# SPEC-1C — Lucid RDP: Tokenomics, Wallet, Client Controls & Execution

## Reward Policy Addendum (Finalized & Immutable)

### Fixed Block Rate

* **slotDurationSec = 120s** ⇒ **max 30 blocks/hour** (immutable).

### Fallback Publisher & Reward

* If a slot observes **no sessions**, the **Server (Original node)** must publish the block and receives a **fixed reward of 2 LUCID** (exempt from halving/stabilizer).

### Halving Schedule (Supply‑Driven)

* **Max supply reference**: **42,000,000,000 LUCID**.
* **Halving trigger:** every **2.1B** tokens minted (5% of max), the **per‑block maximum reward halves**; never below **1**.
* slotMax(H) = max(1, floor( 50 / 2^H )) where H = floor(totalMinted / 2\_100\_000\_000).

### Node‑Density‑Aware Reward

* Inputs per slot: S\_t sessions, N\_active\_t active nodes, B\_t total compressed bytes; BASE\_MB\_PER\_SESSION (default **5 MB**).
* Work units: W\_t = max(S\_t, ceil(B\_t / BASE\_MB\_PER\_SESSION)); density: D\_t = W\_t / max(1, N\_active\_t).
* Reward: with minReward=1, g\_sessions = clamp((S\_t-1)/9,0,1), g\_density = 0 if D\_t < D\_min else (D\_t-D\_min)/(1-D\_min); reward\_raw = minReward + floor((slotMax(H) - minReward) \* g\_sessions \* g\_density); stabilizer may scale minting down; if S\_t=0 then reward=2.

**ParamRegistry**: BASE\_MB\_PER\_SESSION (5), D\_min (0.2), slotDurationSec (120 fixed), plus stabilizer params elsewhere.

## Node Worker Duties — VM Processing & In‑House Transfers

* Execute/validate VM transactions (LucidAnchors, LucidChunkStore, LucidGovernor, ParamRegistry, LucidToken, EligibilityManager, WorkCreditsOracle).
* Index events/receipts; expose proofs; produce VM traces on demand.
* Assemble & attest payout batches; relay TRON transfers; reconcile entitlements; only multisig‑authorized nodes co‑sign.

**MongoDB**: tx\_index, vm\_traces, contract\_states, payout\_batches, transfers\_internal, tron\_receipts.

## Tokenomics & Voting (Transferable Token, Stimulus Targets, Net‑of‑Fees)

### Governance (recap)

* **One‑node‑one‑vote** among eligible nodes (≥80% uptime in last 3 months and ≥1 LUCID earned). Token balances do **not** influence votes.

### LUCID Token

* **Transferable** ERC‑20‑style token with **monthly snapshot** balances (Snapshot\_t) for payout apportionment.
* Not immediately redeemable; holders **lodge monthly claims** (then any‑time withdrawals once posted to PayoutsVault).

### Revenue Split & Stimulus (TRON side)

* Split GrossIncome\_t: **18% Tax**, **2% Management**, **40% HoldingsVault**, **40% BaseDistributable**.
* **Stimulus**: if **HoldingsVault ≥ Goal\_k**, add **10% × Goal\_k** to the month’s distributable pool, then decrement HoldingsVault and bump Goal\_{k+1} = Goal\_k + $5M (20M → 25M → 30M → …).

### Per‑Token Rate & Net Payout (Local Fee Estimation)

* Supply\_t = Σ Snapshot\_t balances; GRate\_t = Distributable\_t / Supply\_t.
* **Min payout threshold**: **$10.00 USD** pre‑fee → smaller entitlements roll to next month.
* **TRON fee** from **local full node** (energy/bandwidth, staked resources, configured TRX→USD), **no external oracle**. Receivable = Gross − NetworkFee − PlatformFee%.

### Worked Examples

* **Stimulus**: Goal 20M, Income 100k, Supply 1M → Distributable = 2,040,000 → $2.04/token; 10k tokens → $20,400 gross (minus fees); HoldingsVault → 18M; next goal 25M.
* **No stimulus**: Distributable 40k → $0.04/token; 10k tokens → $400 gross (minus fees).

## Wallet & Cash‑Out (USDT Direct Only)

* **Any‑time withdrawals** after monthly entitlements are posted; **$10 pre‑fee minimum**.
* **TRX staking** for Energy/Bandwidth; per‑holder prepay option; TRX buffer targets.
* **USDT off‑ramp connectors**: Exchange/OTC/PSP to bank/PayPal (after fiat conversion). No XRP bridge in MVP.
* **Controls**: 2‑of‑3 multisig approvals; off‑ramp platform fee (%) supported; daily/tx caps in ParamRegistry.

## Client‑Controlled Session Policy & Connection Paths (P2P)

### Client‑Enforced Controls (Trust‑Nothing at the Console)

* Owner defines a **Control Policy** for each session; hashed/anchored on‑chain with the session ID; signed by owner.
* Runtime enforcer on the client blocks disallowed inputs (mouse/keyboard/shell/USB/audio/webcam/clipboard), enforces file allow/deny and replace‑same‑name guard, and applies **Privacy Shield** (hide client data, redaction zones, app allowlist). Violations terminate the session and log an incident.
* Re‑entry contracts **inherit** the exact policyHash (immutable during the contract term).

**MongoDB**: control\_policies with expanded schema.

### Rolling Free‑Tier & De‑Clutter

* **2 actions per rolling 24h** (join/search combined) with per‑action TTL enforcement.
* If a user owns multiple active session IDs, **keep the most recent** and **archive the rest**.

### Allowed P2P Paths (Tor‑only)

* **Path 1 — Session Rendezvous:** User → Server/Node → sessions\_db → session\_id, where both parties meet at the session ID.
* **Path 2 — VM Contract Re‑Entry:** requires a prior Path‑1 session, **set phrase + reentry key**, fixed term (**30d** default or **90d** option; writer may set up to **2 years**), and **policy inheritance** from the original session.

## Implementation

### MVP Rollout Plan (S & C)

| Item | Type | Included in MVP? | Scope in MVP |
| --- | --- | --- | --- |
| Hardware‑accelerated video encode (V4L2/FFmpeg) | S | Yes | Enable h264\_v4l2m2m on Pi; bitrate caps via admin UI |
| QUIC/UDP fallback | S | **No** | Tor‑only stack; no non‑Tor transport |
| Identity (email magic + TOTP) | S | Yes | Local accounts, 2FA; no external IdP |
| API endpoints (manifests/proofs) | S | Yes | Read‑only REST + JWT on Pi |
| Encrypted S3 backups | S | Yes | Client‑side encrypted exports; MinIO/S3 compatible |
| Rate‑limiting & anomaly detection | S | Partial | Nginx rate‑limit + simple heuristics |
| Headless bootstrap + QR | S | Yes | Cloud‑init + QR provisioning |
| Observer role | S | Yes | Read‑only viewer when sharer permits |
| **KYC & payout caps** | **C** | **Yes (deployed)** | **PRKYC contract deployed now; runtime‑selectable** |
| Federation across Pis | C | No | Phase 2 |
| Mobile viewer apps | C | No | Phase 2 |
| PQ crypto experiments | C | Yes (testnet only) | Dilithium key wrapping for chunk keys |
| Privacy filters | C | Partial | Window/keystroke redaction pre‑encryption |

### Concrete Steps

1. **Smart Contracts**: Implement/freeze LucidAnchors, PayoutRouterV0, PayoutRouterKYC, PoOT/minter, ParamRegistry; audits.
2. **Deployments**: Shasta + Mainnet; fund vaults; record addresses in image; set multisig roles.
3. **Wallets**: Ledger 2‑of‑3 multisig; appliance keystore; device binding.
4. **Pi Build**: Docker Compose; Tor; Node 20 + TronWeb; **MongoDB 7 (arm64)**; FFmpeg with Pi hardware codecs.
5. **Admin UI**: Ledger signing; router toggle; payout and withdrawal flows; policy editor for client controls.
6. **Ops**: TRX staking/energy rental; monitoring; daily reconciliations.

### Milestones

* **M1 (Week 1‑2)**: Contracts + tests; audit started.
* **M2 (Week 3)**: Shasta deploy; Pi image alpha; end‑to‑end anchor+payout on testnet.
* **M3 (Week 4)**: Mainnet deploy; addresses baked; compliance signer live.
* **M4 (Week 5‑6)**: S‑features complete; KYC router wired (optional); performance hardening.
* **M5 (Week 7)**: Release Candidate; OTA key rotation; docs.

### Gathering Results

* **On‑chain**: export anchor/payout txids; cross‑check vs local DB.
* **Performance**: <300 ms anchor submit latency (ex‑confirmation); <2 s USDT transfer initiation.
* **Security**: quarterly key rotation drill; testnet chaos runs.