

PCX Phase-I Prototype and 24-Month Roadmap

EXECUTIVE SUMMARY

ValiDeck is developing PCX (Privacy-Compliant eXtensible), a proposed privacy-first protocol for structuring and reusing verified transaction records without embedding identity. The Phase-I program focuses on PCX-CTR, the initial transaction-record implementation. The PCX architecture operates through three structural layers: **Custodian**, **Platform**, and **Governance**, ensuring that all transactional data is processed inside attested environments (TEEs/HSMs) following the *attest* → *pseudonymize* → *compute* sequence. Each operation produces cryptographic integrity proofs that form a continuous audit trail accessible to lawful oversight bodies. Phase-I is designed as a jurisdiction-aligned feasibility prototype and may be executed in Canada or Germany, depending on funding source and institutional alignment.

The Phase-I feasibility prototype will be executed within a 24-month, USD 1M budget envelope aligned to the selected funding jurisdiction and will demonstrate that pseudonymized, tokenized transaction flows can be captured and analyzed across merchants in a manner designed to meet applicable data-protection requirements, including PIPEDA and GDPR. Integration engineering begins at month 12 and runs alongside the closing stretch of the prototype build. In the final six months (months 18–24), the program converts the prototype into an independently reviewable, partner-ready evidence package through architectural hardening, privacy auditing, early partner engagement, and pre-integration work with PoS vendors. This positions ValiDeck to raise the next funding round against a demonstrated privacy-first architecture with documented compliance readiness rather than a conceptual pitch.

The 24-month plan establishes both feasibility and momentum. The PCX prototype demonstrates the model technically and establishes a credible compliance posture, while ValiDeck enters the Phase II funding process with independently reviewable evidence and a partner-ready implementation plan.

PHASE-I SCOPE – PROTOTYPE BUILD (MONTHS 1–18)

The Phase-I prototype establishes the technical and regulatory feasibility of the PCX-CTR privacy-preserving transaction architecture. The objective is to demonstrate that line-item transaction data can be captured, linked, and analyzed across merchants without storing personal identifiers.

The Phase-I build will deliver:

- A multi-merchant point-of-sale simulator generating realistic pseudonymized transactions
- A token-issuing microservice generating pseudonymous UIDs and enforcing token lifecycle
- A pseudonymized loyalty and ledger backend linking tokens to rewards without identity exposure
- Merchant analytics with enforced aggregation thresholds to prevent re-identification
- Continuous PIPEDA/GDPR readiness documentation and SR&ED evidence capture

The PCX prototype will implement a standardized Customer Transaction Record (CTR) format for simulated transaction ingestion. Representative PoS sources, regardless of vendor, will produce or be transformed into this standardized PCX-CTR format. Within Phase-I, encrypted token flows will be simulated in a manner consistent with the intended card-issuer and payment-network model,

ensuring that each transaction record is cryptographically linked to a verified but pseudonymous transaction event.

Phase-I implements a jurisdiction-portable PCX reference node. Custodianship, audit authority, key-management policy, and reporting obligations are configurable per jurisdiction without altering the core PCX Platform architecture or data model.

During the prototype, PoS systems will connect through an API-based ingestion layer, enabling rapid validation of the CTR schema and token linkage. In Phase II and later deployments, PCX integrations can use lightweight PoS-specific connectors or SDKs that embed this logic directly into the terminal or cloud backend, enabling merchants to connect through an integrated PoS provider rather than through merchant-by-merchant implementation.

This strategy eliminates the need for merchant-by-merchant onboarding, dramatically reducing cost and friction while supporting privacy compliance and interoperability across diverse retail environments. The completion of Phase-I results in a working reference implementation demonstrating that privacy-preserving cross-merchant analytics is technically achievable without identity collection.

BUDGET ALLOCATION AND SR&ED ELIGIBILITY

The prototype aligns with the Privacy-Compliant eXtensible (PCX) architecture as follows:

- **Custodian Layer:** Simulated card issuer issuing encrypted tokens and jurisdictional salts.
- **Platform Layer:** Secure enclave-based pseudonymization and CTR storage with Integrity Hash chains.
- **Governance Layer:** Automated audit logs, key-rotation proofs, and consent-token validation.

This supports compliance-by-design, providing verifiable privacy and lawful transparency from inception. The Phase-I prototype will be executed within a fixed budget envelope of USD 1,000,000, aligned to the selected execution jurisdiction. Canada-based execution prioritizes SR&ED eligibility and cost recovery, while Germany-based execution prioritizes institutional co-funding, regulatory proximity, and EU research alignment. When executed in Germany or the EU, Phase-I would operate under an EU-aligned supervisory review model to validate Governance Layer assumptions prior to commercial deployment.

Budget Structure

- Engineering & Product Build — \$700,000
- Partner Integration & Testing — \$200,000
- Compliance & Operations — \$100,000

Total Phase-I Budget — \$1,000,000

SR&ED Recovery Impact

Under the Canadian execution path, Phase-I will be structured to support SR&ED claims for eligible engineering expenditure. Any resulting SR&ED tax-credit recovery would be realized after expenditures are incurred and would not reduce the capital required up front. The recovery amount will depend on the final expenditure mix, claimant eligibility, and CRA assessment, and will be reviewed with SR&ED counsel before filing.

The Phase-I prototype may therefore be partially offset by non-dilutive tax-credit recovery, which, if realized, would reduce effective capital risk while preserving ownership and control.

INTEGRATION & PILOT-READINESS PHASE (MONTHS 12–24)

Integration engineering begins at month 12 and overlaps the closing stretch of the prototype build, so that connector and SDK work is underway before the prototype is complete. In the program's final six months (months 18–24), that work is converted into integration readiness and investor conviction. The goal of this phase is to exit month twenty-four positioned for a capital raise linked to execution rather than feasibility.

This phase will deliver:

- Architectural hardening for external integrations including boundary contracts and observability
- An SDK-level integration blueprint and reference connector demonstrating standardized CTR ingestion and token linkage for one target PoS ecosystem such as Clover, Square, Ingenico, or Oracle
- A privacy and compliance readiness memorandum aligned with PIPEDA and GDPR and prepared for disclosures
- A merchant pilot playbook defining onboarding logic, access control, consent and risk envelope
- An investor-ready dossier including integration brief, compliance memo, updated deck and demonstration environment

At the end of the program, the PCX prototype will be an independently reviewable, partner-ready implementation awaiting Phase II capital for live payment acceptance integration and controlled pilots, rather than further core feasibility work.

STRATEGIC RATIONALE — WHY USD 1M IS SUFFICIENT

The Phase-I prototype resolves the key uncertainties that prevent serious capital or institutional engagement. It reduces the principal feasibility risks and shifts PCX from conceptual architecture to demonstrable implementation.

Risk Elimination

- Technical feasibility is demonstrated through end-to-end pseudonymized transaction flow
- Privacy feasibility is assessed against a documented PIPEDA/GDPR readiness posture
- Economic risk may be partially offset through SR&ED recovery under the Canadian execution path
- Market skepticism is replaced by a working system rather than narrative claims
- Scalable merchant onboarding is prepared through a standardized CTR format and an API/SDK integration model designed to operate at the PoS or payment-network level rather than at the individual merchant level

Value Creation

- A reference implementation of privacy-compliant transaction infrastructure is established
- Compliance evidence and documentation are produced in parallel with engineering
- An integration blueprint is prepared to shorten time to first live pilot
- The next capital phase is priced on execution readiness instead of hypothesis

The Phase-I program is intended to move PCX from architectural design toward a demonstrable trust infrastructure, positioning the PCX Platform as a candidate foundation for lawful, cross-merchant data collaboration under Supervisory Authority oversight. The USD 1M program is therefore not an exploratory exercise; it is intended to convert the existing architecture and patent portfolio into independently reviewable technical, privacy, integration, and partner evidence.

HIRING BRIEF

The following resourcing plan delivers the feasibility prototype within a jurisdiction-aligned Phase-I execution structure. Roles may be filled by Canada-based or Germany/EU-based contributors depending on funding source and institutional requirements. Roles are staffed for the minimum duration required to reach an investor-ready and audit-ready reference implementation, with core build roles engaged full-time during their active execution window. The security and encryption role is the exception: it is scoped as a fractional senior engagement or an academic research partnership across an eleven-month window rather than a full-time hire, and is costed on that basis.

Bucket / Role	Duration	Cost (USD)
Engineering & Product Build	Months 1–18	700,000
Lead Full-Stack Engineer	18 mo	160,000
Backend Engineer	14 mo	110,000
Data / Privacy Engineer	11 mo	100,000
Security / Encryption Specialist	11 mo (fractional)	130,000
DevOps / Cloud SRE	8 mo	60,000
Founder / PM / SR&ED Lead	Full program	110,000
UI/UX & build contingency	As needed	30,000
Partner Integration & Testing	Months 12–24	200,000
Integration Engineer (PoS SDK / connector)	9 mo	110,000
QA / Integration Testing	6 mo	45,000
Integration cloud / test environments	Months 12–24	45,000
Compliance & Operations	Full program	100,000
Independent Privacy & Security Audit	Design + final	45,000
Legal / IP / Administrative	Full duration	35,000
Operations / admin reserve	Full duration	20,000
Total	24-month program	1,000,000

TALENT STRATEGY AND COMPENSATION

Phase-I staffing is designed around the talent segments where ValiDeck's value proposition is strongest, rather than competing directly for engineers holding active offers from large United States technology firms. The plan draws on four complementary sourcing channels:

- Senior engineers anchored in Canada by family, immigration status, or preference, for whom a Waterloo-based, equity-bearing role is attractive on its own terms.
- The substantial pool of skilled permanent residents and recent immigrants across the Waterloo–Toronto technology corridor.
- The University of Waterloo co-op and new-graduate pipeline, supported by ValiDeck's presence in the Waterloo ecosystem and its Communitech and IPON relationships.
- For the specialized security and encryption (trusted-execution) role, a fractional senior engagement or an academic research partnership, for example with the University of Waterloo's cryptography, security, and privacy research group under a collaborative research vehicle, matching a globally scarce skill to the minimum footprint the prototype requires.

Compensation blends below-market cash with equity participation for the small number of long-tenure core hires, and cash plus milestone-completion bonuses for short, specialized engagements where standard option vesting would not apply. For core hires structured as employees, options on the company's shares may carry Canadian-Controlled Private Corporation (CCPC) tax advantages, including potential deferral of the taxable employment benefit until the shares are sold and, where eligibility requirements are met, potential access to the lifetime capital gains exemption on qualifying shares. These features can improve after-tax value relative to comparable early-stage equity in the United States. Option terms are structured in consultation with Canadian tax counsel.

Core, equity-bearing roles are engaged as T4 employees, aligning with the CCPC option treatment above and with the treatment of eligible salary expenditures under SR&ED. Any NRC IRAP support would be pursued separately and remains subject to program approval. Short specialist roles are retained as independent contractors. The employee option pool is sized and finalized within the company's capitalization and financing materials to preserve headroom for a future priced round.

NEXT CAPITAL POSITIONING AND CLOSE

With feasibility demonstrated, compliance readiness documented, and architectural continuity established inside a USD 1M envelope, the next capital event can fund productionization, live partner integration, and controlled commercialization rather than core feasibility. The final Phase-I integration work is intended to ensure that ValiDeck enters the raise with an independently reviewable PCX prototype and partner package rather than a concept-stage architecture:

- Working end-to-end PCX prototype operating without embedded personal identifiers
- PIPEDA/GDPR privacy readiness documented and supported by independent review
- A de-risked feasibility cost profile, supported in Canada by anticipated SR&ED recovery and in Germany/EU by potential institutional co-funding pathways
- Integration blueprint prepared for a first PoS ecosystem
- Merchant pilot playbook prepared for controlled onboarding
- Investor dossier ready for diligence

The next round is therefore priced against execution rather than unresolved feasibility. Capital is deployed against an implementation whose core technical and privacy assumptions have been tested rather than against a concept alone.

Initial Phase-I execution may occur in Canada or Germany, enabling subsequent EU-aligned deployment without architectural discontinuity. Subsequent EU deployment would activate the full Governance Layer, linking local custodians under EU-aligned oversight and completing the compliance-by-architecture cycle.