

List of changes from v2.0 to v2.3

✦ Explain

The document has undergone several textual modifications, primarily focused on standardizing terminology and improving grammatical clarity.

- **Terminology Standardization:** A significant and recurring change is the replacement of "ada" with "Ada Holders" when referring to the owners of the Cardano governance token. This was applied in various contexts, including:
 - In the Preamble, specifically in relation to the rights of token owners [3](#).
 - In the definition of "Delegated Representative" [5](#).
 - In the "Participation Rights of Ada Holders" section [17](#).
 - In the "Economic Parameters" section [70](#) [71](#).
 - In the "Update Committee" actions guardrails [166](#).
 - In the "Framing Notes" of Appendix II [175](#).
- **Grammar and Punctuation:** Several minor grammatical adjustments were made for improved readability.
 - Commas have been added to lists to ensure proper separation of items, such as in the Preamble: "identity, value, and governance" [1](#) and "identity, value, and governance" [13](#).
 - The capitalization of specific terms has been standardized. For instance, "Cardano Community Member" is now consistently capitalized [4](#).
 - Punctuation within quoted terms has been adjusted, moving from using quotation marks around phrases like "Parameter Update" to using them consistently as "Parameter Update" [27](#) [59](#).
 - The use of "and" in lists has been made more consistent, for example, in the Preamble [1](#).
- **Phrasing and Clarity:** Some phrases have been reworded for greater precision and conciseness.
 - [6](#): The definition of "Net Change Limit" was rephrased from "the maximum amount or percentage by which the Cardano Treasury may not be reduced by in a given period" to "The maximum allowed amount or percentage of lovelace that may be removed from the Cardano Treasury in a given period."
 - [9](#): The description for a "Treasury Withdrawal Recipient" was updated from "treasury withdrawal governance action" to "Treasury Withdrawals" action.
 - [15](#) [16](#): Section headers and introductory text were slightly rephrased for clarity and conciseness.
 - [28](#): The introduction to the "Treasury Withdrawals" action standards was clarified.
- **Technical Terminology Updates:**
 - The description for "Stake Pool Operator" was updated in [7](#) to specify controlling "cold key(s) of a block-producing node" rather than just manifesting intent through signed transactions.

- References to specific actions were standardized, for example, changing "Parameter Update" to "Parameter Update" and "Treasury Withdrawal" to "Treasury Withdrawals" in various contexts 27 58 59 63 157 160 161.
- The term "bytes" has been consistently used in place of "Bytes" when referring to data size in Appendix I 95 96 97 105 138.
- Several instances of "steps/memory" were standardized to "steps/memory" within parentheses 67 82 110 121 170.
- **Structural and Formatting Adjustments:**
 - Some minor formatting changes were made, such as ensuring consistent capitalization and spacing.
 - The use of quotation marks around specific action types like "Parameter Update" and "Treasury Withdrawals" was standardized 27 59 63 157 160 161.

— 302 removals

2002 lines

+ 268 additions

1968 lines

```

1  **CARDANO BLOCKCHAIN ECOSYSTEM
  CONSTITUTION**
2  =====
  =====
3
4  **PREAMBLE**
5  -----
6
7  Cardano is a decentralized
  ecosystem of blockchain
  technology, smart
8  contracts, and community
  governance, committed to
  improving economic,
9  political, and social systems for
  everyone, everywhere. By offering
  this
10 foundational infrastructure,
   Cardano empowers individuals and
11 communities to manage their
   identity, value and governance,
   fostering
12 the emergence of decentralized
   applications, businesses and
   network
13 states.
14
15 Through unbiased processing of
   immutable data, we, the
   participants of
16 the Cardano Community, consisting
   of individuals, organizations,
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```

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   immutable data, we, the
   participants of
16 the Cardano Community, consisting
   of individuals, organizations,
```

17 contributors and others, choose
to follow in the footsteps of the
early

18 Internet and cryptocurrency
pioneers, who first forged bonds
of

19 community through digital
technologies. We are guided by
our shared

20 principles and tenets as we
exercise our self-governance by
balancing

21 decentralized decision-making
with accountability and
safeguarding the

22 security of the Cardano
Blockchain.

23

24 Recognizing the need for a more
robust and dynamic governance
framework,

25 that neither relies nor depends
upon traditional nation-state
governance

26 systems, but instead relies on
self-governance by the Cardano
Community,

27 utilizing, wherever possible and
beneficial, blockchain technology
in

28 the governance process, we hereby
establish this Cardano
Constitution to

29 govern the Cardano Blockchain
ecosystem, ensure the continuity
of the

30 Cardano Blockchain, and guard the
rights of those who utilize it
and the

31 rights of those who own ada.

32

33 With these purposes in mind, we,
the Cardano Community, affirm our

34 intention to abide by this
Constitution in order to
participate in the

35 governance of the Cardano
Blockchain ecosystem. We invite
all who share

36 our values to join us for as long
as they wish, while honoring the

17 contributors, and others, choose
to follow in the footsteps of the
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30 Cardano Blockchain, and guard the
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and the

31 rights of Ada Holders.

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Constitution in order to
participate in the

35 governance of the Cardano
Blockchain ecosystem. We invite
all who share

36 our values to join us for as long
as they wish, while honoring the

37 freedom to take another path.
38
39 ****DEFINED TERMS****
40 -----
41
42 1. Active Voting Stake. The
total amount of lovelace that is
delegated
43 to active DReps or SPOs. This
stake is used as the basis for
44 calculating voting thresholds
and adjudicating proposed
Governance
45 action outcomes. It excludes
stake delegated to inactive
DReps, the
46 predefined abstain voting
option, unregistered stake, and
registered
47 undelegated stake.
48
49 2. Ada Holders. Persons who
directly control the private
key(s) to ada
50 token(s).
51
52 3. Cardano Community. The
collective group of all
individuals and
53 organizations that, in
embracing the shared principles
and
54 objectives set forth in the
Cardano Blockchain Ecosystem
55 Constitution, own ada,
develop, build on, support,
maintain,
56 contribute to, and use the
Cardano Blockchain.
57
58 4. Cardano Community member.
Means any participant, individual
or
59 organization in the Cardano
Community, including the CC.
60
61 5. Constitutional Committee
(CC). The governing body and its
component
62 elected seats charged with
ensuring that applicable

37 freedom to take another path.
38
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59 organization in the Cardano
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61 5. Constitutional Committee
(CC). The governing body and its
component
62 elected seats charged with
ensuring that applicable

governance

63 actions take effect on the
Cardano Blockchain only if in
alignment

64 with the principles and
provisions set forth in the
Cardano

65 Blockchain Ecosystem
Constitution.

66

67 6. Constitutional Committee
member (CC member). A person,
whether an

68 individual or organization,
that serves as a member of the
69 Constitutional Committee.

70

71 7. Delegated Representative
(DRep). The individual or entity
registered

72 to vote with respect to on-
chain governance actions for its
own

73 behalf or on behalf of other
owners of ada.

74

75 8. Net Change Limit. Means the
maximum amount or percentage by
which

76 the Cardano Treasury may not
be reduced by in a given period.

77

78 9. Stake Pool Operator (SPO). An
individual or entity that
manifests

79 intent through the signed
transactions of a Stake Pool.

80

81 10. Stake Pool. A Stake Pool
Operator's Block producing node,
identified

82 by a unique Stake Pool ID,
which aggregates applicable
Delegator

83 stake, forges and validates
Blocks, and facilitates
contributions of

governance

63 actions take effect on the
Cardano Blockchain only if in
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(DRep). The individual or entity
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72 to vote with respect to on-
chain governance actions on its
own

73 behalf or on behalf of other
Ada Holders.

74

75 8. Net Change Limit. The maximum
allowed amount or percentage of

76 lovelace that may be removed
from the Cardano Treasury in a
given

77 period.

78

79 9. Stake Pool Operator (SPO). An
individual or entity that
controls

80 cold key(s) of a block-
producing node of a Stake Pool.

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Operator's block producing node,
identified

83 by a unique Stake Pool ID,
which aggregates applicable
Delegator

84 stake, forges and validates
Blocks, and facilitates
contributions of

84 the SP0 to the Cardano
Blockchain's security,
decentralization,
85 consensus mechanism, and
governance process.
86
87 11. Treasury Withdrawal
Recipient. A person or entity who
is indicated as
88 the recipient of ada from the
Cardano Treasury in the relevant
89 treasury withdrawal
governance action
90
91 **ARTICLE I. CARDANO BLOCKCHAIN
TENETS AND GUARDRAILS**
92 -----

93
94 ### **Section 1 Guiding Tenets**
95
96 These below Tenets shall guide
all Cardano Community members and
97 proposed governance actions shall
be evaluated in accordance with
these
98 Tenets. The order in which the
below Tenets appear is not
intended to
99 represent a priority among
Tenets.
100
101 TENET 1 Transactions on the
Cardano Blockchain shall not be
slowed down
102 or censored and shall be
expediently served for their
intended purpose.
103
104 TENET 2 The cost of transactions
on the Cardano Blockchain shall
be
105 predictable and not unreasonable.
106
107 TENET 3 Anyone desiring to
develop and deploy applications
on the
108 Cardano Blockchain shall not
unreasonably be prevented from

85 the SP0 to the Cardano
Blockchain's security,
decentralization,
86 consensus mechanism, and
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87
88 11. Treasury Withdrawal
Recipient. A person or entity who
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89 the recipient of ada from the
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90 "Treasury Withdrawals"
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on the
109 Cardano Blockchain shall not be
unreasonably prevented from

developing

109 and deploying such applications
as intended.

110

111 TENET 4 Contributions by the
Cardano Community on the Cardano
Blockchain

112 shall be recognized, recorded and
assessed fairly through reward
sharing

113 with SPOs, potential compensation
to DReps and CC members, and
114 appropriate tokenomics.

115

116 TENET 5 The Cardano Blockchain
shall not lock in an ada owner's
value

117 or data without the owner's
consent.

118

119 TENET 6 The Cardano Blockchain
shall not unreasonably impede
120 interoperability.

121

122 TENET 7 The Cardano Blockchain
shall preserve in a safe manner
any value

123 and information stored on the
Cardano Blockchain.

124

125 TENET 8 The Cardano Blockchain
shall not unreasonably spend
resources.

126

127 TENET 9 All users of the Cardano
Blockchain shall be treated
fairly and

128 impartially, taking into account
the collective desires of the
Cardano

129 Community, consistent with the
long-term sustainability and
viability of

130 the Cardano Blockchain.

131

132 TENET 10 The Cardano Blockchain's
monetary system shall promote
133 financial stability. This shall
include seeking to preserve the
value

developing

110 and deploying such applications
as intended.

111

112 TENET 4 Contributions by the
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and assessed fairly through
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115 appropriate tokenomics.

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132

133 TENET 10 The Cardano Blockchain's
monetary system shall promote
134 financial stability. This shall
include seeking to preserve the
value

134 and utility of ada as a medium of
exchange, store of value, and
unit of
135 account. The total supply of ada
shall not exceed 45,000,000,000
136 (45,000,000,000,000,000
lovelace).
137
138 ### **Section 2 Implementation of
Guardrails**
139
140 1. The Cardano Blockchain shall
operate in accordance with the
Cardano
141 Blockchain Guardrails
Appendix to this Constitution.
The Cardano
142 Community may digitally
codify certain Guardrails such
that the
143 Guardrails are directly
programmed and implemented on the
Cardano
144 Blockchain using on-chain
Guardrails Script or built-in
ledger
145 rules.
146
147 2. In the event there are
inconsistencies between a
Guardrail as set
148 forth in the Cardano
Blockchain Guardrails Appendix
and any such
149 Guardrail that has been
programmed and implemented on the
Cardano
150 Blockchain, the version of
such Guardrail that has been
deployed
151 directly on the Cardano
Blockchain shall prevail unless
and until
152 replaced or revised pursuant
to an on-chain governance action.
The
153 CC shall seek to reconcile
such inconsistencies through the
154 encouragement of an
appropriate on-chain governance
action.
155

135 and utility of ada as a medium of
exchange, store of value, and
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136 account. The total supply of ada
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The
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such inconsistencies through the
155 encouragement of an
appropriate on-chain governance
action.
156

156 ****ARTICLE II. COMMUNITY AND GOVERNANCE****
157 -----
158 -----
159 **### **Section 1 The Cardano Community****
160
161 1. Cardano Community members are entitled to the rights, privileges,
162 and protections of this Constitution, and are accordingly expected
163 to support and uphold this Constitution, maintain the integrity of
164 the ecosystem, participate in governance, and resolve disputes transparently.
165
166
167 2. Cardano Community members are encouraged to collaborate on
168 developing applications and to form organizations that support the
169 Cardano Blockchain and the Cardano Community.
170
171 **### **Section 2 Participation Rights of Ada Holders****
172
173 1. Ada Holders are entitled to access and participate in the on-chain
174 decision-making processes of the Cardano Blockchain ecosystem,
175 including voting, proposing changes to the governance structure in
176 accordance with the Guardrails, and otherwise taking part in
177 on-chain governance actions.
178

157 ****ARTICLE II. COMMUNITY AND GOVERNANCE****
158 -----
159 -----
160 **### **Section 1 The Cardano Community****
161
162 1. No formal membership shall be required to use, participate in and
163 benefit from the Cardano Blockchain.
164 Cardano Community members are entitled to the rights, privileges,
165 and protections of this Constitution, and are accordingly expected
166 to support and uphold this Constitution, maintain the integrity of
167 the ecosystem, participate in governance, and resolve disputes transparently.
168
169
170 2. Cardano Community members are encouraged to collaborate on
171 developing applications and to form organizations that support the
172 Cardano Blockchain and the Cardano Community.
173
174 **### **Section 2 Participation Rights of Ada Holders****
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176 1. Ada Holders are entitled to access and participate in the on-chain
177 decision-making processes of the Cardano Blockchain ecosystem,
178 including voting, proposing changes to the governance structure in
179 accordance with the Guardrails, and otherwise taking part in
180 on-chain governance actions.
181

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

182
183 3. Any Ada Holder shall be
allowed to register as a DRep. A
DRep may
184 act in the interest of one or
more Ada Holders.

185
186 4. Any Ada Holder shall be
allowed to delegate their voting
stake to
187 one or more registered DReps,
including themselves.

188
189 5. Ada Holders shall be allowed
to change the delegation of their
190 voting stake at any time.

191
192 6. Ada **owners** who use third-
party custodians or other
designees to hold
193 their ada may **authorize**, or
withhold authorization from, such
194 third parties to vote or
delegate the **owners'** voting
rights to
195 registered DReps on the
owners' behalf.

196
197 7. Ada Holders have the right to
a process for participating in,
198 submitting and voting on on-
chain governance actions that is

199 **open, transparent** and
protected from undue influence
and

200 manipulation.

201
202 **### **Section 3 Decentralized
Governance Framework****

203
204 1. The Cardano Blockchain is
governed by a decentralized, on-

182 2. Ada Holders can directly
participate in governance actions
by
183 registering as DReps
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184 rights to other registered
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193 voting stake at any time.

194
195 6. Ada **Holders** who use third-
party custodians or other
designees to hold
196 their ada may **authorize** or
withhold authorization from, such
197 third parties to vote or
delegate the **Ada Holders'** voting
rights to
198 registered DReps on the **Ada
Holders'** behalf.

199
200 7. Ada Holders have the right to
a process for participating in,
201 submitting and voting on on-
chain governance actions that is

202 **open, transparent, and**
protected from undue influence
and

203 manipulation.

204
205 **### **Section 3 Decentralized
Governance Framework****

206
207 1. The Cardano Blockchain is
governed by a decentralized, on-

chain

205 model that, where beneficial,
uses smart contracts and other
206 blockchain tools to
facilitate decision-making and
ensure
207 transparency.

208

209 2. Three independent voting
bodies – DReps, SPOs, and the
210 CC – participate in on-chain
voting; anyone holding multiple
roles

211 must publicly disclose such
overlaps before engaging in any
212 on-chain governance actions.

213

214 **### **Section 4: Delegated
Representatives****

215

216 1. DReps have voting power equal
to the number of **Lovelace**
delegated to

217 them.

218

219 2. DReps may vote on all types
of governance actions.

220

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

224

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

227 **behalf.**

228

229 **### **Section 5: Stake Pool
Operators****

230

231 1. Stake Pool Operators shall
vote on the following governance

chain

208 model that, where beneficial,
uses smart contracts and other
209 blockchain tools to
facilitate decision-making and
ensure
210 transparency.

211

212 2. Three independent voting
bodies – DReps, SPOs, and the
213 CC – participate in on-chain
voting; anyone holding multiple
roles

214 must publicly disclose such
overlaps before engaging in any
215 on-chain governance actions.

216

217 **### **Section 4 Delegated
Representatives****

218

219 1. DReps have voting power equal
to the number of **Lovelace**
delegated to

220 them.

221

222 2. DReps may vote on all types
of governance actions.

223

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

227

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

232 actions: (i) Motion of No
Confidence, (ii) Update
233 Committee/Threshold, (iii)
Hard Fork Initiation, (iv)
Protocol
234 Parameter Changes that affect
security-relevant parameters,
235 and (v) Info Actions. For
each of these governance actions,
SPOs
236 shall cast their votes
separately from DReps in
accordance with
237 the Guardrails.

238
239 2. SPOs shall publicly disclose
if they are simultaneously voting
as a
240 DRep on the same governance
actions.

241
242 3. SPOs vote on \"Hard Fork
Initiation\", \"No Confidence\",
\"Update
243 Committee\", and \"Parameter
Update\" governance actions that
244 affect security-critical
parameters set forth under
Parameters
245 that are Critical to the
Operation of the Blockchain in
Section
246 2.1 of the Cardano Blockchain
Guardrails Appendix.

247
248 ### **Section 6 Governance Action
Standards**

249
250 1. To ensure transparency in on-
chain governance, proposed
governance
251 actions shall follow a
standardized and legible format
before
252 being recorded or enacted on-
chain. This format shall include
a
253 URL, hosting a document that
outlines additional context for

230

231 ### **Section 5 Stake Pool
Operators**

232

233 1. SPOs shall vote on the
following governance actions: \"No
Confidence\",
234 \"Update Committee\", \"Hard
Fork Initiation\", \"Parameter
Update\" that
235 affect security-relevant
parameters, and \"Info\" actions.

236

237 ### **Section 6 Governance Action
Standards**

238

239 1. To ensure transparency in on-
chain governance, proposed
governance
240 actions shall follow a
standardized and legible format
before
241 being recorded or enacted on-
chain. This format shall include
a
242 URL hosting a document that
outlines additional context for

the
254 proposed governance action,
and hash of this document. The
255 document hosted by such a URL
shall be immutable in nature and
256 incapable of being altered
after submission of the proposed
257 governance action for on-
chain voting.

258
259 2. Each proposal shall provide
sufficient rationale, including
at
260 minimum: a title, abstract,
justification, and relevant
supporting
261 materials.
262

263 3. The content of every on-chain
governance action must be
identical to
264 the final off-chain version
of the proposed action.
265
266 4. "Hard Fork Initiation" and
"Parameter Update" actions
shall

267 undergo sufficient technical
review and scrutiny as mandated
by
268 the Guardrails to ensure that
the governance action does not
269 endanger the security,
functionality, performance or
long-term
270 sustainability of the Cardano
Blockchain.

271
272 ### **Section 7 Treasury
Withdrawal Governance Action
Standards**

273
274 A Treasury withdrawal governance
action must meet all of the

the
243 proposed governance action,
and the hash of this document.
The
244 document hosted by such a URL
shall be immutable and incapable
of
245 being altered after
submission, and the content of
every on-chain
246 Governance Action must be
identical to the final off-chain
version
247 of the proposed action.

248
249 2. Each proposal shall provide
sufficient rationale, including
at
250 minimum: a title, abstract,
justification, and relevant
supporting
251 materials.
252

253 3. "Hard Fork Initiation" and
"Parameter Update" actions shall

254 undergo sufficient technical
review and scrutiny as mandated
by
255 the Guardrails to ensure that
the governance action does not
256 endanger the security,
functionality, performance, or
long-term
257 sustainability of the Cardano
Blockchain.

258
259 ### **Section 7 "Treasury
Withdrawals" Action Standards**

260
261 A "Treasury Withdrawals" action
must, in addition to the

following

275 requirements:

276

277 1. Treasury withdrawal
governance actions must, in
278 addition to the
requirements at Section 6
above, specify the terms of the

279 withdrawal. This shall
include: the purpose of the
withdrawal, the
280 period for delivery of
proposed activities which the
withdrawal

281 shall be used for, the
relevant costs and expenses of
the proposed
282 activities, circumstances
under which the withdrawal might
be

283 refunded to the Cardano
treasury, the location and the
identity of
284 the recipient.

285

286 2. Treasury withdrawal
governance actions shall disclose
whether the
287 prospective recipient of the
Treasury withdrawal governance
action

288 has received ada from the
Cardano Treasury within the last
24

289 (twenty-four) months.

290

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

293

294 4. All treasury withdrawal
governance actions shall specify
a process

262 requirements at Section 6, meet
all of the following
requirements:

263

264 1. "Treasury Withdrawals"
actions must specify the terms of
265 the withdrawal. This shall
include: the purpose of the
withdrawal,
266 the period for delivery of
proposed activities which the
withdrawal

267 shall be used for, the
relevant costs and expenses of
the proposed
268 activities, circumstances
under which the withdrawal might
be

269 refunded to the Cardano
Treasury.

270

271 2. "Treasury Withdrawals"
actions shall disclose whether
the
272 prospective recipient of the
"Treasury Withdrawals" action

273 has received ada from the
Cardano Treasury within the last
24

274 months.

295 for oversight of use of funds
received from the Cardano
Treasury.

296

297 5. For Treasury Withdrawal
Recipients requesting more than
1,000,000

298 ada during any two (2) year
period, the following additional
299 requirements must all be met:

300

301 1. Treasury withdrawal
recipients shall appoint
professional,

302 independent auditors to
conduct an audit and provide a
report

303 of treasury recipients'
use of such funds received from
the

304 treasury, which shall be
made available to the Cardano
Community

305 on no less than an annual
basis.

306

307 2. Treasury withdrawal
governance actions shall make
provision for

308 the costs of such an
audit.

309

310 3. Treasury withdrawal
governance actions shall
designate one or

311 more administrators
responsible for monitoring how
the funds

312 are used, and ensuring
the deliverables are achieved as
set

313 out in Section 7,
paragraph 1 above.

314

275

276 3. A Net Change Limit must be
set. "Treasury Withdrawals"
actions

277 must not exceed the Net
Change Limit for that period.

278

279 4. All "Treasury Withdrawals"
actions shall specify a process

280 for oversight of use of funds
received from the Cardano
Treasury

281 and shall appoint independent
auditors to conduct an audit and

282 provide a report of treasury
recipients' use of such funds
received

283 from the treasury, which
shall be made available to the
Cardano

284 Community on no less than an
annual basis.

285

315 4. Any ada received from a
Cardano Blockchain treasury
withdrawal,
316 so long as such ada is
being held by an administrator
prior to
317 further disbursement to
the Treasury Withdrawal
Recipient,
318 must be kept in one or
more separate accounts that can
be
319 audited by the Cardano
Community, and such accounts
shall not
320 be delegated to an SP0
but must be delegated to the
predefined
321 auto abstain voting
option.

322

323 6. Treasury Withdrawal
Recipients shall use treasury
withdrawals for
324 the purpose set out in
Section 7, paragraph 1 above.

325

326 ****ARTICLE III. CONSTITUTIONAL
COMMITTEE****

327 -----

328

329 **### **Section 1 Role and Scope****
330

331 1. A CC shall be established as
the branch of Cardano's on-chain

332 governance process that
ensures governance actions to be
enacted

286 5. "Treasury Withdrawals"
actions shall designate one or
more
287 administrators responsible
for monitoring how the funds are
used,
288 and ensuring the deliverables
are achieved.

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290 6. Any ada received from a
Cardano Blockchain treasury
withdrawal,
291 so long as such ada is being
held by an administrator prior to
292 further disbursement to the
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293 must be kept in one or more
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the branch of Cardano's on-chain

304 governance process that
ensures governance actions to be
enacted

333 on-chain are consistent with
334 this Constitution.

335

336 2. Each CC member shall have one
337 vote.

338

339 3. No governance action – other
340 than a "No Confidence" or "Update
341 Committee" action – may be
342 implemented on-chain without
343 affirmation by a requisite
344 percentage of CC members.

345

346 4. The CC shall be limited to
347 voting on the constitutionality
348 of
349 governance actions, including
350 any proposed or contemplated
351 actions

352 contained within Info
353 actions.

354

355 ### **Section 2 Composition and
356 Terms**

357

358 1. The CC shall be composed of
359 such number of members and serve
360 such

361 term lengths as are
362 sufficient to assure the ongoing
363 integrity of

364 the Cardano Blockchain, as
365 determined from time to time by
366 owners

367 of ada.

368

369 2. To assure continuity in the
370 operation of the CC, the terms
371 for CC

372 members shall be staggered.

373

374 ### **Section 3 Election Process,
375 No Confidence and Removal**

376

377 1. The CC shall be considered to
378 be in one of the following two
379 states

380 at all times: a state of
381 confidence or a state of no
382 confidence.

305 on-chain are consistent with
306 this Constitution.

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309 vote.

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313 Committee" action – may be
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316 percentage of CC members.

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350 be in one of the following two
351 states

352 at all times: a state of
353 confidence or a state of no
354 confidence.

359 In a state of no confidence,
members of the then standing CC
must

360 be reinstated or replaced
using the "Update Committee"
action

361 before any other on-chain
governance action, other than
\["Info\
362 actions, may go forward. If a
"No Confidence" action is
enacted, a
363 state of no confidence will
result.

364

365 2. The Cardano Community shall
establish and make public a
process from

366 time to time for election of
members of the CC consistent with
the

367 requirements of the
Guardrails.

368

369 3. In the event of a vote of no
confidence or the removal of some
CC

370 members by "Update Committee"
action, an election shall be held
as

371 soon as practical.

372

373 ### **Section 4 Transparency and
Conduct**

374

375 1. CC processes shall be
transparent, and the CC shall
publish each

376 decision.

377

378 2. When voting that a governance
action proposed to be executed
379 on-chain is unconstitutional,
each CC member casting such a
vote

380 shall set forth the basis for
its decision with reference to

381 specific Articles of this
Constitution or provisions of the

382 Cardano Blockchain Guardrails
Appendix that are in conflict

331 In a state of no confidence,
members of the then-standing CC
must

332 be reinstated or replaced
using the "Update Committee"
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333 before any other on-chain
governance action, other than
"Info"

334 actions, may go forward.

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350 on-chain is unconstitutional,
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its decision with reference to

352 specific Articles of this
Constitution or provisions of the

353 Cardano Blockchain Guardrails
Appendix that are in conflict

with a
383 given proposal.
384
385 3. CC members may be compensated
for their efforts as members and
shall
386 ensure that any compensation
received in connection with such
387 activities is disclosed in a
timely manner through relevant
388 governance communication
channels.
389
390 ****ARTICLE IV. AMENDMENT PROCESS****
391 -----
392
393 **### **Section 1 Amendment Rules****
394
395 Amendments to this Constitution,
including amendments to the
Cardano
396 Blockchain Guardrails Appendix,
shall require approval through a
397 collective decision-making
process, by means of an on-chain
governance
398 action supported by at least 65%
of the then active voting stake,
unless
399 a different threshold is
specifically set forth in the
Cardano
400 Blockchain Guardrails Appendix
for the amendment of a particular
401 Guardrail, in which case that
specified threshold shall apply.
402
403 ****APPENDIX I. CARDANO BLOCKCHAIN
GUARDRAILS****
404 -----
405
406 **### **1. Introduction****
407
408 To implement Cardano Blockchain
on-chain governance, it is
necessary to
409 establish sensible Guardrails
that will enable the Cardano

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354 given proposal.
355
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358 activities is disclosed in a
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361 ****ARTICLE IV. AMENDMENT PROCESS****
362 -----
363
364 **### **Section 1 Amendment Rules****
365
366 Amendments to this Constitution,
including the Cardano Blockchain
367 Guardrails Appendix, shall
require approval via an on-chain
governance
368 action supported by at least 65%
of the active voting stake at
that
369 time, unless a different
threshold is expressly provided
in the Cardano
370 Blockchain Guardrails Appendix
for the amendment of a particular
371 Guardrail, in which case that
threshold shall apply.
372
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376 **### **1. Introduction****
377
378 To implement Cardano Blockchain
on-chain governance, it is
necessary to
379 establish sensible Guardrails
that will enable the Cardano

Blockchain to
410 continue to operate in a secure
and sustainable way.
411
412 This Appendix sets forth
Guardrails that must be applied
to Cardano
413 Blockchain on-chain governance
actions, including changes to the
414 protocol parameters and limits on
treasury withdrawals. These
Guardrails
415 cover both essential, intrinsic
limits on settings, and
recommendations
416 that are based on experience,
research, measurement and
governance
417 objectives.
418
419 These Guardrails are designed to
avoid both unexpected and
foreseeable
420 problems with the operation of
the Cardano Blockchain. They are
intended
421 to guide the choice of sensible
parameter settings and avoid
potential
422 problems with security,
performance, functionality or
long-term
423 sustainability. As described
below, some of these Guardrails
are
424 automatable and will be enforced
via an on-chain Guardrails Script
or
425 built-in ledger rules.
426
427 These Guardrails apply only to
the Cardano Blockchain Layer 1
mainnet
428 environment. They are not
intended to apply to test
environments or to
429 other blockchains that use
Cardano Blockchain software.
430

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380 continue to operate in a secure
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399 other blockchains that use
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431 Not all parameters for the
Cardano Blockchain can be
considered
432 independently. Some parameters
interact with other settings in
an
433 intrinsic way. Where known, these
interactions are addressed in
this
434 Appendix.
435
436 While the Guardrails in this
Appendix presently reflect the
current
437 state of technical insight, this
Appendix should be treated as a
living
438 document. Implementation
improvements, new simulations or
performance
439 evaluation results for the
Cardano Blockchain may allow some
of the
440 restrictions contained in these
Guardrails to be relaxed or
tightened in
441 due course.
442
443 Additional Guardrails may also be
needed where, for example, new
444 protocol parameters are
introduced or existing ones are
removed.
445
446 ##### **Amending, Adding or
Deprecating Guardrails**
447
448 The Guardrails set forth in this
Appendix may be amended from time
to
449 time pursuant to an on-chain
governance action that satisfies
the
450 applicable voting threshold as
set forth in this Appendix. Any
such
451 amendment to any Guardrails shall
require and be deemed to be an
452 amendment to the Constitution
itself, including any new
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422 amendment to the Constitution
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Guardrails. Each

453 Guardrail has a unique label. If
the text of a Guardrail is
amended, the
454 existing Guardrail will be
deprecated and a new label will
be used in
455 this Appendix. Similarly, if a
Guardrail is deprecated, its
label will
456 never be reused in the future. In
all cases, the Guardrails that
apply
457 to a governance action will be
those in force at the time that
the
458 governance action is submitted
on-chain, regardless of any later
459 amendments.
460
461 ##### **Terminology and Guidance**
462
463 This section provides
supplementary definitions and
interpretive
464 guidance for terms used
throughout this Constitution and
the Guardrails
465 Appendix.
466
467 Cardano Blockchain. The
decentralized, public, peer-to-
peer,
468 proof-of-stake distributed ledger
system, designed to securely
record,
469 verify, and synchronize
transactions and data across the
network while
470 enabling the execution of smart
contracts and decentralized
471 applications. This system,
powered by ada, is the longest
chain of
472 **Blocks** with sufficient
confirmations to be considered
finalized starting
473 from **Block** Hash
474 5f20df933584822601f9e3f8c024eb5eb
252fe8cefb24d1317dc3d432e940ebb,
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as

475 forged on 2017-09-23 21:44:51 UTC
on the Cardano Network.

476

477 Block. A container of data
produced by a Stake Pool that
includes, at

478 minimum, a header. Block
production and Block forging are
used

479 interchangeably.

480

481 Protocol. The algorithms, rules,
and procedures that govern the
exchange

482 of information on the Cardano
Blockchain.

483

484 Protocol Parameters. Protocol
settings that define how the
Cardano

485 Blockchain functions; modifiable
through applicable governance
processes.

486

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

488

489 Epoch. A Protocol-determined
interval characterized by a fixed
number of

491 Slots. Each Slot's duration and
sequence are governed by the
492 blockchain's consensus
mechanisms and are associated
with a universal

493 timestamp defined in UTC. It is
used for operations including
governance

494 voting, Block production
leadership determination, rewards
calculation,

495 and Hard Forks.

496

497 lovelace. The smallest unit of
value for the native
cryptocurrency of

498 the Cardano Blockchain, utilized
for the network's security and

499 governance. It is distinguished
from other native tokens by its

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500 a policy ID and policy name.
501
502 ada. A superunit of lovelace,
with 1 ada equal to 1,000,000
lovelace.
503
504 Delegator. A private key holder
that delegates stake to a Stake
Pool for
505 **Block** production and network
security, to a DRep for
participation in
506 on-chain governance, or both. In
doing so, the delegator
contributes to
507 the operation and governance of
the Cardano Blockchain.
508
509 Active Block Production Stake.
The cumulative amount of stake,
measured
510 in lovelace, that is actively
delegated to Stake Pools and
utilized for
511 **Block** forging during the current
Epoch. This amount is determined
by a
512 snapshot of stake distribution
taken at the beginning of the
previous
513 Epoch, ensuring that it
accurately represents the
effective stake
514 available for securing and
maintaining the Cardano
Blockchain through
515 **Block** forging.
516
517 On-chain. A classification for
actions, transactions, or
governance
518 activities that are executed,
recorded, or implemented directly
on the
519 Cardano Blockchain. These
actions, transactions, or
governance
520 activities are permanently
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470 a policy ID and policy name.
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489 Cardano Blockchain. These
actions, transactions, or
governance
490 activities are permanently
validated and stored through the

blockchain's
521 consensus mechanism, ensuring
their immutability and
transparency.
522
523 Off-Chain. A classification for
activities, proposals, or
governance
524 decisions that are either not yet
implemented on the Cardano
Blockchain,
525 or not intended to be directly
recorded on the blockchain. These
may
526 include discussions, proposals,
or agreements that exist outside
the
527 blockchain and do not involve
direct consensus or on-chain
validation.
528
529 Governance Action. An on-chain
proposal enabling participation
in
530 shaping the future of the Cardano
Blockchain Ecosystem through
voting
531 transactions.
532
533 Hard Fork. A Protocol upgrade for
the Cardano Blockchain that
results in
534 a new Protocol version and
necessitates coordinated adoption
by network
535 participants.
536
537 Guardrails. A set of restrictions
on Governance Actions to prevent
538 undesirable outcomes and assist
voters in deciding whether the
proposed
539 action complies with the Cardano
Blockchain Ecosystem
Constitution. Some
540 guardrails are enforced using the
Guardrails Script or ledger rules
to
541 prevent submission of the action,
while others necessitate further
542 adjudication to determine if they
violate the Constitution in ways

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494 decisions that are either not yet
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Guardrails Script or ledger rules
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511 prevent submission of the action,
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512 adjudication to determine if they
violate the Constitution in ways

the
543 Guardrails Script or ledger
cannot check. Guardrails may be
either
544 mandatory ("must"/"must not") or
advisory ("should"/"should not").
The
545 latter allows for interpretive
flexibility where necessary.
546
547 Guardrails Script. A smart
contract script that checks
specific proposed
548 Governance Actions, Hard Fork and
Parameter update Governance
Actions,
549 against automatically checkable
Guardrails. The check is applied
when
550 the Governance Action is proposed
on-chain.
551
552 Motion of no confidence
governance action ("No
Confidence" action). A
553 motion to create a state of no
confidence in the current
constitutional
554 committee.
555
556 Update committee and/or threshold
and/or terms governance action
557 ("Update Committee" action).
Changes to the members of the
558 constitutional committee and/or
to its signature threshold and/or
terms.
559
560 New Constitution or Guardrails
Script governance action ("New
561 Constitution" action). A
modification to the Constitution
or Guardrails
562 Script, recorded as on-chain
hashes.
563
564 Hard Fork Initiation governance
action ("Hard Fork Initiation"
action).

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517 Guardrails Script. A smart
contract script that checks
specific proposed
518 Governance Actions, "Hard Fork
Initiation" and "Parameter
Update"
519 actions, against automatically
checkable Guardrails. The check
is applied
520 when the Governance Action is
proposed on-chain.
521
522 Motion of no confidence
governance action ("No
Confidence" action). A
523 motion to create a state of no
confidence in the current
constitutional
524 committee.
525
526 Update committee and/or threshold
and/or terms governance action
527 ("Update Committee" action).
Changes to the members of the
528 Constitutional Committee and/or
to its signature threshold and/or
terms.
529
530 New Constitution or Guardrails
Script governance action ("New
531 Constitution" action). A
modification to the Constitution
or Guardrails
532 Script, recorded as on-chain
hashes.
533
534 Hard Fork Initiation governance
action ("Hard Fork Initiation"
action).

565 Triggers a non-backwards
compatible upgrade of the
network; requires a
566 prior software upgrade.
567
568 Protocol Parameter Changes
governance action ("Parameter
Changes" action
569 or "Parameter Update" action).
Any change to one or more
updatable
570 protocol parameters, excluding
changes to major protocol
versions
571 ("hard forks").
572
573 Treasury Withdrawals governance
action ("Treasury Withdrawals"
action).
574 Withdrawals from the treasury.
575
576 Info action ("Info" action). An
action that has no effect on-
chain,
577 other than an on-chain record.
578
579 Cardano Blockchain Treasury,
Cardano Treasury, or Treasury. A
supply of
580 ada controlled by the Protocol of
the Cardano Blockchain; collected
from
581 transaction fees, reserves, and
other designated sources.
Withdrawals
582 from this supply of ada are
subject to the processes and
restrictions
583 set forth in the Cardano
Blockchain Ecosystem
Constitution.
584
585 Cardano Blockchain Ecosystem. The
collective ecosystem comprising
the
586 Cardano Blockchain, the Cardano
Community, and the tooling and
587 infrastructure utilized by the
Cardano Community to support the
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543 Treasury Withdrawals governance
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544 Withdrawals from the treasury.
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549 Cardano Blockchain Treasury,
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588 Blockchain in alignment with the
shared principles and objectives
set
589 forth in the Cardano Blockchain
Ecosystem Constitution.
590
591 Expected. A reasonable
presumption that the identified
action, although
592 not mandatory, will occur.
593
594 Should/Should not. Where this
Appendix says that a value
\\"should not\\"
595 be set below or above some value,
this means that the Guardrail is
a
596 recommendation or guideline, and
the specific value could be open
to
597 discussion or alteration by a
suitably expert group recognized
by the
598 Cardano Community in light of
experience with the Cardano
Blockchain
599 governance system or the
operation of the Cardano
Blockchain.
600
601 Must/Must not. Where this
Appendix says that a value
\\"must\\" or \\"must
602 not\\" be set below or above some
value, this means that the
Guardrail is
603 a requirement that will be
enforced by Cardano Blockchain
ledger rules,
604 types or other built-in
mechanisms where possible, and
that if not
605 followed could cause a protocol
failure, security breach or other
606 undesirable outcome.
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608 Benchmarking. Benchmarking refers
to careful system level
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609 evaluation that is designed to
show *a priori* that, for
example, 95% of
610 blocks will be diffused across a
global network of Cardano
Blockchain
611 nodes within the required 5s time
interval in all cases. This may
612 require construction of specific
test workflows and execution on a
large
613 test network of Cardano
Blockchain nodes, simulating a
global Cardano
614 Blockchain network.
615
616 Performance analysis. Performance
analysis refers to projecting
617 theoretical performance,
empirical benchmarking or
simulation results to
618 predict actual system behavior.
For example, performance results
619 obtained from tests in a
controlled test environment (such
as a
620 collection of data centers with
known networking properties) may
be
621 extrapolated to inform likely
performance behavior in a real
Cardano
622 Blockchain network environment.
623
624 Simulation. Simulation refers to
synthetic execution that is
designed to
625 inform performance/functionality
decisions in a repeatable way.
For
626 example, the IOSim Cardano
Blockchain module allows the
operation of the
627 networking stack to be simulated
in a controlled and repeatable
way,
628 allowing issues to be detected
before code deployment.
629
630 Performance Monitoring.
Performance monitoring involves
measuring the

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example, 95% of
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600 Performance Monitoring.
Performance monitoring involves
measuring the

631 actual behavior of the Cardano
Blockchain network, for example,
by using
632 timing probes to evaluate round-
trip times, or test blocks to
assess
633 overall network health. It
complements benchmarking and
performance
634 analysis by providing information
about actual system behavior that
635 cannot be obtained using
simulated workloads or
theoretical analysis.
636
637 Reverting Changes. Where
performance monitoring shows that
actual
638 network behavior following a
change is inconsistent with the
performance
639 requirements for the Cardano
Blockchain, then the change must
be
640 reverted to its previous state if
that is possible. For example, if
the
641 block size is increased from
100KB to 120KB and 95% of blocks
are no
642 longer diffused within 5s, then a
change must be made to revert the
643 block size to 100KB. If this is
not possible, then one or more
644 alternative changes must be made
that will ensure that the
performance
645 requirements are met.
646
647 Severity Levels. Issues that
affect the Cardano Blockchain
network are
648 classified by severity level,
where:
649
650 – Severity 1 is a critical
incident or issue with very high
impact to
651 the security, performance,
functionality or sustainability
of the
652 Cardano Blockchain network

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Blockchain network, for example,
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618 classified by severity level,
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619
620 – Severity 1 is a critical
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621 the security, performance,
functionality or sustainability
of the
622 Cardano Blockchain network

653
654 – Severity 2 is a major
incident or issue with
significant impact to
655 the security, performance,
functionality or sustainability
of the
656 Cardano Blockchain network
657
658 – Severity 3 is a minor
incident or issue with low impact
to the
659 security, performance,
functionality or sustainability
of the
660 Cardano Blockchain network
661
662 Future Performance Requirements.
Planned development such as new
663 mechanisms for out of memory
storage may impact block
diffusion or other
664 times. When changing parameters,
it is necessary to consider these
665 future performance requirements
as well as the current operation
of the
666 Cardano Blockchain. Until
development is complete, the
requirements will
667 be conservative but may then be
relaxed to account for actual
timing
668 behavior.
669
670 ##### **Automated Checking
671 ("Guardrails Script\")**
672 A script hash is associated with
the Constitution hash when a New
673 Constitution or Guardrails Script
governance action is enacted. It
acts
674 as an additional safeguard to the
ledger rules and types, filtering
675 non-compliant governance actions.
676
677 The Guardrails Script only
affects two types of governance
actions:
678

623
624 – Severity 2 is a major
incident or issue with
significant impact to
625 the security, performance,
functionality or sustainability
of the
626 Cardano Blockchain network
627
628 – Severity 3 is a minor
incident or issue with low impact
to the
629 security, performance,
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647 The Guardrails Script only
affects two types of governance
actions:
648

679 - `\\"Parameter Update\\"` actions,
and

680

681 - `\\"Treasury Withdrawal\\"`
actions.

682

683 The Guardrails Script is executed
when either of these types of
684 governance action is submitted
on-chain. This avoids scenarios
where,

685 for example, an erroneous script
could prevent the Cardano
Blockchain

686 from ever enacting a Hard Fork
action, resulting in deadlock.

There are

687 three different situations that
apply to Guardrail Script usage.

688

689 Symbol and Explanation

690

691 - `\(y\)` The Guardrail Script
can be used to enforce the
Guardrail

692

693 - `\(x\)` The Guardrail Script
cannot be used to enforce the
Guardrail

694

695 - `\(~ - reason)` The Guardrail
Script cannot be used to enforce the

696 Guardrail for the reason
given, but future ledger changes
could

697 enable this.

698

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

701

702 Where a parameter is not
explicitly listed in this
document, then the

703 Guardrail Script must not permit
any changes to the parameter.

704

649 - `"Parameter Update"` actions,
and

650

651 - `"Treasury Withdrawals"`
action.

652

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

708

709 **### **2. Guardrails and
Guidelines on \"Parameter
Update\" actions****

710

711 Below are Guardrails and
guidelines for changing updatable
protocol

712 parameter settings via the
\"Parameter Update\" action such
that the

713 Cardano Blockchain is never in an
unrecoverable state as a result
of

714 such changes.

715

716 Note that, to avoid ambiguity,
this Appendix uses the parameter
name

717 that is used in \"Parameter
Update\" actions rather than any
other

718 convention.

719

720 ##### **GUARDRAILS**

721

722 PARAM-01 (y) Any protocol
parameter that is not explicitly
named in this

723 document must not be changed by a
\"Parameter Update\" action

724

725 PARAM-02a (y) Where a protocol
parameter is explicitly listed in
this

726 document but no checkable
Guardrails are specified, the
Guardrails

727 Script must not impose any
constraints on changes to the
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parameter is explicitly listed in
this

696 document but no checkable
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Guardrails

697 Script must not impose any
constraints on changes to the
parameter.

728 Checkable Guardrails are shown by
a (y)
729
730 **### **2.1. Critical Protocol
Parameters****
731
732 The below protocol parameters are
critical from a security point of
733 view.
734
735 **#### **Parameters that are
Critical to the Operation of the
Blockchain****
736
737 - *maximum block body size*
(*maxBlockBodySize*)
738
739 - *maximum transaction size*
(*maxTxSize*)
740
741 - *maximum block header size*
(*maxBlockHeaderSize*)
742
743 - *maximum size of a serialized
asset value* (*maxValueSize*)
744
745 - *maximum script
execution/memory units in a
single block*
746 (*maxBlockExecutionUnits\
[steps/memory]*)
747
748 - *minimum fee coefficient*
(*txFeePerByte*)
749
750 - *minimum fee constant*
(*txFeeFixed*)
751
752 - *minimum fee per byte for
reference scripts*
753 (*minFeeRefScriptCoinsPerByte*)
754
755 - *minimum lovelace deposit per
byte of serialized UTxO*
756 (*utxoCostPerByte*)
757
758 - *governance action deposit*
(*govDeposit*)
759

698 Checkable Guardrails are shown by
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(*maxBlockHeaderSize*)
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asset value* (*maxValueSize*)
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execution/memory units in a
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760 ##### **GUARDRAILS**
761
762 PARAM-03a (y) A parameter that is
critical to the operation of the
763 blockchain **require** an SP0 vote in
addition to a DRep vote: SP0s
must say
764 **\\"yes\\"** with a collective support
of more than 50% of all active
block
765 production stake. This is
enforced by the Guardrails on the
stake pool
766 voting threshold.
767
768 PARAM-04a (x) At least 90 days
should normally pass between the
769 publication of an off-chain
proposal to change a parameter
that is
770 critical to the operation of the
blockchain and the submission of
the
771 corresponding on-chain governance
action. This Guardrail may be
relaxed
772 in the event of a Severity 1 or
Severity 2 network issue
following
773 careful technical discussion and
evaluation.
774
775 ##### **Parameters that are
Critical to the Governance
System**
776
777 - *delegation key lovelace
deposit* (*stakeAddressDeposit*)
778
779 - *pool registration lovelace
deposit* (*stakePoolDeposit*)
780
781 - *minimum fixed rewards cut
for pools* (*minPoolCost*)
782
783 - *DRep deposit amount*
(*dRepDeposit*)
784
785 - *minimal Constitutional
Committee size*
(*committeeMinSize*)

730 ##### **GUARDRAILS**
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critical to the operation of the
733 blockchain **requires** an SP0 vote
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755 - *minimal Constitutional
Committee size*
(*committeeMinSize*)

786
787 - *maximum term length (in
epochs) for the Constitutional
Committee
788 members*
(*committeeMaxTermLength*)
789
790 ##### **GUARDRAILS**
791
792 PARAM-05a (y) DReps must vote
"yes\" with a collective support
of more
793 than 50% of all active voting
stake. This is enforced by the
Guardrails
794 on the DRep voting thresholds.
795
796 PARAM-06a (x) At least 90 days
should normally pass between the
797 publication of an off-chain
proposal to change a parameter
that is
798 critical to the governance system
and the submission of the
799 corresponding on-chain governance
action. This Guardrail may be
relaxed
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Severity 2 network issue
following
801 careful technical discussion and
evaluation.
802
803 ### **2.2. Economic Parameters**
804
805 The overall goals when managing
economic parameters are to:
806
807 1. Enable long-term economic
sustainability for the Cardano
Blockchain;
808
809 2. Ensure that stake pools are
adequately rewarded for
maintaining the
810 Cardano Blockchain;
811
812 3. Ensure that ada holders are
adequately rewarded for using
stake in

756
757 - *maximum term length (in
epochs) for the Constitutional
Committee
758 members*
(*committeeMaxTermLength*)
759
760 ##### **GUARDRAILS**
761
762 PARAM-05a (y) DReps must vote
"yes" with a collective support
of more
763 than 50% of all active voting
stake. This is enforced by the
Guardrails
764 on the DRep voting thresholds.
765
766 PARAM-06a (x) At least 90 days
should normally pass between the
767 publication of an off-chain
proposal to change a parameter
that is
768 critical to the governance system
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adequately rewarded for
maintaining the
780 Cardano Blockchain;
781
782 3. Ensure that Ada Holders are
adequately rewarded for using
stake in

813 constructive ways, including
when delegating ada for block
814 production; and
815
816 4. Balance economic incentives
for different Cardano Blockchain
817 ecosystem stakeholders,
including but not limited to
Stake Pool

818 Operators, ada holders, DeFi
users, infrastructure users,

819 developers (e.g. DApps) and
financial intermediaries (e.g.
820 exchanges)
821

822 ##### **Triggers for Change**
823

824 1. Significant changes in the
fiat value of ada resulting in
potential

825 problems with security,
performance, functionality or
long-term

826 sustainability
827

828 2. Changes in transaction
volumes or types
829

830 3. Community requests or
suggestions
831

832 4. Emergency situations that
require changes to economic
parameters
833

834 ##### **Counter-indicators**
835

836 Changes to the economic
parameters should not be made in
isolation. They
837 need to account for:
838

839 – External economic factors
840

841 – Network security concerns
842

843 ##### **Core Metrics**
844

845 – Fiat value of ada resulting
in potential problems with

783 constructive ways, including
when delegating ada for block
784 production; and
785
786 4. Balance economic incentives
for different Cardano Blockchain
787 ecosystem stakeholders,
including but not limited to
Stake Pool

788 Operators, Ada Holders, DeFi
users, infrastructure users,

789 developers (e.g. DApps) and
financial intermediaries (e.g.
790 exchanges)
791

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794 1. Significant changes in the
fiat value of ada resulting in
potential

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814

815 – Fiat value of ada resulting
in potential problems with

security,

846 performance, **functionality** or
long-term sustainability

847

848 – Transaction volumes and types

849

850 – Number and health of stake
pools

851

852 – External economic factors

853

854 ##### **Changes to Specific
Economic Parameters**

855

856 Transaction fee per byte
(txFeePerByte) and fixed
transaction fee

857 (txFeeFixed)

858

859 Defines the cost for basic
transactions in lovelace:

860

861 $\text{*fee(tx) = txFeeFixed + txFeePerByte} \times \text{nBytes(tx)}$

862

863 ##### **GUARDRAILS**

864

865 TFPB-01 (y) *txFeePerByte must
not be lower than 30 (0.000030
ada) This

866 protects against low-cost denial
of service attacks

867

868 TFPB-02 (y) *txFeePerByte must
not exceed 1,000 (0.001 ada) This

869 ensures that transactions can be
paid for

870

871 TFPB-03 (y) *txFeePerByte must
not be negative

872

873 TFF-01 (y) *txFeeFixed must not
be lower than 100,000 (0.1 ada)
This

874 protects against low-cost denial
of service attacks

875

876 TFF-02 (y) *txFeeFixed must not
exceed 10,000,000 (10 ada) This
ensures

877 that transactions can be paid for

security,

816 performance, **functionality**,
or long-term sustainability

817

818 – Transaction volumes and types

819

820 – Number and health of stake
pools

821

822 – External economic factors

823

824 ##### **Changes to Specific
Economic Parameters**

825

826 Transaction fee per byte
(txFeePerByte) and fixed
transaction fee

827 (txFeeFixed)

828

829 Defines the cost for basic
transactions in lovelace:

830

831 $\text{*fee(tx) = txFeeFixed + txFeePerByte} \times \text{nBytes(tx)}$

832

833 ##### **GUARDRAILS**

834

835 TFPB-01 (y) *txFeePerByte must
not be lower than 30 (0.000030
ada) This

836 protects against low-cost denial
of service attacks

837

838 TFPB-02 (y) *txFeePerByte must
not exceed 1,000 (0.001 ada) This

839 ensures that transactions can be
paid for

840

841 TFPB-03 (y) *txFeePerByte must
not be negative

842

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

845

846 TFF-02 (y) *txFeeFixed must not
exceed 10,000,000 (10 ada) This
ensures

847 that transactions can be paid for

878
879 TFF-03 (y) *txFeeFixed* must not
be negative
880
881 TFGEN-01 (x - \"should\") To
maintain a consistent level of
protection
882 against denial-of-service
attacks, *txFeeFixed* and
txFeePerByte
883 should be adjusted whenever
Plutus Execution prices are
adjusted
884 (executionUnitPrices\
[steps/memory\])
885
886 TFGEN-02 (x - unquantifiable) Any
changes to *txFeeFixed* or
887 *txFeePerByte* must consider the
implications of reducing the cost
of a
888 denial-of-service attack or
increasing the maximum
transaction fee so
889 that it becomes impossible to
construct a transaction.
890
891 ##### **UTx0 cost per byte
(utxoCostPerByte)**
892
893 Defines the deposit (in lovelace)
that is charged for each byte of
894 storage that is held in a UTx0.
This deposit is returned when the
UTx0
895 is no longer active.
896
897 - Sets a minimum threshold on
ada that is held within a single
UTx0
898
899 - Provides protection against
low-cost denial of service attack
on
900 UTx0 storage. DoS protection
decreases in line with the free
node
901 memory (proportional to UTx0
growth)
902

848
849 TFF-03 (y) *txFeeFixed* must not
be negative
850
851 TFGEN-01 (x - \"should\") To
maintain a consistent level of
protection
852 against denial-of-service
attacks, *txFeeFixed* and
txFeePerByte
853 should be adjusted whenever
Plutus Execution prices are
adjusted
854 (executionUnitPrices[steps/memory
])
855
856 TFGEN-02 (x - \"unquantifiable\")
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857 *txFeePerByte* must consider the
implications of reducing the cost
of a
858 denial-of-service attack or
increasing the maximum
transaction fee so
859 that it becomes impossible to
construct a transaction.
860
861 ##### **UTx0 cost per byte
(utxoCostPerByte)**
862
863 Defines the deposit (in lovelace)
that is charged for each byte of
864 storage that is held in a UTx0.
This deposit is returned when the
UTx0
865 is no longer active.
866
867 - Sets a minimum threshold on
ada that is held within a single
UTx0
868
869 - Provides protection against
low-cost denial of service attack
on
870 UTx0 storage. DoS protection
decreases in line with the free
node
871 memory (proportional to UTx0
growth)
872

903 – Helps reduce long-term
storage costs for node users by
providing an
904 incentive to return UTxOs
when no longer needed, or to
merge
905 UTxOs.
906
907 ##### **GUARDRAILS**
908
909 UCPB-01 (y) *utxoCostPerByte*
must not be lower than 3,000
(0.003 ada)
910
911 UCPB-02 (y) *utxoCostPerByte*
must not exceed 6,500 (0.0065
ada)
912
913 UCPB-03 (y) *utxoCostPerByte*
must not be zero
914
915 UCPB-04 (y) *utxoCostPerByte*
must not be negative
916
917 UCPB-05a (x – \"should\") Changes
should account for
918
919 1. The acceptable cost of attack
920
921 2. The acceptable time for an
attack
922
923 3. The acceptable memory
configuration for full node users
924
925 4. The sizes of UTxOs and
926
927 5. The current total node memory
usage
928
929 ##### **Stake address deposit
(stakeAddressDeposit)**
930
931 Ensures that stake addresses are
retired when no longer needed
932
933 – Helps reduce long-term
storage costs
934
935 – Helps limit CPU and memory
costs in the ledger

873 – Helps reduce long-term
storage costs for node users by
providing an
874 incentive to return UTxOs
when no longer needed, or to
merge
875 UTxOs.
876
877 ##### **GUARDRAILS**
878
879 UCPB-01 (y) *utxoCostPerByte*
must not be lower than 3,000
(0.003 ada)
880
881 UCPB-02 (y) *utxoCostPerByte*
must not exceed 6,500 (0.0065
ada)
882
883 UCPB-03 (y) *utxoCostPerByte*
must not be zero
884
885 UCPB-04 (y) *utxoCostPerByte*
must not be negative
886
887 UCPB-05a (x – \"should\") Changes
should account for
888
889 1. The acceptable cost of attack
890
891 2. The acceptable time for an
attack
892
893 3. The acceptable memory
configuration for full node users
894
895 4. The sizes of UTxOs and
896
897 5. The current total node memory
usage
898
899 ##### **Stake address deposit
(stakeAddressDeposit)**
900
901 Ensures that stake addresses are
retired when no longer needed
902
903 – Helps reduce long-term
storage costs
904
905 – Helps limit CPU and memory
costs in the ledger

936
937 The rationale for the deposit is
to incentivize that scarce memory
938 resources are returned when they
are no longer required. Reducing
the
939 number of active stake addresses
also reduces processing and
memory
940 costs at the epoch boundary when
calculating stake snapshots.
941
942 ##### **GUARDRAILS**
943
944 SAD-01 (y) *stakeAddressDeposit*
must not be lower than 1,000,000
(1
945 ada)
946
947 SAD-02 (y) *stakeAddressDeposit*
must not exceed 5,000,000 (5 ada)
948
949 SAD-03 (y) *stakeAddressDeposit*
must not be negative
950
951 ##### **Stake pool deposit
(stakePoolDeposit)**
952
953 Ensures that stake pools are
retired by the stake pool
operator when no
954 longer needed by them
955
956 – Helps reduce long-term
storage costs
957
958 The rationale for the deposit is
to incentivize that scarce memory
959 resources are returned when they
are no longer required. Rewards
and
960 stake snapshot calculations are
also impacted by the number of
active
961 stake pools.
962
963 ##### **GUARDRAILS**
964
965 SPD-01 (y) *stakePoolDeposit*
must not be lower than
250,000,000 (250
966 ada)

906
907 The rationale for the deposit is
to incentivize that scarce memory
908 resources are returned when they
are no longer required. Reducing
the
909 number of active stake addresses
also reduces processing and
memory
910 costs at the epoch boundary when
calculating stake snapshots.
911
912 ##### **GUARDRAILS**
913
914 SAD-01 (y) *stakeAddressDeposit*
must not be lower than 1,000,000
(1
915 ada)
916
917 SAD-02 (y) *stakeAddressDeposit*
must not exceed 5,000,000 (5 ada)
918
919 SAD-03 (y) *stakeAddressDeposit*
must not be negative
920
921 ##### **Stake pool deposit
(stakePoolDeposit)**
922
923 Ensures that stake pools are
retired by the stake pool
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924 longer needed by them
925
926 – Helps reduce long-term
storage costs
927
928 The rationale for the deposit is
to incentivize that scarce memory
929 resources are returned when they
are no longer required. Rewards
and
930 stake snapshot calculations are
also impacted by the number of
active
931 stake pools.
932
933 ##### **GUARDRAILS**
934
935 SPD-01 (y) *stakePoolDeposit*
must not be lower than
250,000,000 (250
936 ada)

967
 968 SPD-02 (y) *stakePoolDeposit*
 must not exceed 500,000,000 (500
 ada)
 969
 970 SPD-03 (y) *stakePoolDeposit*
 must not be negative
 971
 972 ##### **Minimum Pool Cost
 (minPoolCost)**
 973
 974 Part of the rewards mechanism
 975
 976 – The minimum pool cost is
 transferred to the pool rewards
 address
 977 before any delegator rewards
 are paid
 978
 979 ##### **GUARDRAILS**
 980
 981 MPC-01 (y) *minPoolCost* must not
 be negative
 982
 983 MPC-02 (y) *minPoolCost* must not
 exceed 500,000,000 (500 ada)
 984
 985 MPC-03 (x – \"should\")
 minPoolCost should be set in
 line with the
 986 economic cost for operating a
 pool
 987
 988 ##### **Treasury Cut
 (treasuryCut)**
 989
 990 Part of the rewards mechanism
 991
 992 – The treasury cut portion of
 the monetary expansion is
 transferred to
 993 the treasury before any pool
 rewards are paid
 994
 995 – Can be set in the range 0.0–
 1.0 (0%–100%)
 996
 997 ##### **GUARDRAILS**
 998
 999 TC-01 (y) *treasuryCut* must not
 be lower than 0.1 (10%)

937
 938 SPD-02 (y) *stakePoolDeposit*
 must not exceed 500,000,000 (500
 ada)
 939
 940 SPD-03 (y) *stakePoolDeposit*
 must not be negative
 941
 942 ##### **Minimum Pool Cost
 (minPoolCost)**
 943
 944 Part of the rewards mechanism
 945
 946 – The minimum pool cost is
 transferred to the pool rewards
 address
 947 before any delegator rewards
 are paid
 948
 949 ##### **GUARDRAILS**
 950
 951 MPC-01 (y) *minPoolCost* must not
 be negative
 952
 953 MPC-02 (y) *minPoolCost* must not
 exceed 500,000,000 (500 ada)
 954
 955 MPC-03 (x – \"should\")
 minPoolCost should be set in
 line with the
 956 economic cost for operating a
 pool
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 958 ##### **Treasury Cut
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 the monetary expansion is
 transferred to
 963 the treasury before any pool
 rewards are paid
 964
 965 – Can be set in the range 0.0–
 1.0 (0%–100%)
 966
 967 ##### **GUARDRAILS**
 968
 969 TC-01 (y) *treasuryCut* must not
 be lower than 0.1 (10%)

1000
1001 TC-02 (y) *treasuryCut* must not
exceed 0.3 (30%)
1002
1003 TC-03 (y) *treasuryCut* must not
be negative
1004
1005 TC-04 (y) *treasuryCut* must not
exceed 1.0 (100%)
1006
1007 TC-05 (\~ - no access to change
history) *treasuryCut* must not
be
1008 changed more than once in any 36
epoch period (approximately 6
months)
1009
1010 ##### **Monetary Expansion Rate
(monetaryExpansion)**
1011
1012 Part of the rewards mechanism
1013
1014 - The monetary expansion
controls the amount of reserves
that is used
1015 for rewards each epoch
1016
1017 Governs the long-term
sustainability of the Cardano
Blockchain
1018
1019 - The reserves are gradually
depleted until no rewards are
supplied
1020
1021 ##### **GUARDRAILS**
1022
1023 ME-01 (y) *monetaryExpansion*
must not exceed 0.005
1024
1025 ME-02 (y) *monetaryExpansion*
must not be lower than 0.001
1026
1027 ME-03 (y) *monetaryExpansion*
must not be negative
1028
1029 ME-04 (x - \"should\")
monetaryExpansion should not be
varied by more

970
971 TC-02 (y) *treasuryCut* must not
exceed 0.3 (30%)
972
973 TC-03 (y) *treasuryCut* must not
be negative
974
975 TC-04 (y) *treasuryCut* must not
exceed 1.0 (100%)
976
977 TC-05 (~ - no access to change
history) *treasuryCut* must not
be
978 changed more than once in any 36
epoch period (approximately 6
months)
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980 ##### **Monetary Expansion Rate
(monetaryExpansion)**
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sustainability of the Cardano
Blockchain
988
989 - The reserves are gradually
depleted until no rewards are
supplied
990
991 ##### **GUARDRAILS**
992
993 ME-01 (y) *monetaryExpansion*
must not exceed 0.005
994
995 ME-02 (y) *monetaryExpansion*
must not be lower than 0.001
996
997 ME-03 (y) *monetaryExpansion*
must not be negative
998
999 ME-04 (x - \"should\")
monetaryExpansion should not be
varied by more

1030 than +/- 10% in any 73-epoch
period (approximately 12 months)

1031

1032 ME-05 (x - \"should\")
monetaryExpansion should not be
changed more

1033 than once in any 36-epoch period
(approximately 6 months)

1034

1035 ##### **Plutus Script Execution
Prices (executionUnitPrices\
[priceSteps/priceMemory\])**

1036

1037 Define the fees for executing
Plutus scripts

1038

1039 Gives an economic return for
Plutus script execution

1040

1041 Provides security against low-
cost DoS attacks

1042

1043 ##### **GUARDRAILS**

1044

1045 EIUP-PS-01 (y)
*executionUnitPrices\
[priceSteps\]* must not exceed
2,000

1046 / 10,000,000

1047

1048 EIUP-PS-02 (y)
*executionUnitPrices\
[priceSteps\]* must not be lower

1049 than 500 / 10,000,000

1050

1051 EIUP-PM-01 (y)
*executionUnitPrices\
[priceMemory\]* must not exceed

1052 2,000 / 10,000

1053

1054 EIUP-PM-02 (y)
*executionUnitPrices\
[priceMemory\]* must not be lower

1055 than 400 / 10,000

1056

1000 than +/- 10% in any 73-epoch
period (approximately 12 months)

1001

1002 ME-05 (x - "should")
monetaryExpansion should not be
changed more

1003 than once in any 36-epoch period
(approximately 6 months)

1004

1005 ##### **Plutus Script Execution
Prices
(executionUnitPrices[priceSteps/p
riceMemory\])**

1006

1007 Define the fees for executing
Plutus scripts

1008

1009 Gives an economic return for
Plutus script execution

1010

1011 Provides security against low-
cost DoS attacks

1012

1013 ##### **GUARDRAILS**

1014

1015 EIUP-PS-01 (y)
executionUnitPrices[priceSteps]
must not exceed 2,000

1016 / 10,000,000

1017

1018 EIUP-PS-02 (y)
executionUnitPrices[priceSteps]
must not be lower

1019 than 500 / 10,000,000

1020

1021 EIUP-PM-01 (y)
*executionUnitPrices[priceMemory]
* must not exceed

1022 2,000 / 10,000

1023

1024 EIUP-PM-02 (y)
*executionUnitPrices[priceMemory]
* must not be lower

1025 than 400 / 10,000

1026

1057 EIUP-GEN-01 (x - `\similar to\`)
 The execution prices must be set
 so

1058 that

1059

1060 1. the cost of executing a
 transaction with maximum CPU
 steps is

1061 similar to the cost of a
 maximum sized non-script
 transaction and

1062

1063 2. the cost of executing a
 transaction with maximum memory
 units is

1064 similar to the cost of a
 maximum sized non-script
 transaction

1065

1066 EIUP-GEN-02 (x - `\should\`) The
 execution prices should be
 adjusted

1067 whenever transaction fees are
 adjusted
 ($*txFeeFixed/txFeePerByte*$). The

1068 goal is to ensure that the
 processing delay is similar for
`\full\`

1069 transactions, regardless of their
 type.

1070

1071 – This helps ensure that the
 requirements on block

1072 diffusion/propagation times
 are met.

1073

1074 ##### ****Transaction fee per byte
 for a reference script
 (minFeeRefScriptCoinsPerByte)****

1075

1076 Defines the cost for using Plutus
 reference scripts in lovelace

1077

1078 ##### ****GUARDRAILS****

1079

1080 MFRS-01 (y)
 $*minFeeRefScriptCoinsPerByte*$
 must not exceed 1,000 (0.001

1081 ada)

1082

1027 EIUP-GEN-01 (x - `"similar to"`)
 The execution prices must be set
 so

1028 that

1029

1030 1. the cost of executing a
 transaction with maximum CPU
 steps is

1031 similar to the cost of a
 maximum sized non-script
 transaction and

1032

1033 2. the cost of executing a
 transaction with maximum memory
 units is

1034 similar to the cost of a
 maximum sized non-script
 transaction

1035

1036 EIUP-GEN-02 (x - `"should"`) The
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1038 goal is to ensure that the
 processing delay is similar for
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1039 transactions, regardless of their
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 requirements on block

1042 diffusion/propagation times
 are met.

1043

1044 ##### ****Transaction fee per byte
 for a reference script
 (minFeeRefScriptCoinsPerByte)****

1045

1046 Defines the cost for using Plutus
 reference scripts in lovelace

1047

1048 ##### ****GUARDRAILS****

1049

1050 MFRS-01 (y)
 $*minFeeRefScriptCoinsPerByte*$
 must not exceed 1,000 (0.001

1051 ada)

1052

1083 – This ensures that
transactions can be paid for
1084
1085 MFRS-02 (y)
minFeeRefScriptCoinsPerByte
must not be negative
1086
1087 MFRS-03 (x – `"should"`) To
maintain a consistent level of
protection
1088 against denial-of-service
attacks,
minFeeRefScriptCoinsPerByte
should
1089 be adjusted whenever Plutus
Execution prices are adjusted
1090 `(*executionUnitPrices\
[steps/memory\]*)` and whenever
txFeeFixed is
1091 adjusted
1092
1093 MFRS-04 (x – `unquantifiable`) Any
changes to
1094 *minFeeRefScriptCoinsPerByte*
must consider the implications of
reducing
1095 the cost of a denial-of-service
attack or increasing the maximum
1096 transaction fee
1097
1098 `### **2.3. Network Parameters**`
1099
1100 The overall goals when managing
the Cardano Blockchain network
1101 parameters are to:
1102
1103 1. Match the available Cardano
Blockchain Layer 1 network
capacity to
1104 current or future traffic
demands, including payment
transactions,
1105 layer 1 DApps, sidechain
management and governance needs
1106
1107 2. Balance traffic demands for
different user groups, including
payment
1108 transactions, minters of
Fungible/Non-Fungible Tokens,

1053 – This ensures that
transactions can be paid for
1054
1055 MFRS-02 (y)
minFeeRefScriptCoinsPerByte
must not be negative
1056
1057 MFRS-03 (x – `"should"`) To
maintain a consistent level of
protection
1058 against denial-of-service
attacks,
minFeeRefScriptCoinsPerByte
should
1059 be adjusted whenever Plutus
Execution prices are adjusted
1060 `(*executionUnitPrices[steps/memor
y]*)` and whenever *txFeeFixed* is
1061 adjusted
1062
1063 MFRS-04 (x – `unquantifiable`)
Any changes to
1064 *minFeeRefScriptCoinsPerByte*
must consider the implications of
reducing
1065 the cost of a denial-of-service
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1066 transaction fee
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1068 `### **2.3. Network Parameters**`
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1073 1. Match the available Cardano
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demands, including payment
transactions,
1075 layer 1 DApps, sidechain
management and governance needs
1076
1077 2. Balance traffic demands for
different user groups, including
payment
1078 transactions, minters of
Fungible/Non-Fungible Tokens,

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1109 scripts, DeFi developers,
Stake Pool Operators and voting
1110 transactions
1111
1112 ##### **Triggers for Change**
1113
1114 Changes to network parameters may
be triggered by:
1115
1116 1. Measured changes in traffic
demands over a 2-epoch period (10
days)
1117
1118 2. Anticipated changes in
traffic demands
1119
1120 3. Cardano Community requests
1121
1122 ##### **Counter-indicators**
1123
1124 Changes may need to be reversed
and/or should not be enacted in
the
1125 event of:
1126
1127 - Excessive block propagation
delays
1128
1129 - Stake pools being unable to
handle traffic volume
1130
1131 - Scripts being unable to
complete execution
1132
1133 ##### **Core Metrics**
1134
1135 All decisions on parameter
changes should be informed by:
1136
1137 - Block propagation delay
profile
1138
1139 - Traffic volume (block size
over time)
1140
1141 - Script volume (size of
scripts and execution units)
1142
1143 - Script execution cost
benchmarks
1144

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1079 scripts, DeFi developers,
Stake Pool Operators and voting
1080 transactions
1081
1082 ##### **Triggers for Change**
1083
1084 Changes to network parameters may
be triggered by:
1085
1086 1. Measured changes in traffic
demands over a 2-epoch period (10
days)
1087
1088 2. Anticipated changes in
traffic demands
1089
1090 3. Cardano Community requests
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1092 ##### **Counter-indicators**
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1094 Changes may need to be reversed
and/or should not be enacted in
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1095 event of:
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handle traffic volume
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complete execution
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changes should be informed by:
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profile
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1109 - Traffic volume (block size
over time)
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1111 - Script volume (size of
scripts and execution units)
1112
1113 - Script execution cost
benchmarks
1114

1145 – Block propagation
delay/diffusion benchmarks
1146
1147 Detailed benchmarking results are
required to confirm the effect of
any
1148 changes on mainnet performance or
behavior prior to enactment. The
1149 effects of different transaction
mixes must be analyzed, including
1150 normal transactions, Plutus
scripts, and governance actions.
1151
1152 ##### **GUARDRAILS**
1153
1154 NETWORK-01 (x – \"should\") No
individual network parameter
should
1155 change more than once per two
epochs
1156
1157 NETWORK-02 (x – \"should\") Only
one network parameter should be
changed
1158 per epoch unless they are
directly correlated, e.g., per-
transaction and
1159 per-block memory unit limits
1160
1161 ##### **Changes to Specific
Network Parameters**
1162
1163 ##### **Block Size
(maxBlockBodySize)**
1164
1165 The maximum size of a block, in
Bytes.
1166
1167 ##### **GUARDRAILS**
1168
1169 MBBS-01 (y) *maxBlockBodySize*
must not exceed 122,880 Bytes
(120KB)
1170
1171 MBBS-02 (y) *maxBlockBodySize*
must not be lower than 24,576
Bytes
1172 (24KB)

1115 – Block propagation
delay/diffusion benchmarks
1116
1117 Detailed benchmarking results are
required to confirm the effect of
any
1118 changes on mainnet performance or
behavior prior to enactment. The
1119 effects of different transaction
mixes must be analyzed, including
1120 normal transactions, Plutus
scripts, and governance actions.
1121
1122 ##### **GUARDRAILS**
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1129 per-block memory unit limits
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Network Parameters**
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(maxBlockBodySize)**
1134
1135 The maximum size of a block, in
bytes.
1136
1137 ##### **GUARDRAILS**
1138
1139 MBBS-01 (y) *maxBlockBodySize*
must not exceed 122,880 bytes
(120KB)
1140
1141 MBBS-02 (y) *maxBlockBodySize*
must not be lower than 24,576
bytes
1142 (24KB)

1173

1174 MBBS-03a (x - \"exceptional
circumstances\")
maxBlockBodySize must not

1175 be decreased, other than in
exceptional circumstances where
there are
1176 potential problems with security,
performance, functionality or
1177 long-term sustainability
1178

1179 MBBS-04 (~ - no access to
existing parameter values)
maxBlockBodySize

1180 must be large enough to include
at least one transaction (that
is,
1181 *maxBlockBodySize* must be at
least *maxTxSize*)
1182

1183 MBBS-05 (x - \"should\")
maxBlockBodySize should be
changed by at most
1184 10,240 Bytes (10KB) per epoch (5
days), and preferably by 8,192
Bytes

1185 (8KB) or less per epoch
1186

1187 MBBS-06 (x - \"should\") The
block size should not induce an
additional

1188 Transmission Control Protocol
(TCP) round trip. Any increase
beyond this
1189 must be backed by performance
analysis, simulation and
benchmarking
1190

1191 MBBS-07 (x - \"unquantifiable\")
The impact of any change to

1192 *maxBlockBodySize* must be
confirmed by detailed
benchmarking/simulation
1193 and not exceed the requirements
of the block
diffusion/propagation time
1194 budgets, as described below. Any
increase to *maxBlockBodySize*

1143

1144 MBBS-03a (x - exceptional
circumstances) *maxBlockBodySize*
must not

1145 be decreased, other than in
exceptional circumstances where
there are
1146 potential problems with security,
performance, functionality or
1147 long-term sustainability
1148

1149 MBBS-04 (~ - no access to
existing parameter values)
maxBlockBodySize

1150 must be large enough to include
at least one transaction (that
is,
1151 *maxBlockBodySize* must be at
least *maxTxSize*)
1152

1153 MBBS-05 (x - \"should\")
maxBlockBodySize should be
changed by at most
1154 10,240 bytes (10KB) per epoch (5
days), and preferably by 8,192
bytes

1155 (8KB) or less per epoch
1156

1157 MBBS-06 (x - \"should\") The block
size should not induce an
additional

1158 Transmission Control Protocol
(TCP) round trip. Any increase
beyond this
1159 must be backed by performance
analysis, simulation and
benchmarking
1160

1161 MBBS-07 (x - \"unquantifiable\")
The impact of any change to

1162 *maxBlockBodySize* must be
confirmed by detailed
benchmarking/simulation
1163 and not exceed the requirements
of the block
diffusion/propagation time
1164 budgets, as described below. Any
increase to *maxBlockBodySize*

must
1195 also consider future requirements
for Plutus script execution
1196 `(*maxBlockExecutionUnits\
[steps\]*)` against the total
block diffusion
1197 target of 3s with 95% block
propagation within 5s. The limit
on maximum
1198 block size may be increased in
the future if this is supported
by
1199 benchmarking and monitoring
results
1200
1201 `#### **Transaction Size
(maxTxSize)**`
1202
1203 The maximum size of a
transaction, in Bytes.
1204
1205 `##### **GUARDRAILS**`
1206
1207 MTS-01 (y) `*maxTxSize*` must not
exceed 32,768 Bytes (32KB)
1208
1209 MTS-02 (y) `*maxTxSize*` must not
be negative
1210
1211 MTS-03 (`\~` – no access to
existing parameter values)
`*maxTxSize*` must
1212 not be decreased
1213
1214 MTS-04 (`\~` – no access to
existing parameter values)
`*maxTxSize*` must
1215 not exceed `*maxBlockBodySize*`
1216
1217 MTS-05 (x – `\"should\"`)
`*maxTxSize*` should not be
increased by more than
1218 2,560 Bytes (2.5KB) in any epoch,
and preferably should be
increased by
1219 2,048 Bytes (2KB) or less per
epoch

must
1165 also consider future requirements
for Plutus script execution
1166 `(*maxBlockExecutionUnits[steps]*)`
against the total block diffusion
1167 target of 3s with 95% block
propagation within 5s. The limit
on maximum
1168 block size may be increased in
the future if this is supported
by
1169 benchmarking and monitoring
results
1170
1171 `#### **Transaction Size
(maxTxSize)**`
1172
1173 The maximum size of a
transaction, in bytes.
1174
1175 `##### **GUARDRAILS**`
1176
1177 MTS-01 (y) `*maxTxSize*` must not
exceed 32,768 bytes (32KB)
1178
1179 MTS-02 (y) `*maxTxSize*` must not
be negative
1180
1181 MTS-03 (`\~` – no access to existing
parameter values) `*maxTxSize*`
must
1182 not be decreased
1183
1184 MTS-04 (`\~` – no access to existing
parameter values) `*maxTxSize*`
must
1185 not exceed `*maxBlockBodySize*`
1186
1187 MTS-05 (x – `"should"`) `*maxTxSize*`
should not be increased by more
than
1188 2,560 bytes (2.5KB) in any epoch,
and preferably should be
increased by
1189 2,048 bytes (2KB) or less per
epoch

1220

1221 MTS-06 (x - `\\"should\\"`)
maxTxSize should not exceed 1/4
of the block

1222 size

1223

1224 ##### **Memory Unit Limits
(maxBlockExecutionUnits\
[memory\], maxTxExecutionUnits\
[memory\])**

1225

1226 The limit on the maximum number
of memory units that can be used
by

1227 Plutus scripts, either per-
transaction or per-block.

1228

1229 ##### **GUARDRAILS**

1230

1231 MTEU-M-01 (y)
maxTxExecutionUnits\[memory\]
must not exceed 40,000,000

1232 units

1233

1234 MTEU-M-02 (y)
maxTxExecutionUnits\[memory\]
must not be negative

1235

1236 MTEU-M-03 (`\~` - no access to
existing parameter values)

1237 *maxTxExecutionUnits\[memory\]*
must not be decreased

1238

1239 MTEU-M-04 (x - `\\"should\\"`)
maxTxExecutionUnits\[memory\]
should not be

1240 increased by more than 2,500,000
units in any epoch

1241

1242 MBEU-M-01 (y)
*maxBlockExecutionUnits\
[memory\]* must not exceed

1243 120,000,000 units

1244

1245 MBEU-M-02 (y)
*maxBlockExecutionUnits\
[memory\]*

1190

1191 MTS-06 (x - `"should"`) *maxTxSize*
should not exceed 1/4 of the
block

1192 size

1193

1194 ##### **Memory Unit Limits
(maxBlockExecutionUnits[memory],
maxTxExecutionUnits[memory])**

1195

1196 The limit on the maximum number
of memory units that can be used
by

1197 Plutus scripts, either per-
transaction or per-block.

1198

1199 ##### **GUARDRAILS**

1200

1201 MTEU-M-01 (y)
maxTxExecutionUnits[memory]
must not exceed 40,000,000

1202 units

1203

1204 MTEU-M-02 (y)
maxTxExecutionUnits[memory]
must not be negative

1205

1206 MTEU-M-03 (`\~` - no access to
existing parameter values)

1207 *maxTxExecutionUnits[memory]*
must not be decreased

1208

1209 MTEU-M-04 (x - `"should"`)
maxTxExecutionUnits[memory]
should not be

1210 increased by more than 2,500,000
units in any epoch

1211

1212 MBEU-M-01 (y)
maxBlockExecutionUnits[memory]
must not exceed

1213 120,000,000 units

1214

1215 MBEU-M-02 (y)
maxBlockExecutionUnits[memory]

[memory\]* must not be negative

1246

1247 MBEU-M-03 (x - \"should\")
*maxBlockExecutionUnits\
[memory\]* should not

1248 be changed (increased or
decreased) by more than
10,000,000 units in ANY

1249 epoch

1250

1251 MBEU-M-04a (x - unquantifiable)
The impact of any change to
1252 *maxBlockExecutionUnits\
[memory\]* must be confirmed by
detailed

1253 benchmarking/simulation and not
exceed the requirements of the
block

1254 diffusion/propagation time
budgets, as also impacted by

1255 *maxBlockExecutionUnits\[steps\]*
and *maxBlockBodySize*. Any
increase

1256 must also consider previously
agreed future requirements for
the total

1257 block size (*maxBlockBodySize*)
measured against the total block
1258 diffusion target of 3s with 95%
block propagation within 5s.
Future

1259 Plutus performance improvements
may allow the per-block memory
limit to

1260 be increased, but must be
balanced against the overall
diffusion limits

1261 as specified in the previous
sentence, and future requirements

1262

1263 MEU-M-01 (~ - no access to
existing parameter values)
1264 *maxBlockExecutionUnits\
[memory\]* must not be less than
1265 *maxTxExecutionUnits\[memory\]*

1266

1267 ##### **CPU Unit Limits
(maxBlockExecutionUnits\[steps\],

must not be negative

1216

1217 MBEU-M-03 (x - "should")
maxBlockExecutionUnits[memory]
should not

1218 be changed (increased or
decreased) by more than
10,000,000 units in ANY

1219 epoch

1220

1221 MBEU-M-04a (x - "unquantifiable")
The impact of any change to
1222 *maxBlockExecutionUnits[memory]*
must be confirmed by detailed

1223 benchmarking/simulation and not
exceed the requirements of the
block

1224 diffusion/propagation time
budgets, as also impacted by

1225 *maxBlockExecutionUnits\[steps\]*
and *maxBlockBodySize*. Any
increase

1226 must also consider previously
agreed future requirements for
the total

1227 block size (*maxBlockBodySize*)
measured against the total block
1228 diffusion target of 3s with 95%
block propagation within 5s.
Future

1229 Plutus performance improvements
may allow the per-block memory
limit to

1230 be increased, but must be
balanced against the overall
diffusion limits

1231 as specified in the previous
sentence, and future requirements

1232

1233 MEU-M-01 (~ - no access to
existing parameter values)
1234 *maxBlockExecutionUnits[memory]*
must not be less than
1235 *maxTxExecutionUnits[memory]*

1236

1237 ##### **CPU Unit Limits
(maxBlockExecutionUnits\[steps\],

`maxTxExecutionUnits\[steps\])*`

1268

1269 The limit on the maximum number
of CPU steps that can be used by
Plutus

1270 scripts, either per transaction
or per-block.

1271

1272 ##### **GUARDRAILS**

1273

1274 MTEU-S-01 (y)

`*maxTxExecutionUnits\[steps\]*`
must not exceed

1275 15,000,000,000 (15Bn) units

1276

1277 MTEU-S-02 (y)

`*maxTxExecutionUnits\[steps\]*`
must not be negative

1278

1279 MTEU-S-03 (~ - no access to
existing parameter values)

1280 `*maxTxExecutionUnits\[steps\]*`
must not be decreased

1281

1282 MTEU-S-04 (x - "should")

`*maxTxExecutionUnits\[steps\]*`
should not be

1283 increased by more than
500,000,000 (500M) units in any
epoch (5 days)

1284

1285 MBEU-S-01 (y)

`*maxBlockExecutionUnits\[steps\]*`
must not exceed

1286 40,000,000,000 (40Bn) units

1287

1288 MBEU-S-02 (y)

`*maxBlockExecutionUnits\[steps\]*`
must not be negative

1289

1290 MBEU-S-03 (x - "should")

`*maxBlockExecutionUnits\[steps\]*`
should not

1291 be changed (increased or
decreased) by more than
2,000,000,000 (2Bn)

`maxTxExecutionUnits[steps])*`

1238

1239 The limit on the maximum number
of CPU steps that can be used by
Plutus

1240 scripts, either per transaction
or per-block.

1241

1242 ##### **GUARDRAILS**

1243

1244 MTEU-S-01 (y)

`*maxTxExecutionUnits[steps]*` must
not exceed

1245 15,000,000,000 (15Bn) units

1246

1247 MTEU-S-02 (y)

`*maxTxExecutionUnits[steps]*` must
not be negative

1248

1249 MTEU-S-03 (~ - no access to
existing parameter values)

1250 `*maxTxExecutionUnits[steps]*` must
not be decreased

1251

1252 MTEU-S-04 (x - "should")

`*maxTxExecutionUnits[steps]*`
should not be

1253 increased by more than
500,000,000 (500M) units in any
epoch (5 days)

1254

1255 MBEU-S-01 (y)

`*maxBlockExecutionUnits[steps]*`
must not exceed

1256 40,000,000,000 (40Bn) units

1257

1258 MBEU-S-02 (y)

`*maxBlockExecutionUnits[steps]*`
must not be negative

1259

1260 MBEU-S-03 (x - "should")

`*maxBlockExecutionUnits[steps]*`
should not

1261 be changed (increased or
decreased) by more than
2,000,000,000 (2Bn)

1292 units in any epoch (5 days)
1293
1294 MBEU-S-04a (x - unquantifiable)
The impact of the change to
1295 *maxBlockExecutionUnits\[steps\]*
must be confirmed by detailed
1296 benchmarking/simulation and not
exceed the requirements of the
block
1297 diffusion/propagation time
budgets, as also impacted by
1298 *maxBlockExecutionUnits\
[memory]\]* and
maxBlockBodySize. Any increase
1299 must also consider previously
identified future requirements
for the
1300 total block size
(*maxBlockBodySize*) measured
against the total block
1301 diffusion target of 3s with 95%
block propagation within 5s.
Future
1302 Plutus performance improvements
may allow the per-block step
limit to be
1303 increased, but must be balanced
against the overall diffusion
limits as
1304 specified in the previous
sentence, and future requirements
1305
1306 MEU-S-01 (\~ - no access to
existing parameter values)
1307 *maxBlockExecutionUnits\[steps\]*
must not be less than
1308 *maxTxExecutionUnits\[steps\]*
1309
1310 ##### **Block Header Size
(maxBlockHeaderSize)**
1311
1312 The size of the block header.
1313
1314 ##### **GUARDRAILS**
1315
1316 MBHS-01 (y) *maxBlockHeaderSize*
must not exceed 5,000 Bytes
1317

1262 units in any epoch (5 days)
1263
1264 MBEU-S-04a (x - "unquantifiable")
The impact of the change to
1265 *maxBlockExecutionUnits[steps]*
must be confirmed by detailed
1266 benchmarking/simulation and not
exceed the requirements of the
block
1267 diffusion/propagation time
budgets, as also impacted by
1268 *maxBlockExecutionUnits[memory]*
and *maxBlockBodySize*. Any
increase
1269 must also consider previously
identified future requirements
for the
1270 total block size
(*maxBlockBodySize*) measured
against the total block
1271 diffusion target of 3s with 95%
block propagation within 5s.
Future
1272 Plutus performance improvements
may allow the per-block step
limit to be
1273 increased, but must be balanced
against the overall diffusion
limits as
1274 specified in the previous
sentence, and future requirements
1275
1276 MEU-S-01 (~ - no access to
existing parameter values)
1277 *maxBlockExecutionUnits[steps]*
must not be less than
1278 *maxTxExecutionUnits[steps]*
1279
1280 ##### **Block Header Size
(maxBlockHeaderSize)**
1281
1282 The size of the block header.
1283
1284 ##### **GUARDRAILS**
1285
1286 MBHS-01 (y) *maxBlockHeaderSize*
must not exceed 5,000 bytes
1287

1318 MBHS-02 (y) *maxBlockHeaderSize*
must not be negative
1319
1320 MBHS-03 (x - \"largest valid
header\" is subject to change)
1321 *maxBlockHeaderSize* must be
large enough for the largest
valid header
1322
1323 MBHS-04 (x - \"should\")
maxBlockHeaderSize should only
normally be
1324 increased if the protocol changes
1325
1326 MBHS-05 (x - \"should\")
maxBlockHeaderSize should be
within TCP's
1327 initial congestion window (3 or
10 MTUs)
1328
1329 ### **2.4. Technical/Security
Parameters**
1330
1331 The overall goals when managing
the technical/security parameters
are:
1332
1333 1. Ensure the security of the
Cardano Blockchain network in
terms of
1334 decentralization and
protection against adversarial
actions
1335
1336 2. Enable changes to the Plutus
language
1337
1338 ##### **Triggers for Change**
1339
1340 1. Changes in the number of
active SP0s
1341
1342 2. Changes to the Plutus
language
1343
1344 3. Security threats
1345
1346 4. Cardano Community requests
1347
1348 ##### **Counter-indicators**

1288 MBHS-02 (y) *maxBlockHeaderSize*
must not be negative
1289
1290 MBHS-03 (x - largest valid header
is subject to change)
1291 *maxBlockHeaderSize* must be
large enough for the largest
valid header
1292
1293 MBHS-04 (x - \"should\")
maxBlockHeaderSize should only
normally be
1294 increased if the protocol changes
1295
1296 MBHS-05 (x - \"should\")
maxBlockHeaderSize should be
within TCP's
1297 initial congestion window (3 or
10 MTUs)
1298
1299 ### **2.4. Technical/Security
Parameters**
1300
1301 The overall goals when managing
the technical/security parameters
are:
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1303 1. Ensure the security of the
Cardano Blockchain network in
terms of
1304 decentralization and
protection against adversarial
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1305
1306 2. Enable changes to the Plutus
language
1307
1308 ##### **Triggers for Change**
1309
1310 1. Changes in the number of
active SP0s
1311
1312 2. Changes to the Plutus
language
1313
1314 3. Security threats
1315
1316 4. Cardano Community requests
1317
1318 ##### **Counter-indicators**

1349
1350 – Economic concerns, e.g. when
changing the number of stake
pools
1351
1352 ##### **Core Metrics**
1353
1354 – Number of stake pools
1355
1356 – Level of decentralization
1357
1358 ##### **Changes to Specific
Technical/Security Parameters**
1359
1360 ##### **Target Number of Stake
Pools (stakePoolTargetNum)**
1361
1362 Sets the target number of stake
pools
1363
1364 – The expected number of stake
pools when the network is in the
1365 equilibrium state
1366
1367 – Primarily a security
parameter, ensuring
decentralization by stake
1368 pool division/replication
1369
1370 – Has an economic effect as
well as a security effect –
economic
1371 advice based on analysis is
also required when changing this
1372 parameter
1373
1374 – Large changes in this
parameter will trigger mass
redemption
1375 events
1376
1377 ##### **GUARDRAILS**
1378
1379 SPTN-01 (y) *stakePoolTargetNum*
must not be lower than 250
1380
1381 SPTN-02 (y) *stakePoolTargetNum*
must not exceed 2,000
1382
1383 SPTN-03 (y) *stakePoolTargetNum*
must not be negative
1384

1319
1320 – Economic concerns, e.g. when
changing the number of stake
pools
1321
1322 ##### **Core Metrics**
1323
1324 – Number of stake pools
1325
1326 – Level of decentralization
1327
1328 ##### **Changes to Specific
Technical/Security Parameters**
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Pools (stakePoolTargetNum)**
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pools when the network is in the
1335 equilibrium state
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parameter, ensuring
decentralization by stake
1338 pool division/replication
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well as a security effect –
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parameter will trigger mass
redemption
1345 events
1346
1347 ##### **GUARDRAILS**
1348
1349 SPTN-01 (y) *stakePoolTargetNum*
must not be lower than 250
1350
1351 SPTN-02 (y) *stakePoolTargetNum*
must not exceed 2,000
1352
1353 SPTN-03 (y) *stakePoolTargetNum*
must not be negative
1354

1385 SPTN-04 (y) *stakePoolTargetNum*
must not be zero
1386
1387 ##### **Pledge Influence Factor
(poolPledgeInfluence)**
1388
1389 Enables the pledge protection
mechanism
1390
1391 Provides protection against Sybil
attack
1392
1393 – Higher values reward pools
that have more pledge and
penalize pools
1394 that have less pledge
1395
1396 Has an economic effect as well as
technical effect – economic
advice
1397 based on analysis is also
required
1398
1399 ##### **GUARDRAILS**
1400
1401 PPI-01 (y) *poolPledgeInfluence*
must not be lower than 0.1
1402
1403 PPI-02 (y) *poolPledgeInfluence*
must not exceed 1.0
1404
1405 PPI-03 (y) *poolPledgeInfluence*
must not be negative
1406
1407 PPI-04 (x – "should")
poolPledgeInfluence should not
vary by more
1408 than +/- 10% in any 18-epoch
period (approximately 3 months)
1409
1410 ##### **Pool Retirement Window
(poolRetireMaxEpoch)**
1411
1412 Defines the maximum number of
epochs notice that a pool can
give when
1413 planning to retire
1414
1415 ##### **GUARDRAILS**
1416

1355 SPTN-04 (y) *stakePoolTargetNum*
must not be zero
1356
1357 ##### **Pledge Influence Factor
(poolPledgeInfluence)**
1358
1359 Enables the pledge protection
mechanism
1360
1361 Provides protection against Sybil
attack
1362
1363 – Higher values reward pools
that have more pledge and
penalize pools
1364 that have less pledge
1365
1366 Has an economic effect as well as
technical effect – economic
advice
1367 based on analysis is also
required
1368
1369 ##### **GUARDRAILS**
1370
1371 PPI-01 (y) *poolPledgeInfluence*
must not be lower than 0.1
1372
1373 PPI-02 (y) *poolPledgeInfluence*
must not exceed 1.0
1374
1375 PPI-03 (y) *poolPledgeInfluence*
must not be negative
1376
1377 PPI-04 (x – "should")
poolPledgeInfluence should not
vary by more
1378 than +/- 10% in any 18-epoch
period (approximately 3 months)
1379
1380 ##### **Pool Retirement Window
(poolRetireMaxEpoch)**
1381
1382 Defines the maximum number of
epochs notice that a pool can
give when
1383 planning to retire
1384
1385 ##### **GUARDRAILS**
1386

1417 PRME-01 (y) *poolRetireMaxEpoch*
must not be negative
1418
1419 PRME-02 (x - \"should\")
poolRetireMaxEpoch should not
be lower than 1
1420
1421 ##### **Collateral Percentage
(collateralPercentage)**
1422
1423 Defines how much collateral must
be provided when executing a
Plutus
1424 script as a percentage of the
normal execution cost
1425
1426 - Collateral is additional to
fee payments
1427
1428 - If a script fails to execute,
then the collateral is lost
1429
1430 - The collateral is never lost
if a script executes successfully
1431
1432 Provides security against low-
cost attacks by making it more
expensive
1433 rather than less expensive to
execute failed scripts
1434
1435 ##### **GUARDRAILS**
1436
1437 CP-01 (y) *collateralPercentage*
must not be lower than 100
1438
1439 CP-02 (y) *collateralPercentage*
must not exceed 200
1440
1441 CP-03 (y) *collateralPercentage*
must not be negative
1442
1443 CP-04 (y) *collateralPercentage*
must not be zero
1444
1445 ##### **Maximum number of
collateral inputs
(maxCollateralInputs)**
1446
1447 Defines the maximum number of
inputs that can be used for

1387 PRME-01 (y) *poolRetireMaxEpoch*
must not be negative
1388
1389 PRME-02 (x - \"should\")
poolRetireMaxEpoch should not
be lower than 1
1390
1391 ##### **Collateral Percentage
(collateralPercentage)**
1392
1393 Defines how much collateral must
be provided when executing a
Plutus
1394 script as a percentage of the
normal execution cost
1395
1396 - Collateral is additional to
fee payments
1397
1398 - If a script fails to execute,
then the collateral is lost
1399
1400 - The collateral is never lost
if a script executes successfully
1401
1402 Provides security against low-
cost attacks by making it more
expensive
1403 rather than less expensive to
execute failed scripts
1404
1405 ##### **GUARDRAILS**
1406
1407 CP-01 (y) *collateralPercentage*
must not be lower than 100
1408
1409 CP-02 (y) *collateralPercentage*
must not exceed 200
1410
1411 CP-03 (y) *collateralPercentage*
must not be negative
1412
1413 CP-04 (y) *collateralPercentage*
must not be zero
1414
1415 ##### **Maximum number of
collateral inputs
(maxCollateralInputs)**
1416
1417 Defines the maximum number of
inputs that can be used for

collateral
1448 when executing a Plutus script
1449
1450 ##### **GUARDRAILS**
1451
1452 MCI-01 (y) *maxCollateralInputs*
must not be lower than 1
1453
1454 ##### **Maximum Value Size
(maxValueSize)**
1455
1456 The limit on the serialized size
of the Value in each output.
1457
1458 ##### **GUARDRAILS**
1459
1460 MVS-01 (y) *maxValueSize* must
not exceed 12,288 Bytes (12KB)
1461
1462 MVS-02 (y) *maxValueSize* must
not be negative
1463
1464 MVS-03 (\~ - no access to
existing parameter values)
maxValueSize must
1465 be less than *maxTxSize*
1466
1467 MVS-04 (\~ - no access to
existing parameter values)
maxValueSize must
1468 not be reduced
1469
1470 MVS-05 (x - \"sensible output\"
is subject to interpretation)
1471 *maxValueSize* must be large
enough to allow sensible outputs
(e.g. any
1472 existing on-chain output or
anticipated outputs that could be
produced
1473 by new ledger rules)
1474
1475 ##### **Plutus Cost Models
(costModels)**
1476
1477 Define the base costs for each
Plutus primitive in terms of CPU
and
1478 memory units

collateral
1418 when executing a Plutus script
1419
1420 ##### **GUARDRAILS**
1421
1422 MCI-01 (y) *maxCollateralInputs*
must not be lower than 1
1423
1424 ##### **Maximum Value Size
(maxValueSize)**
1425
1426 The limit on the serialized size
of the Value in each output.
1427
1428 ##### **GUARDRAILS**
1429
1430 MVS-01 (y) *maxValueSize* must
not exceed 12,288 bytes (12KB)
1431
1432 MVS-02 (y) *maxValueSize* must
not be negative
1433
1434 MVS-03 (~ - no access to existing
parameter values) *maxValueSize*
must
1435 be less than *maxTxSize*
1436
1437 MVS-04 (~ - no access to existing
parameter values) *maxValueSize*
must
1438 not be reduced
1439
1440 MVS-05 (x - sensible output is
subject to interpretation)
1441 *maxValueSize* must be large
enough to allow sensible outputs
(e.g. any
1442 existing on-chain output or
anticipated outputs that could be
produced
1443 by new ledger rules)
1444
1445 ##### **Plutus Cost Models
(costModels)**
1446
1447 Define the base costs for each
Plutus primitive in terms of CPU
and
1448 memory units

1479
1480 A different cost model is
required for each Plutus version.
Each cost
1481 model comprises many distinct
cost model values. Cost models
are defined
1482 for each Plutus language version.
A new language version may
introduce
1483 additional cost model values or
remove existing cost model
values.
1484
1485 ##### **GUARDRAILS**
1486
1487 PCM-01 (x - unquantifiable) *Cost
model* values must be set by
1488 benchmarking on a reference
architecture
1489
1490 PCM-02 (x - primitives and
language versions aren't
introduced in
1491 transactions) The *cost model*
must be updated if new primitives
are
1492 introduced or a new Plutus
language version is added
1493
1494 PCM-03a (\~ - no access to
Plutus cost model parameters)
Cost model
1495 values should not normally be
negative. Negative values must be
1496 justified against the underlying
cost model for the associated
1497 primitives
1498
1499 PCM-04 (\~ - no access to *Plutus
cost model* parameters) A *cost
model*
1500 must be supplied for each Plutus
language version that the
protocol
1501 supports
1502

1449
1450 A different cost model is
required for each Plutus version.
Each cost
1451 model comprises many distinct
cost model values. Cost models
are defined
1452 for each Plutus language version.
A new language version may
introduce
1453 additional cost model values or
remove existing cost model
values.
1454
1455 ##### **GUARDRAILS**
1456
1457 PCM-01 (x - "unquantifiable")
Cost model values must be set
by
1458 benchmarking on a reference
architecture
1459
1460 PCM-02 (x - primitives and
language versions aren't
introduced in
1461 transactions) The *cost model*
must be updated if new primitives
are
1462 introduced or a new Plutus
language version is added
1463
1464 PCM-03a (~ - no access to *Plutus
cost model* parameters) *Cost
model*
1465 values should not normally be
negative. Negative values must be
1466 justified against the underlying
cost model for the associated
1467 primitives
1468
1469 PCM-04 (~ - no access to *Plutus
cost model* parameters) A *cost
model*
1470 must be supplied for each Plutus
language version that the
protocol
1471 supports
1472

1503 ### **2.5. Governance
Parameters**
1504
1505 The overall goals when managing
the governance parameters are to:
1506
1507 1. Ensure governance stability
1508
1509 2. Maintain a representative
form of governance
1510
1511 ##### **Triggers for Change**
1512
1513 Changes to governance parameters
may be triggered by:
1514
1515 1. Cardano Community requests
1516
1517 2. Regulatory requirements
1518
1519 3. Unexpected or unwanted
governance outcomes
1520
1521 4. Entering a state of no
confidence
1522
1523 ##### **Counter-indicators**
1524
1525 Changes may need to be reversed
and/or should not be enacted in
the
1526 event of:
1527
1528 – Unexpected effects on
governance
1529
1530 – Excessive Layer 1 load due to
on-chain voting or excessive
numbers
1531 of governance actions
1532
1533 ##### **Core Metrics**
1534
1535 All decisions on parameter
changes should be informed by:
1536
1537 – Governance participation
levels
1538
1539 – Governance behaviors and
patterns
1540

1473 ### **2.5. Governance
Parameters**
1474
1475 The overall goals when managing
the governance parameters are to:
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1479 2. Maintain a representative
form of governance
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may be triggered by:
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1488
1489 3. Unexpected or unwanted
governance outcomes
1490
1491 4. Entering a state of no
confidence
1492
1493 ##### **Counter-indicators**
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1495 Changes may need to be reversed
and/or should not be enacted in
the
1496 event of:
1497
1498 – Unexpected effects on
governance
1499
1500 – Excessive Layer 1 load due to
on-chain voting or excessive
numbers
1501 of governance actions
1502
1503 ##### **Core Metrics**
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changes should be informed by:
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1507 – Governance participation
levels
1508
1509 – Governance behaviors and
patterns
1510

1541 – Regulatory considerations
1542
1543 – Confidence in the governance
system
1544
1545 – The effectiveness of the
governance system in managing
necessary
1546 change
1547
1548 ##### **Changes to Specific
Governance Parameters**
1549
1550 ##### **Deposit for Governance
Actions (govDeposit)**
1551
1552 The deposit that is charged when
submitting a governance action.
1553
1554 – Helps to limit the number of
actions that are submitted
1555
1556 ##### **GUARDRAILS**
1557
1558 GD-01 (y) *govDeposit* must not
be negative
1559
1560 GD-02 (y) *govDeposit* must not
be lower than 1,000,000 (1 ada)
1561
1562 GD-03a (y) *govDeposit* must not
exceed 10,000,000,000,000 (10
million
1563 ada)
1564
1565 GD-04 (x – \"should\")
govDeposit should be adjusted
in line with fiat
1566 changes
1567
1568 ##### **Deposit for DReps
(dRepDeposit)**
1569
1570 The deposit that is charged when
registering a DRep.
1571
1572 – Helps to limit the number of
active DReps
1573
1574 ##### **GUARDRAILS**
1575

1511 – Regulatory considerations
1512
1513 – Confidence in the governance
system
1514
1515 – The effectiveness of the
governance system in managing
necessary
1516 change
1517
1518 ##### **Changes to Specific
Governance Parameters**
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1520 ##### **Deposit for Governance
Actions (govDeposit)**
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1522 The deposit that is charged when
submitting a governance action.
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1524 – Helps to limit the number of
actions that are submitted
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1526 ##### **GUARDRAILS**
1527
1528 GD-01 (y) *govDeposit* must not
be negative
1529
1530 GD-02 (y) *govDeposit* must not
be lower than 1,000,000 (1 ada)
1531
1532 GD-03a (y) *govDeposit* must not
exceed 10,000,000,000,000 (10
million
1533 ada)
1534
1535 GD-04 (x – \"should\") *govDeposit*
should be adjusted in line with
fiat
1536 changes
1537
1538 ##### **Deposit for DReps
(dRepDeposit)**
1539
1540 The deposit that is charged when
registering a DRep.
1541
1542 – Helps to limit the number of
active DReps
1543
1544 ##### **GUARDRAILS**
1545

1576 DRD-01 (y) *dRepDeposit* must not
be negative

1577

1578 DRD-02 (y) *dRepDeposit* must not
be lower than 1,000,000 (1 ada)

1579

1580 DRD-03 (y) *dRepDeposit* must not
exceed 100,000,000,000 (100,000
ada)

1581

1582 DRD-04 (x - \"should\")
dRepDeposit should be adjusted
in line with

1583 fiat changes

1584

1585 ##### **DRep Activity Period
(dRepActivity)**

1586

1587 The period (as a whole number of
epochs) after which a DRep is
1588 considered to be inactive for
vote calculation purposes, if
they do not
1589 vote on any proposal.

1590

1591 ##### **GUARDRAILS**

1592

1593 DRA-01 (y) *dRepActivity* must
not be lower than 13 epochs (65
days)

1594

1595 DRA-02 (y) *dRepActivity* must
not exceed 37 epochs (185 days)

1596

1597 DRA-03 (y) *dRepActivity* must
not be negative

1598

1599 DRA-04 (~ - no access to
existing parameter values)
dRepActivity must

1600 be greater than
govActionLifetime

1601

1602 DRA-05 (x - \"should\")
dRepActivity should be
calculated in human
1603 terms (60 days etc)

1604

1546 DRD-01 (y) *dRepDeposit* must not
be negative

1547

1548 DRD-02 (y) *dRepDeposit* must not
be lower than 1,000,000 (1 ada)

1549

1550 DRD-03 (y) *dRepDeposit* must not
exceed 100,000,000,000 (100,000
ada)

1551

1552 DRD-04 (x - \"should\")
dRepDeposit should be adjusted
in line with

1553 fiat changes

1554

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(dRepActivity)**

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1557 The period (as a whole number of
epochs) after which a DRep is
1558 considered to be inactive for
vote calculation purposes, if
they do not
1559 vote on any proposal.

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1562

1563 DRA-01 (y) *dRepActivity* must
not be lower than 13 epochs (65
days)

1564

1565 DRA-02 (y) *dRepActivity* must
not exceed 37 epochs (185 days)

1566

1567 DRA-03 (y) *dRepActivity* must
not be negative

1568

1569 DRA-04 (~ - no access to existing
parameter values) *dRepActivity*
must

1570 be greater than
govActionLifetime

1571

1572 DRA-05 (x - \"should\")
dRepActivity should be
calculated in human
1573 terms (60 days, etc.)

1574

1605 ##### **DRep and SP0 Governance
Action Thresholds
(dRepVotingThresholds\
[\...\],poolVotingThresholds\
[\...\])**

1606

1607 Thresholds on the active voting
stake that is required to ratify
a

1608 specific type of governance
action by either DReps or SP0s.

1609

1610 – Ensures legitimacy of the
action

1611

1612 The threshold parameters are
listed below:

1613

1614 *dRepVotingThresholds*:

1615

1616 – *dvtCommitteeNoConfidence*

1617

1618 – *dvtCommitteeNormal*

1619

1620 – *dvtHardForkInitiation*

1621

1622 – *dvtMotionNoConfidence*

1623

1624 – *dvtPPEconomicGroup*

1625

1626 – *dvtPPGovGroup*

1627

1628 – *dvtPPNetworkGroup*

1629

1630 – *dvtPPTechnicalGroup*

1631

1632 – *dvtTreasuryWithdrawal*

1633

1634 – *dvtUpdateToConstitution*

1635

1636 *poolVotingThresholds*:

1637

1638 – *pvtCommitteeNoConfidence*

1639

1640 – *pvtCommitteeNormal*

1641

1642 – *pvtHardForkInitiation*

1643

1644 – *pvtMotionNoConfidence*

1645

1646 – *pvtPPSecurityGroup*

1647

1575 ##### **DRep and SP0 Governance
Action Thresholds
(dRepVotingThresholds[...],poolVo
tingThresholds[...])**

1576

1577 Thresholds on the active voting
stake that is required to ratify
a

1578 specific type of governance
action by either DReps or SP0s.

1579

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action

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listed below:

1583

1584 *dRepVotingThresholds*:

1585

1586 – *dvtCommitteeNoConfidence*

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1589

1590 – *dvtHardForkInitiation*

1591

1592 – *dvtMotionNoConfidence*

1593

1594 – *dvtPPEconomicGroup*

1595

1596 – *dvtPPGovGroup*

1597

1598 – *dvtPPNetworkGroup*

1599

1600 – *dvtPPTechnicalGroup*

1601

1602 – *dvtTreasuryWithdrawal*

1603

1604 – *dvtUpdateToConstitution*

1605

1606 *poolVotingThresholds*:

1607

1608 – *pvtCommitteeNoConfidence*

1609

1610 – *pvtCommitteeNormal*

1611

1612 – *pvtHardForkInitiation*

1613

1614 – *pvtMotionNoConfidence*

1615

1616 – *pvtPPSecurityGroup*

1617

1648 ##### **GUARDRAILS**
1649
1650 VT-GEN-01 (y) All thresholds must
be greater than 50% and less than
or
1651 equal to 100%
1652
1653 VT-GEN-02a (y) Economic, network
and technical/security parameter
1654 thresholds must be in the range
51%–75%
1655
1656 VT-GEN-03 (y) Governance
parameter thresholds must be in
the range
1657 75%–90%
1658
1659 VT-HF-01 (y) \"Hard Fork
Initiation\" action thresholds
must be in the
1660 range 51%–80%
1661
1662 VT-CON-01 (y) \"New Constitution\"
action thresholds must be in the
range
1663 65%–90%
1664
1665 VT-CC-01 (y) \"Update Committee\"
action thresholds must be in the
range
1666 51%–90%
1667
1668 VT-NC-01 (y) \"No Confidence\"
action thresholds must be in the
range
1669 51%–75%
1670
1671 ##### **Governance Action Lifetime
(govActionLifetime)**
1672
1673 The period after which a
governance action will expire if
it is not
1674 enacted – as a whole number of
epochs
1675
1676 ##### **GUARDRAILS**
1677
1678 GAL-01 (y) *govActionLifetime*
must not be lower than 1 epoch (5
days)

1618 ##### **GUARDRAILS**
1619
1620 VT-GEN-01 (y) All thresholds must
be greater than 50% and less than
or
1621 equal to 100%
1622
1623 VT-GEN-02a (y) Economic, network
and technical/security parameter
1624 thresholds must be in the range
51%–75%
1625
1626 VT-GEN-03 (y) Governance
parameter thresholds must be in
the range
1627 75%–90%
1628
1629 VT-HF-01 (y) \"Hard Fork
Initiation\" action thresholds
must be in the
1630 range 51%–80%
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range
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action thresholds must be in the
range
1636 51%–90%
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action thresholds must be in the
range
1639 51%–75%
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1641 ##### **Governance Action Lifetime
(govActionLifetime)**
1642
1643 The period after which a
governance action will expire if
it is not
1644 enacted – as a whole number of
epochs
1645
1646 ##### **GUARDRAILS**
1647
1648 GAL-01 (y) *govActionLifetime*
must not be lower than 1 epoch (5
days)

1679

1680 GAL-03 (x - `\\"should\\"`)
govActionLifetime should not be
lower than 2

1681 epochs (10 days)

1682

1683 GAL-02 (y) *govActionLifetime*
must not exceed 15 epochs (75
days)

1684

1685 GAL-04 (x - `\\"should\\"`)
govActionLifetime should be
calibrated in
1686 human terms (eg 30 days, two
weeks), to allow sufficient time
for voting

1687 etc. to take place

1688

1689 GAL-05 (`\~` - no access to
existing parameter values)
govActionLifetime

1690 must be less than *dRepActivity*

1691

1692 ##### **Maximum Constitutional
Committee Term
(committeeMaxTermLength)**

1693

1694 The limit on the maximum term
length that a committee member
may serve

1695

1696 ##### **GUARDRAILS**

1697

1698 CMTL-01a (y)
committeeMaxTermLength must not
be zero

1699

1700 CMTL-02a (y)
committeeMaxTermLength must not
be negative

1701

1702 CMTL-03a (y)
committeeMaxTermLength must not
be lower than 18 epochs

1703 (90 days, or approximately 3
months)

1704

1705 CMTL-04a (y)
committeeMaxTermLength must not
exceed 293 epochs

1649

1650 GAL-03 (x - `"should"`)
govActionLifetime should not be
lower than 2

1651 epochs (10 days)

1652

1653 GAL-02 (y) *govActionLifetime*
must not exceed 15 epochs (75
days)

1654

1655 GAL-04 (x - `"should"`)
govActionLifetime should be
calibrated in
1656 human terms (e.g., 30 days, two
weeks), to allow sufficient time
for voting

1657 etc. to take place

1658

1659 GAL-05 (`\~` - no access to existing
parameter values)
govActionLifetime

1660 must be less than *dRepActivity*

1661

1662 ##### **Maximum Constitutional
Committee Term
(committeeMaxTermLength)**

1663

1664 The limit on the maximum term
length that a committee member
may serve

1665

1666 ##### **GUARDRAILS**

1667

1668 CMTL-01a (y)
committeeMaxTermLength must not
be zero

1669

1670 CMTL-02a (y)
committeeMaxTermLength must not
be negative

1671

1672 CMTL-03a (y)
committeeMaxTermLength must not
be lower than 18 epochs

1673 (90 days, or approximately 3
months)

1674

1675 CMTL-04a (y)
committeeMaxTermLength must not
exceed 293 epochs

1706 (approximately 4 years)
1707
1708 CMTL-05a (x - \"should\")
committeeMaxTermLength should
not exceed 220
1709 epochs (approximately 3 years)
1710
1711 ##### **The minimum size of the
Constitutional Committee
(committeeMinSize)**
1712
1713 The least number of members that
can be included in a
Constitutional
1714 Committee following a governance
action to change the
Constitutional
1715 Committee.
1716
1717 ##### **GUARDRAILS**
1718
1719 CMS-01 (y) *committeeMinSize*
must not be negative
1720
1721 CMS-02 (y) *committeeMinSize*
must not be lower than 3
1722
1723 CMS-03 (y) *committeeMinSize*
must not exceed 10
1724
1725 ### **2.6. Monitoring and
Reversion of Parameter Changes**
1726
1727 All network parameter changes
must be monitored carefully for
no less
1728 than 2 epochs (10 days)
1729
1730 – Changes must be reverted as
soon as possible if block
propagation
1731 delays exceed 4.5s for more
than 5% of blocks over any 6 hour
1732 rolling window
1733
1734 All other parameter changes
should be monitored
1735
1736 – The reversion plan should be
implemented if the overall effect
on

1676 (approximately 4 years)
1677
1678 CMTL-05a (x - "should")
committeeMaxTermLength should
not exceed 220
1679 epochs (approximately 3 years)
1680
1681 ##### **The minimum size of the
Constitutional Committee
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1682
1683 The least number of members that
can be included in a
Constitutional
1684 Committee following a governance
action to change the
Constitutional
1685 Committee.
1686
1687 ##### **GUARDRAILS**
1688
1689 CMS-01 (y) *committeeMinSize*
must not be negative
1690
1691 CMS-02 (y) *committeeMinSize*
must not be lower than 3
1692
1693 CMS-03 (y) *committeeMinSize*
must not exceed 10
1694
1695 ### **2.6. Monitoring and
Reversion of Parameter Changes**
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1697 All network parameter changes
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1698 than 2 epochs (10 days)
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1700 – Changes must be reverted as
soon as possible if block
propagation
1701 delays exceed 4.5s for more
than 5% of blocks over any 6 hour
1702 rolling window
1703
1704 All other parameter changes
should be monitored
1705
1706 – The reversion plan should be
implemented if the overall effect
on

1737 performance, security,
functionality or long-term
sustainability

1738 is unacceptable.

1739

1740 A specific reversion/recovery
plan must be produced for each
parameter

1741 change. This plan must include:

1742

1743 – Which parameters need to
change and in which ways in order
to return

1744 to the previous state (or a
similar state)

1745

1746 – How to recover the network in
the event of disastrous failure

1747

1748 This plan should be followed if
problems are observed following
the

1749 parameter change. Note that not
all changes can be reverted.
Additional

1750 care must be taken when making
changes to these parameters.

1751

1752 ***** **2.7. Non-Updatable Protocol
Parameters****

1753

1754 Some fundamental protocol
parameters cannot be changed by
the

1755 **"Parameter Update"** action.
These parameters can only be
changed in a

1756 new Genesis file as part of a
hard fork. It is not necessary to
provide

1757 specific guardrails on updating
these parameters.

1758

1759 ***** **3. Guardrails and
Guidelines on "Treasury
Withdrawals" Actions****

1760

1761 "Treasury Withdrawals" actions
specify the destination and
amount of a

1707 performance, security,
functionality, or long-term
sustainability

1708 is unacceptable.

1709

1710 A specific reversion/recovery
plan must be produced for each
parameter

1711 change. This plan must include:

1712

1713 – Which parameters need to
change and in which ways in order
to return

1714 to the previous state (or a
similar state)

1715

1716 – How to recover the network in
the event of disastrous failure

1717

1718 This plan should be followed if
problems are observed following
the

1719 parameter change. Note that not
all changes can be reverted.
Additional

1720 care must be taken when making
changes to these parameters.

1721

1722 ***** **2.7. Non-Updatable Protocol
Parameters****

1723

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the

1725 **"Parameter Update"** action. These
parameters can only be changed in
a

1726 new Genesis file as part of a
hard fork. It is not necessary to
provide

1727 specific guardrails on updating
these parameters.

1728

1729 ***** **3. Guardrails and
Guidelines on "Treasury
Withdrawals" Actions****

1730

1731 "Treasury Withdrawals" actions
specify the destination and
amount of a

1762 number of withdrawals from the
Cardano Treasury.
1763
1764 ##### **GUARDRAILS**
1765
1766 TREASURY-01a (x) A Net Change
Limit for the Cardano Treasury's
balance
1767 per period of time must be agreed
by the DReps via an on-chain
1768 governance action with a
threshold of greater than 50% of
the active
1769 voting stake
1770
1771 TREASURY-02a (x) Withdrawals from
the Cardano Blockchain treasury
must
1772 not exceed the Net Change Limit
for the Cardano Treasury's
balance per
1773 period of time
1774
1775 TREASURY-03a (x) Withdrawals from
the Cardano Blockchain treasury
must
1776 be denominated in ada
1777
1778 TREASURY-04a (x) A roadmap that
includes the applicable period of
the
1779 treasury withdrawal must be
approved by the DReps via an Info
Action
1780 with a threshold of greater than
50% of the active voting stake.
1781
1782 ### **4. Guardrails and
Guidelines on "Hard Fork
Initiation" Actions**
1783
1784 The "Hard Fork Initiation"
action requires both a new major
and a new
1785 minor protocol version to be
specified.
1786
1787 – As positive integers
1788

1732 number of withdrawals from the
Cardano Treasury.
1733
1734 ##### **GUARDRAILS**
1735
1736 TREASURY-01a (x) A Net Change
Limit for the Cardano Treasury's
balance
1737 per period of time must be agreed
by the DReps via an on-chain
1738 governance action with a
threshold of greater than 50% of
the active
1739 voting stake
1740
1741 TREASURY-02a (x) Withdrawals from
the Cardano Blockchain treasury
must
1742 not exceed the Net Change Limit
for the Cardano Treasury's
balance per
1743 period of time
1744
1745 TREASURY-03a (x) Withdrawals from
the Cardano Blockchain treasury
must
1746 be denominated in ada
1747
1748 ### **4. Guardrails and
Guidelines on "Hard Fork
Initiation" actions**
1749
1750 The "Hard Fork Initiation" action
requires both a new major and a
new
1751 minor protocol version to be
specified.
1752
1753 – As positive integers
1754

1789 As the result of a hard fork, new
updatable protocol parameters may
be
1790 introduced. Guardrails may be
defined for these parameters,
which will
1791 take effect following the hard
fork. Existing updatable protocol
1792 parameters may also be deprecated
by the hard fork, in which case
the
1793 guardrails become obsolete for
all future changes.
1794
1795 ##### **GUARDRAILS**
1796
1797 **HARDFORK-01** (\~ - no access to
existing parameter values) The
major
1798 protocol version must be the same
as or one greater than the major
1799 version that will be enacted
immediately prior to this change.
If the
1800 major protocol version is one
greater, then the minor protocol
version
1801 must be zero
1802
1803 **HARDFORK-02a** (\~ - no access to
existing parameter values) Unless
the
1804 major protocol version is also
changed, the minor protocol
version must
1805 be greater than the minor version
that will be enacted immediately
prior
1806 to this change
1807
1808 **HARDFORK-03** (\~ - no access to
existing parameter values) At
least one
1809 of the protocol versions (major
or minor or both) must change
1810
1811 **HARDFORK-04a** (x) At least 85% of
stake pools by active stake
should have

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updatable protocol parameters may
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1756 introduced. Guardrails may be
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1758 parameters may also be deprecated
by the hard fork, in which case
the
1759 guardrails become obsolete for
all future changes.
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1761 ##### **GUARDRAILS**
1762
1763 **HARDFORK-01** (~ - no access to
existing parameter values) The
major
1764 protocol version must be the same
as or one greater than the major
1765 version that will be enacted
immediately prior to this change.
If the
1766 major protocol version is one
greater, then the minor protocol
version
1767 must be zero
1768
1769 **HARDFORK-02a** (~ - no access to
existing parameter values) Unless
the
1770 major protocol version is also
changed, the minor protocol
version must
1771 be greater than the minor version
that will be enacted immediately
prior
1772 to this change
1773
1774 **HARDFORK-03** (~ - no access to
existing parameter values) At
least one
1775 of the protocol versions (major
or minor or both) must change
1776
1777 **HARDFORK-04a** (x) At least 85% of
stake pools by active stake
should have

1812 upgraded to a Cardano Blockchain
1813 node version that is capable of
1814 processing the rules associated
1815 with the new protocol version
1816
1817 HARDFORK-05 (x) Any new updatable
1818 protocol parameters that are
1819 introduced with a hard fork must
1820 be included in this Appendix and
1821 suitable guardrails defined for
1822 those parameters
1823
1824 HARDFORK-06 (x) Settings for any
1825 new protocol parameters that are
1826 introduced with a hard fork must
1827 be included in the appropriate
1828 Genesis
1829 file
1830
1831 HARDFORK-07 (x) Any deprecated
1832 protocol parameters must be
1833 indicated in
1834 this Appendix
1835
1836 HARDFORK-08 (~ - no access to
1837 *Plutus cost model* parameters)
1838 New
1839
1840 Plutus versions must be supported
1841 by a version-specific *Plutus
1842 cost
1843 model* that covers each primitive
1844 that is available in the new
1845 Plutus
1846 version
1847
1848 ### **5. Guardrails and
1849 Guidelines on "Update Committee"
1850 actions**
1851
1852 "Update Committee" actions may
1853 change the size, composition or
1854 required
1855 voting thresholds for the
1856 Constitutional Committee.
1857
1858 ##### **GUARDRAILS**
1859
1860 UPDATE-CC-01a (x) "Update
1861 Committee" actions must not be
1862 ratified until

1778 upgraded to a Cardano Blockchain
1779 node version that is capable of
1780 processing the rules associated
1781 with the new protocol version
1782
1783 HARDFORK-05 (x) Any new updatable
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1819 change the size, composition or
1820 required
1821 voting thresholds for the
1822 Constitutional Committee.
1823
1824 ##### **GUARDRAILS**
1825
1826 UPDATE-CC-01a (x) "Update
1827 Committee" actions must not be
1828 ratified until

1839 ada holders have ratified through
an on-chain governance action
this

1840 Constitution

1841

1842 ### **6. Guardrails and
Guidelines on "New Constitution"
actions**

1843

1844 "New Constitution" actions change
the hash of the on-chain
Constitution

1845 and the associated Guardrails
Script.

1846

1847 ##### **GUARDRAILS**

1848

1849 NEW-CONSTITUTION-01a (x) A New
Constitution or Guardrails Script

1850 governance action must be
submitted to define any required
guardrails

1851 for new parameters that are
introduced via a Hard Fork
governance action

1852

1853 NEW-CONSTITUTION-02 (x) If
specified, the new Guardrails
Script must be

1854 consistent with this Constitution

1855

1856 ### **7. Guardrails and
Guidelines on "No Confidence"
actions**

1857

1858 "No Confidence" actions signal a
state of no confidence in the

1859 governance system. No guardrails
are imposed on "No Confidence"
actions.

1860

1861 ##### **GUARDRAILS**

1862

1863 – None

1864

1865 ### **8. Guardrails and
Guidelines on "Info" actions**

1866

1867 "Info" actions are not enacted
on-chain. No guardrails are
imposed on

1805 Ada Holders have ratified through
an on-chain governance action
this

1806 Constitution

1807

1808 ### **6. Guardrails and
Guidelines on "New Constitution"
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the hash of the on-chain
Constitution

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Script.

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Constitution or Guardrails Script

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submitted to define any required
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1817 for new parameters that are
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governance action

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Script must be

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1825 governance system. No guardrails
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1827 ##### **GUARDRAILS**

1828

1829 – None

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Guidelines on "Info" actions**

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1833 "Info" actions are not enacted
on-chain. No guardrails are
imposed on

1868 Info actions.

1869

1870 ##### **GUARDRAILS**

1871

1872 - None

1873

1874 ### **9. List of Protocol
Parameter Groups**

1875

1876 The protocol parameters are
grouped by type, allowing
different

1877 thresholds to be set for each
group.

1878

1879 The network parameter group
consists of:

1880

1881 - *maximum block body size*
(*maxBlockBodySize*)

1882

1883 - *maximum transaction size*
(*maxTxSize*)

1884

1885 - *maximum block header size*
(*maxBlockHeaderSize*)

1886

1887 - *maximum size of a serialized
asset value* (*maxValueSize*)

1888

1889 - *maximum script execution
units in a single transaction*

1890 (*maxTxExecutionUnits\
[steps]\])

1891

1892 - *maximum script execution
units in a single block*

1893 (*maxBlockExecutionUnits\
[steps]\]*)

1894

1895 - *maximum number of collateral
inputs* (*maxCollateralInputs*)

1896

1897 The economic parameter group
consists of:

1898

1899 - *minimum fee coefficient*
(*txFeePerByte*)

1900

1834 "Info" actions.

1835

1836 ##### **GUARDRAILS**

1837

1838 - None

1839

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Parameter Groups**

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(*maxBlockHeaderSize*)

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asset value* (*maxValueSize*)

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units in a single transaction*

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units in a single block*

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inputs* (*maxCollateralInputs*)

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consists of:

1864

1865 - *minimum fee coefficient*
(*txFeePerByte*)

1866

1901 - *minimum fee constant*
 (*txFeeFixed*)
 1902
 1903 - *minimum fee per byte for
 reference scripts*
 1904
 (*minFeeRefScriptCoinsPerByte*)
 1905
 1906 - *delegation key lovelace
 deposit* (*stakeAddressDeposit*)
 1907
 1908 - *pool registration lovelace
 deposit* (*stakePoolDeposit*)
 1909
 1910 - *monetary expansion*
 (*monetaryExpansion*)
 1911
 1912 - *treasury expansion*
 (*treasuryCut*)
 1913
 1914 - *minimum fixed rewards cut
 for pools* (*minPoolCost*)
 1915
 1916 - *minimum lovelace deposit per
 byte of serialized UTx0*
 1917 (*coinsPerUTx0Byte*)
 1918
 1919 - *prices of Plutus execution
 units*
 1920 (*executionUnitPrices\
 [priceSteps/priceMemory]*)
 1921
 1922 The technical/security parameter
 group consists of:
 1923
 1924 - *pool pledge influence*
 (*poolPledgeInfluence*)
 1925
 1926 - *pool retirement maximum
 epoch* (*poolRetireMaxEpoch*)
 1927
 1928 - *desired number of pools*
 (*stakePoolTargetNum*)
 1929
 1930 - *Plutus execution cost
 models* (*costModels*)
 1931
 1932 - *proportion of collateral
 needed for scripts*
 1933 (*collateralPercentage*)

1867 - *minimum fee constant*
 (*txFeeFixed*)
 1868
 1869 - *minimum fee per byte for
 reference scripts*
 1870
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1934
1935 The governance parameter group
consists of:
1936
1937 - *governance voting
thresholds*
(*dRepVotingThresholds\[\...\],
1938 poolVotingThresholds\
[\...\]*)
1939
1940 - *governance action maximum
lifetime in epochs*
(*govActionLifetime*)
1941
1942 - governance action deposit*
(*govActionDeposit*)
1943
1944 - *DRep deposit amount*
(*dRepDeposit*)
1945
1946 - *DRep activity period in
epochs* (*dRepActivity*)
1947
1948 - *minimal constitutional
committee size*
(*committeeMinSize*)
1949
1950 - *maximum term length (in
epochs) for the constitutional
committee
members*
(*committeeMaxTermLength*)
1952
1953 **APPENDIX II. SUPPORTING
GUIDANCE**
1954 -----

1955
1956 This Appendix II is intended to
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1957 Constitution and the
Constitutional Committee shall
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1958 Appendix II as it deems relevant
and useful in carrying out its
1959 constitutional duties.
1960
1961 ### **1. Framing Notes**

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(*dRepVotingThresholds[...],
1904 poolVotingThresholds[...]*)
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(*govActionLifetime*)
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(*govDeposit*)
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1963 The Cardano Blockchain was established in 2017. In July 2020 the Cardano
1964 Blockchain was expanded to include independent block validators and in
1965 September 2024 an on-chain governance system was introduced. This
1966 Constitution outlines the rights and responsibilities of governance
1967 actors in the decentralized system who represent the owners of ada, the
1968 governance token of the Cardano Blockchain. The Cardano Blockchain is a
1969 decentralized ecosystem of blockchain technology, smart contracts, and
1970 community governance.
1971
1972 In approaching this Constitution, the Cardano Community recognizes that
1973 this is not a constitution for only a blockchain but rather a
1974 constitution for a blockchain ecosystem. Accordingly, how
1975 governance actions are approved, while extremely important, is not the sole focus
1976 of this Constitution. Rather, this Constitution provides the basis and
1977 fundamental framework through which all participants in the Cardano
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1983 participate in collective bodies
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1984 on-chain governance, and empowers
DReps – including ada holders
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1985 directly as DReps – to act as the
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1988 The Constitution also recognizes
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1989 and the use of funds of the
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1990 inclusion of the Cardano
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1992 ### **2. Other Guidance**
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1996 guidance for interpreting the
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1997 limitation, a definition booklet
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