

Book 2

The Osnias Network architecture

Title	Book 2 The Osnias Network architecture
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Abstract

Osnias Clearing is a blockchain-based clearing infrastructure built on a strict functional separation between clearing and settlement. The canonical clearing register operates on Sei Network, incorporating structured financial messaging aligned with ISO 20022 principles and a 19-digit clearing account identifier (Osnias-ID, MOD-97 checksum, ISO 4217 currency codes). Multilateral netting is calculated on-chain across 1-, 4- and 13-week cycles. Settlement is executed exclusively by independent NNN nodes operating their own escrow infrastructure on connected EVM networks. Osnias does not take custody of collateral and does not execute settlement. The architecture is designed with reference to CPMI-IOSCO Principles for Financial Market Infrastructures and applicable regulatory frameworks including EMIR and FINMA guidelines.

Keywords

on-chain clearing, multilateral netting, ISO 20022, Sei Network, EVM, Osnias-ID, MOD-97, ISO 4217, CPMI-IOSCO, EMIR, FINMA, non-custodial, clearing cycle, NNN node, smart contracts, escrow, canonical register, settlement finality

Résumé

Osnias Clearing est une infrastructure de clearing sur blockchain reposant sur une séparation fonctionnelle stricte entre le clearing et le règlement. Le registre canonique de clearing opère sur Sei Network, avec une messagerie financière structurée conforme aux principes ISO 20022 et un identifiant de compte de clearing à 19 chiffres (Osnias-ID, checksum MOD-97, codes devise ISO 4217). Le netting multilatéral est calculé on-chain sur des cycles de 1, 4 et 13 semaines. Le règlement est exécuté exclusivement par des nœuds NNN indépendants opérant leur propre infrastructure d'escrow sur des réseaux EVM connectés. Osnias ne prend pas en garde les actifs et n'exécute pas le règlement. L'architecture est conçue par référence aux Principes CPMI-IOSCO pour les infrastructures de marchés financiers, ainsi qu'aux cadres réglementaires EMIR et FINMA.

Mots-clés

clearing on-chain, netting multilatéral, ISO 20022, Sei Network, EVM, Osnias-ID, MOD-97, ISO 4217, CPMI-IOSCO, EMIR, FINMA, non-custodial, cycle de clearing, nœud NNN, smart contracts, escrow, registre canonique, finalité du règlement

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1 Position within the document framework and status

Book 2 is a standalone document in the logical sequence of the Osnias Clearing document framework.

Document	Function	Contribution to the onboarding journey	URL
Book 1	Osnias-ID	Participant identity and crosschain linkages.	https://www.osnias-clearing.com/osniasid/
Book 2	Architecture	Separation of clearing, settlement and collateral.	https://www.osnias-clearing.com/architecture/
Book 3	Clearing Rules	Obligations, netting, governance and responsibilities.	https://www.osnias-clearing.com/rules/
Book 4	Cycles and Calendar	Time synchronization and transaction states.	https://www.osnias-clearing.com/cycle/
Book 5	Security	Domains A B C, composite condition and threat model.	https://www.osnias-clearing.com/security/
Book 6	Onboarding	Admission, EUR/EURC gateway, escrow and exit.	https://www.osnias-clearing.com/onboarding/

Document status This document sets out a functional architecture and design requirements. It is not an independent audit, a formal verification, a penetration test, a security certification or an authorization for production deployment.

2 Executive Position

Osnias Clearing is designed as a functionally segregated infrastructure. Sei hosts the canonical clearing register: clearing accounts, clearing-room parameters, register positions, cycle status and multilateral netting. Connected EVM environments host local Osnias-ID registries, collateral escrow arrangements and the infrastructure of registered NNN nodes.

The canonical clearing layer on Sei incorporates structured financial messaging for the issuance, processing and acceptance of payment requests between participants. EVM environments remain separate and are used for local registry, collateral and settlement functions.

Osnias calculates the netting result but does not execute settlement. At the settlement stage, Sei records the residual net positions and Osnias-ID allocates them to the relevant NNN nodes. NNN nodes execute settlement at two levels: inter-NNN settlement of residual obligations between nodes and intra-NNN settlement for accounts registered with the same node.

The principal innovation lies in combining a canonical clearing chain with separately operated NNN settlement infrastructures linked through Osnias-ID. The identifier provides a compact, verifiable account-to-node mapping across networks, currencies and clearing cycles, without bridging the clearing register. Clearing calculation and novation are separate mechanisms: netting determines residual positions, while the on-chain architecture records and controls novation events against the relevant Osnias-IDs.

3 Clearing and Settlement

3.a Clearing Function

Clearing identifies accepted obligations, reconciles them under the rules of a clearing room and offsets them on a bilateral or multilateral basis. Its output is a set of net positions and settlement instructions. Clearing determines

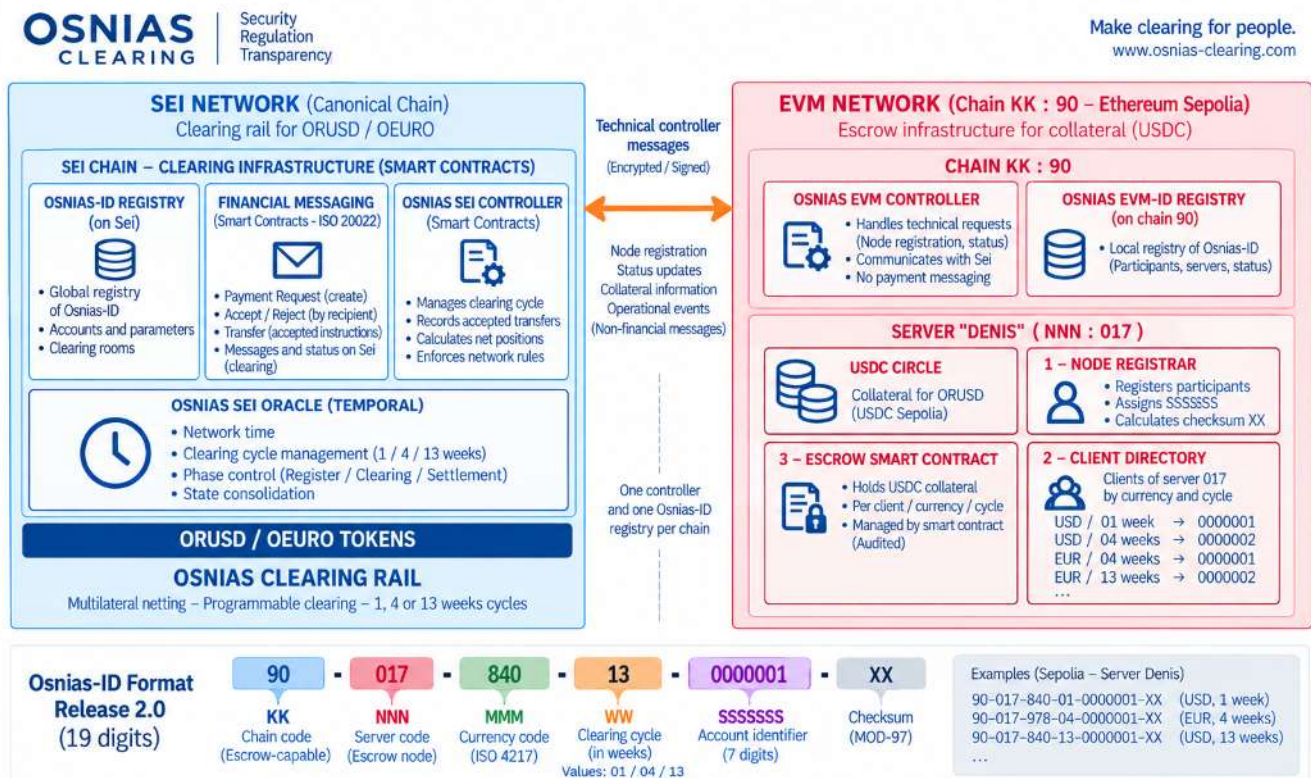
what remains payable; it does not itself discharge the payment obligation, and the netting calculation alone does not effect novation.

3.b Settlement Function

Settlement discharges the residual obligation through the transfer of the relevant settlement asset. Osnias does not perform that transfer. NNN nodes execute inter-NNN settlement for residual obligations between nodes and intra-NNN settlement for obligations involving accounts registered with the same node. Each node uses the settlement infrastructure and procedures for which it is responsible. Legal finality arises at that settlement level under the applicable system rules, contracts, settlement asset and governing law.

Clearing and settlement are therefore distinct functions, even when they form part of the same payment process. Osnias assigns the canonical clearing calculation and record to Sei. Osnias-ID allocates the resulting instructions, and the NNN nodes execute and finalise settlement.

4 Functional Architecture



4.a Federated Geographic and Jurisdictional Architecture

Osnias Clearing is designed as a federated network of geographically distributed NNN nodes. Each NNN node is operated by an independent local legal entity established or authorised to operate within its relevant jurisdiction.

The canonical clearing protocol remains common to all participating nodes. Clearing rules, cycle states, Osnias-ID references and multilateral net positions are maintained through the common Osnias architecture and canonical Sei clearing layer. The geographic distribution of nodes does not modify the deterministic clearing calculation.

Each NNN node nevertheless operates within its own legal and regulatory perimeter. The node operator is responsible for determining and maintaining the licences, registrations, contractual arrangements, compliance procedures and supervisory relationships required under the laws applicable to its activities.

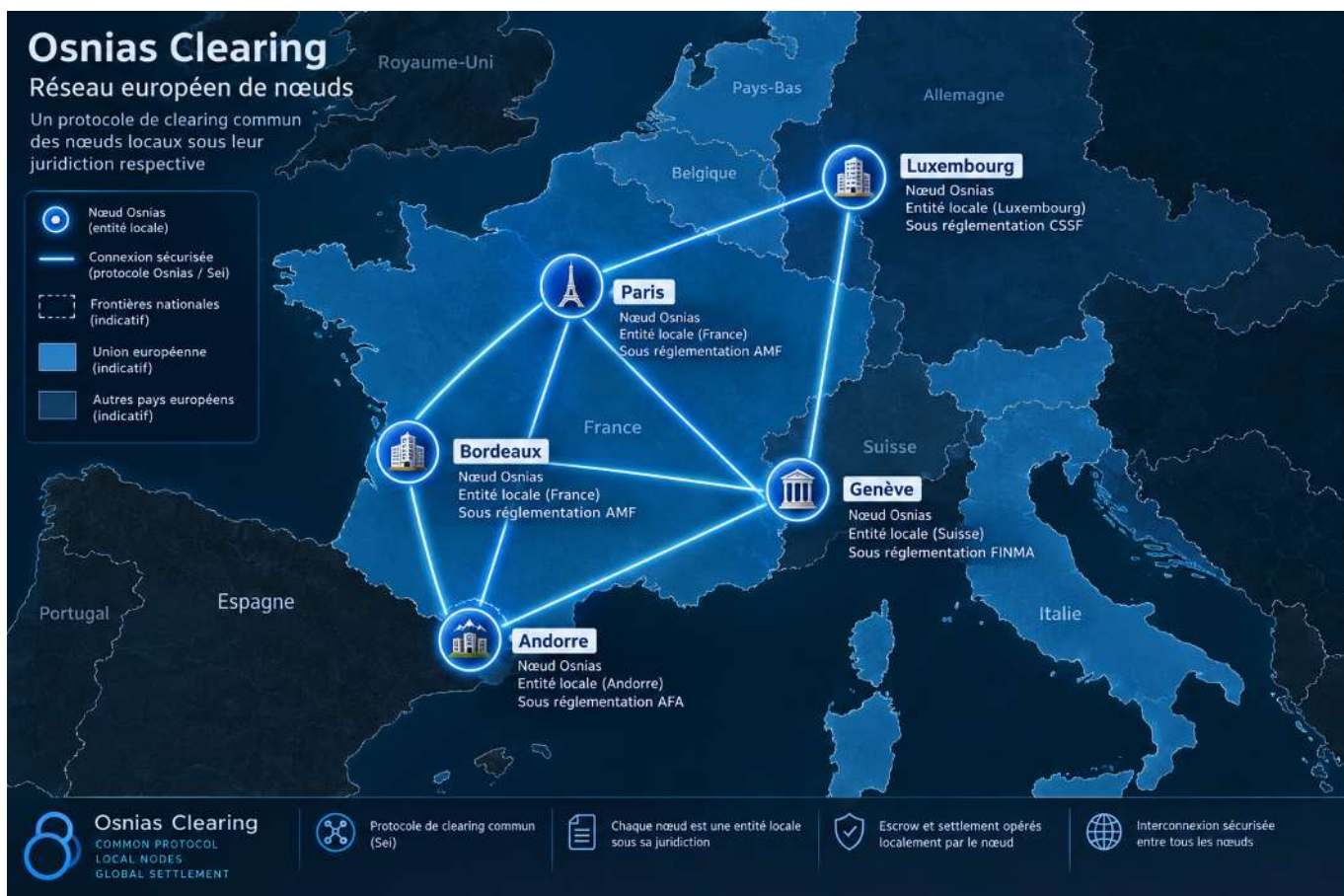
Accordingly, participation in the Osnias network does not transfer, mutualise or extend the regulatory status of one node to another node. Admission to the common clearing protocol does not constitute recognition that the regulatory authorisation applicable to one jurisdiction is valid in another jurisdiction.

The architecture therefore separates :

- a common and jurisdiction-neutral clearing protocol;
- locally operated NNN nodes;
- jurisdiction-specific regulatory and supervisory requirements; and
- locally authorised settlement infrastructure.

This federated model allows nodes operating under different jurisdictions to participate in the same deterministic clearing environment while preserving the legal and regulatory autonomy of each node operator.

4.b Local Custody, Escrow Control and Settlement Responsibility



Custody and settlement functions remain local to each NNN node and are not transferred to Osnias Clearing.

Each NNN node operates or controls, under its applicable contractual and regulatory arrangements, the escrow infrastructure associated with the participants registered with that node. The node operator is responsible for the availability, safeguarding and permitted use of the relevant settlement assets or collateral held within that infrastructure.

At the end of a clearing cycle, the canonical Sei layer determines the net positions resulting from the accepted clearing state. Osnias-ID identifies the NNN nodes responsible for the corresponding accounts and routes the resulting settlement information to the relevant node operators.

The resulting net position constitutes the output of the clearing process. It does not itself transfer settlement assets.

The responsible NNN node retains operational control over the relevant client escrow accounts and executes the settlement operations required to discharge the resulting obligations. This includes intra-NNN settlement between accounts administered by the same node and inter-NNN settlement of residual obligations between different nodes.

The settlement rail is determined at node level in accordance with the infrastructure, settlement assets, banking arrangements and legal requirements applicable in the relevant jurisdiction. The common Osnias clearing protocol does not impose a privileged banking, payment or settlement rail.

Osnias Clearing does not control participant escrow accounts, does not hold participant or node settlement assets, does not initiate transfers from those accounts and does not execute settlement on behalf of an NNN node.

Settlement finality therefore arises within the settlement infrastructure used by the responsible node and under the contractual rules and governing law applicable to that settlement operation.

The resulting allocation of functions is:

Osnias Clearing → canonical clearing calculation and common protocol

NNN Node → local participant relationship, escrow control and settlement responsibility

Local regulatory framework → authorisation, supervision and legal conditions applicable to the node and its settlement activities

5 **Osnias-ID**

Osnias-ID is the common account reference across the architecture. Its 19-digit format identifies the connected chain, the NNN node responsible for the account, the ISO 4217 currency, the clearing cycle and the account sequence, with a MOD 97 checksum. It identifies a clearing account rather than the legal entity itself. A participant may therefore hold separate Osnias-IDs for different currencies, cycles or clearing rooms.

The identifier enables the Sei registry to associate a canonical clearing account with the corresponding local EVM account without treating a blockchain address as the corporate identity. The NNN field supports aggregation of positions by node, as well as routing and reconciliation of settlement instructions. This preserves local responsibility for registration and settlement while providing a stable cross-chain reference.

Novation is handled at this architectural layer rather than within the clearing calculation. The relevant on-chain state transition is linked to the Osnias-IDs of the affected accounts, providing a traceable association between the pre-novation obligation and the resulting obligation. Its legal effect is governed by the applicable rulebook, contractual documentation and governing law.

6 **Operating Cycle and Controls**

Each clearing room defines its currency, participants and cycle duration. The temporal oracle on Sei determines the applicable phase and applies the same phase status to the clearing register. At the cycle cut-off, accepted positions are time-stamped and frozen for calculation. Participants then have a defined contestation period before residual settlement instructions are released to the responsible NNN nodes.

- The state used for netting is reproducible from the accepted on-chain register.
- A contested item is placed in an exception state under predefined rules and is excluded or held pending resolution.
- A contestation does not delete the historical record. The resolution and any resulting correction remain traceable.

- Decisions relating to identity verification, legal adjudication of a dispute and recovery remain the responsibility of the relevant participant, the NNN node and the external legal process.

Deterministic calculation does not make the underlying commercial claim legally incontestable. It means that the same accepted register state and the same published rules produce the same residual result.

7 Canonical Clearing Layer on Sei

Sei maintains the authoritative state of each clearing room. The Sei layer comprises the global Osnias-ID registry, the Sei controller, the temporal oracle and the ORUSD or OEURO clearing register.

It applies the cycle rules, records accepted payment requests as Transfers and calculates the residual position from the accepted state.

ORUSD and OEURO are used in this paper as functional descriptions of clearing-register units. They are not bridged, wrapped or routed through decentralised exchanges. Transfers are restricted to eligible externally owned accounts registered in the Osnias network.

8 ISO 2022 Messages

Within the clearing layer operated on Sei, Osnias incorporates a financial messaging function for the exchange of structured, identified and traceable payment requests between participants in a clearing room.

Messages are structured in accordance with the principles of ISO 2022 and use Osnias-ID as the clearing-account reference. In particular, Osnias-ID identifies the associated network through KK, the relevant node through NNN, as well as the currency, clearing cycle and associated account.

A payment request follows three functional stages:

1. Payment Request — Creation of the request

A participant creates a payment request containing, in particular, the Osnias-IDs of the sender and recipient, the transaction reference, amount, currency, date and the information required for processing.

2. Processing — Review by the recipient

The recipient receives the request within the Sei clearing environment and may accept or reject it. Until accepted, the request does not constitute an admitted Transfer in the clearing register.

3. Transfer — Recording of the accepted instruction

Once accepted, the request moves to Transfer status. It then becomes an instruction recognised within the clearing cycle and may be included in the canonical register for the subsequent calculation of net positions.

8.a Identity Confidentiality and Participant Identification

The clearing layer on Sei does not directly process the legal or commercial identity of participants. The register primarily sees the Osnias-IDs of the sender and recipient together with the data required to process the instruction.

The mapping between an Osnias-ID and the identity of the account holder is not publicly exposed within the clearing layer. Only the legitimate recipient of a payment request may submit an identification query to determine the participant to which the relevant Osnias-ID is linked, subject to the access and authorisation rules applicable at the competent node.

This mechanism separates:

the clearing identifier visible on Sei from the participant identity, which is maintained outside the canonical clearing layer.

The messaging layer therefore preserves the traceability required for processing, reconciliation and netting while limiting the exposure of identity data on the Sei register.

The message carries the payment instruction; it does not itself execute settlement. Settlement occurs subsequently, on the basis of residual positions produced by clearing, at the level of the responsible NNN node.

The functional sequence is therefore:

ISO 20022 Message on Sei → Payment Request → Accept / Reject → Transfer → Clearing → Net Position → Settlement by the relevant NNN node.

9 EVM Node Infrastructure

Each connected EVM network has an Osnias controller and a local Osnias-ID registry. A registered NNN node enrolls eligible accounts, maintains its client directory and operates an escrow smart contract for the designated collateral. Mint requests are transmitted to Sei only after the node-side controls have been satisfied. A burn confirmed on Sei authorises the corresponding settlement or collateral-release process at the originating NNN node.

The NNN node is responsible for settlement involving its registered accounts. It settles its residual position with other NNN nodes and performs the corresponding allocation across its own account population. Osnias Clearing does not take custody of the settlement asset or collateral and does not execute either leg of settlement. Collateral remains subject to the node-specific escrow contract and the legal arrangements between the node and the participant.

10 Financial Effects

10.a Netting of Accepted Obligations Before Settlement

Before settlement, multilateral netting may reduce the gross amount submitted to NNN nodes for settlement. The reduction depends on the number of participants, the direction and concentration of obligations, the currency, the cycle and accepted contestations. It is an observed outcome for a given cycle, not a fixed protocol guarantee.

For example, if accepted gross commercial flows of 100 produce residual settlement instructions of 5, the cycle has reduced the gross external settlement flow by 95 per cent. Any published reduction ratio should be accompanied by the underlying dataset and calculation methodology.

10.b Collateral Integrity

Netting before settlement does not reduce the backing requirement for outstanding clearing-register units. Each authorised mint remains subject to the applicable EVM escrow requirement. The benefit is a reduction in gross settlement flows submitted to NNN nodes, while the collateral invariant remains independently verifiable.

10.c Difference in Nature

Dimension	CCP — Central Counterparty	Osnias Clearing
Legal position	Interposes itself between the original counterparties under its rulebook	The protocol does not itself become the legal counterparty; resulting obligations follow the on-chain state, Osnias-ID mapping and applicable documentation
Novation	Typically achieved through interposition under the CCP rulebook	Separate from netting; implemented and recorded as an on-chain state transition linked to the relevant Osnias-IDs
Performance guarantee	Manages participant default risk through margin, financial resources and default procedures	Does not guarantee performance and does not mutualise participant losses through a default fund
Clearing state	Maintained under the CCP rulebook and operating systems	Canonical register and cycle state maintained on Sei
Settlement	Produces obligations for settlement through the relevant settlement arrangements	Calculates residual positions on Sei and routes instructions through Osnias-ID; NNN nodes execute inter-NNN and intra-NNN settlement

Dimension	CCP — Central Counterparty	Osnias Clearing
Collateral	Risk-based margin and other financial resources	NNN-node-specific escrow backing authorised register issuance
Credit risk	Centralised and managed under the CCP framework	Allocated under the resulting obligations, NNN-node arrangements and applicable clearing-room documentation
Identifier	Member and account identifiers defined by the CCP	Osnias-ID links each clearing account to its chain, NNN node, currency and cycle

11 Regulatory Perimeter and Responsibilities

This paper describes the intended allocation of technical functions. It is not a legal opinion and does not determine the regulatory classification of Osnias, ORUSD, OEURO, an NNN node, an escrow arrangement or a connected settlement service.

Osnias performs the clearing calculation but does not execute settlement. Sei records the canonical net positions and Osnias-ID allocates them to the relevant NNN nodes. Settlement occurs at node level: inter-NNN between nodes and intra-NNN within a node's registered accounts. Each NNN node remains responsible for its settlement assets, execution, legal finality and regulatory obligations. This allocation is material to the regulatory analysis; classification depends on the applicable rulebook, contracts, governance and actual operation of the network.

Osnias separates the clearing calculation from the on-chain novation mechanism. Novation is recorded and controlled through architecture-level state transitions linked to Osnias-ID; it does not arise from the netting calculation alone. Its legal effectiveness, enforceability and treatment in insolvency depend on the applicable rulebook, contractual documentation and governing law. The presence of this mechanism, together with the actual custody, settlement, guarantee and risk-allocation arrangements, must therefore be considered in any jurisdiction-specific assessment relating to financial market infrastructures, payments, crypto-assets, banking, AML/CFT, data protection and other applicable rules.

- Osnias does not operate a DEX, AMM or CEX and does not provide leveraged trading or investment services.
- ORUSD and OEURO remain on the canonical Sei clearing layer and are not designed for market circulation, bridging or smart-contract routing.
- Each NNN node retains responsibility for onboarding, AML and sanctions controls, collateral arrangements and settlement execution within its own regulatory perimeter.
- Participants remain responsible for the validity of commercial claims, their tax and accounting treatment and compliance with the rules of their clearing room.
- External legal or agreed procedures govern disputes that cannot be resolved by deterministic protocol rules.

12 Conclusion

Osnias separates clearing from settlement by design. Sei is the canonical clearing chain. Connected EVM environments host local registries, collateral arrangements and NNN-node infrastructure.

Financial messaging and payment instructions are processed within the canonical clearing layer on Sei. EVM environments host collateral arrangements, settlement infrastructure and participant-identification information at NNN-node level.

Osnias calculates multilateral net positions on Sei. Osnias-ID aggregates and routes the resulting instructions by NNN node. NNN nodes execute inter-NNN and intra-NNN settlement and remain responsible for settlement finality. Clearing, novation and settlement are distinct functions, each governed by its own technical state and applicable legal framework.