



PROTOCOL DOCUMENTATION · 2026

SL Protocol Whitepaper

AI Cardiac-Risk Screening · Health-Data DePIN

AI-assisted cardiovascular wellness insight. Powered by SL.

Version 2.1 · Token: **\$SL** · Network: **opBNB (BNB Chain Layer-2)**

Total Supply: **2,000,000,000** (fixed) · Issued by **SL Labs (Singapore)**

Technology Partner: **DIGIRAY Co., Ltd. (Korea)**

IMPORTANT NOTICE

This document describes the technical architecture and token utility of the SL protocol. Nothing herein constitutes an offer, solicitation, investment advice, a promise of returns, or the marketing of a security or financial product. \$SL is a functional access credit used to consume AI services within the network. Holding \$SL confers no monetary right, claim on revenue, dividend, or equity. \$SL is structured so as not to constitute a security; final classification is fact- and jurisdiction-specific, and the protocol restricts functions where required. Certain functions are restricted for users in specific jurisdictions, including the Republic of Korea and the United States. WCS-to-\$SL conversion and token sales are unavailable to Korean residents. Before participating, verify the laws of your country of residence and obtain independent legal, tax, and financial advice.

MEDICAL DISCLAIMER

SL Watch is a wellness device. It is not a medical device and cannot determine the presence, absence, or diagnosis of any disease. All sensor outputs and AI results are wellness-oriented awareness indicators only; they are not clinical measurements. Any abnormal signal must be evaluated by a licensed medical professional. Medical-device functions will be offered only after MFDS (Korea) clearance and equivalent authorization in other markets. Performance figures are stated strictly on a clinical-research basis and do not represent cleared device performance.

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CHAPTER 1

Executive Summary — A Business First, A Token Second

SL Labs operates a revenue-first Health-Data DePIN. The story starts not with a coin, but with machines that already generate verified health data.

Our technology partner, DIGIRAY Co., Ltd., is a digital X-ray (CR) manufacturer that has shipped 50,000+ scanners worldwide¹ and supplies dental-imaging equipment to roughly 5,000 veterinary clinics. On this installed base, SL Labs adds a single settlement layer: every AI service across four "proof networks" is paid for in one functional credit, \$SL.

50,000+CR scanners shipped by
DIGIRAY (cumulative)¹**~5,000**Veterinary clinics served
(DIGIRAY)**0.88**ECG AI AUROC (clinical
research basis)**2.0B**\$SL fixed supply (no re-
issuance)

Failed health-DePIN projects bought hardware with token capital and paid early users with newcomers' money. SL is the opposite: hardware is funded by the manufacturer, research by government R&D, and operations by B2B revenue. The token funds none of these — it works only as a service credit. This is a network that runs without the token; the token is added on top.

Powered by revenue, not promises. We never pivoted away from revenue — we pivoted on top of it.

¹ "50,000+" denotes cumulative units shipped by DIGIRAY over its operating history, not the number of currently active protocol nodes. DIGIRAY's installed base is parent-company traction and is never aggregated into on-chain protocol metrics (see §4.1).

CHAPTER 2

The Problem: Episodic Data, Siloed Signals, No Named Buyers

2.1 Cardiovascular risk is under-observed between clinic visits

Cardiovascular disease remains one of the leading causes of death worldwide, yet most cardiovascular monitoring is episodic — a few minutes in a clinic, months apart. The large majority of a person's day-to-day cardiovascular signal is never captured, consented, or made usable for prevention research and population health. Prevention-oriented healthcare needs continuous, consent-based, real-world data infrastructure that does not exist at scale today.

SL does not predict, prevent, or provide early warning of sudden cardiac arrest or any acute medical event, and makes no such claim. SL addresses a **data-infrastructure gap** — the absence of consented, verifiable, real-world cardiovascular data for wellness screening and research — not an emergency-response gap.

2.2 Five structural failures of health DePINs

- **Consumer-grade sensors.** PPG-based wearables degrade sharply during motion, undermining data trust.
- **Siloed data.** Valuable signals are locked inside device-maker and hospital silos.
- **No named buyers.** Most projects claim data can be sold but never name a buyer.
- **Extractive tokenomics.** X-to-Earn models funded by newcomers spiral to zero.
- **Regulation & UX.** GDPR / HIPAA / medical-device constraints, and weak UX versus incumbents.

2.3 Why first-generation health tokens stalled

Gen-1 Korean projects tried to extract data hospitals already held and were blocked by medical-data law; their tokens sat outside the revenue loop; and some rebranded with fresh token issuance. SL inverts each of these — our devices generate data outside the hospital, every service fee consumes credit, and supply is permanently fixed.

CHAPTER 3

The SL Protocol: Four Proof Networks

SL is one protocol with three functions and four networks. We do not extract hospital data; our devices generate it.

3.1 Three protocol functions

Function	Description
Verify — Proof of Vitals	Verified-quality sensors, staked verification nodes, and a reputation system confirm data quality; signatures are recorded on-chain.
Settle	Every AI service fee across all verticals is denominated and settled in a single credit, \$SL.
Recycle	10% of each service fee is processed by the protocol, converging all usage into one sink.

3.2 The four proof networks

#	Network	Role	Headline metric
1	VetDental AI	Revenue engine · credit sink. Veterinary use — outside human-medical-device regulation — provides the first on-chain demand proof.	5,000 clinics · \$0.1 / read
2	MediReport	B2B revenue · data source. LLM-generated check-up report drafts for screening centers (non-diagnostic).	Per-report / credit pack
3	SL Watch	Data source · credit sink. Single-lead ECG (clinical-research validated); flagship and future largest credit sink.	AUROC 0.88 (research)
4	Institutional Data	External validation. Government-funded data infrastructure (operated by DIGIRAY).	Gov-funded R&D

The aggregate metrics — total reads, credits consumed, protocol-processed volume — belong to the protocol layer, not to any single vertical. Each network states one metric only.

CHAPTER 4

Traction & Revenue Model

4.1 We only claim what can be verified

We separate two kinds of traction strictly. **Parent-company traction** (DIGIRAY's manufacturing, deployment, and research record) is always labeled as such and is never aggregated into protocol metrics. **Protocol traction** (on-chain reads, credits consumed, participating institutions) is reported only from the live dashboard after TGE. The 50,000 scanners and 5,000 clinics are DIGIRAY's installed base, not protocol nodes; the protocol switches them on.

4.2 Contract-stage labeling

Stage	Definition
Research	Joint study / proof-of-concept
Pilot	Paid or free pilot in operation
MOU	Memorandum of understanding (non-binding)
Deployment	SLA-based commercial deployment & billing

4.3 Revenue model by vertical

Network	Billing	Regulatory position	Commercial start
VetDental AI	\$0.1-equiv. credit / read	Outside human-medical law (veterinary)	2026
MediReport	Metered / Enterprise Credit Pack	Non-diagnostic document automation	2026+
SL Watch	10 SL cardiac monitoring · 5 SL wellness	Device functions post-MFDS clearance	Wellness 2026 / device 2027
Institutional Data	Institutional access credit	Pseudonymized, consent-based	2027+

We do not make quantified data-value promises (e.g., "\$N of data per year"). We publish a price list, not a forecast.

CHAPTER 5

Data Demand: Who Validates, Who Buys

Almost every health project claims data has buyers; few distinguish validation from revenue. We separate the two explicitly.

5.1 Validation comes first — and is not a token-demand source

A government-funded R&D program (operated by DIGIRAY) provides **external validation** that institutional demand for verified, consented medical data is real. This is validation, **not a purchase and not a token-demand source**. The government project's budget and outputs do not transfer into the token economy (see Chapter 9). We deliberately do not list the government as a "buyer."

5.2 Commercial buyer pipeline (future, labeled as such)

Timing	Party	Role
Now (2026)	Government R&D (via DIGIRAY)	Validation that institutional demand for verified data is real — not a buyer.
2027 (pilot)	Life insurers	Prospective buyer: cardiovascular risk screening for prevention-oriented products.
2027 H2+ (pipeline)	Pharma & medical-AI firms	Prospective buyers: pseudonymized datasets for model training and clinical research.

5.3 Data-handling principle — originals are not sold

What may be provided are pseudonymized / de-identified datasets or analysis results, never raw biometric data. All use requires explicit, separate consent, and data subjects may withdraw consent and request deletion at any time. This is research / validation use of pseudonymized data — not "data-sale rewards."

CHAPTER 6

Technology

6.1 AI cardiac-risk engine (CNN-LSTM)

Item	Detail
Research	Gachon University team + Seoul National University Hospital clinical team
Training data	204,000+ ECG segments (SNUH clinical + MIT-BIH open set)
Duration	4 years (2022–2026)
Performance (research basis)	Accuracy 0.80 · Sensitivity 0.83 · F1 0.84 · AUROC 0.88
Inference	Primary analysis on-device (10-second cycle); only de-identified features and hashes are processed off-device. Consistent with the local-storage design in §10.1.

The model screens for abnormal ECG patterns and issues a wellness-oriented risk alert. Prior to MFDS clearance this is described strictly as "cardiac-risk monitoring / abnormal-ECG-pattern detection," never as diagnosis. Research-basis performance figures do not represent cleared-device performance.

6.2 Smartwatch hardware

Spec	Detail
ECG	Single-lead, 125 Hz sampling ²
Sensors	ECG · heart rate · SpO ₂ · skin temperature · blood-pressure trend · steps
Battery	Up to 72-hour continuous use
Water / dust resistance	IP68 (dust & water ingress) · 5 ATM (≈50 m) water resistance ³
Connectivity / Display	Bluetooth 5.2 + Wi-Fi · 1.3" AMOLED round

All sensor outputs are wellness indicators, not clinical measurements. Blood-pressure output is a non-diagnostic trend indicator, not a validated blood-pressure measurement.

² ECG sampling rate reflects the current wellness-tier hardware and is stated as a wellness specification, not a diagnostic-grade claim; the final specification for any medical-device variant will be confirmed at MFDS filing.

³ IP68 and 5 ATM are distinct ratings and are stated separately; IP68 does not by itself certify a specific water depth.

6.3 Verification network & chain

Distributed nodes stake \$SL to participate, validate ECG and imaging data quality, submit on-chain signatures, and accrue reputation (minimum 95% uptime). At launch, verification nodes are foundation-operated and are opened progressively — stated honestly, not hidden.

Chain: \$SL is issued on opBNB, BNB Chain's Layer-2, chosen for low gas fees on high-frequency inference settlement. Keeping a niche or bespoke chain is uneconomical for a healthcare protocol; the settlement layer lives where liquidity, developers, and cost structure are best.

CHAPTER 7

Token Economy

"\$SL is the settlement credit for verified health AI. Daily reads = daily demand."

7.1 Demand comes from a price list, not an airdrop

Four faucets converge into one sink: veterinary reads (\$0.1-equiv. each), LLM report generation, cardiac monitoring (10 SL) and wellness screening (5 SL), and institutional data access. 10% of every fee is processed by the protocol. The relationship "daily reads = daily credit demand" is published on-chain. No price outcome is predicted or promised.

7.2 Supply is deliberately conservative

2.0B

Fixed supply · no re-issuance · no swap

9.6%

TGE circulating supply

~1.6%

Realistically sellable at TGE

7.3 WCS — Wellness Contribution Score

WCS is a non-transferable, non-redeemable contribution score. Conversion to \$SL follows separate terms and an issuance-decay curve (contribution issuance decreases over time, expressed as a formula / graph). WCS-to-\$SL conversion is disabled for Korea and the United States by IP + KYC. This mirrors the data-credit / token separation used by mature DePINs — a compliance device and a stability device at once.

This section replaces the earlier "burn / deflationary" framing. Fees are processed by protocol rule based on usage; no price outcome is predicted or promised.

CHAPTER 8

Distribution & Circulation Policy

8.1 Allocation (total 2,000,000,000 \$SL, fixed)

Category	%	Amount	Purpose
Network Access Credit Pool	10%	200,000,000	Health-data points → \$SL conversion pool
Participant Program	5%	100,000,000	Ambassador & supporter activity
VC Sale	15%	300,000,000	Strategic investors (≥6 months post-listing)
Team & Core	15%	300,000,000	12-mo cliff + 36-mo linear
Treasury	20%	400,000,000	Product, AI, protocol operations
Liquidity Pool	8%	160,000,000	DEX liquidity (TGE, 24-mo LP lock)
Marketing	5%	100,000,000	Global marketing, PR
Advisors	2%	40,000,000	Medical · technical · legal advisors
Protocol Reserve (retired)	5%	100,000,000	Permanently processed before TGE
Ecosystem Reserve	15%	300,000,000	Ecosystem expansion, governance

8.2 TGE circulation & foundation sell rules

TGE circulating supply is approximately 9.6%; realistically sellable supply is approximately 1.6%; roughly 85% is locked. Team: 12-month cliff + 36-month linear. VC: 18-month cliff + 24-month linear. Any foundation token sale for operating costs or taxes follows pre-published rules — a per-quarter cap, a fixed cadence, and advance disclosure — with foundation wallets published for third-party verification. Quarterly circulation is disclosed, and DAXA's four listing criteria are met before any domestic listing.

Structural note. A low initial float alongside a large fixed supply implies a high fully-diluted valuation relative to circulating supply. This is disclosed deliberately: lock-ups, published vesting, and wallet transparency are intended to mitigate — not eliminate — the volatility and concentration risks that low float can create. See Chapter 13.

CHAPTER 9

Entity Structure & Governance

Entity	Role
DIGIRAY Co., Ltd. (Korea)	Smartwatch / device manufacturing & sales, MFDS certification, hospital B2B contracts, government R&D execution.
SL Labs (Singapore)	\$SL issuance, protocol & smart-contract operation, credit settlement, WCS-to-\$SL conversion (permitted regions).

9.1 Separation principles (enforced)

- **Funds:** government budgets / outputs do not transfer into the token economy; token-sale proceeds do not flow to the manufacturer.
- **Decision-making:** executive cross-holding is minimized; conflicted parties abstain on related matters.
- **Data:** data collected under the government project is governed by the project agreement and privacy law, and is never a token-reward basis.
- **Relationship:** SL Labs and DIGIRAY are technology partners only.

9.2 Governance

\$SL holders vote on protocol fee ratios, Ecosystem Reserve use, node parameters, and upgrades. A gradual DAO transition is reviewed after Phase 3 (H2 2027); to avoid a purely token-formal DAO, participation and quorum thresholds are announced in advance.

CHAPTER 10

Regulatory Compliance

Regime	Response
MFDS — SaMD (Korea)	Certification in progress; before clearance, "screening support" only — no diagnostic marketing.
MAS (Singapore) — PS Act / SF Act	Issuer SL Labs is Singapore-domiciled. \$SL is structured as a functional utility credit and assessed under MAS Digital Payment Token and capital-markets guidance; independent legal opinion obtained; \$SL is not offered as a capital-markets product, and AML/CFT and travel-rule obligations are addressed as applicable.
GDPR (EU)	Consent-based processing, right to erasure, DPA, SCCs for transfers.
HIPAA (US)	PHI-not-stored design, BAA, access control, audit logs.
PIPA (Korea)	Separate consent for health data, cross-border notice, deletion procedures.
Virtual-asset law (KR)	User-Protection Act compliance; WCS → SL conversion disabled; enhanced KYC.

10.1 Data protection

Raw ECG data is stored locally on the user's device, not on a central server. Only cryptographic hash commitments are recorded on-chain (with a roadmap toward zero-knowledge proofs); data used for AI is de-identified to a non-re-identifiable level; consent is recorded on a decentralized consent layer and can be withdrawn. Off-device processing is limited to de-identified features and hashes, consistent with §6.1.

10.2 Regional restrictions

Functions are restricted or disabled per jurisdiction. In Korea, WCS → SL conversion is disabled. In the United States, certain token functions are unavailable pending completion of a securities-law analysis and any required compliance steps. In China, crypto functions are disabled.

CHAPTER 11

Why We Are Different from Gen-1

Failure mode	Example	Cause of death	SL's difference
Institutional-data dependence	Gen-1 PHR projects	Hospital-data extraction blocked by law	Our devices generate data (no extraction)
Token–revenue decoupling	Gen-1 tokens	Product existed; token sat outside the loop	Every AI fee = credit consumed (on-chain)
Inflationary rebrand	Gen-1 rebrands	Re-issuance during rebrand → collapse	Fixed 2B · no re-issuance · no swap
Ponzinomics	Move-to-earn	Newcomers funded incumbents' rewards	Demand from service fees, not airdrops
Token-funded CapEx	Wearable DePINs	Hardware bought with token / VC capital	Hardware funded by the manufacturer
No buyer / inflated claims	Wellness DePINs	No named buyer; quantified value promises	Named validation first; no value promises

Gen-1 tried to pull data out of hospitals, decoupled the token from revenue, and grew supply. SL generates its own data, settles every fee in one credit, and fixes supply forever.

CHAPTER 12

Roadmap — Proof by Proof

Each stage stands on the on-chain evidence of the last.

Stage	Milestones
Stage 0 — Done	Supply exists: 50,000 scanners shipped, ~5,000 clinics, 4-year ECG research, 10,000+ interpreted images.
2026	Smart-contract audit, TGE, DEX liquidity, VetDental AI commercial launch, SL Watch (wellness) launch, MFDS SaMD filing, on-chain dashboard.
2027	AI accuracy 0.85+, insurer partnerships, MFDS clearance unlocks device functions, hospital B2B, SDK, Japan / Southeast Asia.
2027 H2 – 2028	Data-buyer pipeline expands (insurer → pharma / AI), verification-node network opens, DAO review.

Domestic listing is a prepared listing that first meets DAXA's four criteria and quarterly disclosure. The government project is noted only as a partner-ecosystem / validation activity, not a token milestone.

CHAPTER 13

Risk Factors & Legal Disclaimer

Risk	Description
Regulatory	Virtual-asset and medical-device regulation may restrict services.
Token classification	Despite being structured as a utility credit, \$SL could be classified as a security or regulated instrument in some jurisdictions, restricting functions or availability.
Technical	AI prediction accuracy is not guaranteed and requires ongoing improvement.
Certification	MFDS and other clearances may be delayed beyond expectations.
Smart contract	Audited, but unknown vulnerabilities may exist.
Liquidity & low float	Market liquidity is not guaranteed; low initial circulating supply relative to fixed total supply may increase volatility and price concentration.
Business	DIGIRAY's business plans may not proceed as expected.

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