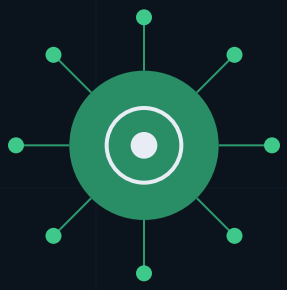

PinHigh

AI-POWERED DATA QUALITY

Technical Brief

AI-Powered CASS-Certified Address Validation Platform

PinHigh Systems LLC | March 2026 | Confidential

Executive Summary

PinHigh is a CASS-certified, AI-enhanced address validation platform designed for enterprise deployment. It combines traditional USPS address validation with AI-powered capabilities that no competing platform offers: pre-validation address correction, intelligent configurable line fitting, and international address standardization across 240+ countries without per-country reference database licensing.

The platform is built on a serverless-first architecture targeting five-nines availability, deployable on the customer's own cloud infrastructure via AWS CDK, Terraform, OpenTofu, or Helm. Data never leaves your perimeter.

<100ms	99.999%	240+	500K+
Type-Ahead Latency	Availability Target	Countries Supported	Records per Batch

Core Capabilities

1. Pre-Validation Address Correction [AI-Driven]

AI corrects common misspellings in street names, cities, and unit designators before validation, using ZIP, state, and city for contextual disambiguation. Every correction is fully auditable via a corrections_applied array in the API response. Configurable via skip_correction and confidence_threshold parameters.

2. CASS-Certified Domestic Validation [CASS Required]

Full validation against all required USPS datasets: DPV (Delivery Point Validation), LACSLink (rural-to-city conversions), SuiteLink (business suite appending), and eLOT (carrier line of travel). Output includes standardized addresses, ZIP+4 codes, delivery point barcodes, DPV status codes, USPS footnotes, return codes, and carrier route information.

3. AI International Address Standardization [AI + Open Data + Geocode]

240+ countries covered through a hybrid approach: AI models parse and standardize addresses using UPU S42 postal standards, open postal datasets provide validation, and geocoding APIs confirm delivery confidence. No expensive per-country reference database licensing required.

4. Real-Time Type-Ahead

Sub-100ms autocomplete powered by in-memory Redis cache against USPS ZIP+4 and DPV datasets. Addresses indexed by ZIP5 prefix with normalized street name hashes for instant prefix-match queries.

5. Geocoding with Location Precision

Every validated address includes latitude/longitude with a precision indicator: rooftop, interpolated, street centroid, ZIP centroid, or city centroid. Enables consuming systems to assess delivery confidence before fulfillment.

6. CASS-Compliant Batch Processing

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500K+ record batches processed via S3 upload, Step Functions fan-out, and Lambda workers. Full CASS output with footnotes, return codes, DPV status, geocodes, and automated Form 3553 generation.

7. Intelligent Address Line Fitting [AI-Driven]

Two-pass engine: first pass applies USPS Pub 28 abbreviation tables deterministically (North to N, Boulevard to BLVD, Suite to STE). If abbreviation alone is insufficient, AI intelligently reflows components across address lines while preserving delivery semantics. Max line length is fully configurable. For international addresses, UPU S42 formatting standards apply. Re-validation confirms the shortened address still resolves to the same delivery point.

Competitive Comparison

The following matrix compares PinHigh against leading CASS-certified address validation platforms across the capabilities that matter most to enterprise customers.

Capability	PinHigh	Precisely	Smarty	Melissa
CASS Certified	✓	✓	✓	✓
Pre-Validation Correction	✓ AI-Driven	—	—	—
International Validation	✓ AI-Driven	✓ Ref. DB	✓ Ref. DB	✓ Ref. DB
Configurable Line Fitting	✓ AI-Driven	—	—	—
Type-Ahead (<100ms)	✓	✓	✓	✓
Geocode + Precision	✓	✓	✓	✓
Patient Safety Priority	✓	—	—	—
Cloud Native (BYOC)	✓	Monolith	SaaS Only	SaaS Only
Zero-Downtime Updates	✓	Manual	N/A	Manual

Technical Architecture

PinHigh is built on a serverless-first architecture designed for five-nines resilience. It deploys on the customer's own cloud account via infrastructure-as-code. Data never leaves your perimeter.

Serverless Compute

API Gateway to Lambda with SnapStart and provisioned concurrency. Sub-100ms p99 for type-ahead, sub-200ms for full validation.

In-Memory Data Layer

ElastiCache Redis (cluster mode, multi-AZ, multi-region) holds all USPS datasets in memory. Aurora PostgreSQL for persistence and automatic failover.

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AI Integration Layer

Powers pre-validation correction, international parsing against UPU S42 standards, and intelligent line fitting. Open postal datasets and geocoding APIs provide validation and confidence scoring.

Blue-Green Dataset Updates

Zero-downtime USPS dataset updates via secondary Redis instance. Health check validation against test deck before traffic cut-over. Old instance retained as rollback target.

BYOC Deployment

Infrastructure-as-code via AWS CDK, Terraform, OpenTofu, or Helm deployed into the customer's own cloud account. AWS, Azure, and GCP supported. No vendor lock-in.

Circuit Breaker Failover

If Redis is unavailable, automatic failover to Aurora PostgreSQL at higher latency. Multi-AZ and multi-region. Always available.

Deployment Models

Model	Description	Best For
Regulated Industries	BYOC on customer cloud. CDK, Terraform, OpenTofu, or Helm. Data stays in your account.	Healthcare, financial services, government
Healthcare	Patient safety prioritization for pharmacy and mail-order records. Full audit trails. HIPAA-aligned.	Hospital systems, mail-order pharmacy
Enterprise SaaS	Managed SaaS or BYOC on AWS, Azure, or GCP. Flexible licensing.	E-commerce, logistics, insurance

Patient Safety

Healthcare systems and mail-order pharmacies ship millions of prescriptions annually. A misspelled street, a truncated apartment number, or a malformed international address can mean missed medication, controlled substance diversion, or an adverse health event. Every capability in PinHigh is designed to prevent those outcomes.

- Pre-validation correction catches misspellings before they reach fulfillment systems.
- Intelligent line fitting ensures apartment, suite, and unit numbers are never silently truncated.
- AI international standardization ensures overseas addresses conform to country-specific postal rules, reducing customs holds.
- Location precision on geocode results enables consuming systems to assess delivery confidence before fulfillment.
- Audit trails on all corrections support regulatory compliance and safety protocols.

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Ready to see PinHigh in action? Request a demo at pinhigh.ai

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