

BOOK 2

Osnias Network Architecture

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Abstract

Osnias Clearing is a blockchain clearing infrastructure built on a strict functional separation between clearing and settlement. The canonical clearing ledger runs on Sei Network, with 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 computed on-chain over 1-, 9- and 13-week cycles (1W, 9W and 13W profiles of Book 4). Since Release 2.1, no clearing token is issued: each member's clearing capacity is recorded as a net position on the Sei ledger, backed 1:1 by its escrow on the EVM side, and chamber solvency is monitored in real time by two oracles. Settlement is executed under the responsibility of independent NNN nodes using locally authorised settlement infrastructure. Connected EVM environments can host node-level escrow and collateral arrangements. Osnias does not take custody of settlement assets and does not execute settlement. The architecture is designed with reference to the CPMI-IOSCO Principles for Financial Market Infrastructures and to the EMIR and FINMA regulatory frameworks.

Keywords

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

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1 Position within the document corpus and status

Book 2 is a standalone document within the logical sequence of the Osnias Clearing corpus.

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/
Book 7	O-POP Osnias	Mainnet access architecture, dedicated RPC and audit traces.	https://www.osnias-clearing.com/pop/

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 authorisation to go live.

Release 2.1 — 14 October 2026. Alignment with Book 3 (Release 1.3): removal of the clearing token and of MINT/BURN operations, position ledger on Sei, two-oracle solvency control, Osnias-ID registry oracles and registry concordance control, strictly positive net position condition, cycle closing calendar (1W, 9W and 13W profiles), escrow frozen during the cycle and node licensing requirement.

2 Statement of principle

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

The canonical clearing layer on Sei embeds 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 computes 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.

Clearing computation and the architecture-level recording of obligation state transitions are distinct mechanisms: netting determines the residual positions, while the on-chain architecture records and controls the state transitions associated with the relevant Osnias-IDs. Whether such a transition qualifies as legal novation depends on the applicable rulebook, the contractual documentation and the governing law.

Major simplification (Release 2.1). Osnias no longer issues a clearing token. At cycle opening, each member's position on the Sei ledger equals the amount of its escrow on the EVM side; each accepted obligation simultaneously books $-X$ to the debtor and $+X$ to the creditor, without changing the system total. Solvency is monitored continuously by two oracles: the Ethereum solvency oracle, relayed to Sei by the Controllers, and the Sei solvency oracle. The Sei net total must equal the Ethereum escrow total at all times (Book 3, §4.q and §7).

3 Clearing and settlement

a Clearing function

Clearing identifies accepted obligations, matches them according to the rules of a clearing chamber and offsets them on a bilateral or multilateral basis. It produces a set of net positions and settlement instructions. Clearing determines what remains to be paid; it does not, on its own, discharge the payment obligation, and the netting computation alone does not effect novation.

b Settlement function

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

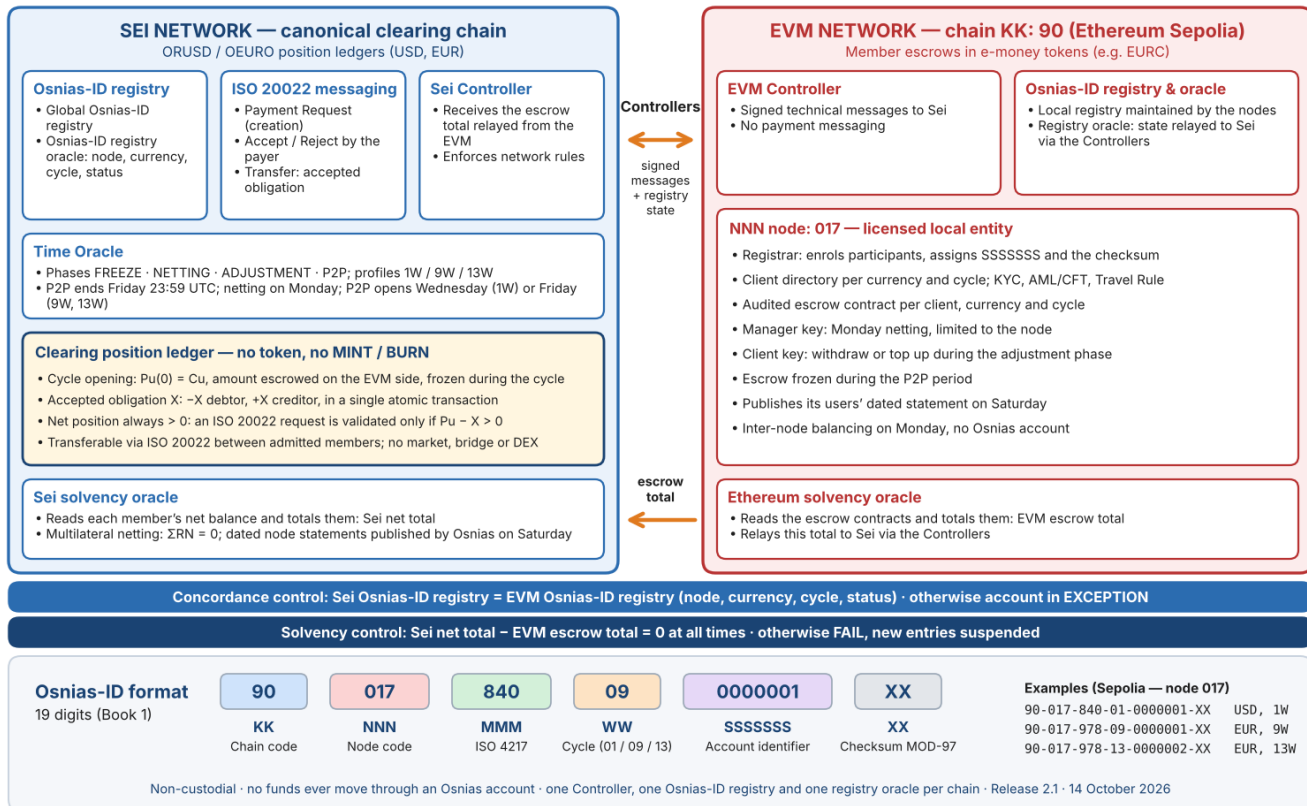
Clearing and settlement are therefore distinct functions, even when they form part of the same payment process. Osnias assigns canonical clearing computation and recording to Sei. Osnias-ID allocates the resulting instructions, and NNN nodes execute and finalise settlement.

4 Functional architecture

OSNIAS CLEARING

Multi-chain architecture · Release 2.1 — tokenless position ledger

Book 2 — Architecture

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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 in the 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 the canonical clearing layer on Sei. The geographic distribution of nodes does not alter the deterministic clearing computation.

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 by the law applicable to its activities.

Accordingly, participation in the Osnias network does not transfer, pool or extend the regulatory status of one node to another. Admission to the common clearing protocol does not amount to recognition, in another jurisdiction, of the regulatory authorisation applicable in a given jurisdiction.

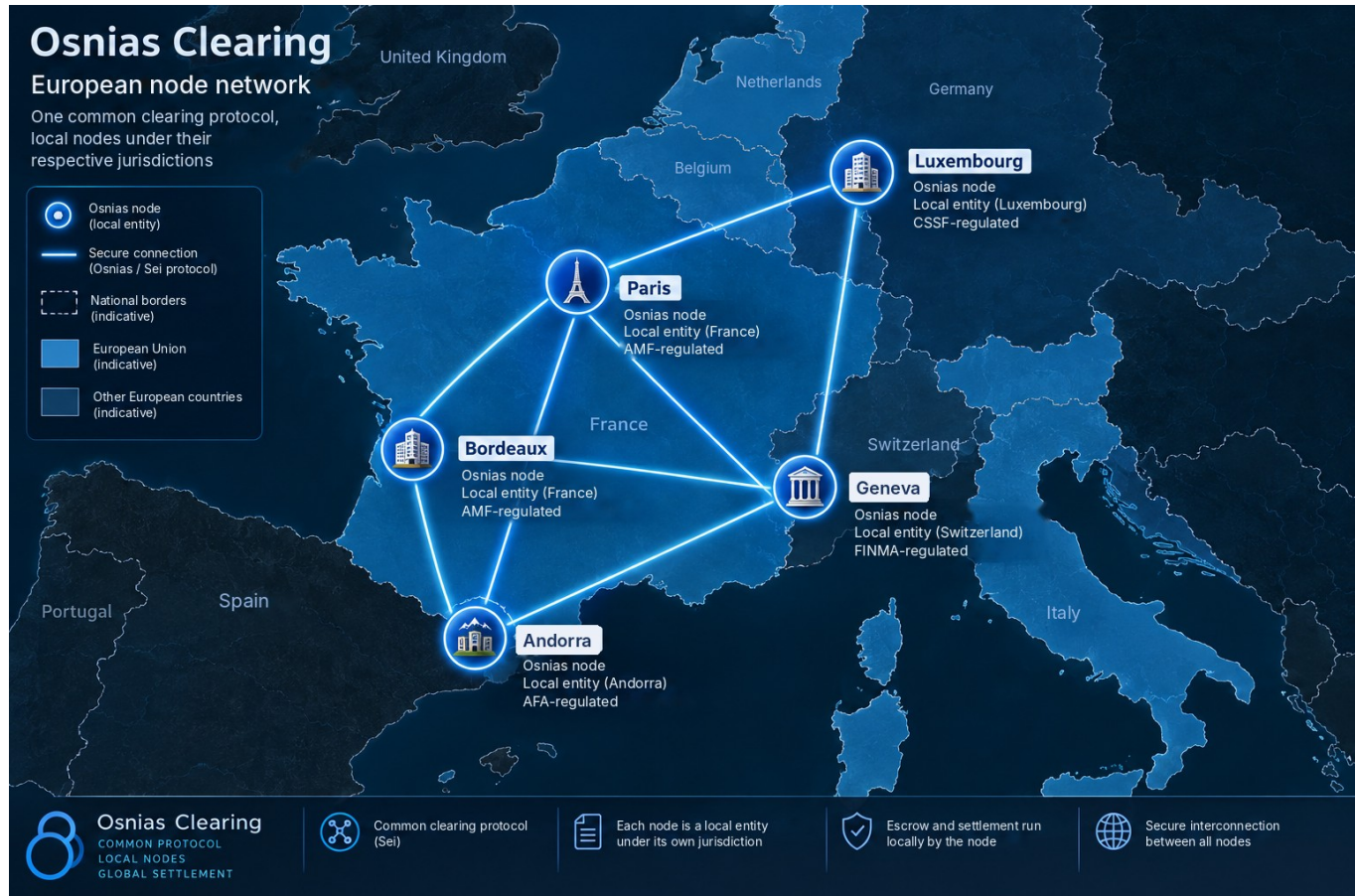
The architecture therefore distinguishes:

- a common, jurisdiction-neutral clearing protocol;
- locally operated NNN nodes;
- regulatory and supervisory requirements specific to each jurisdiction; 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.

Figure 2 — Federated geographic and jurisdictional node architecture — Illustrative European topology

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, within the contractual and regulatory arrangements applicable to it, the escrow infrastructure associated with the participants registered with that node. The node operator is responsible for the availability, protection and authorised 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 is the output of the clearing process. It does not, by itself, transfer settlement assets.

The responsible NNN node retains operational authority over the escrow or settlement arrangements of the relevant participants, or has settlement executed through them. It executes, or is responsible for having executed, the settlement operations needed 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 separate nodes.

The settlement rail is determined at node level according to the infrastructure, settlement assets, banking arrangements and legal requirements applicable in the relevant jurisdiction. The common Osnias clearing protocol does not impose any preferred banking, payment or settlement rail.

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

Escrow control by cycle phase. On Monday (netting phase), the node manager aligns its clients' escrows with the net dated statement using its manager key, limited to the node's own users and to the node account for inter-node amounts. During the adjustment phase (Tuesday in 1W; Tuesday to Thursday in 9W and 13W), the client alone controls its escrow and may withdraw to its withdrawal address or top it up. During the P2P period, the escrow is frozen. No movement ever passes through an Osnias account (Book 3, §4.j and §4.r).

Settlement risk. During the netting phase, a creditor client bears the settlement risk of the paying node, which the Rulebook must address; a debtor client is exposed only to its own collateral (Book 3, §4.q).

Settlement finality therefore occurs within the settlement infrastructure used by the responsible node, in accordance with the contractual rules and the law applicable to that settlement operation.

The resulting functional allocation is as follows:

Osnias Clearing → canonical clearing computation 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, as defined in Book I of the Osnias Clearing Technical and Functional Reference Corpus, is the common clearing account reference used throughout the Osnias architecture. Book I is the normative specification of the Osnias-ID format, its allocation, validation, life cycle and registry controls.

Within the functional architecture described in this Book II, Osnias-ID provides the deterministic link between a clearing account, its network domain, the responsible NNN node, the associated ISO 4217 currency and the authorised clearing cycle. It enables routing, aggregation and reconciliation between the canonical clearing layer and the corresponding node-level infrastructure.

The registry architecture and Osnias-ID binding rules are defined normatively in Book I. Book II describes their functional position and use within the overall Osnias Clearing architecture.

6 Operating cycle and controls

Each clearing chamber defines its currency, its participants and its cycle length. The Time Oracle on Sei determines the applicable phase and applies the same phase state to the clearing ledger. At cycle close, accepted positions are timestamped and frozen for computation. Participants then have a defined dispute period before residual settlement instructions are sent to the responsible NNN nodes.

Closing calendar. The last P2P order of the cycle is accepted on Friday of the final week at 23:59:59 UTC. On Saturday and Sunday (freeze), each node publishes the dated statement of its users and Osnias publishes the consolidated dated statement of the nodes; disputes are open throughout those two days. Monday is the netting day, followed by the client's escrow adjustment phase. The opening position $Pu(0) = Cu$ is booked at the start of the P2P period: Wednesday at 00:00 UTC in 1W, Friday at 00:00 UTC in 9W and 13W. The normative calendar is set out in Book 4; the corresponding rules are in Book 3.

- The state used for netting is reproducible from the accepted on-chain ledger.
- A disputed item is placed in an exception state according to predefined rules and is excluded or held pending until it is resolved.
- A dispute does not erase history. Its resolution and any resulting correction remain traceable.

- Decisions on identity verification, the legal resolution of a dispute and debt recovery remain the responsibility of the participant concerned, the NNN node and external legal procedures.

The deterministic nature of the computation does not make the underlying commercial claim legally incontestable. It means that the same accepted ledger state, subject to the same published rules, produces the same residual result.

7 Canonical clearing layer on Sei

Sei maintains the authoritative state of each clearing chamber. The Sei layer comprises the global Osnias-ID registry and its registry oracle, the Sei Controller, the Time Oracle, the Sei solvency oracle and the chamber's clearing position ledger (ORUSD for USD, OEURO for EUR).

It applies the cycle rules, records accepted payment requests under Transfer status and computes the residual position from the accepted state. Before any acceptance, it checks that the debtor's net position remains strictly positive ($P_u - X > 0$).

Since Release 2.1, ORUSD and OEURO no longer designate tokens: they are the names of the USD and EUR clearing position ledgers. Positions recorded there are transferable through ISO 20022 messaging: each accepted obligation transfers value from the debtor to the creditor between eligible accounts of the Osnias network. They are not tradable on a market and are not bridged, wrapped or routed through decentralised exchanges. Transfers are limited to eligible external accounts registered in the Osnias network.

8 ISO 20022 messages

Within the clearing layer operated on Sei, Osnias embeds a financial messaging function enabling structured, identified and traceable payment requests to be exchanged between the participants of a clearing chamber.

Messages are structured according to ISO 20022 principles and use Osnias-ID as the clearing account reference. Osnias-ID identifies, in particular, the associated network through KK, the relevant node through NNN, as well as the currency, the clearing cycle and the associated account.

A payment request goes through three functional steps:

1-Payment Request — Creation of the request

A participant creates a payment request containing, in particular, the Osnias-IDs of the sender and the recipient, the transaction reference, the amount, the currency, the date and the information needed to process it.

2. Processing — Review by the recipient

The recipient receives the request in the Sei clearing environment and may accept or reject it. Until it is accepted, the request is not an admitted Transfer in the clearing ledger.

3. Transfer — Recording of the accepted instruction

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

Acceptance condition. The payer can accept a payment request only if its net position on Sei remains strictly positive after the operation; otherwise the request cannot be validated and no entry is booked (Book 3, §4.q).

a Identity confidentiality and participant identification

The clearing layer on Sei does not directly process the legal or commercial identity of participants. The ledger mainly processes the Osnias-IDs of the sender and the recipient and the data needed to process the instruction.

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

This mechanism separates:

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

The messaging layer thus preserves the traceability needed for processing, reconciliation and netting, while limiting the exposure of identity data on the Sei ledger.

The message carries the payment instruction; it does not itself execute settlement. Settlement takes place later, on the basis of the residual positions produced by clearing, at 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, a local Osnias-ID registry and an Osnias-ID registry oracle that attests its state to Sei through the Controllers. A registered NNN node enrolls eligible accounts, maintains its participant master data and operates an escrow smart contract for the designated collateral, held in the e-money token matching the chamber currency (for example EURC for a EUR chamber). There are no more mint or burn requests: at the start of the P2P period, the escrowed amount is booked as the opening position on Sei ($Pu(0) = Cu$) and then remains frozen for the whole cycle. The Ethereum solvency oracle reads the escrow contracts, totals them and relays the total to Sei through the Controllers; the Sei solvency oracle totals the net balances on Sei; the difference between the two totals must be zero at all times.

The NNN node is responsible for settlement for the accounts it has registered. It settles its residual position with the other NNN nodes and performs the corresponding allocation across its own account population. Osnias Clearing does not take custody of the settlement asset or the collateral and executes neither leg of settlement. The collateral remains subject to the node's own escrow contract and to the legal arrangements binding the node and the participant.

10 Network oracles

The Osnias network relies on five oracles. None of them holds funds, signs a transfer or modifies a position: they read a state, total it or compare it, and publish a timestamped, signed attestation. Their failure or silence results in a blocking (fail-closed) state, never in an entry.

Time Oracle (Sei). Determines the cycle phase (FREEZE, NETTING, ADJUSTMENT, P2P) according to the 1W, 9W or 13W profile and applies it identically to the clearing ledger and to access controls.

Osnias-ID registry oracle (Sei). Reads the global Osnias-ID registry and publishes, for each chamber, the account state: Osnias-ID, NNN node, currency, cycle and status (active, suspended, closed).

Osnias-ID registry oracle (Ethereum). Reads the local Osnias-ID registry of the EVM chain, maintained by the NNN nodes, and relays its state to Sei through the Controllers as signed technical messages.

Ethereum solvency oracle. Reads the members' escrow contracts, totals them per chamber and relays this escrow total to Sei through the Controllers.

Sei solvency oracle. Reads each member's net position on the position ledger and totals them per chamber.

Registry concordance control. For each Osnias-ID, the global Sei registry and the local EVM registry must agree on node, currency, cycle and status. A non-matching account is placed in EXCEPTION: it can neither issue nor accept an ISO 20022 request, and its escrow can only be adjusted after resolution by the responsible node. This control ensures that every net position on Sei corresponds to an identified escrow on the EVM side.

Solvency control. The Sei net total must equal the Ethereum escrow total at all times. Any discrepancy, or any attestation missing beyond the set delay (STALE status), produces FAIL status and suspends new entries in the chamber until equality is restored.

Attestations. Each oracle publishes, at least every five minutes and at the end of each phase, a signed and timestamped attestation, stored on Sei and available to nodes, members and competent authorities. The detailed rules are set out in Book 3 (§4.q and §7).

11 Financial effects

a Netting of accepted obligations before settlement

Before settlement, multilateral netting can reduce the gross amount sent 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 disputes. It is an observed result for a given cycle, not a fixed guarantee of the protocol.

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%. Any published reduction ratio must be accompanied by the underlying dataset and the computation methodology.

b Collateral integrity

Netting before settlement does not reduce position coverage: the total of net positions on Sei equals, at all times, the total escrowed on the EVM side, and each member's escrow remains frozen during the cycle. The benefit lies in the reduction of gross settlement flows sent to NNN nodes, while the collateral invariant remains independently verifiable through the two-oracle solvency control.

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; the resulting obligations derive from the on-chain state, the Osnias-ID mapping and the applicable documentation
Novation	Generally effected by interposition under the CCP rulebook	Distinct from netting; implemented and recorded as an on-chain state transition linked to the relevant Osnias-IDs
Settlement guarantee	Manages participant default risk through margins, financial resources and default procedures	Does not guarantee settlement and does not mutualise participant losses through a default fund
Clearing state	Maintained under the CCP rulebook and operational systems	Canonical ledger and cycle state maintained on Sei
Settlement	Produces obligations to be settled through the relevant settlement arrangements	Computes residual positions on Sei and routes instructions via Osnias-ID; NNN nodes execute inter-NNN and intra-NNN settlement
Collateral	Risk-based margins and other financial resources	Each member's escrow, backed 1:1 by its net position on Sei and frozen during the cycle
Credit risk	Centralised and managed within the CCP	Net position always strictly positive: the debtor is exposed only to its collateral; the creditor bears the paying node's settlement risk during netting (Book 3, §4.q)
Identifier	Member and account identifiers defined by the CCP	Osnias-ID links each clearing account to its chain, NNN node, currency and cycle

12 Regulatory perimeter and responsibilities

This document describes the intended allocation of technical functions. It is not legal advice and does not determine the regulatory qualification of Osnias, of positions recorded on the ORUSD and OEURO ledgers, of an NNN node, of an escrow arrangement or of a connected settlement service.

Osnias performs the clearing computation but does not execute settlement. Sei records the canonical net positions and Osnias-ID allocates them to the relevant NNN nodes. Settlement takes place at node level: inter-NNN between nodes and intra-NNN among accounts registered with the same node. Each NNN node remains responsible for its

settlement assets, execution, legal finality and regulatory obligations. This allocation is decisive for the regulatory analysis; qualification depends on the applicable rulebook, contracts, governance and the actual operation of the network.

Osnias separates the clearing computation from the on-chain mechanism that may give effect to novation. The corresponding state transitions are recorded and controlled at architecture level and linked to Osnias-ID; they do not result from the netting computation alone. Their legal effectiveness, enforceability against third parties and treatment in insolvency depend on the applicable rulebook, the contractual documentation and the governing law. The existence of this mechanism, together with the actual custody, settlement, guarantee and risk-allocation arrangements, must therefore be taken into account in any jurisdiction-specific analysis of financial market infrastructure, payments, crypto-assets, banking, AML/CFT, data protection and other applicable rules.

- Osnias operates no DEX, AMM or CEX and provides no leveraged trading or investment service.
- Positions on the ORUSD and OEURO ledgers remain on the canonical Sei clearing layer; they are transferable only through ISO 20022 messaging between eligible accounts of the network and are not designed for market circulation, bridging or routing through smart contracts.
- Each NNN node retains responsibility for onboarding, AML/CFT and sanctions controls, collateral arrangements and settlement execution within its own regulatory perimeter.
- Admission of a node is conditional on evidence that it holds the licences required in its jurisdiction; in France, crypto-asset service provider (CASP) authorisation granted by the AMF and payment institution or e-money institution status, or agent status of such an institution, with the ACPR (Book 3, §2.e).
- The authorities potentially concerned in the European Union and in France include the AMF, the ACPR and the Banque de France; this document does not prejudge any qualification.
- Participants remain responsible for the validity of commercial claims, their tax and accounting treatment and compliance with the rules of their clearing chamber.
- Disputes that cannot be resolved by the protocol's deterministic rules are referred to external legal procedures or agreed procedures.

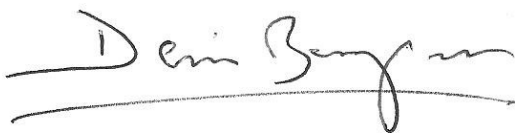
13 Conclusion

Osnias separates clearing from settlement by design. Sei is the canonical clearing chain. Connected EVM environments host the 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 the collateral arrangements, settlement infrastructure and participant identification data at NNN node level.

Osnias computes multilateral net positions on Sei. Osnias-ID aggregates and routes the resulting instructions per 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 by the applicable legal framework.

Since Release 2.1, no clearing token is issued: net positions are held directly on Sei, backed 1:1 by EVM escrows, under permanent solvency control by two oracles.



Kind regards,
Denis Bouzon
Osnias Clearing