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⚙️ Initializing Phase 1 Multi-User Registration Infrastructure Environment...

Alias Name: [+ Register Handle Node](#)

- ✅ Success: Generated keys for '500100100'. Issued Public Handle: 0x02ef1ef43a24608dc1ae7d8fbe1084be916719b0
- ✅ Success: Generated keys for '500100200'. Issued Public Handle: 0xa5bade2b3fdf89a30fef374d5d3395617f3ba376
- ✅ Success: Generated keys for '500100300'. Issued Public Handle: 0x41091d54b3242aaac05c2c36c82b170fb57addae
- ✅ Success: Generated keys for '500100400'. Issued Public Handle: 0xeb5bec0d844c47dd97c4d2017924782c0ee294b9

📁 Scalable Public Handle Identity Registry

Entity Alias	Public Cryptographic Address Handle (0x...)	Local Private Seed Key State
👤 500100100	0x02ef1ef43a24608dc1ae7d8fbe1084be916719b0	🔒 Secured in Client Node Memory
👤 500100200	0xa5bade2b3fdf89a30fef374d5d3395617f3ba376	🔒 Secured in Client Node Memory
👤 500100300	0x41091d54b3242aaac05c2c36c82b170fb57addae	🔒 Secured in Client Node Memory
👤 500100400	0xeb5bec0d844c47dd97c4d2017924782c0ee294b9	🔒 Secured in Client Node Memory

📊 Current Lineage Chain Block Depth: 4 entries | Latest Global Root: cc409d7feedb2515a8ae...

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📄 **Outbound Compensation Requests Ledger (Awaiting Confirmation)**

Tx ID	Creditor (Alias)	Debtor (Alias)	Invoice Value	ATCUD Code	Proposed Line (Lc)	Current State
tx_083b73ca	0x02ef... (500100100)	0xa5ba... (500100200)	\$120,000	q	\$300,000	pending_debtor_confirmation
tx_0fa711bb	0xa5ba... (500100200)	0x4109... (500100300)	\$120,000	qq	\$300,000	pending_debtor_confirmation
tx_d8fe0269	0x4109... (500100300)	0xeb5b... (500100400)	\$120,000	qqq	\$300,000	pending_debtor_confirmation
tx_1ca0c9c8	0xeb5b... (500100400)	0x02ef... (500100100)	\$120,000	qqqq	\$10,000	pending_debtor_confirmation
tx_67ba5f80	0xeb5b... (500100400)	0x02ef... (500100100)	\$10,000	qqqqq	\$10,000	pending_debtor_confirmation
tx_0906d208	0x02ef... (500100100)	0x4109... (500100300)	\$20,000	qqqqqq	\$20,000	pending_debtor_confirmation

🔴 Dashboard: 500100100

Outbound Request Engine

Debtor Link:

Value (\$):

ATCUD ID:

Propose Lc...

🔔 Sign & Dispatch Claim

🔴 Dashboard: 500100300

Outbound Request Engine

Debtor Link:

Value (\$):

ATCUD ID:

Propose Lc...

🔔 Sign & Dispatch Claim

🔴 Dashboard: 500100200

Outbound Request Engine

Debtor Link:

Value (\$):

ATCUD ID:

Propose Lc...

🔔 Sign & Dispatch Claim

🔴 Dashboard: 500100400

Outbound Request Engine

Debtor Link:

Value (\$):

ATCUD ID:

Propose Lc...

🔔 Sign & Dispatch Claim

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🔒 1. Execute DKG Ceremony (Generate Network Key)

🔒 [TEE Enclave] Initializing Secure Hardware Memory Boundary...

👉 Running Distributed Threshold Key Ceremony across active participant shards...

👉 **Network Threshold Public Key Online!**

Master Network Key Target Address: **0x_net_pub_56a4e8dc2851f452e1a12bf5cae9230a**

Decryption keys are now split into shards. Debtors can now directly encrypt confirmations to this target.

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⚙️ Bootstrapping Symmetrical Debtor Confirmation Interface Context...

🔄 Load Symmetrical Debtor Menus

✅ Success: Cryptographic match verified for tx_d8fe0269! Confirmation signed.

📄 Symmetrical Consensus Overview Grid

Tx ID	Creditor (Alias)	Debtor (Alias)	Invoice Value (Locked)	ATCUD Code	Proposed Line (Lc)	Authorized Line (Ld)	Consensus Cap (L)	State
tx_083b73ca	0x02ef... (500100100)	0xa5ba... (500100200)	\$120,000	q	\$300,000	\$300,000	\$300,000	pending_enclave_clearance
tx_0fa711bb	0xa5ba... (500100200)	0x4109... (500100300)	\$120,000	qq	\$300,000	\$300,000	\$300,000	pending_enclave_clearance
tx_d8fe0269	0x4109... (500100300)	0xeb5b... (500100400)	\$120,000	qqq	\$300,000	\$300,000	\$300,000	pending_enclave_clearance
tx_1ca0c9c8	0xeb5b... (500100400)	0x02ef... (500100100)	\$120,000	qqqq	\$10,000	\$120,000	\$10,000	pending_enclave_clearance
tx_67ba5f80	0xeb5b... (500100400)	0x02ef... (500100100)	\$10,000	qqqqq	\$10,000	\$10,000	\$10,000	pending_enclave_clearance
tx_0906d208	0x02ef... (500100100)	0x4109... (500100300)	\$20,000	qqqqqq	\$20,000	\$20,000	\$20,000	pending_enclave_clearance

🟢 Dashboard: 500100100

Inbound Verification Queue

No incoming bills awaiting confirmation.

🟢 Dashboard: 500100300

Inbound Verification Queue

No incoming bills awaiting confirmation.

🟢 Dashboard: 500100200

Inbound Verification Queue

No incoming bills awaiting confirmation.

🟢 Dashboard: 500100400

Inbound Verification Queue

No incoming bills awaiting confirmation.

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📁 Downloading optimization frameworks and solver binaries into runtime path...
W: Skipping acquire of configured file 'main/source/Sources' as repository '<https://r2u.stat.illinois.edu/ubuntu> noble InRelease' does not seem to provide it (sources.list entry mi

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✅ CoinOR CBC Solver is installed and accessible at: /usr/bin/cbc

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⚙️ Bootstrapping Secure FastAPI Payload Ingestion Endpoint...

📄 Ingest Payloads & Map Dynamic Gross Matrix

🔒 [TEE Enclave] FastAPI Payload Ingestion Gateway Active...

🔒 [TEE Enclave] Reassembling fractionalized threshold network keys...

🔑 --- STEP 4.1.A: ESTABLISHING CRYPTOGRAPHIC MATRIX HANDLES ---

Index [0] <==> Handle Address: 0x02ef1ef43a24608dc1ae7d... (500100100)

Index [1] <==> Handle Address: 0x41091d54b3242aaac05c2c... (500100300)

Index [2] <==> Handle Address: 0xa5bade2b3fdf89a30fef37... (500100200)

Index [3] <==> Handle Address: 0xeb5bec0d844c47dd97c4d2... (500100400)

🔒 --- STEP 4.1.B: DECRYPTING PAYLOADS & ASSIGNING GRID COORDINATES ---

-> Successfully Decrypted Tx #tx_083b73ca: Value \$120,000 | ATCUD Reference: q
Mapping: Row [0] owes Column [2]

-> Successfully Decrypted Tx #tx_0fa711bb: Value \$120,000 | ATCUD Reference: qq
Mapping: Row [2] owes Column [1]

-> Successfully Decrypted Tx #tx_d8fe0269: Value \$120,000 | ATCUD Reference: qqq
Mapping: Row [1] owes Column [3]

-> Successfully Decrypted Tx #tx_1ca0c9c8: Value \$120,000 | ATCUD Reference: qqqq
Mapping: Row [3] owes Column [0]

-> Successfully Decrypted Tx #tx_67ba5f80: Value \$10,000 | ATCUD Reference: qqqqq
Mapping: Row [3] owes Column [0]

-> Successfully Decrypted Tx #tx_0906d208: Value \$20,000 | ATCUD Reference: qqqqqq
Mapping: Row [0] owes Column [1]

📊 --- STEP 4.1.C: MEMORY RECONSTITUTED ENCLAVE MATRIX BOUNDARY ---

🔒 [GOD MODE] Enclave Protected Gross Exposure Matrix

This clear-text view represents total outstanding liabilities collected inside the hardware perimeter before optimization runs:

Creditor Handle \ Debtor Handle	500100100	500100300	500100200	500100400
500100100 (0x02ef...)	\$0.0	\$20,000.0	\$120,000.0	\$0.0
500100300 (0x4109...)	\$0.0	\$0.0	\$0.0	\$120,000.0
500100200 (0xa5ba...)	\$0.0	\$120,000.0	\$0.0	\$0.0
500100400 (0xeb5b...)	\$130,000.0	\$0.0	\$0.0	\$0.0

Total Gross Debt Volume parsed inside hardware perimeter: \$510,000.0

> 📊 Model 5 Netting Engine & Global Proofs Verification

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⚙️ Bootstrapping Scalable Pyomo Optimization Infrastructure...

🏠 Compute Model 5 & Generate Global Proofs

🔒 [TEE Enclave] Entering Protected Memory Optimization Subsystem...

Model 5 Optimization Complete. Extracting global verification invariants...

⚙️ Step 4.2 & 4.3: Model 5 Global Proof Verification Engine

Verification Criterion Invariant Rule	Status Code
Verify original balances == new optimized balances	✓ TRUE (PASS)
Verify all new transactions are under consensus limits ($\text{netopt} \leq \text{lim}$)	✓ TRUE (PASS)
Verify all new individual CREDITS SUM are under previous credit sums	✓ TRUE (PASS)
Verify all new individual DEBTS SUM are under bilateral debt sums	✓ TRUE (PASS)

📢 Published Global Proof Root Hash (Appended to Chain):
0x_proof_root_01d97315e692db13cfa5a237df8ed2e013f577b860c7088e20315ab3cd8a5fd1

📄 Publicly Viewable Network Cipher-Text Envelope:
🔒_net_enc_01a7eb69c3fc881efb8e0a784aa25a26

> 👁 Enter God Mode: View Clear Matrix

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👁️ Enter God Mode: View Clear Matrix

🟢 [GOD MODE] Optimized Netting Settlement Matrix Overview

This is the clear-text state calculated inside the secure hardware perimeter before egress row segregation occurs:

Creditor Address Handle	Debtor [0] 500100100 0x02ef1ef4...	Debtor [1] 500100300 0x41091d54...	Debtor [2] 500100200 0xa5bade2b...	Debtor [3] 500100400 0xeb5bec0d...
👤 500100100 (0x02ef1e...)	\$0.00	\$20,000.00	\$0.00	\$0.00
👤 500100300 (0x41091d...)	\$0.00	\$0.00	\$0.00	\$0.00
👤 500100200 (0xa5bade...)	\$0.00	\$0.00	\$0.00	\$0.00
👤 500100400 (0xeb5bec...)	\$10,000.00	\$0.00	\$0.00	\$0.00

- 📁 Concrete Settlement Payment Routes:
- ⚡ Handle 500100300 (0x41091d...) must pay \$20,000.00 to Handle 500100100 (0x02ef1e...).
 - ⚡ Handle 500100100 (0x02ef1e...) must pay \$10,000.00 to Handle 500100400 (0xeb5bec...).

📊 Total Initial Gross Debt Claims:	\$510,000.00
📈 Total Optimized Net Settlement Flow:	\$30,000.00
🌟 Absolute System Liquidity Savings:	\$480,000.00

> 📁 Phase 4.4: Enclave Egress Distribution & Secure Client Retrieval Panels

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⚙️ Bootstrapping Secure FastAPI Outbound Egress & Client Retrieval Systems...

🔒 1. Run Egress Row Segregation & Broadcast Ciphers

🔒 [TEE Enclave] Initializing Secure Data Segregation and Outbound Packaging...

⚙️ Processing 4 individual account matrix vectors...

- Vector row segregated & asymmetrically encrypted for: 500100100 (0x02ef1ef43a24...)
- Vector row segregated & asymmetrically encrypted for: 500100300 (0x41091d54b324...)
- Vector row segregated & asymmetrically encrypted for: 500100200 (0xa5bade2b3fdf...)
- Vector row segregated & asymmetrically encrypted for: 500100400 (0xeb5bec0d844c...)

🟢 [TEE Egress Complete]: Outputs safely broadcasted to the network hash chain directory.

🔒 [500100100 Window] Contacting network layer to retrieve block for handle: 0x02ef1ef43a24608dc1...

👤 Received encrypted cipher stream: 📦 cipher_aes_gcm_d987bbe2b40bca41f868a9cead7f2b4d

🔒 Injecting local private seed key [..4c656d0726..] to unlock unsegmented row...

🛡️ **Local Secure Vault: 500100100**

Asymmetric Handle Key Verified: 0x02ef1ef43a24608dc1ae7d8fbe1084be916719b0

📊 **Settled Internal Ledger Positions:**

🟢 **Your Cleared Credits Row (Amounts owed to you by others):**

[0.0, 20000.0, 0.0, 0.0]

🔴 **Your Cleared Debts Column (Amounts you must route out):**

[0.0, 0.0, 0.0, 10000.0]

🔗 Verified Parent Cryptographic Lineage Proof: 0x_proof_root_01d97315e692db13cfa5a237df8ed2e013f577b860c7088e20315ab3cd8a5fd1

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⚙️ Bootstrapping Secure FastAPI Outbound Egress & Client Retrieval Systems...

🔒 1. Run Egress Row Segregation & Broadcast Ciphers

🔒 [TEE Enclave] Initializing Secure Data Segregation and Outbound Packaging...

>   Processing 4 individual account matrix vectors...
- Vector row segregated & asymmetrically encrypted for: 500100100 (0x02ef1ef43a24...)
- Vector row segregated & asymmetrically encrypted for: 500100100 (0x02ef1ef43a24...)
- Vector row segregated & asymmetrically encrypted for: 500100100 (0x02ef1ef43a24...)
- Vector row segregated & asymmetrically encrypted for: 500100100 (0x02ef1ef43a24...)

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 [TEE Egress Complete]: Outputs safely broadcasted to the network hash chain directory.
 [500100100 Window] Contacting network layer to retrieve block for handle: 0x02ef1ef43a24608dc1...
 Received  encrypted cipher stream:  cipher_aes_gcm_d987bbe2b40bca41f868a9cead7f2b4d
 Injecting local private seed key [..4c656d0726..] to unlock unsegmented row...
 [TEE Enclave Security Perimeter] Initializing Guardrail Audit Matrix...

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Pre-flight invariant audit checking completed prior to final network block validation:

-  **Proof 1: Conservation of Value** -> Net sum is exactly zero. No artificial liquidity generated. **[PASS]**
-  **Proof 2: Anti-Drain Bond** -> No user net position was degraded during routing execution. **[PASS]**
-  **Proof 3: Model 5 Capacity Bounds** -> All outputs strictly bounded by consensus limits matrix ($\forall i,j \leq \min(L_c, L_d)$). **[PASS]**

 Live Sequence Nonce Anchor (Anti-Replay Tracker Block):
0x_nonce_anchor_4fba8a05f7741de191cf012d
Unix Epoch Time Anchor Seed: 1790126037