actions have no on-chain effect other than to record such "Info" actions on the Cardano Blockchain. In accordance with Article VII Section 4, "Info" actions shall also be used in connection with proposed Cardano Blockchain ecosystem budgets and Cardano Blockchain treasury withdrawals.

Section 5

Ada owners who use third-party custodians or other designees to hold their ada may authorize, or withhold authorization from, such third parties to vote or delegate the owners' voting rights to registered DReps on the owners' behalf.

Ada Holders have the right to a process for participating in, submitting and voting on on-chain governance actions that is open,transparent and protected from undue influence and manipulation.

In order to promote transparency in the process of on-chain governance, prior to being recorded or enacted on-chain, all proposed governance actions are expected to follow a standardized and legible format including a URL and hash of all documented off-chain content to the Cardano Blockchain. Sufficient rationale shall be provided to justify the requested change to the Cardano Blockchain. The rationale shall include, at a minimum, a title, abstract, reason for the proposal, and relevant supporting materials.

The content of every on-chain governance action must be identical to the final off-chain version of the proposed action.

"Hard Fork Initiation" and "Protocol Parameter Change" governance actions shall undergo sufficient technical review and scrutiny as mandated by the Guardrails to ensure that the governance action does not endanger the security, functionality, performance or long-term sustainability of the Cardano Blockchain. On-chain governance actions should address their expected impact on the Cardano Blockchain ecosystem.

All owners of ada shall have the right to ensure that the process for participating in, submitting and voting on on-chain governance actions is open and transparent

Section 3 Decentralized Governance Framework

The Cardano Blockchain is governed by a decentralized, on-chain model that, where beneficial, uses smart contracts and other blockchain tools to facilitate decision-making and ensure transparency.

Three independent voting bodies - DReps, SPOs, and the CC - participate in on-chain voting; anyone holding multiple roles must publicly disclose such overlaps before engaging in any on-chain governance actions.

Section 4: Delegated Representatives

and is protected from undue influence and manipulation.

Section 6

The Cardano Community is expected to support the creation, maintenance and ongoing administration of off-chain governance processes as may be necessary to give effect to this Constitution and to ensure that there is awareness of and an opportunity to debate and shape all future governance actions for the Cardano Blockchain.

ARTICLE IV. THE CARDANO BLOCKCHAIN ECOSYSTEM BUDGET

Section 1

Any participant in the Cardano Community may propose a Cardano Blockchain ecosystem budget at any time. The Cardano Community is expected to periodically propose one or more budgets for the ongoing operation, maintenance and future development of the Cardano Blockchain ecosystem and for covering other costs related to the implementation, administration and maintenance of the decentralized, on-chain governance processes provided for in this Constitution. The Cardano Community may propose one aggregate budget or multiple budgets for the Cardano Blockchain ecosystem. Such budgets are expected to cover not less than a period of 73 epochs

DReps have voting power equal to the number of Lovelace delegated to them.

DReps may vote on all types of governance actions.

DReps shall ensure that any compensation received in connection with their activities as a DRep is publicly disclosed in a timely manner through relevant governance communication channels.

(approximately one calendar year) but nothing shall prevent the Cardano Community from proposing budgets for shorter or longer time periods. All owners of ada are expected to periodically approve one or more Cardano Blockchain ecosystem budgets through an on-chain "Info" action. As provided in Section 3 of this Article IV, withdrawals may be made from the Cardano Blockchain treasury as necessary from time to time to give effect to the Cardano Blockchain ecosystem budget or budgets then in effect. Existing budgets may be amended following the same process as provided in this Section 1.

Section 2

Development of Cardano Blockchain ecosystem budgets and the administration of such budgets shall utilize, to the extent possible and beneficial, smart contracts and other blockchain based tools to facilitate decision-making and ensure transparency. Cardano Blockchain budgets shall specify a process for overseeing use of funds from Cardano Blockchain treasury withdrawals including designating one or more administrators who shall be responsible for such oversight.

Section 3

Withdrawals from the Cardano Blockchain treasury that would cause the Cardano Blockchain treasury balance to violate the then applicable net change limit shall not be permitted. No

DReps shall not offer or provide compensation to an Ada Holder or in exchange for being appointed as a DRep or for voting on their behalf.

Section 5: Stake Pool Operators

Stake Pool Operators shall vote on the following governance actions: (i) Motion of No Confidence, (ii) Update Committee/Threshold, (iii) Hard Fork Initiation, (iv) Protocol

withdrawals from the Cardano Blockchain treasury shall be permitted unless such withdrawals have been authorized and are being made pursuant to a budget for the Cardano Blockchain that is then in effect as required by the Cardano Blockchain Guardrails Appendix, and which has not been determined by the Constitutional Committee to be unconstitutional.

Section 4

Any governance action requesting ada from the Cardano Blockchain treasury shall require an allocation of ada as a part of such funding request to cover the cost of periodic independent audits and the implementation of oversight metrics as to the use of such ada. Contractual obligations governing the use of ada received from the Cardano Blockchain treasury pursuant to a Cardano Blockchain ecosystem budget shall include dispute resolution provisions.

Section 5

Any ada received from a Cardano Blockchain treasury withdrawal, so long as such ada is being held directly or indirectly by an administrator prior to further disbursement, must be kept in one or more separate accounts that

Parameter Changes that affect security-relevant parameters, and (v) Info Actions. For each of these governance actions, SPOs shall cast their votes separately from DReps in accordance with the Guardrails.

SPOs shall publicly disclose if they are simultaneously voting as a DRep on the same governance actions.

SPOs vote on "Hard Fork Initiation", "No Confidence", "Update Committee", and "Parameter Update" governance actions that affect security-critical parameters set forth under Parameters that are Critical to the Operation of the Blockchain in Section 2.1 of the Cardano Blockchain Guardrails Appendix.

can be audited by the Cardano Community, and such accounts shall not be delegated to an SPO but must be delegated to the predefined auto abstain voting option.

ARTICLE V. DELEGATED REPRESENTATIVES

Section 1

In order to participate in governance actions, owners of ada may register as DReps and directly vote on such governance actions or may delegate their voting rights to other registered DReps who shall vote on their behalf.

Section 2

Any owner of ada shall have the option to register as a DRep. Owners of ada shall be allowed to delegate their voting stake to one or more registered DReps, including themselves. DReps may be individuals or coordinated groups. Owners of ada who use third-party custodians or other designees to hold their ada, may authorize, or may withhold

Section 6 Governance Action Standards

To ensure transparency in on-chain governance, proposed governance actions shall follow a standardized and legible format before being recorded or enacted on-chain. This format shall include a URL, hosting a document that outlines additional context for the proposed governance action, and hash of this document. The document hosted by such a URL shall be immutable in nature and incapable of being altered after submission of the proposed governance action for on-chain voting.

Each proposal shall provide sufficient rationale, including at minimum: a title, abstract, justification, and relevant supporting materials.

authorization for, such third-parties to delegate the voting rights of the ada owner to registered DReps on the owner's behalf. DReps are entitled to cast votes directly for on-chain governance actions and represent those ada owners delegating their voting rights to them. DRep voting thresholds are set forth in the Cardano Blockchain Guardrails Appendix.

This voting system shall enshrine a liquid democracy model where owners of ada can seamlessly select among DReps, register as a DRep, and withdraw or change their delegation at any time.

Section 3

DReps who are representing delegators are expected to periodically adopt, and update as they deem appropriate, codes of conduct governing their activities as DReps and make such codes of conduct publicly available. DReps are encouraged to include ethical guidelines in their codes of conduct.

Section 4

The Cardano Community is expected to support the creation, maintenance and ongoing administration of tools to enable owners of ada to explore and evaluate DRep candidates, access and evaluate DRep codes of

The content of every on-chain governance action must be identical to the final off-chain version of the proposed action.

"Hard Fork Initiation" and "Parameter Update" actions shall undergo sufficient technical review and scrutiny as mandated by the Guardrails to ensure that the governance action does not endanger the security, functionality, performance or long-term sustainability of the Cardano Blockchain.

Section 7 Treasury Withdrawal Governance Action Standards

A Treasury withdrawal governance action must meet all of the following requirements:

conduct and select DReps on such criteria as they deem relevant.

Section 5

DReps who are representing delegators may be compensated for their efforts. DReps shall ensure that any compensation received in connection with their activities as a DRep is disclosed.

Section 6

DReps shall not pay compensation to an ada owner or to an owner's designee in exchange for being appointed a DRep by such ada owner or by its designee or for voting on behalf of such ada owner or its designee.

ARTICLE VI. STAKE POOL OPERATORS

Section 1

SPOs shall have a specific role in approving critical on-chain governance actions that require additional oversight and

Treasury withdrawal governance actions must, in addition to the requirements at Section 6 above, specify the terms of the withdrawal. This shall include: the purpose of the withdrawal, the period for delivery of proposed activities which the withdrawal shall be used for, the relevant costs and expenses of the proposed activities, circumstances under which the withdrawal might be refunded to the Cardano treasury, the location and the identity of the recipient.

Treasury withdrawal governance actions shall disclose whether the prospective recipient of the Treasury withdrawal governance action has received ada from the Cardano Treasury within the last 24 (twenty-four) months.

A Net Change Limit must be set. Treasury withdrawals must not exceed the Net Change Limit for that period.

independence, voting separately and independently from DReps as set forth in the Cardano Blockchain Guardrails Appendix. SPOs shall participate in hard fork initiation processes as the operators of the nodes that participate in Cardano Blockchain's consensus mechanism.	
Section 2	All treasury withdrawal governance actions shall specify a process for oversight of use of funds received from the Cardano Treasury.
SPOs shall act as a check on the power of the Constitutional Committee under exceptional circumstances by separately voting on "Motion of no confidence" and "Update committee/threshold and/or term" governance actions, and on "Parameter Update" governance actions that affect security-critical parameters set forth under Parameters that are Critical to the Operation of the Blockchain in Section 2.1 of the Cardano Blockchain Guardrails Appendix.	
Section 3	For Treasury Withdrawal Recipients requesting more than 1,000,000 ada during any two (2) year period, the following additional requirements must all be met:
SPOs are encouraged to periodically adopt, and update as they deem appropriate, codes of conduct governing their activities as SPOs and make such codes of conduct publicly available. SPOs are encouraged to include ethical guidelines in their codes of conduct.	
Section 4	Treasury withdrawal recipients shall appoint professional,

	independent auditors to conduct an audit and provide a report of treasury recipients' use of such funds received from the treasury, which shall be made available to the Cardano Community on no less than an annual basis.
Owners of ada who are both SPOs and acting as DReps shall publicly disclose that they are participating in on-chain governance actions in both such capacities prior to exercising any on-chain governance rights.	
ARTICLE VII. CONSTITUTIONAL COMMITTEE	Treasury withdrawal governance actions shall make provision for the costs of such an audit.
Section 1	
A Constitutional Committee shall be established as the branch of Cardano's on-chain governance process that ensures governance actions to be enacted on-chain are consistent with this Constitution. The Constitutional Committee shall comprise a set of owners of ada that is collectively responsible for ensuring that on-chain governance actions prior to enactment on-chain, are constitutional. Except as otherwise provided in Section 4 of this Article VII, the Constitutional Committee shall be limited to voting on the constitutionality of governance actions to be enacted on-chain. Constitutional Committee members are expected to have appropriate expertise to carry out their required responsibilities, considering their past contributions and involvement in the Cardano Blockchain ecosystem.	
Section 2	Treasury withdrawal governance actions shall designate one or more administrators responsible for monitoring how the funds are

	used, and ensuring the deliverables are achieved as set out in Section 7, paragraph 1 above.
The Constitutional Committee shall be composed of such number of members sufficient to assure the ongoing integrity of the Cardano Blockchain as determined from time to time by owners of ada. The minimum and maximum number of members of the Constitutional Committee shall be consistent with the minimum and maximum number of members as set forth in the Cardano Blockchain Guardrails Appendix.	
Members of the Constitutional Committee shall serve such term lengths as shall be determined from time to time by owners of ada as consistent with the minimum and maximum term lengths as set forth in the Cardano Blockchain Guardrails Appendix. To assure continuity in the operation of the Constitutional Committee, the terms for Constitutional Committee members shall be staggered.	Any ada received from a Cardano Blockchain treasury withdrawal, so long as such ada is being held by an administrator prior to further disbursement to the Treasury Withdrawal Recipient, must be kept in one or more separate accounts that can be audited by the Cardano Community, and such accounts shall not be delegated to an SPO but must be delegated to the predefined auto abstain voting option.
Section 3	Treasury Withdrawal Recipients shall use treasury withdrawals for the purpose set out in Section 7, paragraph 1 above.
The Cardano Community shall establish and make public a process from time to time for election of members of the Constitutional Committee consistent with the requirements of the Guardrails.	
Section 4	ARTICLE III. CONSTITUTIONAL COMMITTEE
No governance action, other than a "Motion of no confidence," or "Update Constitutional Committee/threshold and/or term"	Section 1 Role and Scope

may be implemented on-chain unless a requisite percentage of the members of the Constitutional Committee as specified by the Guardrails shall have first determined and affirmed through an on-chain action that such proposal does not violate this Constitution. Each Constitutional Committee member shall have one vote.

A CC shall be established as the branch of Cardano's on-chain governance process that ensures governance actions to be enacted on-chain are consistent with this Constitution.

Because "Info" actions have no on-chain effect and, accordingly, are neither constitutional nor unconstitutional, Constitutional Committee members may not prevent "Info" actions from being recorded on-chain. Members of the Constitutional Committee may nevertheless record a vote on-chain regarding an "Info" action in order to express their view on such "Info" action, including whether the suggested course of action proposed in such "Info" action, would be, in the view of such member, unconstitutional if it were to be enforced by on-chain mechanisms.

Each CC member shall have one vote.

In the case of "Info" actions that propose a Cardano Blockchain ecosystem budget, Constitutional Committee members shall record a vote on-chain that sets forth their opinion as to whether the proposed budget, if it were to be implemented in the form contained in the "Info" action, would violate this Constitution.

No governance action - other than a "No Confidence" or "Update Committee" action - may be implemented on-chain without affirmation by a requisite percentage of CC members.

In the case of "Info" actions that propose a withdrawal from

The CC shall be limited to voting on the constitutionality of

the Cardano Blockchain treasury pursuant to a previously approved budget, Constitutional Committee members shall record a vote on-chain that sets forth their opinion as to whether such proposed withdrawal, if made in accordance with such "Info" action, would violate this Constitution.

Section 5

The Constitutional Committee shall be considered to be in one of the following two states at all times: a state of confidence or a state of no-confidence. In a state of no-confidence, members of the then standing Constitutional Committee must be reinstated or replaced using the "Update committee/threshold" governance action before any other on-chain governance action, other than "Info" actions, may go forward. During a state of no-confidence, "Info" actions other than "Info" actions relating to budget proposals or treasury withdrawal proposals, may continue to be recorded on-chain.

If a member of the Constitutional Committee is not carrying out its responsibilities as required by this Constitution, as so determined by a requisite percentage as specified by the Guardrails of SPOs and DReps, voting separately pursuant to an "Update Constitutional Committee/threshold and/or term" governance action, such member shall be removed from the Constitutional Committee upon the implementation of the governance action. Thereafter, an election shall be held as soon as practical to replace the member so removed.

governance actions, including any proposed or contemplated actions contained within Info actions.

Section 2 Composition and Terms

The CC shall be composed of such number of members and serve such term lengths as are sufficient to assure the ongoing integrity of the Cardano Blockchain, as determined from time to time by owners of ada.

To assure continuity in the operation of the CC, the terms for CC members shall be staggered.

In the event of a "Motion of no confidence" governance action to remove all members of the Constitutional Committee at the same time, that is approved by a requisite percentage as specified by the Guardrails of DReps and SPOs, upon implementation of the governance action, the Constitutional Committee shall be considered to be a state of no-confidence until such time as an election has been held either to reinstate the existing Constitutional Committee members in whole or in part, or to elect new Constitutional Committee members.	Section 3 Election Process, No Confidence and Removal
	The CC shall be considered to be in one of the following two states at all times: a state of confidence or a state of no confidence. In a state of no confidence, members of the then standing CC must be reinstated or replaced using the "Update Committee" action before any other on-chain governance action, other than "Info" actions, may go forward. If a "No Confidence" action is enacted, a state of no confidence will result.
Section 6	The Cardano Community shall establish and make public a process from time to time for election of members of the CC consistent with the requirements of the Guardrails.
Constitutional Committee processes shall be transparent. The Constitutional Committee shall publish each decision. When voting that a governance action proposed to be executed on-chain is unconstitutional, the Constitutional Committee collectively, or each member of the Constitutional Committee casting such a vote separately,	

shall set forth the basis for its decision with reference to specific Articles of this Constitution or provisions of the Cardano Blockchain Guardrails Appendix that are in conflict with a given proposal. Internal deliberations among members of the Constitutional Committee, prior to casting votes, are not required to be publicly disclosed.

The Constitutional Committee shall operate pursuant to a code of conduct periodically adopted and published by the Constitutional Committee. The Constitutional Committee is encouraged to include ethical guidelines in its code of conduct. The Constitutional Committee shall periodically adopt and publish such policies and procedures as the Constitutional Committee shall deem necessary in carrying out its duties.

Section 7

The Cardano Community is expected to support the creation, maintenance and ongoing administration of tools as may be necessary and appropriate for the Constitutional Committee to perform its required functions.

Section 8

In the event of a vote of no confidence or the removal of some CC members by "Update Committee" action, an election shall be held as soon as practical.

Section 4 Transparency and Conduct

CC processes shall be transparent, and the CC shall publish each decision.

When voting that a governance action proposed to be executed on-chain is unconstitutional, each CC member casting such a vote shall set forth the basis for its decision with reference to specific Articles of this Constitution or provisions of the Cardano Blockchain Guardrails Appendix that are in conflict with a given proposal.

Constitutional Committee members may be compensated for their efforts as members of the Constitutional Committee. Constitutional Committee members shall ensure that any compensation received in connection with their activities as a member is disclosed. Budgets approved for the Cardano Blockchain ecosystem may include allocations from the Cardano Blockchain treasury sufficient to compensate Constitutional Committee members in such amounts as may be approved from time to time by ada owners. Cardano Blockchain ecosystem budgets shall provide for periodic administrative costs of the Constitutional Committee in such amounts as requested from time to time by the Constitutional Committee and as approved by ada owners.	
Section 9	CC members may be compensated for their efforts as members and shall ensure that any compensation received in connection with such activities is disclosed in a timely manner through relevant governance communication channels.
Constitutional Committee members who are also acting as DReps, as SPOs, or both, shall publicly disclose that they are participating in on-chain governance actions in more than one such capacity prior to voting with respect to on-chain governance actions.	
ARTICLE VIII. AMENDMENT PROCESS	
Section 1	
This Constitution should be treated as a living document. Technical advancements, changes in the desires, needs and expectations of the Cardano	

Community, and unforeseen circumstances may give rise to the need in the future to amend this Constitution. The Cardano Community is encouraged to periodically review and debate its provisions, and when so desired, come together in such forums as the Cardano Community may deem appropriate, to propose amendments to this Constitution. Amendments may be made as provided in this Article VIII.

Section 2

Except as otherwise so provided in the Cardano Blockchain Guardrails Appendix, amendments to this Constitution, including to the Cardano Blockchain Guardrails Appendix, shall be approved by a collective decision-making process, requiring an on-chain governance action by owners of ada satisfying a threshold of no less than 65% of the then active voting stake.

Section 3

If the Cardano Blockchain Guardrails Appendix sets forth an amendment threshold for a

ARTICLE IV. AMENDMENT PROCESS

Section 1 Amendment Rules

Amendments to this Constitution, including amendments to the Cardano Blockchain Guardrails Appendix, shall require approval through a collective decision-making process, by means of an on-chain governance action supported by at least 65% of the then active voting stake, unless a different threshold is specifically set forth in the Cardano Blockchain Guardrails Appendix for the amendment of a particular Guardrail, in which case that specified threshold shall apply.

APPENDIX I. CARDANO BLOCKCHAIN GUARDRAILS

Guardrail that is different than the amendment threshold contained in Section 2 of this Article VIII, then the threshold set forth in the Cardano Blockchain Guardrails Appendix for such Guardrail shall apply.

APPENDIX I: CARDANO BLOCKCHAIN GUARDRAILS

1. Introduction

To implement Cardano Blockchain on-chain governance, it is necessary to establish sensible Guardrails that will enable the Cardano Blockchain to continue to operate in a secure and sustainable way.

This Appendix sets forth Guardrails that must be applied to Cardano Blockchain on-chain governance actions, including changes to the protocol parameters and limits on treasury withdrawals. These Guardrails cover both essential, intrinsic limits on settings, and recommendations that are based on experience, measurement and governance objectives.

These Guardrails are designed to avoid unexpected problems with the operation of the Cardano Blockchain. They are intended to guide the choice of sensible parameter settings and avoid potential problems with security, performance, functionality or long-term sustainability. As described below, some of these Guardrails are automatable and will be enforced via an on-chain Guardrails Script or built-in ledger rules.

These Guardrails apply only to the Cardano Blockchain Layer 1

1. Introduction

To implement Cardano Blockchain on-chain governance, it is necessary to establish sensible Guardrails that will enable the Cardano Blockchain to continue to operate in a secure and sustainable way.

This Appendix sets forth Guardrails that must be applied to Cardano Blockchain on-chain governance actions, including changes to the protocol parameters and limits on treasury withdrawals. These Guardrails cover both essential, intrinsic limits on settings, and recommendations that are based on experience, research, measurement and governance objectives.

These Guardrails are designed to avoid both unexpected and foreseeable problems with the operation of the Cardano Blockchain. They are intended to guide the choice of sensible parameter settings and avoid potential problems with security, performance, functionality or long-term sustainability. As described below, some of these Guardrails are automatable and will be enforced via an on-chain Guardrails Script or built-in ledger rules.

These Guardrails apply only to the Cardano Blockchain Layer 1

mainnet environment. They are not intended to apply to test environments or to other blockchains that use Cardano Blockchain software.

Not all parameters for the Cardano Blockchain can be considered independently. Some parameters interact with other settings in an intrinsic way. Where known, these interactions are addressed in this Appendix.

While the Guardrails in this Appendix presently reflect the current state of technical insight, this Appendix should be treated as a living document. Implementation improvements, new simulations or performance evaluation results for the Cardano Blockchain may allow some of the restrictions contained in these Guardrails to be relaxed (or, in some circumstances, require them to be tightened) in due course.

Additional Guardrails may also be needed where, for example, new protocol parameters are introduced.

Amending, Adding or Deprecating Guardrails

The Guardrails set forth in this Appendix may be amended from time to time pursuant to an on-chain governance action that satisfies the applicable voting threshold as set forth in this Appendix. Any such amendment to any Guardrails shall require and be deemed to be an amendment to the Constitution itself, including any new Guardrails. Each Guardrail has a unique label. If the text of a Guardrail is

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Not all parameters for the Cardano Blockchain can be considered independently. Some parameters interact with other settings in an intrinsic way. Where known, these interactions are addressed in this Appendix.

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amended, the existing Guardrail will be deprecated and a new label will be used in this Appendix. Similarly, if a Guardrail is completely deprecated, its label will never be reused in the future. In all cases, the Guardrails that apply to a governance action will be those in force at the time that the governance action is submitted on chain, regardless of any later amendments.

Terminology and Guidance

amended, the existing Guardrail will be deprecated and a new label will be used in this Appendix. Similarly, if a Guardrail is deprecated, its label will never be reused in the future. In all cases, the Guardrails that apply to a governance action will be those in force at the time that the governance action is submitted on-chain, regardless of any later amendments.

Terminology and Guidance

This section provides supplementary definitions and interpretive guidance for terms used throughout this Constitution and the Guardrails Appendix.

Cardano Blockchain. The decentralized, public, peer-to-peer, proof-of-stake distributed ledger system, designed to securely record, verify, and synchronize transactions and data across the network while enabling the execution of smart contracts and decentralized applications. This system, powered by ada, is the longest chain of Blocks with sufficient confirmations to be considered finalized starting from Block Hash 5f20df933584822601f9e3f8c024eb5eb252fe8cefb24d1317dc3d432e940ebb, as forged on 2017-09-23 21:44:51 UTC on the Cardano Network.

Block. A container of data produced by a Stake Pool that includes, at minimum, a header. Block production and Block forging are used interchangeably.

Protocol. The algorithms, rules, and procedures that govern the exchange of information on the Cardano Blockchain.

Protocol Parameters. Protocol settings that define how the Cardano Blockchain functions; modifiable through applicable governance processes.

Slot. The smallest denomination of time nested within an Epoch.

Epoch. A Protocol-determined interval characterized by a fixed number of Slots. Each Slot's duration and sequence are governed by the blockchain's consensus mechanisms and are associated with a universal timestamp defined in UTC. It is used for operations including governance voting, Block production leadership determination, rewards calculation, and Hard Forks.

lovelace. The smallest unit of value for the native cryptocurrency of the Cardano Blockchain, utilized for the network's security and governance. It is distinguished from other native tokens by its lack of a policy ID and policy name.

ada. A superunit of lovelace, with 1 ada equal to 1,000,000 lovelace.

Delegator. A private key holder that delegates stake to a Stake Pool for Block production and network security, to a DRep for participation in on-chain governance, or both. In doing so, the delegator contributes to the operation and governance of the Cardano Blockchain.

Active Block Production Stake. The cumulative amount of stake, measured in lovelace, that is actively delegated to Stake Pools and utilized for Block forging

during the current Epoch. This amount is determined by a snapshot of stake distribution taken at the beginning of the previous Epoch, ensuring that it accurately represents the effective stake available for securing and maintaining the Cardano Blockchain through Block forging.

On-chain. A classification for actions, transactions, or governance activities that are executed, recorded, or implemented directly on the Cardano Blockchain. These actions, transactions, or governance activities are permanently validated and stored through the blockchain's consensus mechanism, ensuring their immutability and transparency.

Off-Chain. A classification for activities, proposals, or governance decisions that are either not yet implemented on the Cardano Blockchain, or not intended to be directly recorded on the blockchain. These may include discussions, proposals, or agreements that exist outside the blockchain and do not involve direct consensus or on-chain validation.

Governance Action. An on-chain proposal enabling participation in shaping the future of the Cardano Blockchain Ecosystem through voting transactions.

Hard Fork. A Protocol upgrade for the Cardano Blockchain that results in a new Protocol version and necessitates coordinated adoption by network participants.

Guardrails. A set of restrictions on Governance Actions to prevent

undesirable outcomes and assist voters in deciding whether the proposed action complies with the Cardano Blockchain Ecosystem Constitution. Some guardrails are enforced using the Guardrails Script or ledger rules to prevent submission of the action, while others necessitate further adjudication to determine if they violate the Constitution in ways the Guardrails Script or ledger cannot check. Guardrails may be either mandatory ("must"/"must not") or advisory ("should"/"should not"). The latter allows for interpretive flexibility where necessary.

Guardrails Script. A smart contract script that checks specific proposed Governance Actions, Hard Fork and Parameter update Governance Actions, against automatically checkable Guardrails. The check is applied when the Governance Action is proposed on-chain.

Motion of no confidence governance action ("No Confidence" action). A motion to create a state of no confidence in the current constitutional committee.

Update committee and/or threshold and/or terms governance action ("Update Committee" action). Changes to the members of the constitutional committee and/or to its signature threshold and/or terms.

New Constitution or Guardrails Script governance action ("New Constitution" action). A modification to the Constitution or Guardrails Script, recorded as on-chain hashes.

Hard Fork Initiation governance action ("Hard Fork Initiation" action). Triggers a non-backwards compatible upgrade of the network; requires a prior software upgrade.

Protocol Parameter Changes governance action ("Parameter Changes" action or "Parameter Update" action). Any change to one or more updatable protocol parameters, excluding changes to major protocol versions ("hard forks").

Treasury Withdrawals governance action ("Treasury Withdrawals" action). Withdrawals from the treasury.

Info action ("Info" action). An action that has no effect on-chain, other than an on-chain record.

Cardano Blockchain Treasury, Cardano Treasury, or Treasury. A supply of ada controlled by the Protocol of the Cardano Blockchain; collected from transaction fees, reserves, and other designated sources. Withdrawals from this supply of ada are subject to the processes and restrictions set forth in the Cardano Blockchain Ecosystem Constitution.

Cardano Blockchain Ecosystem. The collective ecosystem comprising the Cardano Blockchain, the Cardano Community, and the tooling and infrastructure utilized by the Cardano Community to support the Cardano Blockchain in alignment with the shared principles and objectives set forth in the Cardano Blockchain Ecosystem Constitution.

Should/Should not. Where this Appendix says that a value "should not" be set below or above some value, this means that the Guardrail is a recommendation or guideline, and the specific value could be open to discussion or alteration by a suitably expert group recognized by the Cardano Community in light of experience with the Cardano Blockchain governance system or the operation of the Cardano Blockchain.

Must/Must not. Where this Appendix says that a value "must" or "must not" be set below or above some value, this means that the Guardrail is a requirement that will be enforced by Cardano Blockchain ledger rules, types or other built-in mechanisms where possible, and that if not followed could cause a protocol failure, security breach or other undesirable outcome.

Benchmarking. Benchmarking refers to careful system level performance evaluation that is designed to show a priori that, for example, 95% of blocks will be diffused across a global network of Cardano Blockchain nodes within the required 5s time interval in all cases. This may require construction of specific test workflows and execution on a large test network of Cardano Blockchain nodes, simulating a global Cardano Blockchain network.

Performance analysis. Performance analysis refers to projecting theoretical performance,

Expected. A reasonable presumption that the identified action, although not mandatory, will occur.

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Performance analysis. Performance analysis refers to projecting theoretical performance,

empirical benchmarking or simulation results to predict actual system behavior. For example, performance results obtained from tests in a controlled test environment (such as a collection of data centers with known networking properties) may be extrapolated to inform likely performance behavior in a real Cardano Blockchain network environment.

Simulation. Simulation refers to synthetic execution that is designed to inform performance/functionality decisions in a repeatable way. For example, the IOSim Cardano Blockchain module allows the operation of the networking stack to be simulated in a controlled and repeatable way, allowing issues to be detected before code deployment.

Performance Monitoring. Performance monitoring involves measuring the actual behavior of the Cardano Blockchain network, for example, by using timing probes to evaluate round-trip times, or test blocks to assess overall network health. It complements benchmarking and performance analysis by providing information about actual system behavior that cannot be obtained using simulated workloads or theoretical analysis.

Reverting Changes. Where performance monitoring shows that actual network behavior following a change is inconsistent with the performance requirements for the Cardano Blockchain, then the change must be reverted to its previous state if that is possible. For example, if the block size is increased from 100KB to 120KB and 95% of blocks

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are no longer diffused within 5s, then a change must be made to revert the block size to 100KB. If this is not possible, then one or more alternative changes must be made that will ensure that the performance requirements are met.

Severity Levels. Issues that affect the Cardano Blockchain network are classified by severity level, where:

Severity 1 is a critical incident or issue with very high impact to the security, performance, functionality or long-term sustainability of the Cardano Blockchain network

Severity 2 is a major incident or issue with significant impact to the security, performance, functionality or long-term sustainability of the Cardano Blockchain network

Severity 3 is a minor incident or issue with low impact to the security, performance, functionality or long-term sustainability of the Cardano Blockchain network

Future Performance Requirements. Planned development such as new mechanisms for out of memory storage may impact block diffusion or other times. When changing parameters, it is necessary to consider these future performance requirements as well as the current operation of the Cardano Blockchain. Until development is complete, the requirements will be conservative but may then be relaxed to account for actual timing behavior.

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Automated Checking ("Guardrails Script")
A script hash is associated with the Constitution hash when a New Constitution or Guardrails Script governance action is enacted. It acts as an additional safeguard to the ledger rules and types, filtering non-compliant governance actions.

The Guardrails Script only affects two types of governance actions:

Parameter Update actions, and

Treasury Withdrawal actions.

The Guardrails Script is executed when either of these types of governance action is submitted on-chain. This avoids scenarios where, for example, an erroneous script could prevent the Cardano Blockchain from ever enacting a Hard Fork action, resulting in deadlock. There are three different situations that apply to Guardrail Script usage.

Symbol and Explanation

(y) The Guardrail Script can be used to enforce the Guardrail

(x) The Guardrail Script cannot be used to enforce the Guardrail

(~ - reason) The Guardrail Script cannot be used to enforce the Guardrail for the reason given, but future ledger changes could enable this.

Guardrails may overlap: in this case, the most restrictive set of Guardrails will apply.

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Guardrails may overlap: in this case, the most restrictive set of Guardrails will apply.

Where a parameter is not explicitly listed in this document, then the Guardrail Script must not permit any changes to the parameter.

Conversely, where a parameter is explicitly listed in this document but no checkable Guardrails are specified, the Guardrail Script must not impose any constraints on changes to the parameter.

2. Guardrails and Guidelines on Protocol Parameter Update Actions

Below are Guardrails and guidelines for changing updatable protocol parameter settings via the protocol parameter update governance action such that the Cardano Blockchain is never in an unrecoverable state as a result of such changes.

Note that, to avoid ambiguity, this Appendix uses the parameter name that is used in protocol parameter update governance actions rather than any other convention.

GUARDRAILS

PARAM-01 (y) Any protocol parameter that is not explicitly named in this document must not be changed by a Parameter update governance action

PARAM-02a (y) Where a protocol parameter is explicitly listed in this document but no checkable Guardrails are specified, the Guardrails Script must not impose any constraints on changes to the parameter. Checkable Guardrails are shown by a (y)

2.1. Critical Protocol Parameters

Where a parameter is not explicitly listed in this document, then the Guardrail Script must not permit any changes to the parameter.

Conversely, where a parameter is explicitly listed in this document but no checkable Guardrails are specified, the Guardrail Script must not impose any constraints on changes to the parameter.

2. Guardrails and Guidelines on "Parameter Update" actions

Below are Guardrails and guidelines for changing updatable protocol parameter settings via the "Parameter Update" action such that the Cardano Blockchain is never in an unrecoverable state as a result of such changes.

Note that, to avoid ambiguity, this Appendix uses the parameter name that is used in "Parameter Update" actions rather than any other convention.

GUARDRAILS

PARAM-01 (y) Any protocol parameter that is not explicitly named in this document must not be changed by a "Parameter Update" action

PARAM-02a (y) Where a protocol parameter is explicitly listed in this document but no checkable Guardrails are specified, the Guardrails Script must not impose any constraints on changes to the parameter. Checkable Guardrails are shown by a (y)

2.1. Critical Protocol Parameters

```
The below protocol parameters are critical from a security point of view.

Parameters that are Critical to the Operation of the Blockchain
maximum block body size (maxBlockBodySize)

maximum transaction size (maxTxSize)

maximum block header size (maxBlockHeaderSize)

maximum size of a serialized asset value (maxValueSize)

maximum script execution/memory units in a single block (maxBlockExecutionUnits[steps/memory])

minimum fee coefficient (txFeePerByte)

minimum fee constant (txFeeFixed)

minimum fee per byte for reference scripts (minFeeRefScriptCoinsPerByte)

minimum lovelace deposit per byte of serialized UTxO (utxoCostPerByte)

governance action deposit (govDeposit)

GUARDRAILS

PARAM-03a (y) Critical protocol parameters require an SPO vote in addition to a DRep vote: SPOs must say "yes" with a collective support of more than 50% of all active block production stake. This is enforced by the Guardrails on the stake pool voting threshold.

```

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minimum fee per byte for reference scripts (minFeeRefScriptCoinsPerByte)

minimum lovelace deposit per byte of serialized UTxO (utxoCostPerByte)

governance action deposit (govDeposit)

GUARDRAILS

PARAM-03a (y) A parameter that is critical to the operation of the blockchain require an SPO vote in addition to a DRep vote: SPOs must say "yes" with a collective support of more than 50% of all active block production stake. This is enforced by the Guardrails on the stake pool voting threshold.

```

PARAM-04a (x) At least 3 months should normally pass between the publication of an off-chain proposal to change a critical protocol parameter and the submission of the corresponding on-chain governance action. This Guardrail may be relaxed in the event of a Severity 1 or Severity 2 network issue following careful technical discussion and evaluation.

Parameters that are Critical to the Governance System
delegation key lovelace deposit (stakeAddressDeposit)

pool registration lovelace deposit (stakePoolDeposit)

minimum fixed rewards cut for pools (minPoolCost)

DRep deposit amount (dRepDeposit)

minimal Constitutional Committee size (committeeMinSize)

maximum term length (in epochs) for the Constitutional Committee members (committeeMaxTermLength)

GUARDRAILS
PARAM-05a (y) DReps must vote "yes" with a collective support of more than 50% of all active voting stake. This is enforced by the Guardrails on the DRep voting thresholds.

PARAM-06a (x) At least 3 months should normally pass between the publication of an off-chain proposal to change a parameter that is critical to the governance system and the submission of the corresponding on-chain governance action. This Guardrail may be relaxed in the

PARAM-04a (x) At least 90 days should normally pass between the publication of an off-chain proposal to change a parameter that is critical to the operation of the blockchain and the submission of the corresponding on-chain governance action. This Guardrail may be relaxed in the event of a Severity 1 or Severity 2 network issue following careful technical discussion and evaluation.

Parameters that are Critical to the Governance System
delegation key lovelace deposit (stakeAddressDeposit)

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event of a Severity 1 or Severity 2 network issue following careful technical discussion and evaluation.

2.2. Economic Parameters

The overall goals when managing economic parameters are to:

Enable long-term economic sustainability for the Cardano Blockchain;

Ensure that stake pools are adequately rewarded for maintaining the Cardano Blockchain;

Ensure that ada owners are adequately rewarded for using stake in constructive ways, including when delegating ada for block production; and

Balance economic incentives for different Cardano Blockchain ecosystem stakeholders, including but not limited to Stake Pool Operators, ada owners, DeFi users, infrastructure users, developers (e.g. DApps) and financial intermediaries (e.g. exchanges)

Triggers for Change

Significant changes in the fiat value of ada resulting in potential problems with security, performance, functionality or long-term sustainability

Changes in transaction volumes or types

Community requests or suggestions

Emergency situations that require changes to economic parameters

Counter-indicators

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The overall goals when managing economic parameters are to:

Enable long-term economic sustainability for the Cardano Blockchain;

Ensure that stake pools are adequately rewarded for maintaining the Cardano Blockchain;

Ensure that ada holders are adequately rewarded for using stake in constructive ways, including when delegating ada for block production; and

Balance economic incentives for different Cardano Blockchain ecosystem stakeholders, including but not limited to Stake Pool Operators, ada holders, DeFi users, infrastructure users, developers (e.g. DApps) and financial intermediaries (e.g. exchanges)

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Changes in transaction volumes or types

Community requests or suggestions

Emergency situations that require changes to economic parameters

Counter-indicators

Changes to the economic parameters should not be made in isolation. They need to account for:

External economic factors

Network security concerns

Core Metrics
Fiat value of ada resulting in potential problems with security, performance, functionality or long-term sustainability

Transaction volumes and types

Number and health of stake pools

External economic factors

Changes to Specific Economic Parameters
Transaction fee per byte (txFeePerByte) and fixed transaction fee (txFeeFixed)

Defines the cost for basic transactions in lovelace:

fee(tx) = txFeeFixed + txFeePerByte x nBytes(tx)

GUARDRAILS
TFPB-01 (y) txFeePerByte must not be lower than 30 (0.000030 ada) This protects against low-cost denial of service attacks

TFPB-02 (y) txFeePerByte must not exceed 1,000 (0.001 ada) This ensures that transactions can be paid for

TFPB-03 (y) txFeePerByte must not be negative

TFF-01 (y) txFeeFixed must not be lower than 100,000 (0.1 ada) This protects against low-cost denial of service attacks

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External economic factors

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TFPB-03 (y) txFeePerByte must not be negative

TFF-01 (y) txFeeFixed must not be lower than 100,000 (0.1 ada) This protects against low-cost denial of service attacks

TFF-02 (y) txFeeFixed must not exceed 10,000,000 (10 ada) This ensures that transactions can be paid for

TFF-03 (y) txFeeFixed must not be negative

TFGEN-01 (x - "should") To maintain a consistent level of protection agains denial-of-service attacks, txFeeFixed and txFeeFixed should be adjusted whenever Plutus Execution prices are adjusted (executionUnitPrices[steps/memory])

TFGEN-02 (x - unquantifiable) Any changes to txFeeFixed or txFeeFixed must consider the implications of reducing the cost of a denial-of-service attack or increasing the maximum transaction fee so that it becomes impossible to construct a transaction.

UTxO cost per byte (utxoCostPerByte)

Defines the deposit (in lovelace) that is charged for each byte of storage tha is held in a UTxO. This deposit is returned when the UTxO is no longer active.

Sets a minimum threshold on ada that is held within a single UTxO

Provides protection against low-cost denial of service attack on UTxO storage. DoS protection decreases in line with the free node memory (proportional to UTxO growth)

Helps reduce long-term storage costs for node users by providing an incentive to return UTxOs when

TFF-02 (y) txFeeFixed must not exceed 10,000,000 (10 ada) This ensures that transactions can be paid for

TFF-03 (y) txFeeFixed must not be negative

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Sets a minimum threshold on ada that is held within a single UTxO

Provides protection against low-cost denial of service attack on UTxO storage. DoS protection decreases in line with the free node memory (proportional to UTxO growth)

Helps reduce long-term storage costs for node users by providing an incentive to return UTxOs when

no longer needed, or to merge UTxOs.

GUARDRAILS
UCPB-01 (y) utxoCostPerByte must not be lower than 3,000 (0.003 ada)

UCPB-02 (y) utxoCostPerByte must not exceed 6,500 (0.0065 ada)

UCPB-03 (y) utxoCostPerByte must not be zero

UCPB-04 (y) utxoCostPerByte must not be negative

UCPB-05a (x - "should") Changes should account for

The acceptable cost of attack

The acceptable time for an attack

The acceptable memory configuration for full node users

The sizes of UTxOs and

The current total node memory usage

Stake address deposit (stakeAddressDeposit)
Ensures that stake addresses are retired when no longer needed

Helps reduce long-term storage costs

Helps limit CPU and memory costs in the ledger

The rationale for the deposit is to incentivize that scarce memory resources are returned when they are no longer required. Reducing the number of active stake addresses also reduces processing and memory costs at the epoch boundary when calculating stake snapshots.

no longer needed, or to merge UTxOs.

GUARDRAILS
UCPB-01 (y) utxoCostPerByte must not be lower than 3,000 (0.003 ada)

UCPB-02 (y) utxoCostPerByte must not exceed 6,500 (0.0065 ada)

UCPB-03 (y) utxoCostPerByte must not be zero

UCPB-04 (y) utxoCostPerByte must not be negative

UCPB-05a (x - "should") Changes should account for

The acceptable cost of attack

The acceptable time for an attack

The acceptable memory configuration for full node users

The sizes of UTxOs and

The current total node memory usage

Stake address deposit (stakeAddressDeposit)
Ensures that stake addresses are retired when no longer needed

Helps reduce long-term storage costs

Helps limit CPU and memory costs in the ledger

The rationale for the deposit is to incentivize that scarce memory resources are returned when they are no longer required. Reducing the number of active stake addresses also reduces processing and memory costs at the epoch boundary when calculating stake snapshots.

GUARDRAILS
SAD-01 (y) stakeAddressDeposit must not be lower than 1,000,000 (1 ada)

SAD-02 (y) stakeAddressDeposit must not exceed 5,000,000 (5 ada)

SAD-03 (y) stakeAddressDeposit must not be negative

Stake pool deposit (stakePoolDeposit)
Ensures that stake pools are retired by the stake pool operator when no longer needed by them

Helps reduce long-term storage costs
The rationale for the deposit is to incentivize that scarce memory resources are returned when they are no longer required. Rewards and stake snapshot calculations are also impacted by the number of active stake pools.

GUARDRAILS
SPD-01 (y) stakePoolDeposit must not be lower than 250,000,000 (250 ada)

SPD-02 (y) stakePoolDeposit must not exceed 500,000,000 (500 ada)

SPD-03 (y) stakePoolDeposit must not be negative

Minimum Pool Cost (minPoolCost)
Part of the rewards mechanism

The minimum pool cost is transferred to the pool rewards address before any delegator rewards are paid
GUARDRAILS
MPC-01 (y) minPoolCost must not be negative

GUARDRAILS
SAD-01 (y) stakeAddressDeposit must not be lower than 1,000,000 (1 ada)

SAD-02 (y) stakeAddressDeposit must not exceed 5,000,000 (5 ada)

SAD-03 (y) stakeAddressDeposit must not be negative

Stake pool deposit (stakePoolDeposit)
Ensures that stake pools are retired by the stake pool operator when no longer needed by them

Helps reduce long-term storage costs
The rationale for the deposit is to incentivize that scarce memory resources are returned when they are no longer required. Rewards and stake snapshot calculations are also impacted by the number of active stake pools.

GUARDRAILS
SPD-01 (y) stakePoolDeposit must not be lower than 250,000,000 (250 ada)

SPD-02 (y) stakePoolDeposit must not exceed 500,000,000 (500 ada)

SPD-03 (y) stakePoolDeposit must not be negative

Minimum Pool Cost (minPoolCost)
Part of the rewards mechanism

The minimum pool cost is transferred to the pool rewards address before any delegator rewards are paid
GUARDRAILS
MPC-01 (y) minPoolCost must not be negative

MPC-02 (y) minPoolCost must not exceed 500,000,000 (500 ada)

MPC-03 (x - "should") minPoolCost should be set in line with the economic cost for operating a pool

Treasury Cut (treasuryCut)
Part of the rewards mechanism

The treasury cut portion of the monetary expansion is transferred to the treasury before any pool rewards are paid

Can be set in the range 0.0-1.0 (0%-100%)

GUARDRAILS
TC-01 (y) treasuryCut must not be lower than 0.1 (10%)

TC-02 (y) treasuryCut must not exceed 0.3 (30%)

TC-03 (y) treasuryCut must not be negative

TC-04 (y) treasuryCut must not exceed 1.0 (100%)

TC-05 (~ - no access to change history) treasuryCut must not be changed more than once in any 36 epoch period (approximately 6 months)

Monetary Expansion Rate (monetaryExpansion)
Part of the rewards mechanism

The monetary expansion controls the amount of reserves that is used for rewards each epoch
Governs the long-term sustainability of the Cardano Blockchain

The reserves are gradually depleted until no rewards are supplied

MPC-02 (y) minPoolCost must not exceed 500,000,000 (500 ada)

MPC-03 (x - "should") minPoolCost should be set in line with the economic cost for operating a pool

Treasury Cut (treasuryCut)
Part of the rewards mechanism

The treasury cut portion of the monetary expansion is transferred to the treasury before any pool rewards are paid

Can be set in the range 0.0-1.0 (0%-100%)

GUARDRAILS
TC-01 (y) treasuryCut must not be lower than 0.1 (10%)

TC-02 (y) treasuryCut must not exceed 0.3 (30%)

TC-03 (y) treasuryCut must not be negative

TC-04 (y) treasuryCut must not exceed 1.0 (100%)

TC-05 (~ - no access to change history) treasuryCut must not be changed more than once in any 36 epoch period (approximately 6 months)

Monetary Expansion Rate (monetaryExpansion)
Part of the rewards mechanism

The monetary expansion controls the amount of reserves that is used for rewards each epoch
Governs the long-term sustainability of the Cardano Blockchain

The reserves are gradually depleted until no rewards are supplied

```
GUARDRAILS
ME-01 (y) monetaryExpansion must not exceed 0.005

ME-02 (y) monetaryExpansion must not be lower than 0.001

ME-03 (y) monetaryExpansion must not be negative

ME-04 (x - "should") monetaryExpansion should not be varied by more than +/- 10% in any 73-epoch period (approximately 12 months)

ME-05 (x - "should") monetaryExpansion should not be changed more than once in any 36-epoch period (approximately 6 months)

Plutus Script Execution Prices (executionUnitPrices[priceSteps/priceMemory])
Define the fees for executing Plutus scripts

Gives an economic return for Plutus script execution

Provides security against low-cost DoS attacks

GUARDRAILS
EIUP-PS-01 (y) executionUnitPrices[priceSteps] must not exceed 2,000 / 10,000,000

EIUP-PS-02 (y) executionUnitPrices[priceSteps] must not be lower than 500 / 10,000,000

EIUP-PM-01 (y) executionUnitPrices[priceMemory] must not exceed 2,000 / 10,000

EIUP-PM-02 (y) executionUnitPrices[priceMemory]
```

```
GUARDRAILS
ME-01 (y) monetaryExpansion must not exceed 0.005

ME-02 (y) monetaryExpansion must not be lower than 0.001

ME-03 (y) monetaryExpansion must not be negative

ME-04 (x - "should") monetaryExpansion should not be varied by more than +/- 10% in any 73-epoch period (approximately 12 months)

ME-05 (x - "should") monetaryExpansion should not be changed more than once in any 36-epoch period (approximately 6 months)

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Define the fees for executing Plutus scripts

Gives an economic return for Plutus script execution

Provides security against low-cost DoS attacks

GUARDRAILS
EIUP-PS-01 (y) executionUnitPrices[priceSteps] must not exceed 2,000 / 10,000,000

EIUP-PS-02 (y) executionUnitPrices[priceSteps] must not be lower than 500 / 10,000,000

EIUP-PM-01 (y) executionUnitPrices[priceMemory] must not exceed 2,000 / 10,000

EIUP-PM-02 (y) executionUnitPrices[priceMemory]
```

must not be lower than 400 / 10,000

EIUP-GEN-01 (x - "similar to") The execution prices must be set so tha

the cost of executing a transaction with maximum CPU steps is similar to the cost of a maximum sized non-script transaction and

the cost of executing a transaction with maximum memory units is similar to the cost of a maximum sized non-script transaction

EIUP-GEN-02 (x - "should") The execution prices should be adjusted whenever transaction fees are adjusted (txFeeFixed/txFeePerByte). The goal is to ensure that the processing delay is similar for "full" transactions, regardless of their type.

This helps ensure that the requirements on block diffusion/propagation times are met.

Transaction fee per byte for a reference script (minFeeRefScriptCoinsPerByte)

Defines the cost for using Plutus reference scripts in lovelace

GUARDRAILS

MFRS-01 (y) minFeeRefScriptCoinsPerByte must not exceed 1,000 (0.001 ada)

This ensures that transactions can be paid for

MFRS-02 (y) minFeeRefScriptCoinsPerByte must not be negative

must not be lower than 400 / 10,000

EIUP-GEN-01 (x - "similar to") The execution prices must be set so that

the cost of executing a transaction with maximum CPU steps is similar to the cost of a maximum sized non-script transaction and

the cost of executing a transaction with maximum memory units is similar to the cost of a maximum sized non-script transaction

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Defines the cost for using Plutus reference scripts in lovelace

GUARDRAILS

MFRS-01 (y) minFeeRefScriptCoinsPerByte must not exceed 1,000 (0.001 ada)

This ensures that transactions can be paid for

MFRS-02 (y) minFeeRefScriptCoinsPerByte must not be negative

MFRS-03 (x - "should") To maintain a consistent level of protection against denial-of-service attacks, minFeeRefScriptCoinsPerByte should be adjusted whenever Plutus Execution prices are adjusted (executionUnitPrices[steps/memory]) and whenever txFeeFixed is adjusted

MFRS-04 (x - unquantifiable) Any changes to minFeeRefScriptCoinsPerByte must consider the implications of reducing the cost of a denial-of-service attack or increasing the maximum transaction fee

2.3. Network Parameters

The overall goals when managing the Cardano Blockchain network parameters are to:

Match the available Cardano Blockchain Layer 1 network capacity to current or future traffic demands, including payment transactions, layer 1 DApps, sidechain management and governance needs

Balance traffic demands for different user groups, including payment transactions, minters of Fungible/Non-Fungible Tokens, Plutus scripts, DeFi developers, Stake Pool Operators and voting transactions

Triggers for Change

Changes to network parameters may be triggered by:

Measured changes in traffic demands over a 2-epoch period (10 days)

Anticipated changes in traffic demands

MFRS-03 (x - "should") To maintain a consistent level of protection against denial-of-service attacks, minFeeRefScriptCoinsPerByte should be adjusted whenever Plutus Execution prices are adjusted (executionUnitPrices[steps/memory]) and whenever txFeeFixed is adjusted

MFRS-04 (x - unquantifiable) Any changes to minFeeRefScriptCoinsPerByte must consider the implications of reducing the cost of a denial-of-service attack or increasing the maximum transaction fee

2.3. Network Parameters

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Triggers for Change

Changes to network parameters may be triggered by:

Measured changes in traffic demands over a 2-epoch period (10 days)

Anticipated changes in traffic demands

Cardano Community requests

Counter-indicators
Changes may need to be reversed and/or should not be enacted in the event of:

Excessive block propagation delays

Stake pools being unable to handle traffic volume

Scripts being unable to complete execution

Core Metrics
All decisions on parameter changes should be informed by:

Block propagation delay profile

Traffic volume (block size over time)

Script volume (size of scripts and execution units)

Script execution cost benchmarks

Block propagation delay/diffusion benchmarks

Detailed benchmarking results are required to confirm the effect of any changes on mainnet performance or behavior prior to enactment. The effects of different transaction mixes must be analyzed, including normal transactions, Plutus scripts, and governance actions.

GUARDRAILS
NETWORK-01 (x - "should") No individual network parameter should change more than once per two epochs

NETWORK-02 (x - "should") Only one network parameter should be changed per epoch unless they are

Cardano Community requests

Counter-indicators
Changes may need to be reversed and/or should not be enacted in the event of:

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Stake pools being unable to handle traffic volume

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GUARDRAILS
NETWORK-01 (x - "should") No individual network parameter should change more than once per two epochs

NETWORK-02 (x - "should") Only one network parameter should be changed per epoch unless they are

directly correlated, e.g., per-transaction and per-block memory unit limits

Changes to Specific Network Parameters
Block Size (maxBlockBodySize)
The maximum size of a block, in Bytes.

GUARDRAILS
MBBS-01 (y) maxBlockBodySize must not exceed 122,880 Bytes (120KB)

MBBS-02 (y) maxBlockBodySize must not be lower than 24,576 Bytes (24KB)

MBBS-03a (x - "exceptional circumstances") maxBlockBodySize must not be decreased, other than in exceptional circumstances where there are potential problems with security, performance, functionality or long-term sustainability

MBBS-04 (~ - no access to existing parameter values) maxBlockBodySize must be large enough to include at least one transaction (that is, maxBlockBodySize must be at least maxTxSize)

MBBS-05 (x - "should") maxBlockBodySize should be changed by at most 10,240 Bytes (10KB) per epoch (5 days), and preferably by 8,192 Bytes (8KB) or less per epoch

MBBS-06 (x - "should") The block size should not induce an additional Transmission Control Protocol (TCP) round trip. Any increase beyond this must be backed by performance analysis, simulation and benchmarking

MBBS-07 (x - "unquantifiable") The impact of any change to

directly correlated, e.g., per-transaction and per-block memory unit limits

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maxBlockBodySize must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as described below. Any increase to maxBlockBodySize must also consider future requirements for Plutus script execution (maxBlockExecutionUnits[steps]) against the total block diffusion target of 3s with 95% block propagation within 5s. The limit on maximum block size may be increased in the future if this is supported by benchmarking and monitoring results

Transaction Size (maxTxSize)
The maximum size of a transaction, in Bytes.

GUARDRAILS
MTS-01 (y) maxTxSize must not exceed 32,768 Bytes (32KB)

MTS-02 (y) maxTxSize must not be negative

MTS-03 (~ - no access to existing parameter values) maxTxSize must not be decreased

MTS-04 (~ - no access to existing parameter values) maxTxSize must not exceed maxBlockBodySize

MTS-05 (x - "should") maxTxSize should not be increased by more than 2,560 Bytes (2.5KB) in any epoch, and preferably should be increased by 2,048 Bytes (2KB) or less per epoch

MTS-06 (x - "should") maxTxSize should not exceed 1/4 of the block size

Memory Unit Limits (maxBlockExecutionUnits[memory], maxTxExecutionUnits[memory])

maxBlockBodySize must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as described below. Any increase to maxBlockBodySize must also consider future requirements for Plutus script execution (maxBlockExecutionUnits[steps]) against the total block diffusion target of 3s with 95% block propagation within 5s. The limit on maximum block size may be increased in the future if this is supported by benchmarking and monitoring results

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MTS-06 (x - "should") maxTxSize should not exceed 1/4 of the block size

Memory Unit Limits (maxBlockExecutionUnits[memory], maxTxExecutionUnits[memory])

The limit on the maximum number of memory units that can be used by Plutus scripts, either per-transaction or per-block.

GUARDRAILS
MTEU-M-01 (y)
maxTxExecutionUnits[memory] must not exceed 40,000,000 units

MTEU-M-02 (y)
maxTxExecutionUnits[memory] must not be negative

MTEU-M-03 (~ - no access to existing parameter values)
maxTxExecutionUnits[memory] must not be decreased

MTEU-M-04 (x - "should")
maxTxExecutionUnits[memory] should not be increased by more than 2,500,000 units in any epoch

MBEU-M-01 (y)
maxBlockExecutionUnits[memory] must not exceed 120,000,000 units

MBEU-M-02 (y)
maxBlockExecutionUnits[memory] must not be negative

MBEU-M-03 (x - "should")
maxBlockExecutionUnits[memory] should not be changed (increased or decreased) by more than 10,000,000 units in ANY epoch

MBEU-M-04a (x - unquantifiable)
The impact of any change to maxBlockExecutionUnits[memory] must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as also impacted by maxBlockExecutionUnits[steps] and maxBlockBodySize. Any increase must also consider previously agreed future requirements for the total block size (maxBlockBodySize) measured

The limit on the maximum number of memory units that can be used by Plutus scripts, either per-transaction or per-block.

GUARDRAILS
MTEU-M-01 (y)
maxTxExecutionUnits[memory] must not exceed 40,000,000 units

MTEU-M-02 (y)
maxTxExecutionUnits[memory] must not be negative

MTEU-M-03 (~ - no access to existing parameter values)
maxTxExecutionUnits[memory] must not be decreased

MTEU-M-04 (x - "should")
maxTxExecutionUnits[memory] should not be increased by more than 2,500,000 units in any epoch

MBEU-M-01 (y)
maxBlockExecutionUnits[memory] must not exceed 120,000,000 units

MBEU-M-02 (y)
maxBlockExecutionUnits[memory] must not be negative

MBEU-M-03 (x - "should")
maxBlockExecutionUnits[memory] should not be changed (increased or decreased) by more than 10,000,000 units in ANY epoch

MBEU-M-04a (x - unquantifiable)
The impact of any change to maxBlockExecutionUnits[memory] must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as also impacted by maxBlockExecutionUnits[steps] and maxBlockBodySize. Any increase must also consider previously agreed future requirements for the total block size (maxBlockBodySize) measured

against the total block diffusion target of 3s with 95% block propagation within 5s. Future Plutus performance improvements may allow the per-block memory limit to be increased, but must be balanced against the overall diffusion limits as specified in the previous sentence, and future requirements

MEU-M-01 (~ - no access to existing parameter values) maxBlockExecutionUnits[memory] must not be less than maxTxExecutionUnits[memory]

CPU Unit Limits (maxBlockExecutionUnits[steps], maxTxExecutionUnits[steps])
The limit on the maximum number of CPU steps that can be used by Plutus scripts, either per transaction or per-block.

GUARDRAILS
MTEU-S-01 (y) maxTxExecutionUnits[steps] must not exceed 15,000,000,000 (15Bn) units

MTEU-S-02 (y) maxTxExecutionUnits[steps] must not be negative

MTEU-S-03 (~ - no access to existing parameter values) maxTxExecutionUnits[steps] must not be decreased

MTEU-S-04 (x - "should") maxTxExecutionUnits[steps] should not be increased by more than 500,000,000 (500M) units in any epoch (5 days)

MBEU-S-01 (y) maxBlockExecutionUnits[steps] must not exceed 40,000,000,000 (40Bn) units

against the total block diffusion target of 3s with 95% block propagation within 5s. Future Plutus performance improvements may allow the per-block memory limit to be increased, but must be balanced against the overall diffusion limits as specified in the previous sentence, and future requirements

MEU-M-01 (~ - no access to existing parameter values) maxBlockExecutionUnits[memory] must not be less than maxTxExecutionUnits[memory]

CPU Unit Limits (maxBlockExecutionUnits[steps], maxTxExecutionUnits[steps])
The limit on the maximum number of CPU steps that can be used by Plutus scripts, either per transaction or per-block.

GUARDRAILS
MTEU-S-01 (y) maxTxExecutionUnits[steps] must not exceed 15,000,000,000 (15Bn) units

MTEU-S-02 (y) maxTxExecutionUnits[steps] must not be negative

MTEU-S-03 (~ - no access to existing parameter values) maxTxExecutionUnits[steps] must not be decreased

MTEU-S-04 (x - "should") maxTxExecutionUnits[steps] should not be increased by more than 500,000,000 (500M) units in any epoch (5 days)

MBEU-S-01 (y) maxBlockExecutionUnits[steps] must not exceed 40,000,000,000 (40Bn) units

MBEU-S-02 (y) maxBlockExecutionUnits[steps] must not be negative

MBEU-S-03 (x - "should") maxBlockExecutionUnits[steps] should not be changed (increased or decreased) by more than 2,000,000,000 (2Bn) units in any epoch (5 days)

MBEU-S-04a (x - unquantifiable) The impact of the change to maxBlockExecutionUnits[steps] must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as also impacted by maxBlockExecutionUnits[memory] and maxBlockBodySize. Any increase must also consider previously identified future requirements for the total block size (maxBlockBodySize) measured against the total block diffusion target of 3s with 95% block propagation within 5s. Future Plutus performance improvements may allow the per-block step limit to be increased, but must be balanced against the overall diffusion limits as specified in the previous sentence, and future requirements

MEU-S-01 (~ - no access to existing parameter values) maxBlockExecutionUnits[steps] must not be less than maxTxExecutionUnits[steps]

Block Header Size (maxBlockHeaderSize)
The size of the block header.

GUARDRAILS
MBHS-01 (y) maxBlockHeaderSize must not exceed 5,000 Bytes

MBHS-02 (y) maxBlockHeaderSize must not be negative

MBEU-S-02 (y) maxBlockExecutionUnits[steps] must not be negative

MBEU-S-03 (x - "should") maxBlockExecutionUnits[steps] should not be changed (increased or decreased) by more than 2,000,000,000 (2Bn) units in any epoch (5 days)

MBEU-S-04a (x - unquantifiable) The impact of the change to maxBlockExecutionUnits[steps] must be confirmed by detailed benchmarking/simulation and not exceed the requirements of the block diffusion/propagation time budgets, as also impacted by maxBlockExecutionUnits[memory] and maxBlockBodySize. Any increase must also consider previously identified future requirements for the total block size (maxBlockBodySize) measured against the total block diffusion target of 3s with 95% block propagation within 5s. Future Plutus performance improvements may allow the per-block step limit to be increased, but must be balanced against the overall diffusion limits as specified in the previous sentence, and future requirements

MEU-S-01 (~ - no access to existing parameter values) maxBlockExecutionUnits[steps] must not be less than maxTxExecutionUnits[steps]

Block Header Size (maxBlockHeaderSize)
The size of the block header.

GUARDRAILS
MBHS-01 (y) maxBlockHeaderSize must not exceed 5,000 Bytes

MBHS-02 (y) maxBlockHeaderSize must not be negative

MBHS-03 (x - "largest valid header" is subject to change) maxBlockHeaderSize must be large enough for the largest valid header

MBHS-04 (x - "should") maxBlockHeaderSize should only normally be increased if the protocol changes

MBHS-05 (x - "should") maxBlockHeaderSize should be within TCP's initial congestion window (3 or 10 MTUs)

2.4. Technical/Security Parameters

The overall goals when managing the technical/security parameters are:

Ensure the security of the Cardano Blockchain network in terms of decentralization and protection against adversarial actions

Enable changes to the Plutus language

Triggers for Change

Changes in the number of active SPOs

Changes to the Plutus language

Security threats

Cardano Community requests

Counter-indicators

Economic concerns, e.g. when changing the number of stake pools

Core Metrics

Number of stake pools

Level of decentralization

MBHS-03 (x - "largest valid header" is subject to change) maxBlockHeaderSize must be large enough for the largest valid header

MBHS-04 (x - "should") maxBlockHeaderSize should only normally be increased if the protocol changes

MBHS-05 (x - "should") maxBlockHeaderSize should be within TCP's initial congestion window (3 or 10 MTUs)

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Triggers for Change

Changes in the number of active SPOs

Changes to the Plutus language

Security threats

Cardano Community requests

Counter-indicators

Economic concerns, e.g. when changing the number of stake pools

Core Metrics

Number of stake pools

Level of decentralization

```
668 Changes to Specific
    Technical/Security Parameters
669 Target Number of Stake Pools
    (stakePoolTargetNum)
670 Sets the target number of stake
    pools
671
672 The expected number of stake
    pools when the network is in the
    equilibrium state
673
674 Primarily a security parameter,
    ensuring decentralization by
    stake pool division/replication
675
676 Has an economic effect as well as
    a security effect - economic
    advice is also required when
    changing this parameter
677
678 Large changes in this parameter
    will trigger mass redelegation
    events
679
680 GUARDRAILS
681 SPTN-01 (y) stakePoolTargetNum
    must not be lower than 250
682
683 SPTN-02 (y) stakePoolTargetNum
    must not exceed 2,000
684
685 SPTN-03 (y) stakePoolTargetNum
    must not be negative
686
687 SPTN-04 (y) stakePoolTargetNum
    must not be zero
688
689 Pledge Influence Factor
    (poolPledgeInfluence)
690 Enables the pledge protection
    mechanism
691
692 Provides protection against Sybil
    attack
693
694 Higher values reward pools that
    have more pledge and penalize
    pools that have less pledge
695 Has an economic effect as well as
    technical effect - economic
```

```
715 Changes to Specific
    Technical/Security Parameters
716 Target Number of Stake Pools
    (stakePoolTargetNum)
717 Sets the target number of stake
    pools
718
719 The expected number of stake
    pools when the network is in the
    equilibrium state
720
721 Primarily a security parameter,
    ensuring decentralization by
    stake pool division/replication
722
723 Has an economic effect as well as
    a security effect - economic
    advice based on analysis is also
    required when changing this
    parameter
724
725 Large changes in this parameter
    will trigger mass redelegation
    events
726
727 GUARDRAILS
728 SPTN-01 (y) stakePoolTargetNum
    must not be lower than 250
729
730 SPTN-02 (y) stakePoolTargetNum
    must not exceed 2,000
731
732 SPTN-03 (y) stakePoolTargetNum
    must not be negative
733
734 SPTN-04 (y) stakePoolTargetNum
    must not be zero
735
736 Pledge Influence Factor
    (poolPledgeInfluence)
737 Enables the pledge protection
    mechanism
738
739 Provides protection against Sybil
    attack
740
741 Higher values reward pools that
    have more pledge and penalize
    pools that have less pledge
742 Has an economic effect as well as
    technical effect - economic
```

```
advice is also required
```

```
advice based on analysis is also
required
```

```
GUARDRAILS
PPI-01 (y) poolPledgeInfluence
must not be lower than 0.1

PPI-02 (y) poolPledgeInfluence
must not exceed 1.0

PPI-03 (y) poolPledgeInfluence
must not be negative

PPI-04 (x - "should")
poolPledgeInfluence should not
vary by more than +/- 10% in any
18-epoch period (approximately 3
months)

Pool Retirement Window
(poolRetireMaxEpoch)
Defines the maximum number of
epochs notice that a pool can
give when planning to retire

GUARDRAILS
PRME-01 (y) poolRetireMaxEpoch
must not be negative

PRME-02 (x - "should")
poolRetireMaxEpoch should not be
lower than 1

Collateral Percentage
(collateralPercentage)
Defines how much collateral must
be provided when executing a
Plutus script as a percentage of
the normal execution cost

Collateral is additional to fee
payments

If a script fails to execute,
then the collateral is lost

The collateral is never lost if a
script executes successfully

Provides security against low-
cost attacks by making it more
expensive rather than less
```

```
GUARDRAILS
PPI-01 (y) poolPledgeInfluence
must not be lower than 0.1

PPI-02 (y) poolPledgeInfluence
must not exceed 1.0

PPI-03 (y) poolPledgeInfluence
must not be negative

PPI-04 (x - "should")
poolPledgeInfluence should not
vary by more than +/- 10% in any
18-epoch period (approximately 3
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Pool Retirement Window
(poolRetireMaxEpoch)
Defines the maximum number of
epochs notice that a pool can
give when planning to retire

GUARDRAILS
PRME-01 (y) poolRetireMaxEpoch
must not be negative

PRME-02 (x - "should")
poolRetireMaxEpoch should not be
lower than 1

Collateral Percentage
(collateralPercentage)
Defines how much collateral must
be provided when executing a
Plutus script as a percentage of
the normal execution cost

Collateral is additional to fee
payments

If a script fails to execute,
then the collateral is lost

The collateral is never lost if a
script executes successfully

Provides security against low-
cost attacks by making it more
expensive rather than less
```

expensive to execute failed scripts

GUARDRAILS
CP-01 (y) collateralPercentage must not be lower than 100

CP-02 (y) collateralPercentage must not exceed 200

CP-03 (y) collateralPercentage must not be negative

CP-04 (y) collateralPercentage must not be zero

Maximum number of collateral inputs (maxCollateralInputs)
Defines the maximum number of inputs that can be used for collateral when executing a Plutus script

GUARDRAILS
MCI-01 (y) maxCollateralInputs must not be lower than 1

Maximum Value Size (maxValueSize)
The limit on the serialized size of the Value in each output.

GUARDRAILS
MVS-01 (y) maxValueSize must not exceed 12,288 Bytes (12KB)

MVS-02 (y) maxValueSize must not be negative

MVS-03 (~ - no access to existing parameter values) maxValueSize must be less than maxTxSize

MVS-04 (~ - no access to existing parameter values) maxValueSize must not be reduced

MVS-05 (x - "sensible output" is subject to interpretation) maxValueSize must be large enough to allow sensible outputs (e.g. any existing on-chain output or

expensive to execute failed scripts

GUARDRAILS
CP-01 (y) collateralPercentage must not be lower than 100

CP-02 (y) collateralPercentage must not exceed 200

CP-03 (y) collateralPercentage must not be negative

CP-04 (y) collateralPercentage must not be zero

Maximum number of collateral inputs (maxCollateralInputs)
Defines the maximum number of inputs that can be used for collateral when executing a Plutus script

GUARDRAILS
MCI-01 (y) maxCollateralInputs must not be lower than 1

Maximum Value Size (maxValueSize)
The limit on the serialized size of the Value in each output.

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MVS-02 (y) maxValueSize must not be negative

MVS-03 (~ - no access to existing parameter values) maxValueSize must be less than maxTxSize

MVS-04 (~ - no access to existing parameter values) maxValueSize must not be reduced

MVS-05 (x - "sensible output" is subject to interpretation) maxValueSize must be large enough to allow sensible outputs (e.g. any existing on-chain output or

anticipated outputs that could be produced by new ledger rules)

Plutus Cost Models (costModels)

Define the base costs for each Plutus primitive in terms of CPU and memory unit

A different cost model is required for each Plutus version. Each cost model comprises many distinct cost model values. Cost models are defined for each Plutus language version. A new language version may introduce additional cost model values or remove existing cost model values.

GUARDRAILS

PCM-01 (x - unquantifiable) Cost model values must be set by benchmarking on a reference architecture

PCM-02 (x - primitives and language versions aren't introduced in transactions) The cost model must be updated if new primitives are introduced or a new Plutus language version is added

PCM-03a (~ - no access to Plutus cost model parameters) Cost model values should not normally be negative. Negative values must be justified against the underlying cost model for the associated primitives

PCM-04 (~ - no access to Plutus cost model parameters) A cost model must be supplied for each Plutus language version that the protocol supports

2.5. Governance Parameters

The overall goals when managing the governance parameters are to:

anticipated outputs that could be produced by new ledger rules)

Plutus Cost Models (costModels)

Define the base costs for each Plutus primitive in terms of CPU and memory units

A different cost model is required for each Plutus version. Each cost model comprises many distinct cost model values. Cost models are defined for each Plutus language version. A new language version may introduce additional cost model values or remove existing cost model values.

GUARDRAILS

PCM-01 (x - unquantifiable) Cost model values must be set by benchmarking on a reference architecture

PCM-02 (x - primitives and language versions aren't introduced in transactions) The cost model must be updated if new primitives are introduced or a new Plutus language version is added

PCM-03a (~ - no access to Plutus cost model parameters) Cost model values should not normally be negative. Negative values must be justified against the underlying cost model for the associated primitives

PCM-04 (~ - no access to Plutus cost model parameters) A cost model must be supplied for each Plutus language version that the protocol supports

2.5. Governance Parameters

The overall goals when managing the governance parameters are to:

Ensure governance stability

Maintain a representative form of governance

Triggers for Change

Changes to governance parameters may be triggered by:

Cardano Community requests

Regulatory requirements

Unexpected or unwanted governance outcomes

Entering a state of no confidence

Counter-indicators

Changes may need to be reversed and/or should not be enacted in the event of:

Unexpected effects on governance

Excessive Layer 1 load due to on-chain voting or excessive numbers of governance actions

Core Metrics

All decisions on parameter changes should be informed by:

Governance participation levels

Governance behaviors and patterns

Regulatory considerations

Confidence in the governance system

The effectiveness of the governance system in managing necessary change

Changes to Specific Governance Parameters

Deposit for Governance Actions (govDeposit)

The deposit that is charged when submitting a governance action.

Ensure governance stability

Maintain a representative form of governance

Triggers for Change

Changes to governance parameters may be triggered by:

Cardano Community requests

Regulatory requirements

Unexpected or unwanted governance outcomes

Entering a state of no confidence

Counter-indicators

Changes may need to be reversed and/or should not be enacted in the event of:

Unexpected effects on governance

Excessive Layer 1 load due to on-chain voting or excessive numbers of governance actions

Core Metrics

All decisions on parameter changes should be informed by:

Governance participation levels

Governance behaviors and patterns

Regulatory considerations

Confidence in the governance system

The effectiveness of the governance system in managing necessary change

Changes to Specific Governance Parameters

Deposit for Governance Actions (govDeposit)

The deposit that is charged when submitting a governance action.

Helps to limit the number of actions that are submitted
GUARDRAILS
GD-01 (y) govDeposit must not be negative

GD-02 (y) govDeposit must not be lower than 1,000,000 (1 ada)

GD-03a (y) govDeposit must not exceed 10,000,000,000,000 (10 million ada)

GD-04 (x - "should") govDeposit should be adjusted in line with fiat changes

Deposit for DReps (dRepDeposit)
The deposit that is charged when registering a DRep.

Helps to limit the number of active DReps
GUARDRAILS
DRD-01 (y) dRepDeposit must not be negative

DRD-02 (y) dRepDeposit must not be lower than 1,000,000 (1 ada)

DRD-03 (y) dRepDeposit must not exceed 100,000,000,000 (100,000 ada)

DRD-04 (x - "should") dRepDeposit should be adjusted in line with fiat changes

DRep Activity Period (dRepActivity)
The period (as a whole number of epochs) after which a DRep is considered to be inactive for vote calculation purposes, if they do not vote on any proposal.

GUARDRAILS

DRA-01 (y) dRepActivity must not be lower than 13 epochs (2 months)

Helps to limit the number of actions that are submitted
GUARDRAILS
GD-01 (y) govDeposit must not be negative

GD-02 (y) govDeposit must not be lower than 1,000,000 (1 ada)

GD-03a (y) govDeposit must not exceed 10,000,000,000,000 (10 million ada)

GD-04 (x - "should") govDeposit should be adjusted in line with fiat changes

Deposit for DReps (dRepDeposit)
The deposit that is charged when registering a DRep.

Helps to limit the number of active DReps
GUARDRAILS
DRD-01 (y) dRepDeposit must not be negative

DRD-02 (y) dRepDeposit must not be lower than 1,000,000 (1 ada)

DRD-03 (y) dRepDeposit must not exceed 100,000,000,000 (100,000 ada)

DRD-04 (x - "should") dRepDeposit should be adjusted in line with fiat changes

DRep Activity Period (dRepActivity)
The period (as a whole number of epochs) after which a DRep is considered to be inactive for vote calculation purposes, if they do not vote on any proposal.

GUARDRAILS

DRA-01 (y) dRepActivity must not be lower than 13 epochs (65 days)

```
838
839 DRA-02 (y) dRepActivity must not exceed 37 epochs (6 months)
840
841 DRA-03 (y) dRepActivity must not be negative
842
843 DRA-04 (~ - no access to existing parameter values) dRepActivity must be greater than govActionLifetime
844
845 DRA-05 (x - "should") dRepActivity should be calculated in human terms (2 months etc)
846
847 DRep and SPO Governance Action Thresholds (dRepVotingThresholds[...],poolVotingThresholds[...])
848 Thresholds on the active voting stake that is required to ratify a specific type of governance action by either DReps or SPOs.
849
850 Ensures legitimacy of the action
851 The threshold parameters are listed below:
852
853 dRepVotingThresholds:
854
855 dvtCommitteeNoConfidence
856
857 dvtCommitteeNormal
858
859 dvtHardForkInitiation
860
861 dvtMotionNoConfidence
862
863 dvtPPEconomicGroup
864
865 dvtPPGovGroup
866
867 dvtPPNetworkGroup
868
869 dvtPPTechnicalGroup
870
871 dvtTreasuryWithdrawal
872
873 dvtUpdateToConstitution
```

```
885
886 DRA-02 (y) dRepActivity must not exceed 37 epochs (185 days)
887
888 DRA-03 (y) dRepActivity must not be negative
889
890 DRA-04 (~ - no access to existing parameter values) dRepActivity must be greater than govActionLifetime
891
892 DRA-05 (x - "should") dRepActivity should be calculated in human terms ( 60 days etc)
893
894 DRep and SPO Governance Action Thresholds (dRepVotingThresholds[...],poolVotingThresholds[...])
895 Thresholds on the active voting stake that is required to ratify a specific type of governance action by either DReps or SPOs.
896
897 Ensures legitimacy of the action
898 The threshold parameters are listed below:
899
900 dRepVotingThresholds:
901
902 dvtCommitteeNoConfidence
903
904 dvtCommitteeNormal
905
906 dvtHardForkInitiation
907
908 dvtMotionNoConfidence
909
910 dvtPPEconomicGroup
911
912 dvtPPGovGroup
913
914 dvtPPNetworkGroup
915
916 dvtPPTechnicalGroup
917
918 dvtTreasuryWithdrawal
919
920 dvtUpdateToConstitution
```

```
874
875 poolVotingThresholds:
876
877 pvtCommitteeNoConfidence
878
879 pvtCommitteeNormal
880
881 pvtHardForkInitiation
882
883 pvtMotionNoConfidence
884
885 pvtPPSecurityGroup
886
887 GUARDRAILS
888 VT-GEN-01 (y) All thresholds must
    be greater than 50% and less than
    or equal to 100%
889
890 VT-GEN-02a (y) Economic, network
    and technical/security parameter
    thresholds must be in the range
    51%-75%
891
892 VT-GEN-03 (y) Governance
    parameter thresholds must be in
    the range 75%-90%
893
894 VT-HF-01 (y) Hard fork action
    thresholds must be in the range
    51%-80%
895
896 VT-CON-01 (y) New Constitution or
    Guardrails Script action
    thresholds must be in the range
    65%-90%
897
898 VT-CC-01 (y) Update
    Constitutional Committee action
    thresholds must be in the range
    51%-90%
899
900 VT-NC-01 (y) No confidence action
    thresholds must be in the range
    51%-75%
901
902 Governance Action Lifetime
    (govActionLifetime)
903 The period after which a
    governance action will expire if
```

```
921
922 poolVotingThresholds:
923
924 pvtCommitteeNoConfidence
925
926 pvtCommitteeNormal
927
928 pvtHardForkInitiation
929
930 pvtMotionNoConfidence
931
932 pvtPPSecurityGroup
933
934 GUARDRAILS
935 VT-GEN-01 (y) All thresholds must
    be greater than 50% and less than
    or equal to 100%
936
937 VT-GEN-02a (y) Economic, network
    and technical/security parameter
    thresholds must be in the range
    51%-75%
938
939 VT-GEN-03 (y) Governance
    parameter thresholds must be in
    the range 75%-90%
940
941 VT-HF-01 (y) "Hard Fork
    Initiation" action thresholds
    must be in the range 51%-80%
942
943 VT-CON-01 (y) "New Constitution"
    action thresholds must be in the
    range 65%-90%
944
945 VT-CC-01 (y) "Update Committee"
    action thresholds must be in the
    range 51%-90%
946
947 VT-NC-01 (y) "No Confidence"
    action thresholds must be in the
    range 51%-75%
948
949 Governance Action Lifetime
    (govActionLifetime)
950 The period after which a
    governance action will expire if
```

it is not enacted – as a whole number of epochs

GUARDRAILS

GAL–01 (y) govActionLifetime must not be lower than 1 epoch (5 days)

GAL–03 (x – "should") govActionLifetime should not be lower than 2 epochs (10 days)

GAL–02 (y) govActionLifetime must not exceed 15 epochs (75 days)

GAL–04 (x – "should") govActionLifetime should be calibrated in human terms (eg 30 days, two weeks), to allow sufficient time for voting etc. to take place

GAL–05 (~ – no access to existing parameter values) govActionLifetime must be less than dRepActivity

Maximum Constitutional Committee Term (committeeMaxTermLength)
The limit on the maximum term length that a committee member may serve

GUARDRAILS
CMTL–01a (y) committeeMaxTermLength must not be zero

CMTL–02a (y) committeeMaxTermLength must not be negative

CMTL–03a (y) committeeMaxTermLength must not be lower than 18 epochs (90 days, or approximately 3 months)

CMTL–04a (y) committeeMaxTermLength must not exceed 293 epochs (approximately 4 years)

it is not enacted – as a whole number of epochs

GUARDRAILS

GAL–01 (y) govActionLifetime must not be lower than 1 epoch (5 days)

GAL–03 (x – "should") govActionLifetime should not be lower than 2 epochs (10 days)

GAL–02 (y) govActionLifetime must not exceed 15 epochs (75 days)

GAL–04 (x – "should") govActionLifetime should be calibrated in human terms (eg 30 days, two weeks), to allow sufficient time for voting etc. to take place

GAL–05 (~ – no access to existing parameter values) govActionLifetime must be less than dRepActivity

Maximum Constitutional Committee Term (committeeMaxTermLength)
The limit on the maximum term length that a committee member may serve

GUARDRAILS
CMTL–01a (y) committeeMaxTermLength must not be zero

CMTL–02a (y) committeeMaxTermLength must not be negative

CMTL–03a (y) committeeMaxTermLength must not be lower than 18 epochs (90 days, or approximately 3 months)

CMTL–04a (y) committeeMaxTermLength must not exceed 293 epochs (approximately 4 years)

CMTL-05a (x - "should") committeeMaxTermLength should not exceed 220 epochs (approximately 3 years)

The minimum size of the Constitutional Committee (committeeMinSize)
The least number of members that can be included in a Constitutional Committee following a governance action to change the Constitutional Committee.

GUARDRAILS
CMS-01 (y) committeeMinSize must not be negative

CMS-02 (y) committeeMinSize must not be lower than 3

CMS-03 (y) committeeMinSize must not exceed 10

2.6. Monitoring and Reversion of Parameter Changes
All network parameter changes must be monitored carefully for no less than 2 epochs (10 days)

Changes must be reverted as soon as possible if block propagation delays exceed 4.5s for more than 5% of blocks over any 6 hour rolling window
All other parameter changes should be monitored

The reversion plan should be implemented if the overall effect on performance, security, functionality or long-term sustainability is unacceptable.
A specific reversion/recovery plan must be produced for each parameter change. This plan must include:

Which parameters need to change and in which ways in order to

CMTL-05a (x - "should") committeeMaxTermLength should not exceed 220 epochs (approximately 3 years)

The minimum size of the Constitutional Committee (committeeMinSize)
The least number of members that can be included in a Constitutional Committee following a governance action to change the Constitutional Committee.

GUARDRAILS
CMS-01 (y) committeeMinSize must not be negative

CMS-02 (y) committeeMinSize must not be lower than 3

CMS-03 (y) committeeMinSize must not exceed 10

2.6. Monitoring and Reversion of Parameter Changes
All network parameter changes must be monitored carefully for no less than 2 epochs (10 days)

Changes must be reverted as soon as possible if block propagation delays exceed 4.5s for more than 5% of blocks over any 6 hour rolling window
All other parameter changes should be monitored

The reversion plan should be implemented if the overall effect on performance, security, functionality or long-term sustainability is unacceptable.
A specific reversion/recovery plan must be produced for each parameter change. This plan must include:

Which parameters need to change and in which ways in order to

return to the previous state (or a similar state)

How to recover the network in the event of disastrous failure

This plan should be followed if problems are observed following the parameter change. Note that not all changes can be reverted. Additional care must be taken when making changes to these parameters.

2.7. Non-Updatable Protocol Parameters

Some fundamental protocol parameters cannot be changed by the Protocol Parameter Update governance action. These parameters can only be changed in a new Genesis file as part of a hard fork. It is not necessary to provide specific guardrails on updating these parameters.

3. Guardrails and Guidelines on Treasury Withdrawal Actions

Treasury withdrawal actions specify the destination and amount of a number of withdrawals from the Cardano treasury.

GUARDRAILS

TREASURY-01a (x) A net change limit for the Cardano treasury's balance per period of time must be agreed by the DReps via an on-chain governance action with a threshold of greater than 50% of the active voting stake

TREASURY-02a (x) Withdrawals from the Cardano Blockchain treasury made pursuant to an approved Cardano Blockchain ecosystem budget must not exceed the net change limit for the Cardano

return to the previous state (or a similar state)

How to recover the network in the event of disastrous failure

This plan should be followed if problems are observed following the parameter change. Note that not all changes can be reverted. Additional care must be taken when making changes to these parameters.

2.7. Non-Updatable Protocol Parameters

Some fundamental protocol parameters cannot be changed by the "Parameter Update" action. These parameters can only be changed in a new Genesis file as part of a hard fork. It is not necessary to provide specific guardrails on updating these parameters.

3. Guardrails and Guidelines on "Treasury Withdrawals" Actions

"Treasury Withdrawals" actions specify the destination and amount of a number of withdrawals from the Cardano Treasury.

GUARDRAILS

TREASURY-01a (x) A Net Change Limit for the Cardano Treasury's balance per period of time must be agreed by the DReps via an on-chain governance action with a threshold of greater than 50% of the active voting stake

TREASURY-02a (x) Withdrawals from the Cardano Blockchain treasury must not exceed the Net Change Limit for the Cardano Treasury's balance per period of time

Treasury's balance per period of time

TREASURY-03a (x) Withdrawals from the Cardano Blockchain treasury must be denominated in ada

TREASURY-04a (x) Withdrawals from the Cardano Blockchain treasury must not be ratified until there is a Cardano Community approved Cardano Blockchain ecosystem budget then in effect pursuant to a previous on-chain governance action agreed by the DReps with a threshold of greater than 50% of the active voting stake

4. Guardrails and Guidelines on Hard Fork Initiation Actions
The hard fork initiation action requires both a new major and a new minor protocol version to be specified.

As positive integers
As the result of a hard fork, new updatable protocol parameters may be introduced. Guardrails may be defined for these parameters, which will take effect following the hard fork. Existing updatable protocol parameters may also be deprecated by the hard fork, in which case the guardrails become obsolete for all future changes.

GUARDRAILS
HARDFORK-01 (~ - no access to existing parameter values) The major protocol version must be the same as or one greater than the major version that will be enacted immediately prior to this change. If the major protocol version is one greater, then the minor protocol version must be zero

TREASURY-03a (x) Withdrawals from the Cardano Blockchain treasury must be denominated in ada

TREASURY-04a (x) A roadmap that includes the applicable period of the treasury withdrawal must be approved by the DReps via an Info Action with a threshold of greater than 50% of the active voting stake.

4. Guardrails and Guidelines on "Hard Fork Initiation" Actions
The "Hard Fork Initiation" action requires both a new major and a new minor protocol version to be specified.

As positive integers
As the result of a hard fork, new updatable protocol parameters may be introduced. Guardrails may be defined for these parameters, which will take effect following the hard fork. Existing updatable protocol parameters may also be deprecated by the hard fork, in which case the guardrails become obsolete for all future changes.

GUARDRAILS
HARDFORK-01 (~ - no access to existing parameter values) The major protocol version must be the same as or one greater than the major version that will be enacted immediately prior to this change. If the major protocol version is one greater, then the minor protocol version must be zero

HARDFORK-02a (~ - no access to existing parameter values) Unless the major protocol version is also changed, the minor protocol version must be greater than the minor version that will be enacted immediately prior to this change

HARDFORK-03 (~ - no access to existing parameter values) At least one of the protocol versions (major or minor or both) must change

HARDFORK-04a (x) At least 85% of stake pools by active stake should have upgraded to a Cardano Blockchain node version that is capable of processing the rules associated with the new protocol version

HARDFORK-05 (x) Any new updatable protocol parameters that are introduced with a hard fork must be included in this Appendix and suitable guardrails defined for those parameters

HARDFORK-06 (x) Settings for any new protocol parameters that are introduced with a hard fork must be included in the appropriate Genesis file

HARDFORK-07 (x) Any deprecated protocol parameters must be indicated in this Appendix

HARDFORK-08 (~ - no access to Plutus cost model parameters) New Plutus versions must be supported by a version-specific Plutus cost model that covers each primitive that is available in the new Plutus version

5. Guardrails and Guidelines on Update Constitutional Committee or Threshold Actions

HARDFORK-02a (~ - no access to existing parameter values) Unless the major protocol version is also changed, the minor protocol version must be greater than the minor version that will be enacted immediately prior to this change

HARDFORK-03 (~ - no access to existing parameter values) At least one of the protocol versions (major or minor or both) must change

HARDFORK-04a (x) At least 85% of stake pools by active stake should have upgraded to a Cardano Blockchain node version that is capable of processing the rules associated with the new protocol version

HARDFORK-05 (x) Any new updatable protocol parameters that are introduced with a hard fork must be included in this Appendix and suitable guardrails defined for those parameters

HARDFORK-06 (x) Settings for any new protocol parameters that are introduced with a hard fork must be included in the appropriate Genesis file

HARDFORK-07 (x) Any deprecated protocol parameters must be indicated in this Appendix

HARDFORK-08 (~ - no access to Plutus cost model parameters) New Plutus versions must be supported by a version-specific Plutus cost model that covers each primitive that is available in the new Plutus version

5. Guardrails and Guidelines on "Update Committee" actions

Update Constitutional Committee or Threshold governance actions may change the size, composition or required voting thresholds for the Constitutional Committee.

GUARDRAILS

UPDATE-CC-01a (x) Update Constitutional Committee and/or threshold and/or term governance actions must not be ratified until ada holders have ratified through an on-chain governance action this Constitution

6. Guardrails and Guidelines on New Constitution or Guardrails Script Actions

New constitution or Guardrails Script actions change the hash of the on-chain Constitution and the associated Guardrails Script.

GUARDRAILS

NEW-CONSTITUTION-01a (x) A New Constitution or Guardrails Script governance action must be submitted to define any required guardrails for new parameters that are introduced via a Hard Fork governance action

NEW-CONSTITUTION-02 (x) If specified, the new Guardrails Script must be consistent with this Constitution

7. Guardrails and Guidelines on No Confidence Actions

No confidence actions signal a state of no confidence in the governance system. No guardrails are imposed on No Confidence actions.

GUARDRAILS

None

8. GUARDRAILS AND GUIDELINES ON INFO ACTIONS

"Update Committee" actions may change the size, composition or required voting thresholds for the Constitutional Committee.

GUARDRAILS

UPDATE-CC-01a (x) "Update Committee" actions must not be ratified until ada holders have ratified through an on-chain governance action this Constitution

6. Guardrails and Guidelines on "New Constitution" actions

"New Constitution" actions change the hash of the on-chain Constitution and the associated Guardrails Script.

GUARDRAILS

NEW-CONSTITUTION-01a (x) A New Constitution or Guardrails Script governance action must be submitted to define any required guardrails for new parameters that are introduced via a Hard Fork governance action

NEW-CONSTITUTION-02 (x) If specified, the new Guardrails Script must be consistent with this Constitution

7. Guardrails and Guidelines on "No Confidence" actions

"No Confidence" actions signal a state of no confidence in the governance system. No guardrails are imposed on "No Confidence" actions.

GUARDRAILS

None

8. Guardrails and Guidelines on "Info" actions

Info actions are not enacted on-chain. No guardrails are imposed on Info actions.

GUARDRAILS

None

9. List of Protocol Parameter Groups

The protocol parameters are grouped by type, allowing different thresholds to be set for each group.

The network parameter group consists of:

maximum block body size (maxBlockBodySize)

maximum transaction size (maxTxSize)

maximum block header size (maxBlockHeaderSize)

maximum size of a serialized asset value (maxValueSize)

maximum script execution units in a single transaction (maxTxExecutionUnits[steps])

maximum script execution units in a single block (maxBlockExecutionUnits[steps])

maximum number of collateral inputs (maxCollateralInputs)

The economic parameter group consists of:

minimum fee coefficient (txFeePerByte)

minimum fee constant (txFeeFixed)

minimum fee per byte for reference scripts (minFeeRefScriptCoinsPerByte)

"Info" actions are not enacted on-chain. No guardrails are imposed on Info actions.

GUARDRAILS

None

9. List of Protocol Parameter Groups

The protocol parameters are grouped by type, allowing different thresholds to be set for each group.

The network parameter group consists of:

maximum block body size (maxBlockBodySize)

maximum transaction size (maxTxSize)

maximum block header size (maxBlockHeaderSize)

maximum size of a serialized asset value (maxValueSize)

maximum script execution units in a single transaction (maxTxExecutionUnits[steps])

maximum script execution units in a single block (maxBlockExecutionUnits[steps])

maximum number of collateral inputs (maxCollateralInputs)

The economic parameter group consists of:

minimum fee coefficient (txFeePerByte)

minimum fee constant (txFeeFixed)

minimum fee per byte for reference scripts (minFeeRefScriptCoinsPerByte)

delegation key lovelace deposit (stakeAddressDeposit)

pool registration lovelace deposit (stakePoolDeposit)

monetary expansion (monetaryExpansion)

treasury expansion (treasuryCut)

minimum fixed rewards cut for pools (minPoolCost)

minimum lovelace deposit per byte of serialized UTxO (coinsPerUTxOByte)

prices of Plutus execution units (executionUnitPrices[priceSteps/priceMemory])

The technical/security parameter group consists of:

pool pledge influence (poolPledgeInfluence)

pool retirement maximum epoch (poolRetireMaxEpoch)

desired number of pools (stakePoolTargetNum)

Plutus execution cost models (costModels)

proportion of collateral needed for scripts (collateralPercentage)

The governance parameter group consists of:

governance voting thresholds (dRepVotingThresholds[...], poolVotingThresholds[...])

governance action maximum lifetime in epochs (govActionLifetime)

delegation key lovelace deposit (stakeAddressDeposit)

pool registration lovelace deposit (stakePoolDeposit)

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governance action maximum lifetime in epochs (govActionLifetime)

governance action deposit* (govActionDeposit)

DRep deposit amount (dRepDeposit)

DRep activity period in epochs (dRepActivity)

minimal constitutional committee size (committeeMinSize)

maximum term length (in epochs) for the constitutional committee members (committeeMaxTermLength)

APPENDIX II: SUPPORTING GUIDANCE

This Appendix II is intended to provide guidance in interpreting the Constitution and the Constitutional Committee shall consider this Appendix II as it deems relevant and useful in carrying out its constitutional duties.

1. Framing Notes

The Cardano Blockchain was established in 2017. In July 2020 the Cardano Blockchain was expanded to include independent block validators and in September 2024 an on-chain governance system was introduced. This Constitution outlines the rights and responsibilities of governance actors in the decentralized system who represent the owners of ada, the governance token of the Cardano Blockchain. The Cardano Blockchain is presently a decentralized ecosystem of blockchain technology, smart contracts, and community governance.

In approaching this Constitution, the Cardano Community recognizes that it must be remembered that this is not a constitution for

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only a blockchain but rather a constitution for a blockchain ecosystem — a much more ambitious endeavor. Accordingly, how governance actions are approved, while extremely important, is not the sole focus of this Constitution. Rather, this Constitution provides the basis and fundamental framework through which all participants in the Cardano Community can come together to govern themselves and form radically new approaches to human interaction and collaboration.

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By necessity, this Constitution recognizes the role of and empowers the Constitutional Committee, confirms the right of the Cardano Community to participate in collective bodies for collaboration, gives effect to on-chain governance, and empowers DReps to act as the voice of ada owners for on-chain voting.

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The Constitution also recognizes the necessity of safeguarding access to and the use of funds of the Cardano Blockchain treasury through the inclusion of the Cardano Blockchain Guardrails in this Constitution.

2. Other Guidance

The drafters of the Constitution, together with other participants from the Cardano Community, have published and in the future may publish guidance for interpreting the Constitution, including, without limitation, a definition booklet that has been released contemporaneously with the on-chain ratification of the Constitution. So long as any such published guidance has been

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