# Log: Tech Governance (folder, doc) https://github.com/rchain/rchip-proposals

### Notes for Chair:

1. Discord post - meeting invitation should include: pointer to documents such as log/ RChips, meeting time and zoom room.
2. Rules of Order
    a. For each item in the meeting, be sure the record is clear about who has the ball to move things forward between meetings before moving on to the next item.
    b. If a group makes any decisions, be sure the record is clear about that.
        i. For example "Whenever we touch the mainnet a Jira ticket is opened (GSJ)" <- is that a proposal? Was it agreed?
        ii. As chair, I trust you're taking occasional straw polls, sensing a critical mass of support, and then going "the proposal is clear and several of you clearly support it; any objections? Hearing none, so resolved."
        iii. ??All RCHIP issues are deemed approved unless there is a conflict/ breaking change or a financial requirement for the issue to move forward. Assuming that the RCHIP issue meets all editorial compliance.
        iv. ??Consensus is needed before merging breaking / conflicting code changes to master branch. Ideally the process of raising issues, concerns and objections should precede such consensus.

**Questions for Greg**

- High-value decentralized assets and its implication for security. Have a built in mechanism for network security cost. Mint new REV to finance ongoing security cost.

## 2021-06-25

## 2021-06-18

- Attendees: rao, ian, theo, tomislav, jim,
- From the discussion in tech gov today considering compression of hex and conversion to binary, along with the inevitable size limits suggesting chunking is necessity and streaming will necessarily be done in rholang using linked lists of up to about 10 meg chunks each deployed separately. Compressing the rholang deploys on chain is under consideration in which case the hex compresses well and that was a simpler more general way to save space at this time..
- The issue of retention was raised, perhaps using a timestamp or block height for expiration and maybe a deployId or some unforgeable to extend the expiration.

## 2021-03-25

- Handling network security in case of Network disruption (especially, more than 1/3rd of the network)

- Detection, prevention, recovering from substantial network being down (e.g. undersea cable cut and a large number of nodes go down)
-
- What determines majority - stake? number of nodes ?
- We must move to a variable epoch length
    - Set epoch length to some average that the validators have been missing.
    - Let validators in for some time factor that the other validators were out.
        - Eg 2x the epoch length
- K validators are parked
- Censorship of a validator by other colluding malicious validators is an issue that needs to be resolved.
-

## 2021-03-11

- The ability to increase (reconfigure) phlo price - follow up
    - We can do this now.
    - Policy on phlo adjustments
        - How to maximize transaction volume while making validators good.
        - Enumeration of factors.

## 2021-02-11

- Attendees: Rao, SteveH, Ian, Raphael, Nutzipper, Ian
- Planning for hard fork https://github.com/rchain/rchain/issues/3315
    - Recovery of rev locked in contract addresses.
    - Downtime planning -
- Recover etherdelta rev https://github.com/rchain/Governance-Committee/issues/6

## 2020-12-10

- Attendees: Jim, Rao, SteveH, Theo, Nutzipper
- Discuss new epoch length and quarantine time
    - Quarantine time must be measured in block units
        - start with one week
        - (protecting against malicious validators)
        - The small an epoch could be is 50 blocks
            - We need 50 block to ensure no one is double deploying
        - What makes sense for staking standpoint of …
    - What is needed and what we want them to do? (staking and quarantine length)
    - Requirements
        - performance of network with added validators
        - Number of validators in waiting.
        - Keep things flexible until we have data
    - Ethereum 2.0 data information
        - Discuss in In cbc casper

- Will: Does this issue talk about the first breaking changes Rchain is going to make or just the guidelines for breaking changes? (Implementing a Breaking Change #10)
- dckc: regarding Greg's question at top - move this down too. or actually ask greg the questions.
- Developer Ecosystem ToDos
    - https://docs.google.com/document/d/12zfeJYo0snm4RnfDZPSbg-0v2ofbI0OR7o3b_-FnN24/edit

## 2020-12-03

- Group discussed alternative conference platforms such as Big Blue Button through meet.coop.

## 2020-10-29

- Discussed hackathon topics

## 2020-10-22

- Attendees: Jim, Ian, Rao, Steve, Theo
- Discussed RVote issues

## 2020-10-08

- Attendees: Jim, Ian, Steve, Rao, Theo, nutzipper
- Shard configuration https://github.com/rchain/rchip-proposals/issues/24
    - Multisig change
    - ~~Change at some block?~~
- Nutzipper explained https://github.com/rchain/rchip-proposals/issues/24 and the team asked questions and discussed the implications of various options.

### Meeting summary

## 2020-09-24

- Attendees: Jim, Ian, Steve, Rao, Theo
- Block merging
    - Nutzipper: We cannot merge execute multiple deploys in same block due to cost accounting. Need to refactor REV vault.
        - conflict can be on sender or receiver side.
        - to merge blocks all deployers send precharge to per validator vault
            - change refund and pre charge logic
            - Perhaps the community working with rholang can help solve this problem
            -
    - RCHIP include in refactoring POS

    - Adjust epoch length and run contract with same state.
    - Do in parallel with block merge
    - Blessed contracts are the core of the protocol they might be written in some more efficient state.  Such as making cost accounting parallel.
    - Shard config can be change:
        - All validators can vote on parameters
        - It should be multisig
        - Tool kit for coop control over root shard
        - Needs to be developed
        - Things that can be changed from shard to shard
    -
- How do we handle proof of stake contracts?
    - Controlled contracts, set by multisig or better governance. Facade/Proxy pattern
    - Done manually is a nightmare.
    - Delegation to validators, support for staking pools?
    - Rchip?
- Sharding governance?
- blockchain governance standards shared https://sagroups.ieee.org/ieee2145/
- https://www.weforum.org/platforms/shaping-the-future-of-technology-governance-blockchain-and-distributed-ledger-technologies
- https://widgets.weforum.org/blockchain-toolkit/

**Meeting Summary**

The Tech Governance group looked at what is needed for POS contracts, sharding and hard forks.  No proposals were created.  The group looked at the IEEE organization blockchain governance and the World Economic Forum blockchain toolkit.

Summary by Steve Henley

## 2020-09-10

- Attendees:
- Network security and staking
    - Rolling stake will be possible when we reduce the epoch size - this will reduce some of the security issue
    - Theo proposed higher seigniorage for longer lock up periods
    - Add a mechanism to spread the stake over 5 years. e.g. If you put in 100,000 REV - then the stake is spread over 5 years as below
        - 30% for first year, 25% for 2nd year, 20%, 15%, 10% etc, for 3rd, 4th, 5th years
        - By reducing the amounts over the years, it allows for new parties to join the staking pool
        - If membership agrees to the above staking ratios, we do not necessarily need to pay higher rates for longer because this becomes the only way for people to stake - BUT this may discourage staking and defeat the purpose
        - The rewards formula require a spread overtime
        - Ian: If done as only staking pool, all this is  still centralized
    - OR Stake is not spread but an amount is locked for 12? quarters 100%?, 90%?, 80%?
        - Why is it necessary to limit the amount staked when the rewards can be adjusted to make staking less profitable?

            - Staked REV can be locked or unlocked
    - Or simply stake term chosen by staker with higher rewards for longer periods.
        - Like CD's
    - Rao - need to make it part of the PoS to allow inflation for this purpose only and perhaps minted by the PoS contract, so it is not related to coop paying the seigniorage. Network security has to be paid for by the WHOLE network.
        - Perhaps a 2% to 4% inflation or higher would be tolerable to ensure network security - but this needs to be model driven
    - Nutzipper: change PoS staking contract
- Will Dappy be open source - next week

## 2020-09-03

- Attendees: SteveH, Jim, Rao, Ian, Gary, Gurindar, Theo
- Github website is live
    - Ask Tobi to assist with web design
    - Website updates with github issue
    - Issues go through the communications working group
- Friday dev discussion regarding access to logs (JimW request)
    - Have member use exploratory deploys
    - Dev team feels it is not a good idea to expose the logs to the public
    - Nutzipper: log will not help with looking into issues.  Use exploratory deploy.
    - General discussion on this issue - stdio should be disabled
    - Jim's request for access to observer node logs for selected people
    - In future, more indexing of block for data elements that users most commonly track - this might simplify api's and other aspects also
    - Developers need a way to debug apps - need to come up with a better process than writing to stdio
    - Jim has a log object (list) that captures everything written to it, so it can be read later.
    - Send debug data to the deployId channel but not store it on chain and/or charge fees for it.
    -
- Ren Project (https://renproject.io/) - Max - future discussion
    - Steve: create RCIP issue as placeholder for future interoperability candidates with RChain
- RChain name for ERC 1155 Multi Token Standard https://eips.ethereum.org/EIPS/eip-1155
    - assetStore?
    - Multi Token Standard?
    - Name and branding of these for marketing as well. (RCIP issue)
    - Steve: create RCIP issue for assetStore - look at above notes
- Testnet rev faucet
    - Will -  is creating an api for this
- Network security and staking
    - Rolling stake will be possible when we reduce the epoch size - this will reduce some of the security issue
    - Theo proposed higher seigniorage for longer lock up periods
    - Add a mechanism to spread the stake over 5 years. e.g. If you put in 100,000 REV - then the stake is spread over 5 years as below
        - 30% for first year, 25% for 2nd year, 20%, 15%, 10% etc, for 3rd, 4th, 5th years

        - By reducing the amounts over the years, it allows for new parties to join the staking pool
        - If membership agrees to the above staking ratios, we do not necessarily need to pay higher rates for longer because this becomes the only way for people to stake - BUT this may discourage staking and defeat the purpose
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        - Rao - need to make it part of the PoS to allow inflation for this purpose only and perhaps minted by the PoS contract, so it is not related to coop paying the seigniorage. Network security has to be paid for by the WHOLE network.
        - Perhaps a 2% to 4% inflation or higher would be tolerable to ensure network security - but this needs to be model driven
    - Nutzipper: change PoS staking contract
- Next tech governance working group meeting will be Thursday, September 10th
    - In favor: Steve H, Gary, Jim, Ian, Theo (Majority)
- Will Dappy be open source - next week

## 2020-08-20

- Attendees: JimW, Rao, SteveH, Theo
- Spreadsheet model - ??
- Finish editorial review of rchip/proposals - issues - complete priority labels
- Jeckyl work - static page generator - for the rchip proposals? Theo: How to publish proposals as well as internal progress?
- Review and approve RCHIP Process Draft.md (github)
- Links shared by Frank Doherty in the community debrief on July 29, 2020
    - https://learn.realblocks.com/blog/realblocks-partners-with-aztec-protocol-to-evolve-private-markets
    - https://www.fluidity.io/
    - Really interesting projects that allow the tokenization of land titles, a desperately needed feature in developing countries where land rights are stripped from families
- Discuss bi-weekly meeting
- Ren Project (https://renproject.io/) - Max - future discussion
- RChain name for ERC 1155
    - assetStore?
- Theo: Examine the case of Steemit takeover.  requiring longer staking (10 yrs or such) would prevent take over by exchanges and others because they would not want to stake for such long times. Should we think of this as an annuity or some other manner ? Higher rewards for longer lockup period. Need to make a model that achieves the network security goals and equilibrium. JimW: was steemit a case of governance failure or staking rewards issue? Theo: If one individual locks up for longer, should get higher rewards. Kucoin still holds 20 million or so REV?
- How does Tezo's model work? Theo: Maybe for one person to get their stake out, they have to find someone else? Next fool theory?
- Theo: Rchain should be marketed on stakingrewards.com and similar places to attract new token buyers and stakers https://www.stakingrewards.com/earn/rchain
- Token Investor takeover of the Board as suggested by Juju in the Governance channel is not a good idea. Examine SteemIt etc. cases.

- Should create completely smart-contract based payments and staking
- Theo: Do the bylaws allow giving more voting power to the folks that lock up their stake for a longer time? How does the amount of stake factor into this?
-

## 2020-08-13

- Meeting postponed until next week.

## 2020-08-06

- Attendees: Ian, SteveH, Rao, Theo, Gary, Greg, Tomislav, Jimscarver, nutzipper
- Review questions for Greg with Greg
    - RCHIP issue #15 - Delegate REV for Staking like Tezos.
        - The funds cannot be in control of the person who is staking the funds.  They could simply walk away.
        - If the network validator cannot be slashed then there is no network security.
            - Example: Alice must lose control of her stake inorder for her REV to be truly staked.
        - We could provide smart contract so that people can get feedback on their stake
            - User experience example: Smart contract on their wallet that will show the transfer of REV to their validator stake plus see the rewards on their stake.
    - RCHIP issue #8 - Is there a limit to how much the Phlogiston exchange rate can be changed in each block?
        - This is a good feature to smooth out volatility
        - We want to add this feature in the future.
    - RCHIP issue #7 - What is the initial exchange rate for Phlogiston / Rev
        - 1 phlo = 1 stahl (value of range)
        - The coop always does have the ability to set the price, but so far the coop has not set the price.
        - How many REV equals one phlo is not set.
        - Should there be a minimum is yes
        - But the minimum has not been set yet.
        - What are the reasonable rewards that come from transaction fees for validators.
    - RCHIP issue #6 - Validators / count of blocks
        - Greg: This is trying to put a constraint on stake distribution. Let the market decide what configurations may be accepted by which consumers.. Need functionality to display shard characteristics so that the consumers can make informed decisions.
    - RCHIP issue #5 - Staked token / count of blocks
        - This is a per shard issue.
        - Hardware increases block creation then a policy would hinder block creation.
    - RCHIP issue #4 - The rate by which Validators can unbond

        - This is correct. There is a formula that Mike Birch created to address this issue.
        - This issue a queuing mechanism.
        - There is no checking in proof of stake.
        - https://rchain.atlassian.net/wiki/spaces/CORE/pages/412024951/RChain+consensus+specification
    - RCHIP issue #3 - Specify the unit by which Validators may unbond
        - This issue is an implementation of issue #4.
- Spreadsheet model -
- Finish editorial review of rchip/proposals - issues - complete priority labels
- Jeckyl work
- Review and approve RCHIP Process Draft.md (github)
- Links shared by Frank Doherty in the community debrief on July 29, 2020
    - https://learn.realblocks.com/blog/realblocks-partners-with-aztec-protocol-to-evolve-private-markets
    - https://www.fluidity.io/
    - Really interesting projects that allow the tokenization of land titles, a desperately needed feature in developing countries where land rights are stripped from families
- Discuss bi-weekly meeting
- Ren Project (https://renproject.io/) - Max - future discussion

## 2020-07-30

- Attendees: theo, nutzipper, gsj, gary, steveh, ian, rao, jim
- Finish editorial review of rchip/proposals - issues - complete priority labels
- Jeckyl work
- Review and approve RCHIP Process Draft.md (github)
- Discuss bi-weekly meeting
- Links shared by Frank Doherty in the community debrief on July 29, 2020
    - https://learn.realblocks.com/blog/realblocks-partners-with-aztec-protocol-to-evolve-private-markets
    - https://www.fluidity.io/
    - Really interesting projects that allow the tokenization of land titles, a desperately needed feature in developing countries where land rights are stripped from families

## 2020-07-23

- Attendees: Steve H, Rao, Nutzipper, Jim Gurinder, Ian, Gary, Theo
- Review and approve RCHIP Process Draft.md (github)
- Editorial review of rchip/proposals - issues
    - prioritize old

    - Interaction/Sequence diagram - Nutzipper
    - Issue #7 - updated title
- Rate limit to 1 deploy per second from the same limit - can be different on validator vs observer nodes, exchanges may be whitelisted.. Having access to continuously updated wallet balances will make things easier. Maybe this should all be part of the shard config - is this a protocol or shard issue ?
    - Limit on the message size in the node configuration
- Team agreed on (a) schedule meeting every other week unless higher frequency needed - calendar updated (b) research approaches from other PoS projects (c)review issues in the RCHIP repository every week to assign tasks and/or update status and/or close
- Pull requests should be created when an issue is ready to be presented as a potential RCHIP.
- ToDo
    - Look into forking/mimicking eip_validator applications to RCHIPs
    - Create folder for completed RCHIPs - 'Implemented' tag can be used to search for implemented RCHIPs
    - Create the .md files for the two completed RCHIPs so these can be added to the folder

Meeting Summary
Reviewed and prioritized existing RCHIP issues

# 2020-07-16

1. Attendees: Tomislav, Ian, nutzipper, Theo, Will Q, Gurinder, Gary C, Steve H, Jim
2. Comments on agenda
3. Review and approve RCHIP Process Draft.md (github)
4. Editorial review of rchip/proposals - issues
    a. Interaction/Sequence diagram - Nutzipper
5. Theo: You can bring node down with spamming log - you can send any size deploy without much REV. Tomislav - even without any REV, your data can be put in the block. We need to think of a better way to address this. Maybe add an evaluator node that will calculate the actual amount needed by doing actual deploys and the actual validator nodes will process the transaction ONLY if that amount of REV is available for pre-charge. Objection to this idea: You are putting some trust in this node that does not have any stake.
    a. Resolution
        i. **Write up all use cases proposal - dev team**
        ii. IP sanctioning -
        iii. Nginx - rate limiting at Nginx, maintain list of rev balances, number of connections per second
            1. Have a cheap database that has …..
            2. Optimization - check balance without going to the chain
        iv. Theo's suggestion: Check to see if this is the right time for an id to send a deploy
        v. Theo: Client, before sending a deploy, hashes it's own IP and uses modulus to find out which validator in the bond list the deploy should be sent to in order to be processed quickly. Validator takes the incoming deploy IP, does the same and checks if it should accept the deploy at this time or not.

    b. Tomislav: The main problem is if a node can actually be shut down rather than slowed down. If a node is slowed down, it may be OK, unless the whole network can be done - but there's a cost to bring down the whole network, which acts as a barrier.
    c. Tomislav: The bigger problem is what to do when there is a big deploy with insufficient funds. We should not save this whole deploy but just enough information to point out that this deploy failed due to insufficient phlo. There's storage costs and compute costs to keeping this in the block - should we keep the data until 'insufficient funds' occurs or do we need to get rid of this? **Nutzipper**: We need fast access to the deployer's balance - even before we deploy, to check the payment amount and then cut out streaming when that amount is reached - i.e. we stop receiving the deploy when the funds become insufficient. Maintain a cache of how many rev the deployer has paid for in case of multiple deploys in the same transaction. Streaming cut-off is doable (currently we're receiving the whole message so we cannot easily do that). **Limit on the message size in the node configuration** - should it be 4 MB or similar - need to check with Raphael to see what may be meaningful - current default is 16 mb as grpc setting?. **Nutzipper**: You need to have a trait that allows larger deploys if sufficient REV sent. **Rate limit to 1 deploy per second from the same limit - can be different on validator vs observer nodes, exchanges may be whitelisted.. Having access to continuously updated wallet balances will make things easier. Maybe this should all be part of the shard config - is this a protocol or shard issue ?**
    d. Jim: We can check for the balance. Why would we put something on the block if there's not sufficient phlo? T: We don't put it on the block but we want to prevent a validator from randomly denying a deploy - instead we want to say 'here was the deploy and it did not have sufficient phlo' to prevent a validator from randomly denying. Jim: We should treat 'insufficient phlo' similar to a syntax error - it should never proceed forward. This seems to be better than the alternatives, from the user perspective. Tomislav: What can we safely ignore vs. carrying into the block ? This may require some larger changes - the fields we receive may need to be in particular order etc.. to be able to implement size based cutting off.
    e. Create test cases to solve - what's the problem we're trying to solve.. The solutions we are proposing may not be technically feasible at the moment. 1. **Rate limiting is the initial thing we can do 2. We can investigate how ethereum and other networks handle this.**
6. Remove items 2Biii and 2Biv in chair notes?
7. Corrupt block solution - RCHIP issue
8. RChain strategic plan
9. Create TechGov-WG folder

## 2020-07-09

1. Convene:
    a. Attendees: JimW, Theo, Tomislav, SteveH, Rao
    b. Scribe:
    c. Comments on agenda?
2. Change Approved label to Published - **stay with Approved per Rao**
    a. There is a time when an issue becomes officially an RCHIP - this implies a review of completeness of proposal, a degree of discussion and subsequent agreement that something meets criteria to become an RCHIP

    b. Once something is an RCHIP there may be further discussion and clarification of specification etc.  - when this process completes, it gets an APPROVED tag
    c. We will record member names agreeing to the Approval in the log. The TechGovernance chair will use github comments to publish such approval to the world.  Perhaps a link to the Tech Governance Log should be included in such comments.
3. A TechGovernance process markdown file needs to be created/added from the current Atlassian content and any necessary modifications to the process (perhaps including documenting the rchip lite process), and published on github. Pull requests on this are also an opportunity  for the community to agree, suggest modifications etc - SteveH, Rao, Jim, Tomislav (only review, critique/comment)
4. Tech Gov weekly meeting can be used to do the work of the editorial committee to review specific issues/proposals.
5. Nutzipper is drafting a RCHIP issue for onchain configuration storage
6. Need a RCHIP process overview in code, wiki, or somewhere. For example we need to save the following.
    a. In principle, all issues that get labelled as RCHIPs are deemed worthy of approval unless there is a conflict/ breaking change or a financial requirement for the issue to move forward, assuming that the RCHIP meets all editorial compliance.
    b. Consensus is needed before merging breaking / conflicting code changes to master branch. Ideally the process of raising issues, concerns and objections should precede such consensus.
7. Discussion rchip/proposals - issues
8. Theo: You can bring node down with spamming log - you can send any size deploy without much REV. Tomislav - even without any REV, your data can be put in the block. We need to think of a better way to address this. May be add an evaluator node that will calculate actual amount needed by doing actual deploys and the actual validator nodes will process the transaction ONLY if that amount of REV is available for pre-charge. Objection to this idea: You are putting some trust in this node that does not have any stake.
9. Theo's suggestion: Check to see if this is the right time for an id to send a deploy
        i. Theo: Client, before sending a deploy, hashes it's own IP and uses modulus to find out which validator in the bond list the deploy should be sent to in order to be processed quickly. Validator takes the incoming deploy IP, does the same and checks if it should accept the deploy at this time or not.
    b. Tomislav: The main problem is if a node can actually be shut down rather than slowed down. If a node is slowed down, it may be OK, unless the whole network can be done - but there's a cost to bring down the whole network, which acts as a barrier.
10. RChain strategic plan

## 2020-07-02

1. Convene:
    a. Attendees: Rao, Ian, Theo, Greg, Gurindar, Steve H, Gary
    b. Scribe:
    c. Comments on agenda?
2. Multisig on wallets -  Greg needs to verify scope of applicability

a. Greg Meredith will attend the Thursday tech governance meeting.
b. Proof of stake may not serve our purposes
c. Tech governance can take ownership of this issue.
d. M of N wallets where you need N signatures for a wallet (e.g. 3 of 5 signatures needed) ? Is this already in? Is there more development needed?
e. Coop wallets and validator rewards wallets etc - will they be multisig to allow completely decentralized governance / resolution of things like this?
f. Transaction logs (between rev vaults when you transfer) should be on the chain ? What is needed for this?
    i. Greg - transactions should be on-chain. Space/ time trade off. Memoize state to go backwards in time.
    ii. Transactions logs are useful for governance. Regarding signatures for governance.
g. Concern that signatories have authorization without being elected. There must be a connection between signatory power and will of the community.
h. Jim: Multi-sig is a special case of on-chain governance and liquid democracy.
i. Rao:Should multi-sig be a pervasive capability such that it can be used for all kinds of decisions, whether involving board members or not. Regulatory, compliance, contractual, multi-party privacy etc. applications.
j. Theo: multi-sig can also act as multi-device. If you lose one device, you can still get through.
k. Greg: We have multi-sig but how we use it and who has keys is important.
l. Jim: Would be useful to have this for staking pools administration. May need quorum and majority rules as part of a multi-sig design. It's an object capability that can be delegated to a contract.

3. Shard level POS - need on-chain configuration among shards, this affects business wide parameters, need to change REV vault as well
    a. Sharding is a tree and not a mesh - use cases that can be addressed and not?
        i. Jim has a Demo of cross-chain mechanism. Question of multiple chains. If two are RChain then how are they not shards?
        ii. Transactions that involve both nets, these need to be validated. Jim: there needs to be no relationship between bitcoin and REV.. you just need to have both, to transact.
        iii. A tree is both distributed and decentralized, but a forest is not feasible for performance.
        iv. Jim: may be just a multi-phase commit is all that's needed - Greg: multi-phase is anti-availability, locking on all resources. This will not be performant.
        v. Lots of shards will be child trees (in this sense, the tree functions like a mesh network in most cases). Without this, cryptographic proof cross-shards is not possible.
        vi. If you have a transaction that involves resources on two different shards, you need the tree structure to validate the transaction. E.g. Japan tree in yen, US tree in $,
        vii. Jim to simulate a cross-chain deploy proof of concept with remote names.
        viii.
4. Add rho:io:serialize fixed channel to Rholang #22
    a. https://github.com/rchain/rchip-proposals/issues/22

    b. Should this be a method/function or should it be a powerbox as proposed? Which method preserves the integrity and elegance of Rholang design and allow growth?
    c. Tomislav - Method/function in Rholang may make sense in this case because it operates directly on one piece of data.
    d. We have tobytearray but need frombytearray? Is that sufficient?
5. Consensus equational reasoning
    a. Square root equational reasoning (weak bi-simulation)
    b. Casper equational reasoning
    c. Greg needs assistance developing both - needs to be done eventually. We need something that verifies proofs through isabelle, coq or similar theorem provers.
    d. Greg: Math should have a seat at the governance table. The buck stops at the math.
    e. Eventually create technical roadmap
        i. Research lane
        ii. Product features/capability lane
6. Cross chain interoperability
    a. Mount other chains as shards
    b. Can we do proof of concept with Ethereum and Hyperledger ?
    c. Just do enough so people know how to do a cross-chain solution (i.e. a template) so that others can use the template to integrate to whatever chains they want.
    d. We are much better than polkadot, they're trying to do this with nested automata, which does not work as the network grows. Par operator is providing massive compression on nesting of automata.
    e. Tomislav: is this related to global names? Rho calculus names are visible upfront - you can't make a name that you did not know ahead but you can make unforgeable names. All rholang names are eventually discoverable given infinite computing and memory. Rholang names have a scoping mechanism (e.g. path like names in a url). All of this is not related to nested automata growth.
    f. Rather than look at the product of all possible states of automata, with par, you only focus on the interaction states of automata.

## 2020-06-25

1. Convene:
    a. Attendees: rao, steve h, gary, jim, ian, Gurindersj, nutzipper, theo, tomislav
    b. Scribe:
    c. Comments on agenda?
2. Confirm who are members of the tech governance group - JimScarver, Theo, nutzipper, SteveH, Gurinder, Rao, Tomislav, Ian Bloom, Gary Coulter
3. Decision to leave with the core dev team to update a RCHIP as necessary or as needed and they will approach the tech governance when necessary.
4. RCHIP approvals
    a. RCHIP-01: Add bytesToHex method #11

        i. The proposal is clear and several of you clearly support it; any objections? Hearing none, so resolved.
    b. RCHIP-02: Block merging #23
        i. The proposal is clear and several of you clearly support it; any objections? Hearing none, so resolved.
    **c. All RCHIP issues are deemed approved unless there is a conflict/ breaking change or a financial requirement for the issue to move forward. Assuming that the RCHIP issue meets all editorial compliance.**
    **d. Consensus is needed before merging breaking / conflicting code changes to master branch. Ideally the process of raising issues, concerns and objections should precede such consensus.**
5. Nutzipper is drafting a RCHIP issue for onchain configuration storage
6. Sharding is a tree and not a mesh. Whatever use cases can fit a tree can possibly be enabled.
    a. Invite Greg to next tech governance meeting
7. Discussion rchip/proposals - issues
8. Theo: You can bring node down with spamming log - you can send any size deploy without much REV. Tomislav - even without any REV, your data can be put in the block. We need to think of a better way to address this. May be add an evaluator node that will calculate actual amount needed by doing actual deploys and the actual validator nodes will process the transaction ONLY if that amount of REV is available for pre-charge. Objection to this idea: You are putting some trust in this node that does not have any stake.
9. Theo's suggestion: Check to see if this is the right time for an id to send a deploy

    Theo: Client, before sending a deploy, hashes it's own IP and uses modulus to find out which validator in the bond list the deploy should be sent to in order to be processed quickly. Validator takes the incoming deploy IP, does the same and checks if it should accept the deploy at this time or not.

    Tomislav: The main problem is if a node can actually be shut down rather than slowed down. If a node is slowed down, it may be OK, unless the whole network can be done - but there's a cost to bring down the whole network, which acts as a barrier.

## 2020-06-18

1. Convene:
    a. Attendees: SteveH. Tomislav, Ian, Jim, Theo, Rao, Frank Doherty, Gary, GSJ, Nutzipper
    b. Scribe: SteveH, Rao
    c. Comments on agenda?
2. Github issue template
    a. http://github.com/rchain/rchain
    b. We will use google forms for issuing security bugs with the ethereum template
        i. Security bug are a google form for private and confidentiality
        ii. https://github.com/rchain/rchain/pull/2953
        iii. Chinese cannot access google forms
        iv. Convert Kit is an alternative
            1. Security issues with respect to submitting issue with email

        2. **Ian will contact Convert Kit regarding this**
    c. Github issue template is approved - **done**
    d. Github issues is enabled - **done**
3. Shard level configuration and update - **Nutzipper**
    a. Create RCHIP issue - changing the protocol (multiple RCHIPS)
        i. change proof of stake, transfer state, update node with new version
        ii. other
        iii. other
    b. Separation of shard level POS and root level POS
        i. First see how contract is used
        ii. Update registry with updated POS
        iii. Ask which POS should we deploy
        iv. Logic of change something in state can be part of the consensus
        v. Certain source code will use certain block
        vi. Have different shard working in different ways using liquid democracy for governance
        vii. What is the concept of a root shard and the relationship of the child shards off of it
        viii. Document
            1. Identify issues and how they will be resolved.
            2. Look at chains that have been mismanaged such as SteemIt
            3. Connections between shards - shards must use REV for communication to work
            4. Governance issues must be addressed
            5. They ability to deploy on another shard
            6. Shard should be a namespace??
            7. Any user who wants to work with multiple shards they need tokens for all the shards
            8. To communicate with root shard you need REV in your account
            9. Jim's power box function - ??
            10. Jim model - you bypass the root shard this is a mesh network work using child shards.
                a. In this model there is no confirmation from root shard
                b. Trust issue removing root shard
                c. Root shard is used for financial transactions - you need trust
                d. Each shard is a VAT and is untrusted
            11. Separate networks that go to main network
                a. Do want you want in child shard
                b. Validators must participate in both networks with staking
            12. Cross blockchain transactions have multiple phase commits
4. Overriding BORS to close PR - Ian
    a. Not an issue
5. rchip/proposals - issues
6. New rchips? Sharding, http

## 2020-06-11

1. Convene:

    a. Attendees: Steve Henley, Rao Bhamidipati, Gurinder Johar, Jim Whitescarver, Ian Bloom, Anton Chistiakov, Theo Hallenius, Tomislav Grospić
    b. Scribe:
    c. Comments on agenda?
2. rchip/proposals - pull request
    a. Update proposal main issue template - tgrospic
3. rchip/proposals - issues
    a. review issues
4. Power box discussion
    a. What extensions should be part of methods in rholang or special name - Jim/Rao
    b. https://rchain.atlassian.net/wiki/spaces/CORE/pages/238158228/Node+Powerbox
5. Discuss having ongoing validator preparation session
    a. Possibly open RCHIP for validator setup - To be further discuss
    b. One button installs
    c. One RCHIP to initiate discussion
    ~~d. Separate RCHIP for each cloud platform~~
    e. Think of this as a large buck for validator issues
6. Discuss have monitoring nodes that writes diagnostic data to the blockchain - Greg
    a. Allows for developer to write rholang tools for self monitoring - Greg
    b. Have rholang more like a general purpose language - Tomislav
        i. Rholang language for UI - Tomislav
        ii. Browser built in Rholang - Greg
            1. 2yrs worth of work to do this
        iii. Running Rholang in all browsers (Chrome, Edge, Firefox, Safari etc.) could be an intermediate step - Can Dan Connoly's JS2Rho help here?
7. Create FAQ that summarizes any closed tickets etc. so that more people don't repeat the same.
8. Use RChain repo issues by community for Scala implementation and RCHIP repo only for issues that cut across implementations
9. Need technical documentation that can put many proposals to rest and/or guide them to be architecturally compliant. Need to address this soon after BlockMerge.
10. Theo: Breaking changes + irreversible changes should be part of the RChip process, rest can occur elsewhere
11. Jim W & Gurinder: Tech Governance meetings are not just for RCHIPS but to discuss any technical aspects and activities of interest to the community.
12. If we split community input of issues between the rchain and rchip repositories, we need to make sure to review community entered issues from both repositories in each meeting.

## 2020-06-04

1. Convene
    a. Attendees: JimW, SteveH, Tomislav, Theo, Rao
    b. Scribe: Rao, SteveH, JimW
    c. Comments on Agenda?
2. Community Update 122
3. RChip-09-bytesToHex collaboration document
    a. Need information filled in by Arthur Greef

    b. Work towards standardized template
4. Github label access for for tech governance wg - status
5. rchain/rchip-proposal pull requests - status
6. Discuss creating rchip-tutorial.md (eg. sip-tutorial.md)
7. Main repo issue templates (Ticket has more info. https://rchain.atlassian.net/browse/RCHAIN-4087)

## 2020-05-28

1. Convene
    a. Attendees: Steve H, Rao, Raphael, Theo, Raphael, Ian, Jim
    Regrets: dckc
    b. Scribe: Steve H
    c. Comments on Agenda?
2. Community Update 121
3. 'Rchip Lite' description (Response to Dan Connolly)
    a. The lighter version currently is (a) for simple changes, to create a Jira ticket and capture all discussions and designs in there by all parties including proposers and developers vs. separate committees and an elongated approval process. (b) for larger changes or those with a more significant impact, create RCHIP proposals and outline concerns and methods of resolving those (c) Both (a) and (b) are open to 24x7 review and comment by the community and discussed in the weekly TechGovernance meetings which are published to the community.
    b. The intention is to achieve maximum transparency and deliberation while enabling quick resolution such that the proposed improvements can be implemented quickly.
4. Slashing guidelines
    a. Three scenarios - a. Software bug b. Technical/infrastructure difficulties at validator c. Validator malice
    b. It's recommended that for a. Slashed funds be collected in a coop wallet and returned to the validator. For b. Allow validator to accumulate good behaviour time (x hours of downtime allowance accumulated per day of uptime. The idea is that the validator can use the downtime for infrastructure updates without penalty - can validators trade their allowance to other validators? This may get complicated). For c. Currently only full slashing is implemented, but perhaps need to look into partial slashing (that may be several months away).
5. RChip Github
    a. RChip-template.md
    b. RChip-08-Implementing A Breaking Change Release.md
6. RChip 09
    a. `bytesToHex` is only applicable to Rholang byte array so it should not be mixed with additional methods for regular expressions on strings. - Tomislav
    b. RChip 09 - Improve string function: bytesToHex
        i. Update to RChip 09-bytesToHex - Steve
7. Github label access - Ian
    a. Github IDs for users - Steve

i. Jim Whitescarver -https://github.com/jimscarver
ii. Theo Hallenius - https://github.com/TheoXD
iii. Raphael - https://github.com/fabcotech
iv. Rao - https://github.com/9rb
v. Tomislav - https://github.com/tgrospic
vi. Nutzipper - https://github.com/nzpr
vii. ID's provided to Ian

b. Level of access for users
   i. Asked Ian to ask Rao on which level users need. I image triage or higher
c. Labels
   i. Growth
   ii. Reduce Risk
   iii. Tech Debt
   iv. Provide Ian with Labels to update repository

## 2020-05-21

1. Convene
   a. Attendees: Jim, Rao, Steve H, Theo, Nutzipper, GSJ, Raphael
   b. Scribe: Steve H
   c. Comments on Agenda?
2. Community Update 120
3. RChip discussion (Tomislav) - Steve
   a. Scala has nice organization for their SIPs. Here are their templates, SIPs and meeting notes.
   b. https://github.com/scala/docs.scala-lang/tree/master/_sips The repo has jekyll configuration so it can be served from GitHub directly. There is docker-compose configuration to run site locally. Template https://docs.scala-lang.org/sips/sip-template.html Tutorial https://docs.scala-lang.org/sips/sip-tutorial.html Real SIP https://docs.scala-lang.org/sips/inline-meta.html
   c. If we provide templates it can be much easier for everyone to put their ideas more clearly and also for readers to understand what problem someone has or what is trying to solve. We are now doing this for main repo issue templates (help is welcome, it's just a Markdown). Ticket has more info. https://rchain.atlassian.net/browse/RCHAIN-4087
   d. For RChip issues, maybe we can also define issue labels for different *levels* to designate the progress of specific proposal or level of acceptance. Labels are useful for filtering when searching issues. PR should contain a link to RChip issue at least, with short explanation what code is doing. As the first time, @arthurgreef: can do this

on his PR because he already done the most important part and from the code perspective PR can be merged.

e. *discussion continues below*

4. Multisig on wallets - Greg needs to verify scope of applicability
    a. Proof of stake may not serve our purposes
    b. Tech governance can take ownership of this issue.
    c. **Greg Meredith** will attend the Thursday tech governance meeting.
        i. Rao did ask Greg at an OPS call if he could attend the Tech Governance meeting for May 28th.
5. *RV2020 - voting dapp*
    a. Anonymity is not a requirement - Greg
    b. Implement token methodology like last time
    c. Link back to coop membership to verify membership
    d. Coop issues REV address to all members. Issue REV voting.
    e. Who can help develop this project?
    f. https://docs.google.com/document/d/1jfARb33suC_7AkICblTOFTmKN2mvTu9r7cFRPDKZ6hw/edit#heading=h.fyd936t47m1z
    g. *This Topic was mentioned but not discussed since it was discussed quite a bit during the Member Hangout the day before.*
6. RChip 09
    a. `bytesToHex` is only applicable to Rholang byte array so it should not be mixed with additional methods for regular expressions on strings. - Tomislav
    b. RChip 09 - Improve string function: bytesToHex
    c. Steve will update RChip title
    d. Forward to next week
7. RChip 12
    a. Raphael immediate need - expose function in scala and then expose to rholang
    b. RegEx - regular string validation (exposing scala functionality)
    c. Potential for cost escalation if someone sends a poor regex. DOS attacks possible and can bring down the node and network.
    d. RegEx with limited use of memory
    e. https://nodegoat.herokuapp.com/tutorial/redos
    f. https://stackoverflow.com/questions/1360113/is-java-regex-thread-safe
    g. https://snyk.io/blog/redos-and-catastrophic-backtracking/
    h. https://eyalitkin.wordpress.com/2016/10/14/safe-regex-redos-protection/
    i. https://swtch.com/~rsc/regexp/regexp1.html
    j. May be allow poor man's regex that does not allow loops at all but includes forward patterns - matching linear patterns which is 99% of all useful cases. But avoid DOS attacks and must be simple to cost. For linear match, we can cost based on the length of the two strings or such.
    k. Short term solution, no RChip at this moment - will be provided by Raphael
    l. Short term - Implement only simple items like case conversion (lower to upper) etc.
8. RChip template - category or codes for (red flags) breaking changes

a. Use labels to indicate red flags such as breaking changes
b. Rao: sounds like the **template** is worth trying; who should **set it up**?
**Steve: I'll do it.**

## 2020-05-14

1. Community Update 119
2. RChip 09 - Improve string function and exposing scala regular expressions
    a. Specify expressions for string (Aurthur Greef PR merge - convert into RChip)
    b. Dappy needs Scala regular expressions to be exposed in Rholang - e.g. to check for domain names
    c. https://www.tutorialspoint.com/scala/scala_regular_expressions.htm
3. RChip 10 - Theo needs Bitwise operators to calculate things like Log2
    a. new myevent('rho:io:event') in { myevent!("stuff happened") }
    b. #Event + <read only uri> + ("stuff happened") -> events.log
    c. https://www.tutorialspoint.com/scala/scala_bitwise_operators.htm
4. RChip -11 ? or is this RExt-01 or RNExt-01? - Need event processing framework - subscribers are notified when an event happens. Should this be a language feature rather than having to look inside the block (as in current)? The kind of events to be implemented to be determined. dApps would like to be notified of changes in some values. A way to implement this in your contract already exists?
    a. Theo: new myevent('rho:io:event') in { myevent!("stuff happened") }
        i. #Event + <read only uri> + ("stuff happened") -> events.log
    b. Since this is outside rnode code, may be should be outside Rchip process?
    c. Make read only node reactive or enable publish/subscribe ?
    d. Why can't we do this - isn't event similar to stdout that we already have? Perhaps mimic stdout code to enable event generation - Can first byte be checked to see if it's subscribed to and instead of printing, send that value over to subscribers. Some event bus needs to be implemented.
    e. Need enablement on websockets
    f. Perhaps this should be an extension and not part of core rnode - will enable development of extension market
5. RChain extension marketplace
    a. Extensions to RNode are run outside of RNode on local RNodes
    b. Nutzipper to add link to 'How to develop RNode extensions' in #development
6. Capability transactions protocol between extensions?? Extension is another trusted domain - Jim
    a. Use case 1 - extend beyond RNode arbitrarily by accepting the first result (i.e. not validated by all validators) as acceptable truth
    b. Use case 2 - Wait for all validators to agree and only then present as truth
    c. https://capnproto.org/capnp-tool.html
    d. https://capnproto.org/rpc.html

7. Community dev priorities
    a. Performance issues
        i. Current xx transactions per minute
    b. Activate issues tab - Rao will turn on
        i. Moderate, curate, tagging, banning responsibilities for issues tab moderators
    c. Open tickets for community development - carrier forward
8. IBM BlueMix - Rao
9. Name for very small amounts of REV
    a. Example: gwei, sat, mat, stahl, robin, rao, rho, rob, milner, bit, bat
        i. "How many REVs and RAOs should I send?"
    b. revette or revlet, rvlt - ?
    c. Criteria for name:
        i. Phonetically clear
        ii. No problems with spelling
        iii. Include rev in name
            1. Nutzipper - Include rev in name + allow shorting most probably will lead to `rev` as a short name. Will be difficult not to do so.
            2. So I'm personally against it
        iv. No cultural jump needed
        v. Should allow shorting
10. RChip 08: Implementing A Breaking Change Release
    a. https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit#
11.

## 2020-05-07

12. Convene
    a. Attendees:
    b. Scribe:
    c. Comments on Agenda?
13. Community dev priorities
    a. Performance issues
        i. Current xx transactions per minute
    b. Activate issues tab - Rao will turn on
        i. Moderate, curate, tagging, banning responsibilities for issues tab moderators
    c. Open tickets for community development - carrier forward
14. IBM BlueMix - carrier forward
15. Education
    a. Arthur Greef - bytes2hex TeachOut and RChip submittal

        i. https://github.com/rchain/rchain/pulls
    b. Community not familiar with code base as a result we are having education sessions
    c. Document repository inventory
        i. https://docs.google.com/document/d/1ZablPqToFwgyQ1fBTH2srjeN87YN3Ae5KGBGZmt2iog/edit#heading=h.lyjx2b312yid
        ii. Create issue on github and link to google doc
        iii. Eventually make part of main website
        iv. This could go in the wiki
        v. Coordinated effort among tech gov, education  and communications
        vi. Theo will help Ian with website
16. RChip 08: Implementing A Breaking Change Release
    a. https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit#
17. Review RChip 1-7
    a. https://docs.google.com/spreadsheets/d/1ciWp7pYulkEOzB2vNeDOBpi2RF3gxQVOcLYbrTvv7KE/edit#gid=1761194090
18. Discord channel management
    a. public-testnet - status
    b. node-testing - status
19. Name for very small amounts of REV
    a. Example: gwei, sat, mat, stahl, robin, rao, rho, rob, milner, bit, bat
        i. "How many REVs and RAOs should I send?"
    b. revette or revlet, rvlt - ?
    c. Criteria for name:
        i. Phonetically clear
        ii. No problems with spelling
        iii. Include rev in name
        iv. No cultural jump needed
        v. Should allow shorting
20.

## 2020-04-23

- Convene
    - Attendees: Steve, GSJ, Rao, Jim, Theo, Nuttzipper
    - Scribe: Steve
    - Comments on Agenda?
- Community Update 117
- Dev team priority for community
    - Performance requirements for exchanges coming on

        - Transaction history reporting is the only performance issue - but this is being addressed currently via higher spec machines and potentially multiple reporting nodes if needed
            1. 4-5 minutes to complete transactions
    - Get community to help improving performance
    - Community not familiar with code base as a result we are having education sessions
    - Exploration and analysis community help
        - Test large deploys with multiple (say 1000+) REV transfers
            1. Deploy transfer in a loop
            2. Assign all from one account to 1,000 people (addresses)
            3. Loop of send to each validator (deploy as many transactions as possible to maximize each propose)
            4. See how far behind the test system is
            5. Designing tests, but need help with scripts in python or javascript - Jim & GSJ
            6. Stress test system - Theo
            7. Look at existing tests (we have been doing this for sometime)
            8. Get upper bound of performance
                a. Have plan A
                b. Have plan B
            9. Gossip protocol (discuss Casper Standup) - Steve
        - Also test 1000+ deploys with a REV transfer each and see how the network performs
        - Knockout bugs and performance issue
        - Bugs as opposed to design choices
        - Block store into lmdb - only for convenience not performance
        - https://github.com/nzpr/rnode-parallelism-test
        - https://github.com/grpc/grpc/blob/master/doc/load-balancing.md
        - https://www.google.com/search?q=gossip+protocol+scala+code
    - nutzipperToday at 10:52 AM
    - @Rao we cannot do anything to be ready for high throughput except what we are targeting already -
    - 1. block merging
        - point 1 includes lmdb
    - 2. gossip protocol
    - 3. Figuring out why rholang code execution is slow
    - 4. Enable parallel deploy execution as far goal
    - I would say one pass transfer code execition is about 3-4 seconds. So to create block you have to play and replay it, so 6-8 seconds per tx. So block creation time is {precharge 4s} + 2Nnumber_of_tx_in_a_block*{tx 4 sec} + {refund 4s}
- Community update 116
- IBM BlueMix signup - Rao
- Document Repository Inventory

    - https://docs.google.com/document/d/1ZablPqToFwgyQ1fBTH2srjeN87YN3Ae5KGBGZmt2iog/edit
- Release notes topics and standard format - Nutzipper
    - Whatever is interesting about each release and noting it atop the release notes.
    - I'd like to see a the headline and top para go on the coop homepage at each (significant) release
    - The box on the right e.g. "HERON Truman Now Includes Outpatient Insurance Information"
        - By way of example: https://informatics.kumc.edu/work/
    - Release 0.9.23
        - https://github.com/rchain/rchain/releases/tag/v0.9.23
        - New : improve the network messaging
- Ask Dan Connolly about changing to Github - Steve
- RChip 08: Implementing A Breaking Change Release
    - https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit#
- Review RChip 1-7
    - https://docs.google.com/spreadsheets/d/1ciWp7pYulkEOzB2vNeDOBpi2RF3gxQVOcLYbrTvv7KE/edit#gid=1761194090
- Discord channel management
    - public-testnet - status
    - node-testing - status

### 2020-04-16

- Convene
    - Attendees:
    - Scribe:
    - Comments on Agenda?
- Community update 116
- IBM BlueMix update - Steve
- Release notes topics and standard format - Nutzipper
    - Whatever is interesting about each release and noting it atop the release notes.
    - I'd like to see a the headline and top para go on the coop homepage at each (significant) release
    - The box on the right e.g. "HERON Truman Now Includes Outpatient Insurance Information"
        - By way of example: https://informatics.kumc.edu/work/
    - Release 0.9.23
        - https://github.com/rchain/rchain/releases/tag/v0.9.23
        - New : improve the network messaging
- Ask Dan Connolly about changing to Github - Steve
- RChip 08: Implementing A Breaking Change Release

    - https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit#
- Review RChip 1-7
    - https://docs.google.com/spreadsheets/d/1ciWp7pYulkEOzB2vNeDOBpi2RF3gxQVOcLYbrTvv7KE/edit#gid=1761194090
- Discord channel management
    - public-testnet - status
    - node-testing - status
-

## 2020-04-16

1. Convene
    a. Attendees: Rao, Steve, Jim, Theo, GSJ, Tomislav
    b. Scribe: Steve
    c. Comments on Agenda?
2. Community Update 115
3. IBM BlueMix cloud service through BlockSpaces account - Steve
    a. Up to $10,000/mo. cloud service
    b. Special agreement needed for more than $10,000/mo.
    c. Is RChain ready to activate service?
    d. Join Blockspaces discord to communicate with Gabe Higgins at BlockSpaces
4. Release notes topics and standard format - Nutzipper
    a. Whatever is interesting about each release and noting it atop the release notes.
    b. I'd like to see a the headline and top para go on the coop homepage at each (significant) release
    c. The box on the right e.g. "HERON Truman Now Includes Outpatient Insurance Information"
        i. By way of example: https://informatics.kumc.edu/work/
    d. Release 0.9.23
        i. https://github.com/rchain/rchain/releases/tag/v0.9.23
        ii. New : improve the network messaging
5. Mainnet monitoring Jira epic update - GSJ
    a. Review next on April 30th
6. Add Theo's node to monitoring tools - GSJ is looking into this
    a. Theo's SysOps tools?
        i. Pulseway (+cloud platform monitoring)
        ii. Switch to Mmonit in future
            1. https://mmonit.com/monit/#slideshow
    b. RChain
        i. Using Collect D - GSJ https://collectd.rchain-dev.tk/
        ii. Look prometheus and Grafana
        iii. Rchain having memory issue but Theo is not

        1. Forward this to next week
    iv. GSJ question on Rundeck? still using this? Nutzipper
7. ★ Create a list of things we will get to. - Theo
    a. Split task into smaller units
        i. eg Mmonit
        ii. Use for education working group
            1. Running rnode? Here are monitoring tools you can use
            2. Dockerize it (EngineX proxy, etc)
            3. Dockerized configuration script
            4. Minimize the headaches for users
        iii. RChain nodes will be in the minority and community in the majority
            1. Need to ramp up training and tools for community
        iv. Create google doc philosophies on monitoring and restart
            1. Jira Epoch
            2. Not google doc
    b. Github issues
        i. Core is ok with Jira
        ii. No change now
        iii. Jira disconnected from Github
            1. Activate connection
            2. All activity on Github
            3. On Github add more tracking
            4. Sprint, kanban support is available Github
            5. We can perhaps make Jira read only
            6. Ask Dan Connolly about changing to Github - Steve
            7. Confluence move to Github as well
                a. Archive stuff incorrect
                b. Make detailed comments on inaccuracies on the page needing clean up
8. Adding methods to Scala code base
    a. Jim wants to add strings, get name/process context errors error before special name errors for more complete error reporting in Visual Studio etc.
    b. Once methods are added to the blockchain it is difficult for it to be removed (Tomislav)
    c. Technical specification to help community understand Scala code base
        i. Jim and Dan are trying to work with the code base
9. RChip 08: Implementing A Breaking Change Release
    a. https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit#
10. Review RChip 1-7
11. Discord channel management
    a. public-testnet - status
    b. node-testing - status

12. Communication
    a. Create RChip 09 - Communication Procedures
        i. Add communication notes from RChip 08
13. Run registry for token ticker symbol - RChain oracle
    a. Kucoin not acknowledging RChain's int'l trademark for REV
    b. Potential community dapp
    c. Share in discord?
    d. Registry for tokens running on RChain as well as token ticker symbol lookup
    e. Dapp idea in Google docs
    f. Ideathon SRT
14. Community development projects & dapps
    a.

## 2020-04-09

1. Convene
    a. Attendees: Rao, Steve, Jim, Tomislav, Gurindar, Nutzipper
    b. Scribe: Steve
    c. Comments on Agenda?
2. Network current mainnet state Jira tickets
    a. Whenever we touch mainnet a Jira ticket is opened (GSJ)
        i. Capture reboots, any changes etc
        ii. Automation - (long term goal) (Tomislav)
            - Like a log of changes that is accessible to other application - automate process
                - See some type of structure - API
                - Log of node information - physical nodes
                - Log state of machine - monitor prometheus and know state
            - Any changes to Google infrastructure and notice goes to discord channel
                - example hacks in server or accidently logs in
            - Are there any relevant standards for log formats (https://www.graylog.org/post/log-formats-a-complete-guide) to enable automating monitoring and notification similar to STIX (https://stixproject.github.io/about/) for communicating security events across systems
        iii. Log refers to the Jira ticket - short term (Rao)
        iv. API to report current status to the chain - long term
    b. Mainnet Monitoring Jira Epic
        i. Gurinder will create a Jira epic, story, ticket
        ii. Developer.rchain.coop - updates
        iii. Like https://rundeck.rchain-dev.tk/menu/home and https://collectd.rchain-dev.tk/ ?
        iv. https://github.com/rchain/rchip-proposals/pull/2
3. Network testnet state - future governance
4. RChip 08: Implementing A Breaking Change Release (Draft, pull request)
5. Communication
    a. Testnet and mainnet availability alerts in discord (GSJ)

    b. Create RChip 09 - Communication Procedures
        i. Add communication notes from RChip 08
6. Run registry for token ticker symbol - RChain oracle
    a. Kucoin not acknowledging RChain's int'l trademark for REV
    b. Potential community dapp
    c. Share in discord?
7. Discord channel management
    a. public-testnet - status
    b. node-testing - status
8. O2R - license
9. RChain Scala Education Series
    a. Create Education discord channel
    b. Need more written information (Nutzipper)
    c. RChain community.io
    d. Github.io
    e. How to keep video up to date?
        i. Create multiple videos on same thing
    f. Tech governance - are we achieving our educational goals
    g. https://rchain.atlassian.net/wiki/spaces/DOC/overview
    h. Task base not time based
    i. How to build rnode
    j. Update instructions
10. Review RChip 1-7

## 2020-04-02

- Convene
    - Attendees: Jim, Gary, Rao, Steve
    - Scribe: Steve
    - Comments on Agenda?
- Release notes topics and standard format
    - Release 0.9.23 - add to release notes: bug fixed: How long to take nodes to catchup and join?
        - Add specific PRs in release notes - per Rao
        - Adding specific performance metrics is not advisable because they may not be replicable across environments and context specific situations
        - Going forward would alert if a negative performance impact is anticipated
    - Get Dan Connally's link for micro notes
- RChip 08: Implementing A Breaking Change Release (Draft)
    - https://docs.google.com/document/d/1p2phT3XjkAV45AaDoKYrgPvBAmagsfXRMxeA8YXDDCA/edit

## 2020-03-26

- Convene
    - Attendees: Rao, Jim, Nutzipper, Tomislav, Theo, Steve H, GSJ
    - Scribe: Steve H
    - Comments on Agenda?
- Update tech governance process for updating mainnet with current release
    - Mainnet updated to release 0.9.23
        - Have new release on testnet much longer than one week
        - Critical update release to mainnet maybe shorter than one week on testnet
        - Communications
            - Validator release report - show all validators and their current release they are running
            - Announcements process
                - Inter-communication that helps node runners know network status (i.e. block height of breaking change)
                - List of changes in registry (put this information on the chain) channel announcements
                    - List changes in registry
                - Block height
                - What is change
                - Automation
                    - Validator can agree for this change to be automatic
                    - Combination of services
                    - Stop RSpace
        - **Change classifications:**
            - Release updates (soft change)
                - Validators can run different versions
                - https://rchain.atlassian.net/browse/RCHAIN-4068 created to tag messages and logs with the release of the RNode being used
            - Release update (breaking change)
                - All validators must coordinate to participate in update
                    - Casper protocol provides certain assurances (Tomislav)
                - block height - point in time network will support new version
                    - node pending state - validator will not be backward compatible
                - Start again
                - What should be the lag where breaking change happens
                - Migrate old network to network with breaking change
                - Communicating, identifying, (Tomislav)

        - Create google doc and use mark to populate RChip in github
        - Issue tree or stream
        - How implement breaking changes?l
            - Developers
            - Prospsers
        - Title: Implementing Breaking Changes
        -
    - Hard fork procedures
        - Definition of a hard fork:
            - block height - point in time network will support new version
                - node pending state - validator will not be backward compatible
            - new version
            - all agree to update POS contract or RevVault or other components that intro changes into state that is not the protocol
            - breaking changes (incompatible update) - if validator does not update the node it should stop - i.e. not be able to issue new blocks. Validators will refuse blocks from the validator that does not update. Validaotors will receive blocks but not process them.
        - Announce to node validators this is a required update
        - Decide at which block height do the hard fork
        - For breaking change, read-only must make change
- Machine State -
    - Run old release
        - Snapshot (checkpoint) - defined state from which a validator starts
            - From checkpoint start acquiring blocks
            - Node knows It is ok to not have blocks before checkpoint)
        - Epoch change
            - Validators need to synchronize state by choosing block prior to epoch change block
        - Validators - must be prepared to start in one moment, perhaps starting before the epoch change
        - How to manage deploys in the block?
    - Finalized block
        - Validator know if they are not a validator in the next epoch
        - Validator can stop producing blocks
            - If deploy is not in the last finalized block - what happens?
                - Validator should forward deploys
                - D
        - Epoch change without a fork

            - Epoch change with a fork
    - New validators
        - Need time to sync up
        - User needs to redeploy if they do not see their deploy
        - Deploy gossip
            - Gossiping protocol -  need to implement this
            - https://www.btcwires.com/round-the-block/what-is-gossip-protocol/
        - Deploy signature
            - who received
            - who bound to deploy
            - third signature?
    - Exiting Validator (Unbonding validator)
        - Validator will know if they will be rotated out of network
        - If a validator has deploys in the queue it has no incentive to do anything with them.
- Github testnet & mainnet release update document
    - https://rchain.atlassian.net/wiki/spaces/RIP/overview

## 2020-03-19

- Convene
    - Attendees:
    - Scribe:
    - Comments on Agenda?
- Multi-signatures for RChain co-op Rev wallets
- Create RChip github repository similar to Ethereum
    - https://github.com/ethereum/EIPs/tree/master/EIPS
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