

Core2 Document - P2P Improvement

Seed Authorization

NOTE this feature is partial implemented

Motivation

Core2 P2P network is designed that aims to optimize for the propagation of transactions and blocks based on a structured network. It consists of a tree-shaped network with multiple paths and the root of a tree is a fully connected network between validators. In this network, 'Seed' refers to a node that can be directly connected to the validator-network, and it serves to protect the validator-network from malicious nodes. However, since there are currently no restrictions on becoming a 'Seed', malicious nodes can also become 'Seed' and directly connect to and attack the validator-network.

Policy

NOTE node-configuration is not implemented. (refer to [seedRoleAuthorizationPolicyConfigure in network/seedmanager.go](#))

Policy	Basic platform	ICON platform
ByState	Authorize by Governance SCORE (using Chain SCORE)	Authorized for PRep (Main or Sub grade)
ByAuthorizer	Authorize by Validator	Authorize by PRep (Main or Sub grade)
ByValidatorVotes	Authorize by Validator votes (2/3 over)	

ChainScore

NOTE ChainScore is not implemented. ([service/platform/basic/chainscore.go](#), [icon/chainscore.go](#))

Storage

in System DB

Key	DB Type	Value Type	Description
seed_policy	VarDB	int	SeedRoleAuthorizationPolicy (bit flag) 0: None 1: ByState 2: ByAuthorizer 4: ByValidatorVotes

seed_term	VarDB	int	SeedTerm (used for 'expire' of seed verification, unit as number of blocks)
seeds	ArrayDB	bytes	List of seed addresses
seed_candidates	ArrayDB	bytes	List of seed-candidate addresses

Method

Method	Description
getSeedRoleAuthorizationPolicy() int	Returns SeedRoleAuthorizationPolicy
setSeedRoleAuthorizationPolicy(value int)	Sets SeedRoleAuthorizationPolicy
getSeedTerm() int	Returns SeedTerm
setSeedTerm(value int)	Sets SeedTerm
getSeeds() []Address	Returns list of registered seed addresses (used if SeedRoleAuthorizationPolicy enabled ByState)
addSeed(address Address)	Register seed address (fail if given address is registered)
removeSeed(address Address)	Unregister seed address (fail if given address is not registered)
getSeedCandidates() []Address	Returns list of registered seed-candidate addresses (used for seed-candidate validation)
addSeedCandidate(address Address)	Register seed-candidate address (fail if given address is registered)
removeSeedCandidate(address Address)	Unregister seed-candidate address (fail if given address is not registered)

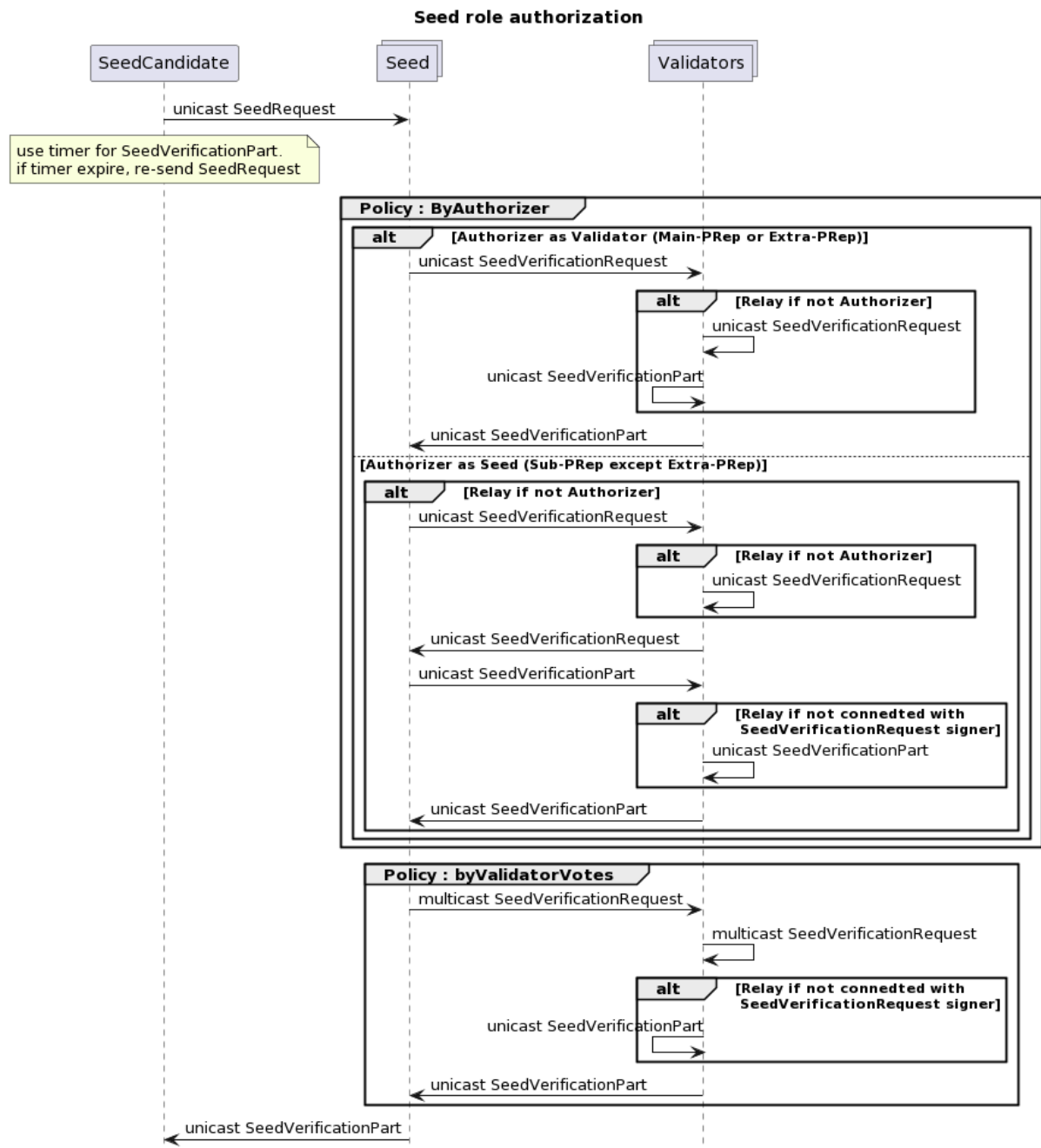
Message

Structure

Message	Field	Description
SeedRequest	Type	One of {ByAuthorizer, ByValidatorVotes}
	Issuer	Address of authorizer or hash of ValidatorSet

	NetAddress	Network address of Seed-Candidate
	Height	Block height at request
	Signature	Sign with other fields
SeedVerificationRequest	SeedRequest	Corresponded message
	Signature	Sign with other fields
SeedVerificationPart	SeedVerificationRequest	Corresponded message
	Expire	Expire of verification (block height)
	Signature	Sign with other fields
SeedVerification	SeedVerificationRequest	SeedVerificationPart.SeedVerificationRequest
	Expire	SeedVerificationPart.Expire
	Signatures	List of SeedVerificationPart.Signature

Sequence



Seed Evaluation

NOTE this feature is not implemented

Metric

Metric	Description
Availability	Cumulative connection time with corresponding seed within SeedTerm. (unit as number of blocks)
Transactions	Number of transactions from corresponding seed within SeedTerm.

ChainScore

NOTE requirements : 'revoke authorization', 'reward based on evaluation metrics'

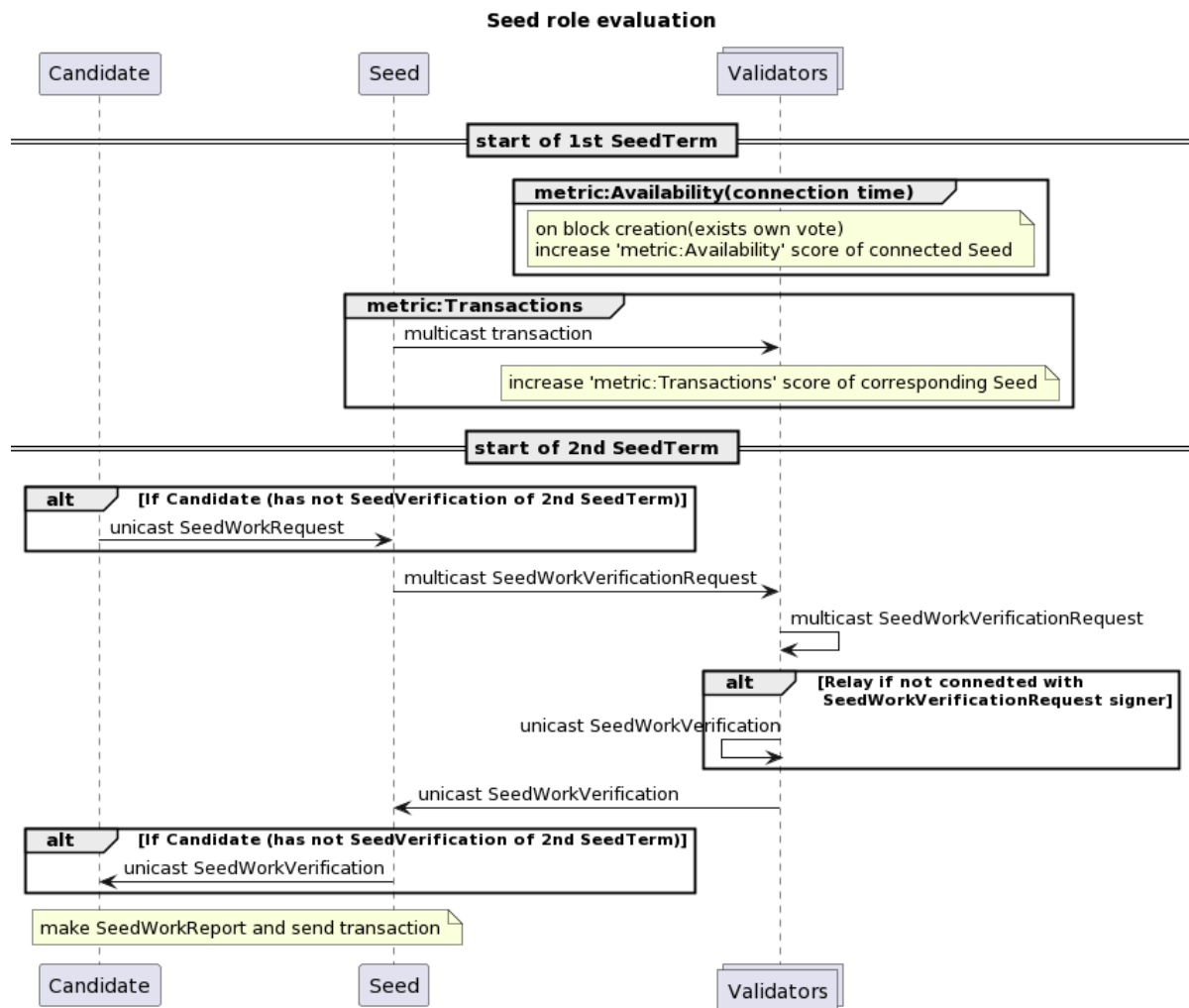
Message

Structure

Message	Field	Description
SeedWorkRequest	SeedVerification	
	Signature	Sign with other fields
SeedWorkVerificationRequest	SeedWorkRequest	
	Signature	Sign with other fields
SeedWorkVerification	SeedWorkMetric	
	Signature	Sign with other fields and corresponding SeedVerification
SeedWorkReport	SeedVerification	
	SeedWorkVerifications	List of SeedWorkVerification

Struct	Field	Description
SeedWorkMetric	Availability	Cumulative connection time (unit as number of blocks)
	Transactions	Number of transactions

Sequence



Enhanced Query protocol

Role

Include proof of role.

Struct	Field	Description
RoleSync	Role	PeerRoleFlag (bit flag) 0: Citizen 1: Seed 2: Validator
	Proof	bytes (of SeedVerification)

RTT

Change from two-way to one-way round trip time measurement for reduce traffic.

Struct	Field	Description
RttMessage	Last	int (last measured round-trip-time value, unit as nano seconds)
	Average	int (exponentially weighted average of round-trip-time, unit as nano seconds)

QueryItem

Apply non-fixed query and reduce result message size

QueryItem	Description
Roots	List of known root network-addresses
Seeds	List of known seed network-addresses
Children	DiffResult, Address of children connections
Nephews	DiffResult, Address of nephews connections
Other	DiffResult, Address of other connections

Struct	Field	Description
DiffResult	From	From version (given version for diff)

	Version	Version at diff
	Type	DiffType 0: None 1: Partial 2: Entire (Used in case of 'From' is too old to diff. To apply result, reset with 'Add')
	Add	List of addresses, added
	Del	List of addresses, deleted

Message

Structure

Message	Field	Description
QueryMessage	Role	RoleSync
	RTT	RttMessage
	Items	List of QueryItem
QueryResultMessage	Role RoleSync	RoleSync
	RTT	RttMessage
	ResultItems	List of QueryResultItem

Struct	Field	Description
QueryItem	ID	QueryItemID 0: Roots 1: Seeds 2: Children 3: Nephews 4: Other
	Version	int
QueryResultItem	ID	QueryItemID
	Error	ErrorCode 0: success other: failure
	Result	bytes (corresponding result)

Sequence

Query

