Where AI Agents Debate So Investors Don't Have To

The Multi-Agent Intelligence Platform for Private Capital

12 specialized AI agents argue, critique, and synthesize—producing verified recommendations with full explainability. No hallucinations. No black boxes. Just better matches.

12	4	$4T+
AI AGENTS	DEBATE TYPES	MARKET SIZE

Product Requirements Document

December 2025

Table of Contents

1. Product Overview

The Opportunity

Private equity and venture capital fundraising is a $4+ trillion industry running on spreadsheets, outdated databases, and gut instinct. Fund managers spend 40% of their time on fundraising—most of it on manual research, blind outreach, and wasted meetings with misaligned investors.

> **The Technical Insight:** Traditional matching systems use a single AI model that outputs a score. They're overconfident, can't explain themselves, and hallucinate data. LPxGP uses a fundamentally different architecture: **12 specialized agents that debate each other**, catch each other's mistakes, and only commit when they reach consensus—or escalate to humans when they don't.

What LPxGP Does

LPxGP is an AI-native intelligence platform that helps fund managers find and engage institutional investors. But unlike "AI-powered" tools that slap ChatGPT onto a database, we built a multi-agent architecture from first principles.

> **In one sentence:** LPxGP's adversarial AI agents debate every match, catch hallucinations before they embarrass users, and produce verified, explainable recommendations—turning fundraising from art into science.

Platform Capabilities

Capability	The AI Approach	Why It Matters
LP Database	5,000+ institutional investors with mandates, AUM, allocation targets, and contacts—enriched by Research Agent debates that validate every data point	Hours of research in seconds, with verified data
Semantic Search	Voyage AI embeddings tuned for finance + LLM re-ranking. Search "growth equity that likes founder-led companies in fintech" and get relevant results	Find LPs by concept, not just keywords

Multi-Agent Matching	Bull Agent argues for, Bear Agent argues against, Synthesizer weighs evidence. Disagreements get cross-feedback loops or human escalation	Catches overconfidence and edge cases that single models miss
Explainable Scores	Full debate transcripts available. See exactly why Bull thinks it's an 85 and Bear thinks it's a 62—and how they resolved it	Users trust recommendations they can understand
Verified Pitch Generation	Pitch Generator creates content, Pitch Critic catches hallucinations and factual errors, Content Synthesizer approves or regenerates	Personalization at scale without embarrassing mistakes
Pipeline Tracking	Every interaction feeds the learning loop. 12-18 month lag to commitment, but we track early signals (response rate, meeting conversion)	System gets smarter with every match

The Problem We Solve

Fundraising is broken. Here's why:

Information Overload

10,000+ institutional investors globally. Mandates change quarterly. Allocation cycles vary. Manually evaluating fit is impossible at scale.

Wasted Meetings

80% of LP meetings go nowhere—wrong strategy, wrong size, wrong timing. Each wasted meeting costs the GP $2,000+ in time and travel.

Generic Outreach

"Dear Investor, we're raising a fund..." gets deleted. Personalization requires hours of research per LP. Most GPs can't scale it.

AI Hallucination Risk

Standard AI tools make up facts about LPs, invent allocations, and fabricate contacts. One wrong claim destroys credibility permanently.

Who Uses LPxGP

GP Fund Manager (Company Admin)

Role: Managing Partner or Partner at a PE/VC firm responsible for fundraising

Platform Access: Full access including fund creation, team management, and all LP features

Primary Goals:

- Raise capital for new funds efficiently
- Build relationships with the right institutional investors
- Track fundraising pipeline across the entire team

GP Associate (Company Member)

Role: Associate or VP supporting fundraising efforts at a PE/VC firm

Platform Access: LP search, matching, and pitch generation (read-only for fund settings)

Primary Goals:

- Research and identify potential LP targets
- Prepare meeting materials and personalized pitches
- Support partners with data and analysis

Super Admin (LPxGP Team)

Role: LPxGP platform administrator responsible for operations

Platform Access: Full administrative access across all companies

Primary Goals:

- Onboard new GP firms to the platform
- Maintain and improve LP database quality
- Monitor platform health and support users

2. Feature Specifications

LP Database & Search

Database Contents

The LP database contains comprehensive information on institutional investors:

- **Organization Profile:** Name, type (pension, endowment, family office, etc.), headquarters location, website
- **Financial Data:** Total AUM, PE/VC allocation percentage, typical check size range, target returns
- **Investment Mandate:** Strategy preferences, geographic focus, sector interests, stage preferences
- **Contact Information:** Key personnel with names, titles, and professional profiles
- **Activity Data:** Recent fund commitments (when available from public sources)

Search Capabilities

Search Type	Description	Example
Keyword Search	Traditional text matching on LP names and fields	"CalPERS" or "technology"
Semantic Search	Natural language queries using AI embeddings	"growth equity investors focused on enterprise software"
Filtered Search	Combine filters for precise targeting	Type: Pension, AUM: >$10B, Geography: North America

AI-Powered Matching

> **Design Principle:** Quality above all else. Cost is not a constraint. Success is measured by actual investment commitments, not just high match scores.

Quality-First Hybrid Pipeline

The matching system uses a 6-stage pipeline that combines hard filters, multiple scoring methods, LLM analysis, and continuous learning:

```
Stage 1: HARD FILTERS (SQL)
  └── Eliminate impossible matches (strategy, geography, size, track record)
  └── Output: ~300-500 candidates from 10,000 LPs

Stage 2: MULTI-SIGNAL SCORING (Python + Embeddings)
  └── Attribute matching, semantic similarity, historical patterns
  └── Output: Ranked list with preliminary scores

Stage 3: LLM DEEP ANALYSIS (Claude via OpenRouter)
  └── Analyze EVERY filtered candidate with LLM for nuanced judgment
  └── Output: LLM-validated scores + detailed reasoning

Stage 4: ENSEMBLE RANKING
  └── Combine all scores, surface disagreements as "worth investigating"
  └── Output: Final ranked matches with multi-perspective validation

Stage 5: EXPLANATION GENERATION
  └── Rich explanations, talking points, concerns, approach strategy
  └── Output: Actionable intelligence for GP outreach

Stage 6: LEARNING LOOP (Continuous)
  └── Track outcomes, retrain models, A/B test changes
```

Ensemble Scoring Weights

Component	Weight	Source	Purpose
Rule-Based Score	25%	SQL + Python	Hard constraints, business logic
Semantic Score	25%	Voyage AI embeddings	Thesis/mandate alignment
LLM Score	**35%**	Claude analysis	Nuanced judgment, non-obvious fit
Collaborative Score	15%	Historical patterns	"LPs like this invested in funds like this"

LLM Scoring (Key Innovation)

Unlike systems that only use LLMs for explanations, we use Claude to actually score every match. The LLM analyzes fund profiles and LP mandates to identify:

- **Strategy Alignment:** How well does fund strategy match LP mandate?
- **Size Fit:** Is fund size in LP's sweet spot or at the edge?
- **Track Record:** Does team experience meet LP's requirements?
- **Timing:** Is LP likely allocating now based on known patterns?
- **Non-Obvious Insights:** Red flags, hidden opportunities, and nuanced factors

Bidirectional Matching

The system supports matching in both directions:

- **GP → LP:** GP creates fund, system finds matching LPs ranked by fit quality
- **LP → GP:** LPs can see which funds match their mandate (optional feature)

Learning From Slow Feedback

> **Critical Reality:** Investment sector feedback takes 12-18 months (first meeting → commitment). The system uses proxy metrics for early learning.

Tier	Signal	Latency	Use For
1	Match shortlisted/dismissed	Immediate	Hard filter tuning
2	Response received	Days-Weeks	**Key early predictor**
2	Meeting scheduled	Weeks	**Strong quality signal**
3	Due diligence started	2-6 months	Deal progression
4	Commitment made	6-18 months	**Ground truth**

Match Output

For each fund, the system generates:

- **Ranked LP List:** LPs ordered by fit score (0-100)
- **Score Breakdown:** How each component contributed to the score
- **Talking Points:** What to emphasize when approaching this LP
- **Risk Factors:** Potential concerns to address proactively

Pitch Generation

Output Types

Type	Length	Use Case
Executive Summary	1 page	One-pager tailored to LP's interests and mandate
Outreach Email	3-5 paragraphs	Initial introduction referencing LP's recent activity
Talking Points	Bullet list	Meeting preparation with key messages and responses

> **Human-in-the-Loop Design:** All AI-generated content requires human review before use. There is no auto-send functionality - users must copy to clipboard and paste into their email client. This ensures quality control and compliance with professional communication standards.

Pipeline Management

The platform tracks LPs through the fundraising pipeline:

- **Identified:** LP discovered through search or matching
- **Shortlisted:** Selected for potential outreach
- **Contacted:** Initial outreach sent
- **Meeting Scheduled:** Engagement confirmed
- **In Diligence:** Active evaluation underway
- **Committed:** Commitment received

3. User Journeys

This section describes the key user experience flows through the LPxGP platform.

Journey 1: Platform Onboarding

Actor: Sarah, LPxGP Super Admin

Goal: Onboard a new GP firm to the platform

> **Screen Flow:** Admin Dashboard → Companies → Create Company → Company Detail → Invite Admin

Sarah receives a request from Acme Capital to join LPxGP. She reviews platform health on the Admin Dashboard, navigates to Companies, creates the new company profile with billing information, and invites John (Managing Partner) as the company admin via email invitation. John receives a secure link to accept the invitation and set up his account.

Journey 2: Fund Creation

Actor: John, Partner at Acme Capital

Goal: Create fund profile for Growth Fund III

> **Screen Flow:** Dashboard → Create Fund → Upload Deck → AI Extraction → Fund Detail

John clicks "+ New Fund" on his dashboard. He can either manually enter fund details or upload a pitch deck PDF. Choosing to upload, the AI extracts fund information (name, strategy, target size, thesis, track record) with confidence scores for each field. John reviews and confirms high-confidence items, manually corrects a low-confidence field, and saves the fund profile. The fund is now ready for LP matching.

Journey 3: LP Research & Matching

Actor: Maria, Associate at Acme Capital

Goal: Find and evaluate LPs for Growth Fund III

> **Screen Flow:** Dashboard → LP Search → Apply Filters → LP Detail → Matches → Match Detail → Add to Shortlist

Maria uses two approaches: manual research and AI matching. For manual research, she navigates to LP Search, enters "growth equity technology investors" and applies filters (Check Size > $10M, Geography: North America). She reviews 45 results, clicks on promising LPs to view full profiles with mandates and contacts.

For AI matching, she goes to Growth Fund III and clicks "View Matches." The system shows 87 LPs ranked by fit score. She clicks on CalPERS (score: 92) to see why it's a strong match: strategy alignment, appropriate size, and high semantic similarity to the fund thesis. The AI provides talking points about CalPERS's recent tech investments and flags a potential concern about their preference for established managers.

Journey 4: Pitch & Outreach

Actor: Maria, Associate at Acme Capital

Goal: Create personalized outreach for high-priority LPs

> **Screen Flow:** Match Detail → Pitch Generator → Generate → Edit → Copy → Outreach Hub

From the CalPERS match detail, Maria clicks "Generate Pitch" and selects "Outreach Email." The AI generates a personalized email referencing CalPERS's recent allocations and how Growth Fund III aligns with their mandate. Maria edits the subject line to add a mutual connection reference, adjusts the call-to-action timing, and copies the final email to clipboard. She pastes it into her email client and sends. Back in LPxGP, she moves CalPERS to "Contacted" in the Outreach Hub and logs the activity.

4. Screen Reference

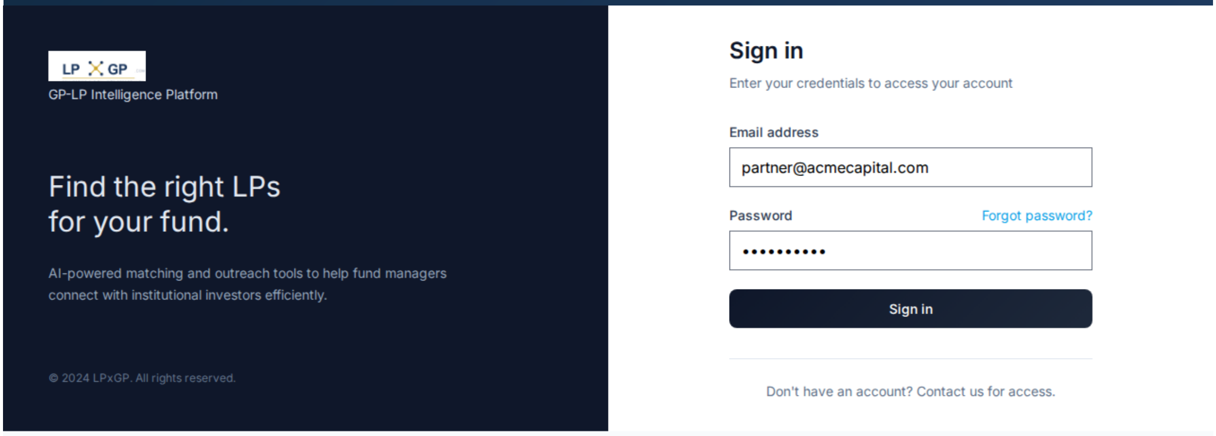
This section documents all 35 screens in the LPxGP platform. Each screen includes a visual mockup and explanation of its purpose, user actions, and role in user journeys.

Public Screens

4 screens — Authentication and onboarding flows for all users

Login

User authentication

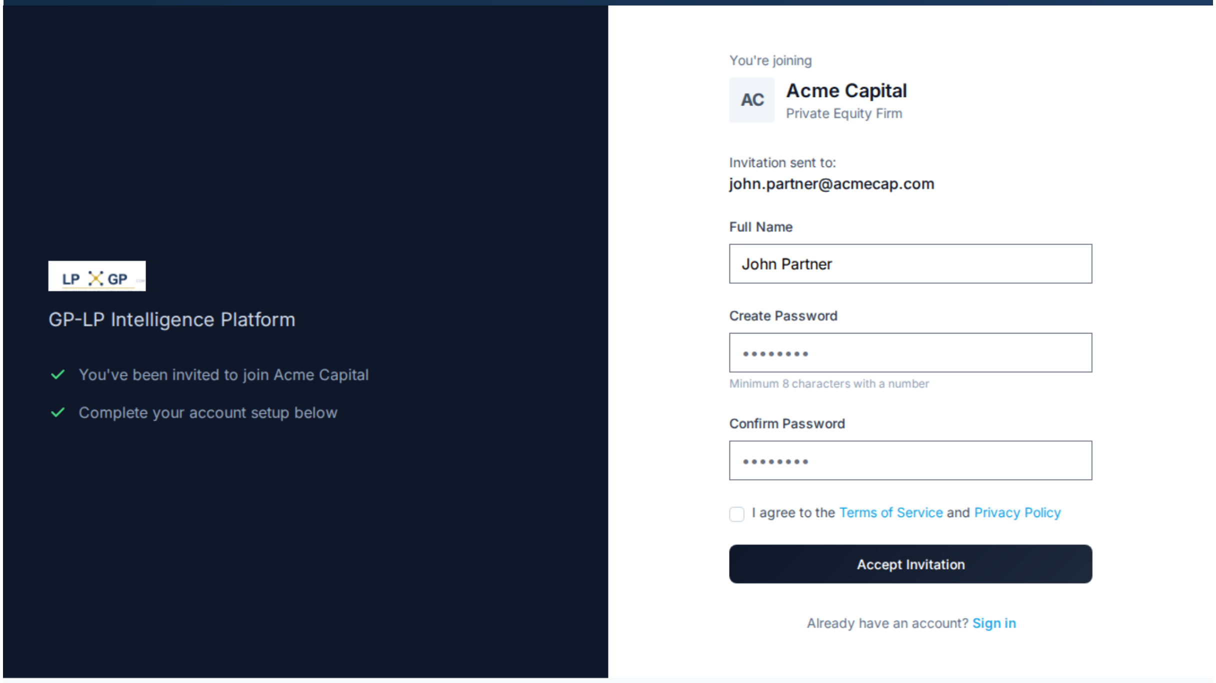


≡ All Screens

The Login screen is the entry point for all authenticated users. Users enter their email and password to access the platform. The design emphasizes security and trust with a clean, professional interface. Failed login attempts are tracked and accounts are locked after 5 consecutive failures to prevent brute-force attacks. A "Forgot Password" link provides account recovery options.

Accept Invitation

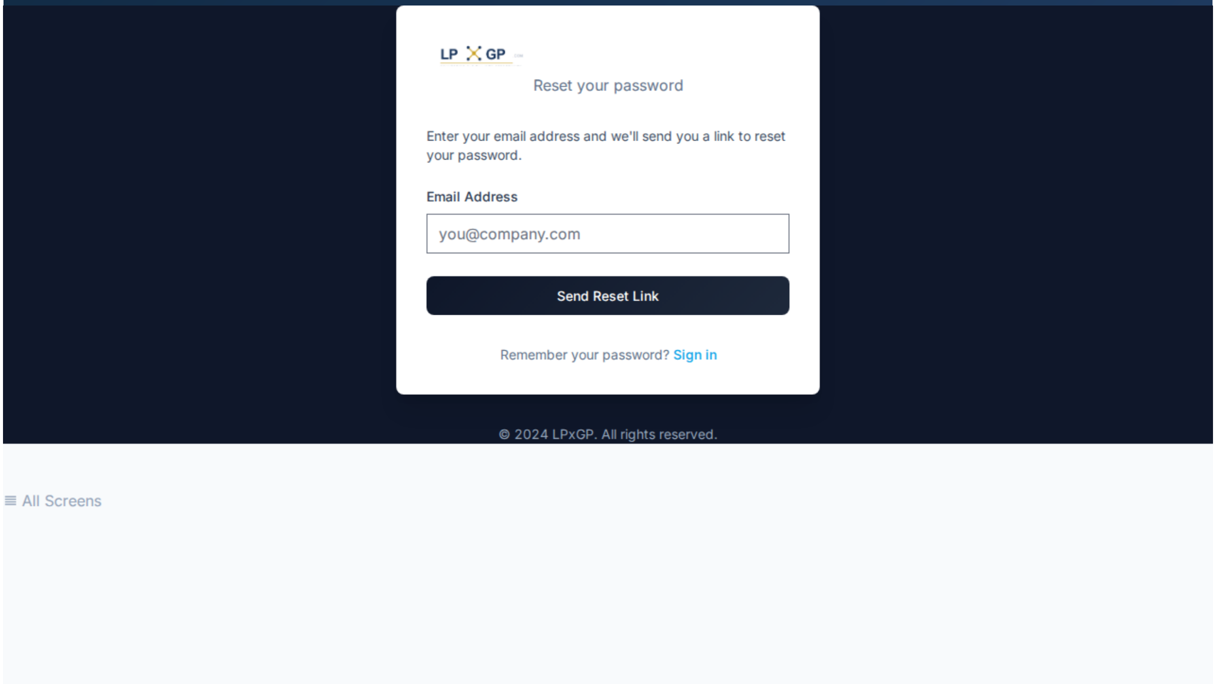
New user onboarding



This screen appears when a user clicks an invitation link from their email. Since LPxGP is invite-only, this is the only way to create an account. Users set their password and confirm their details. The invitation token is validated server-side to ensure security. Expired or already-used tokens show appropriate error messages.

Forgot Password

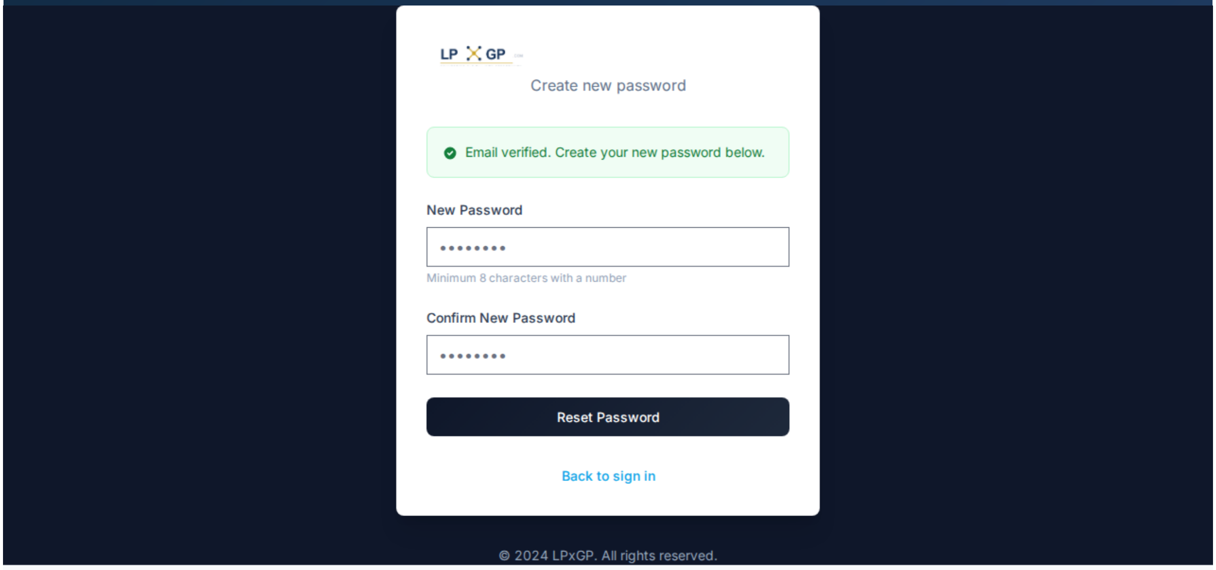
Request reset link



Users who cannot remember their password can request a reset link. They enter their email address and receive a secure, time-limited reset link. The form includes rate limiting to prevent abuse. For security, the same success message is shown whether or not the email exists in the system.

Reset Password

Create new password



≡ All Screens

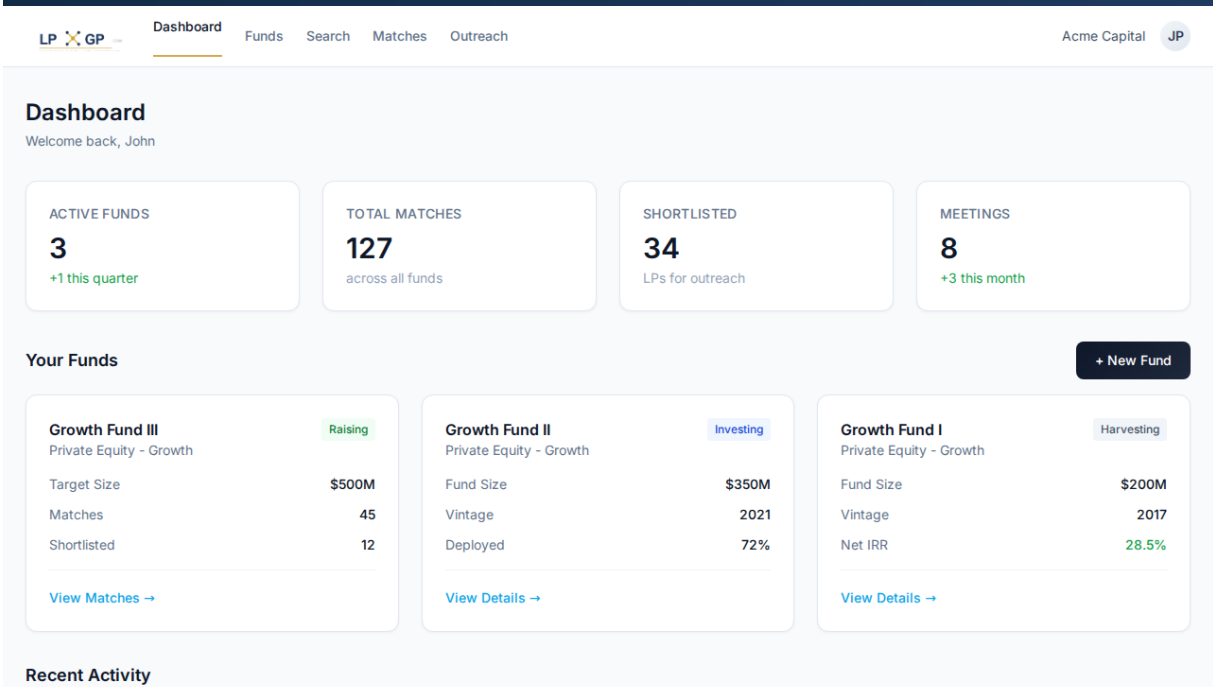
After clicking the reset link from their email, users land on this screen to set a new password. Password strength requirements are enforced (minimum 8 characters, mix of letters and numbers). The reset token is validated and expires after use to ensure security.

GP User Screens

13 screens — Core platform functionality for fund managers and associates

Dashboard

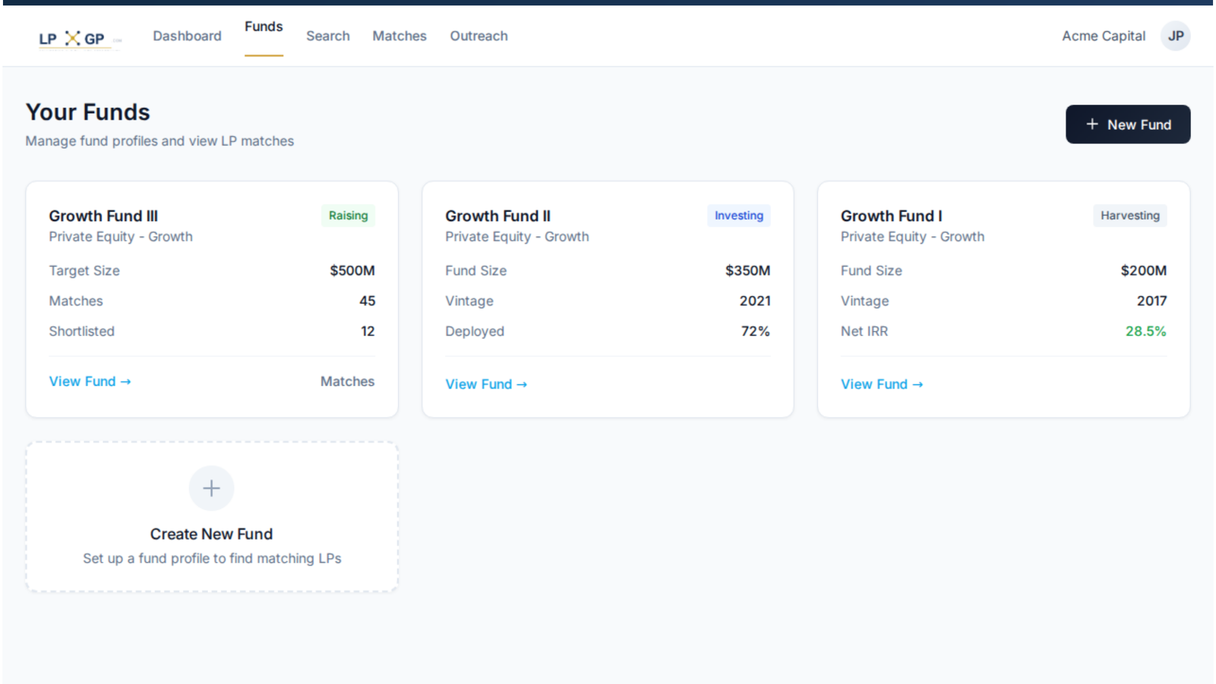
Fund overview and activity



The Dashboard is the command center for fund managers. It provides an at-a-glance view of all funds, recent matching activity, and quick access to key features. Users see fund cards showing name, status (Raising/Investing/Harvesting), target size, and match statistics. Recent activity includes new matches, shortlist additions, and outreach updates. The "+ New Fund" button provides quick access to fund creation.

Funds

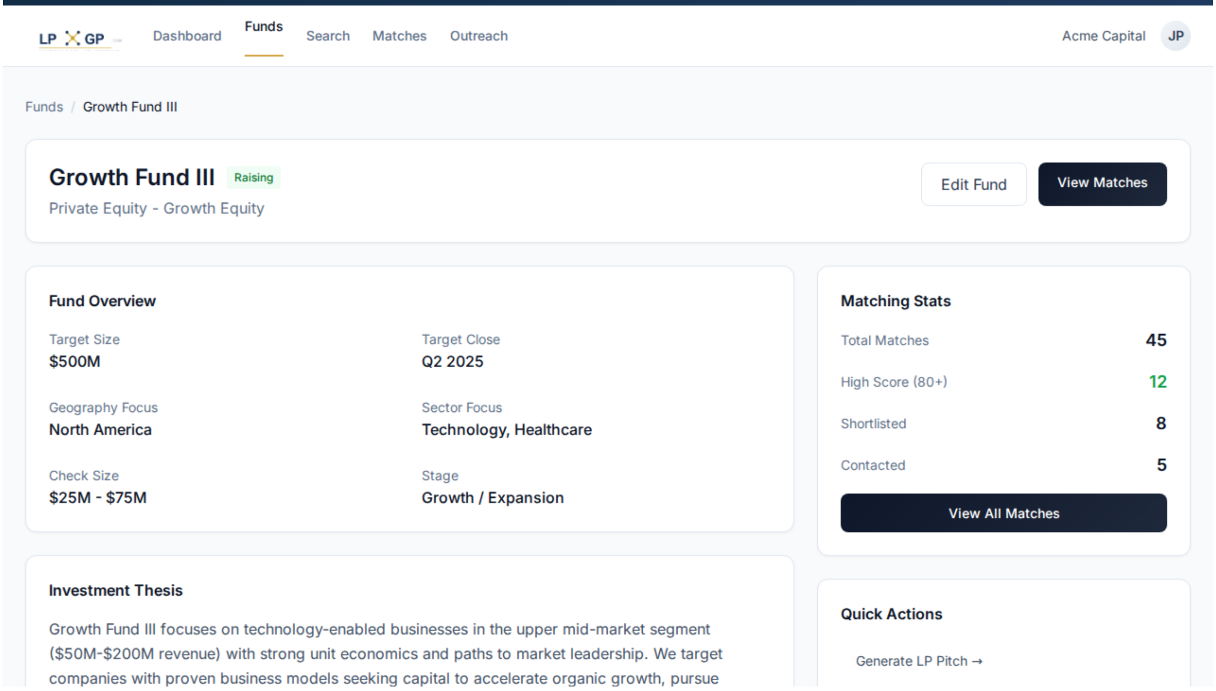
List of all funds



The Funds screen shows all funds belonging to the user's company. Each fund card displays key metrics: fund name, status, target size, number of LP matches, and last activity date. Users can filter by status or search by name. Clicking a fund card navigates to the Fund Detail view. Company admins can see all company funds; members see funds they're assigned to.

Fund Detail

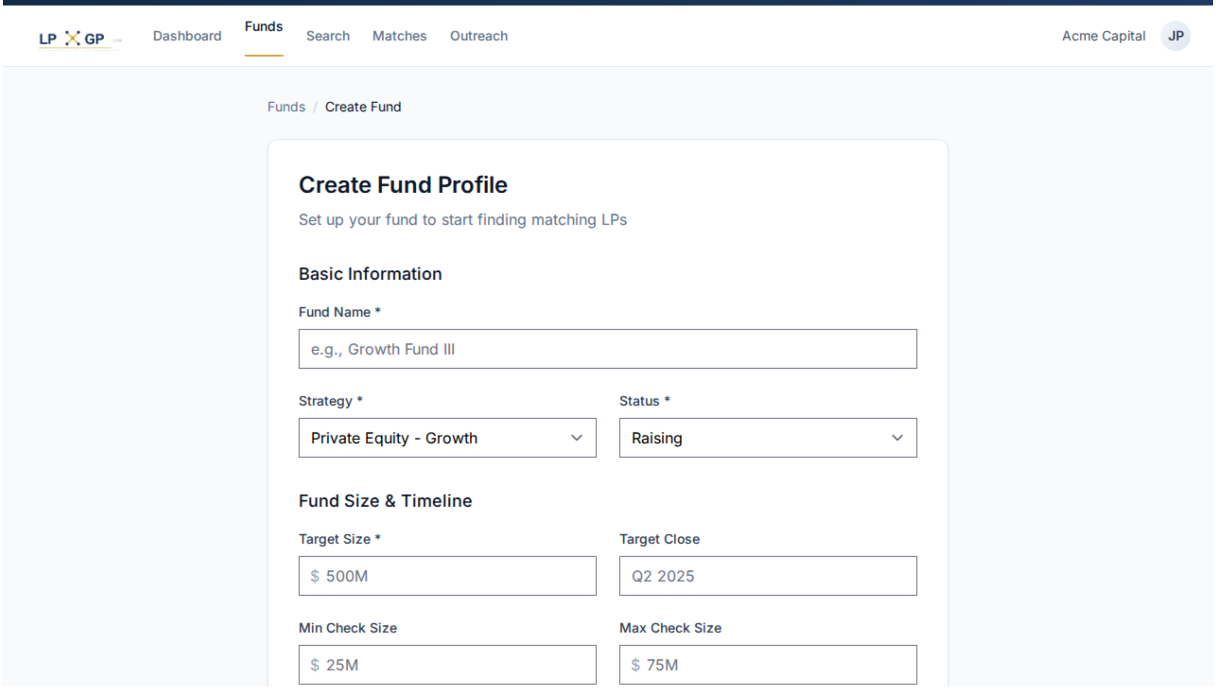
Fund profile with thesis and track record



The Fund Detail screen is the comprehensive profile for a single fund. It displays the fund thesis, investment strategy, geographic focus, target size, and track record of notable exits. A sidebar shows matching statistics and quick actions (View Matches, Generate Pitch). Company admins can edit fund details; members have read-only access. This is the primary context for LP matching and outreach activities.

Create Fund

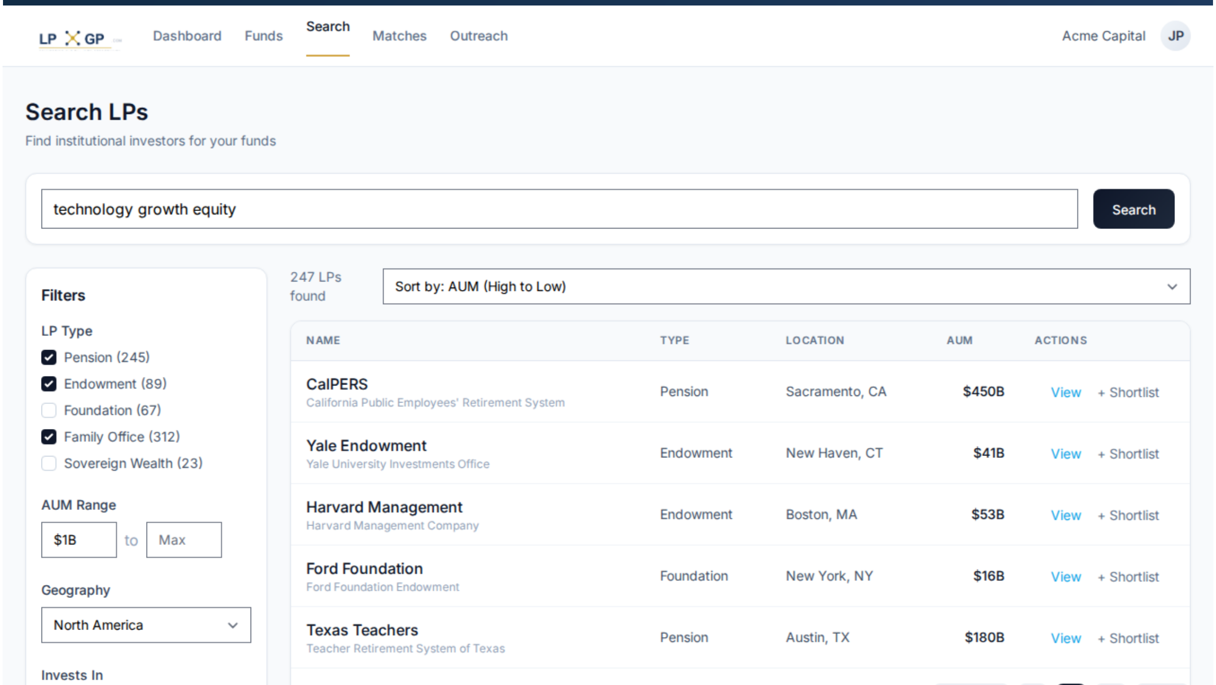
New fund creation form



The Create Fund screen enables users to set up a new fund profile. Users can either manually enter fund details or upload a pitch deck (PDF/PPTX) for AI-assisted extraction. When a deck is uploaded, the system uses Claude to extract fund name, strategy, thesis, target size, and other details. Extracted fields show confidence scores, allowing users to review and correct low-confidence items before saving.

LP Search

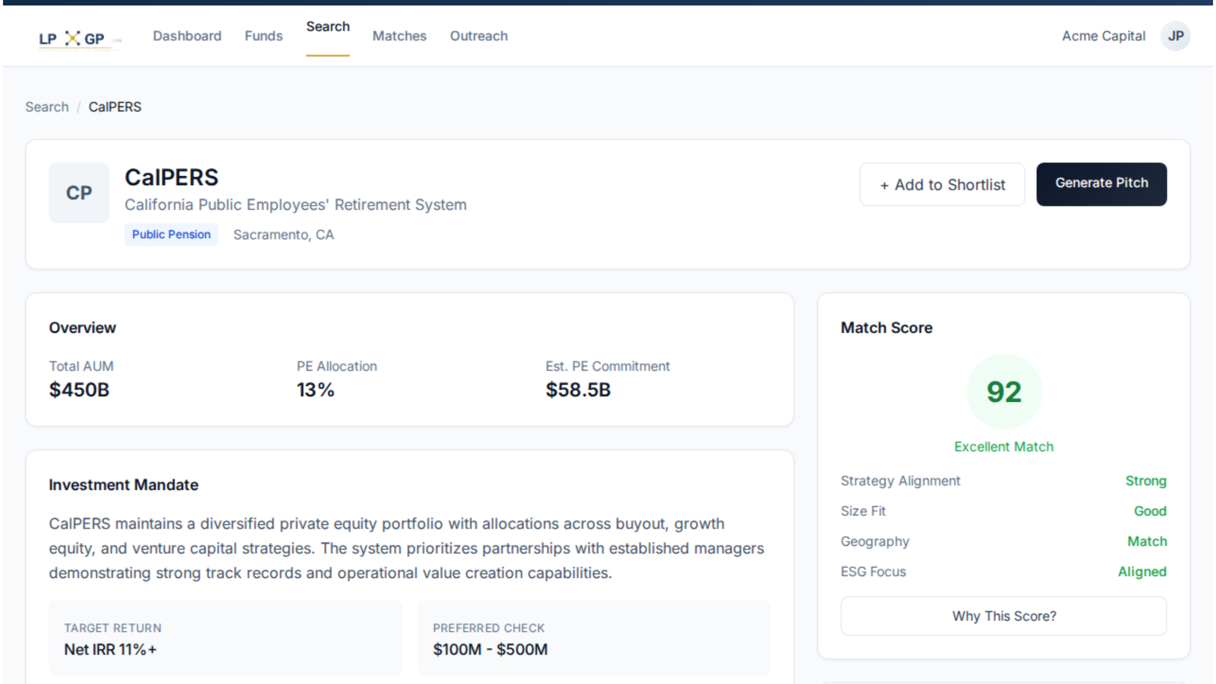
Search and filter institutional investors



LP Search is the primary research tool for finding potential investors. Users can search by keyword or use natural language queries like "technology growth equity investors in North America." Advanced filters allow narrowing by LP type (pension, endowment, family office), AUM range, typical check size, geographic focus, and strategy preferences. Results show relevance scores and key LP attributes. Users can add promising LPs to their shortlist or view full profiles.

LP Detail

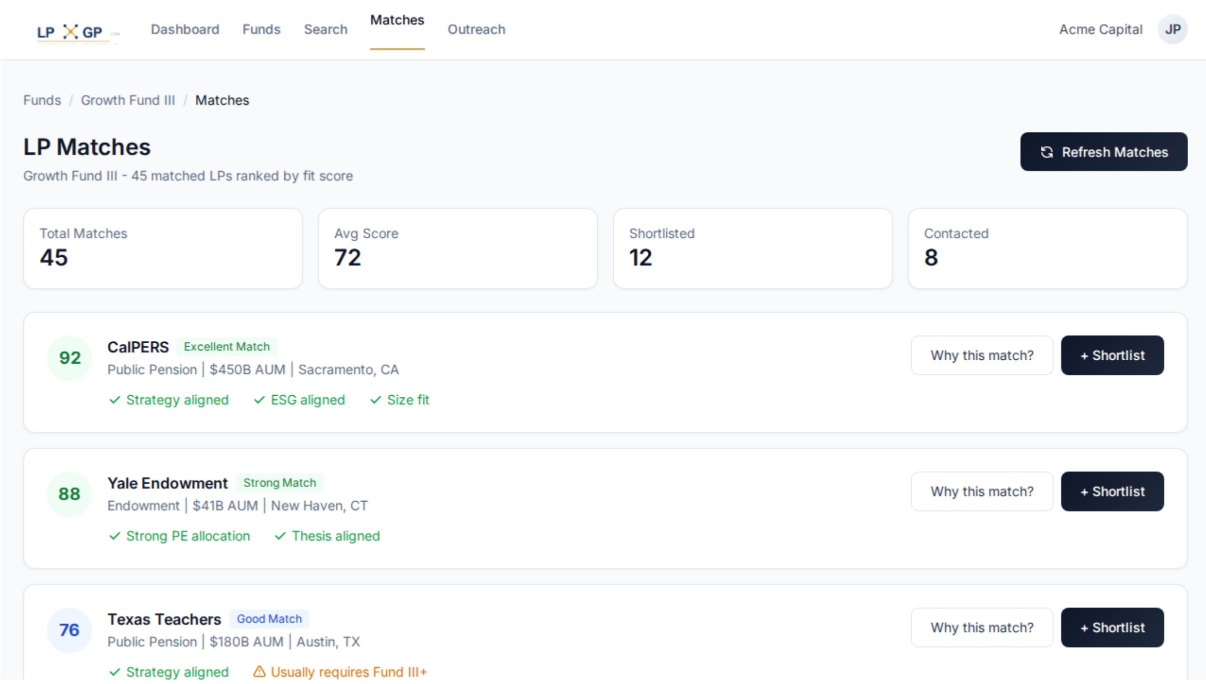
LP profile with mandate and contacts



The LP Detail screen provides comprehensive information about an institutional investor. It displays the LP's investment mandate, AUM, allocation targets, geographic preferences, and recent fund commitments. The Contacts section shows key personnel with titles and roles. Users can add the LP to their shortlist, generate a personalized pitch, or view matching scores against their funds. This screen is essential for research before outreach.

Matches

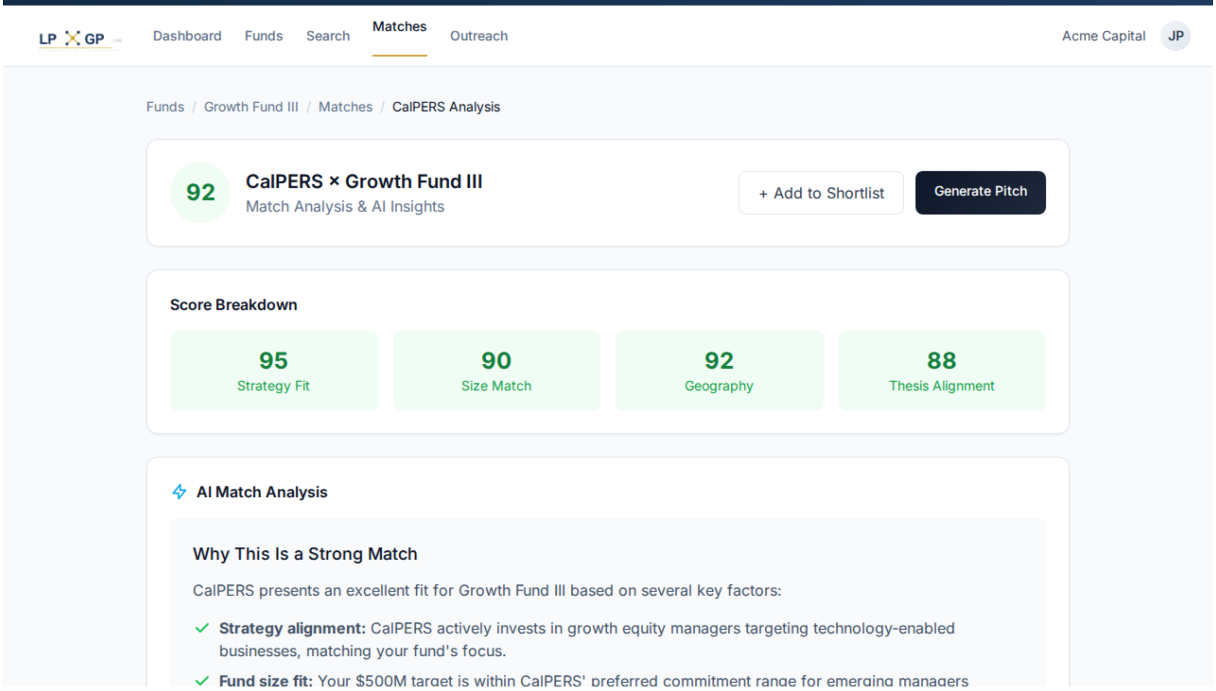
AI-ranked LP matches for fund



The Matches screen shows AI-generated LP recommendations for a specific fund. LPs are ranked by a fit score (0-100) calculated from strategy alignment, size fit, geographic overlap, and semantic similarity between fund thesis and LP mandate. Each match card shows the score, LP name, type, AUM, and key alignment indicators (checkmarks for strong fits, warnings for concerns). Users can filter by score range, sort by different criteria, and bulk-add matches to their shortlist.

Match Analysis

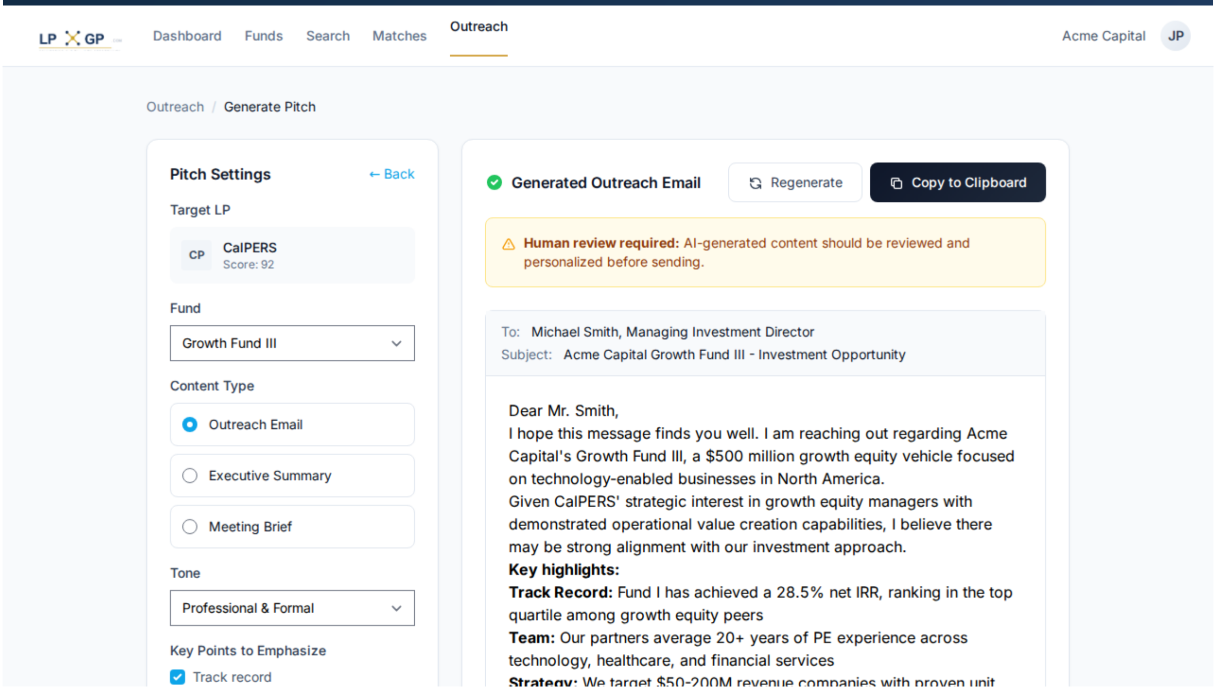
AI insights and talking points



The Match Detail screen explains why a specific LP is recommended for a fund. It breaks down the match score into components: strategy alignment, size compatibility, geographic fit, and semantic similarity. The AI generates talking points highlighting what to emphasize in outreach and identifies potential concerns to address proactively. Recent LP activity (if available) helps users time their outreach. A "Generate Pitch" button launches personalized content creation.

Pitch Generator

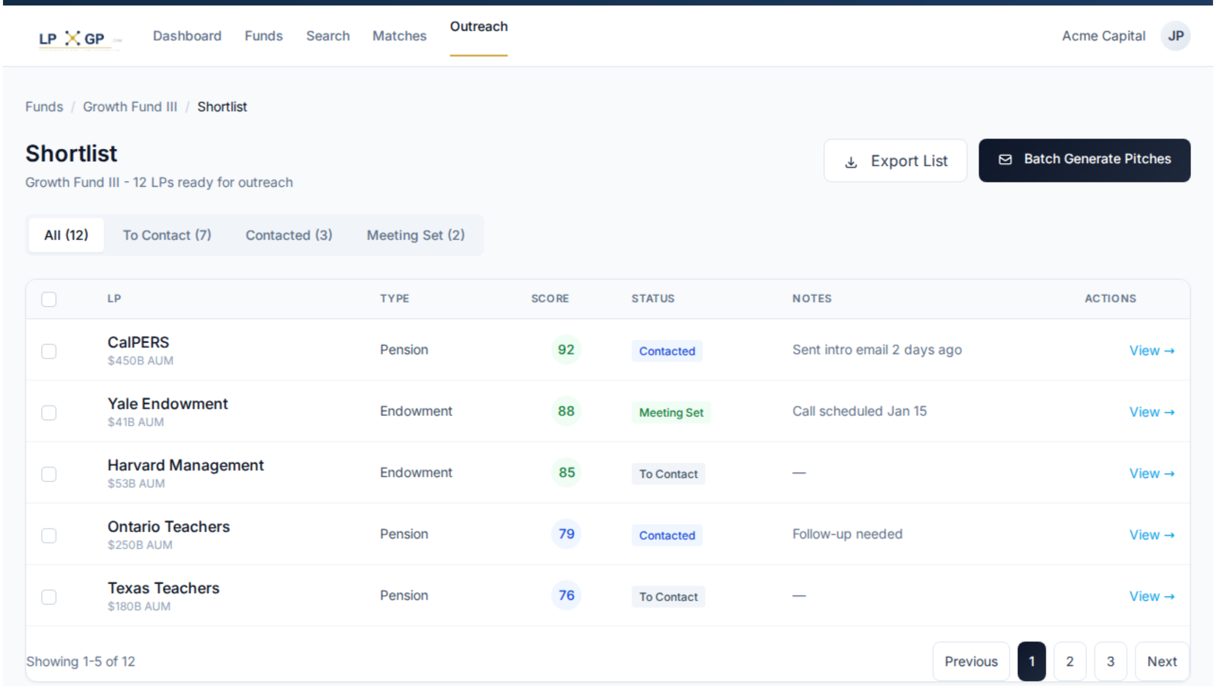
AI-powered outreach content



The Pitch Generator uses Claude to create personalized outreach content for specific LP-fund combinations. Users select the output type: Executive Summary (1-page overview), Outreach Email (introduction message), or Talking Points (meeting preparation). The AI references the LP's mandate, recent activity, and the fund's thesis to create relevant, personalized content. All generated content is editable before copying to clipboard. There is no auto-send - this ensures human review of all outreach.

Shortlist

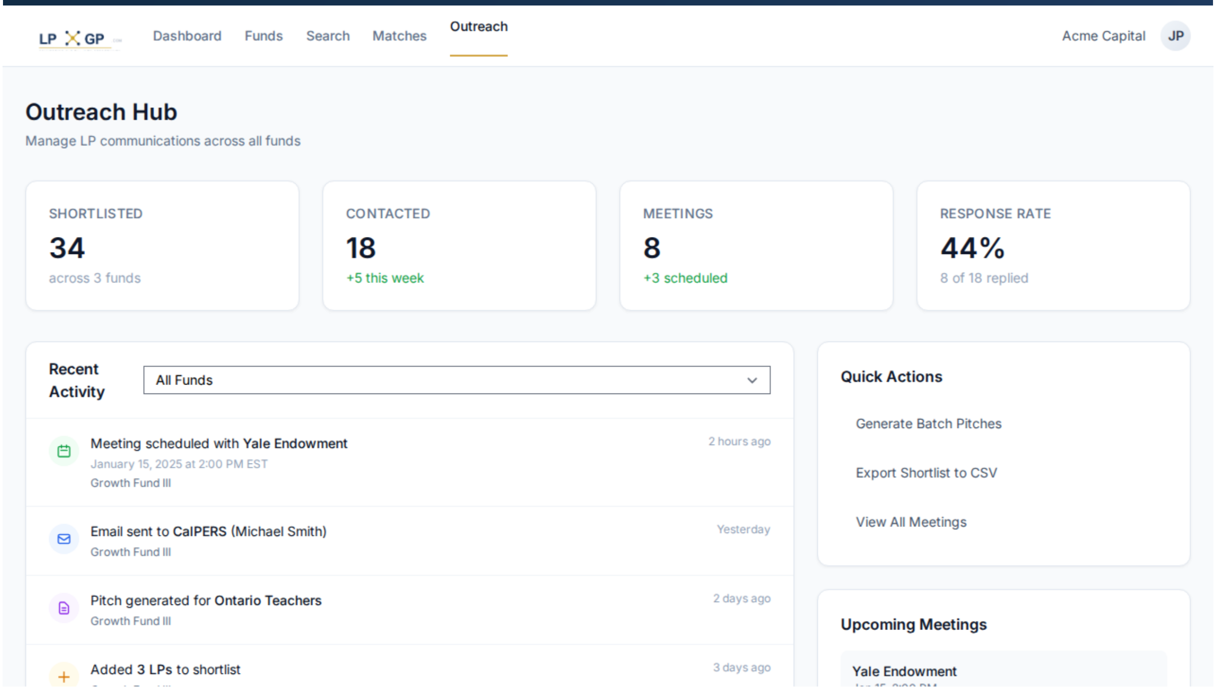
LPs ready for outreach



The Shortlist is a curated collection of LPs the user has identified for potential outreach. It serves as a working list for fundraising campaigns. Users can organize LPs, add notes, track outreach status, and generate pitches in bulk. The shortlist persists across sessions and can be shared with team members. Quick actions allow moving LPs through the pipeline: Not Started → Contacted → Meeting Scheduled → In Diligence → Committed.

Outreach Hub

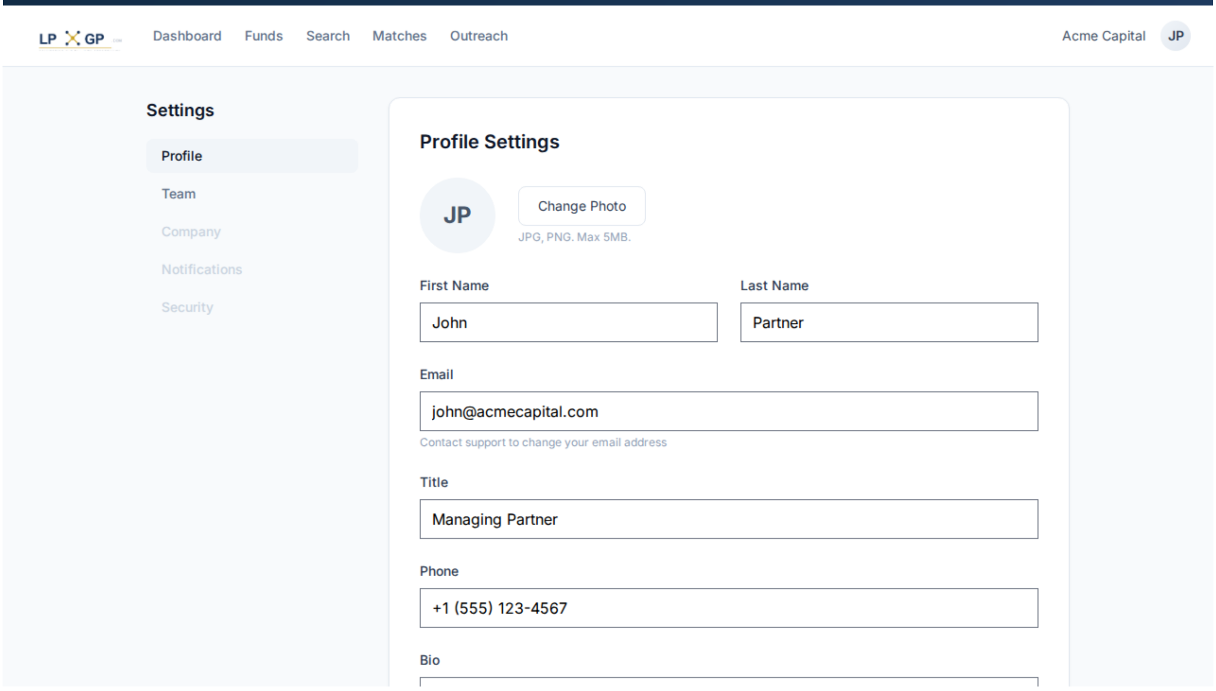
Activity tracking and pipeline



The Outreach Hub provides a kanban-style view of the fundraising pipeline. LPs are organized by status: Identified, Contacted, Meeting Scheduled, In Diligence, and Committed. Users can drag-and-drop LPs between stages, log activities (calls, emails, meetings), and track commitment amounts. Summary metrics show pipeline progress and conversion rates. This screen helps teams coordinate outreach and measure fundraising progress.

Settings - Profile

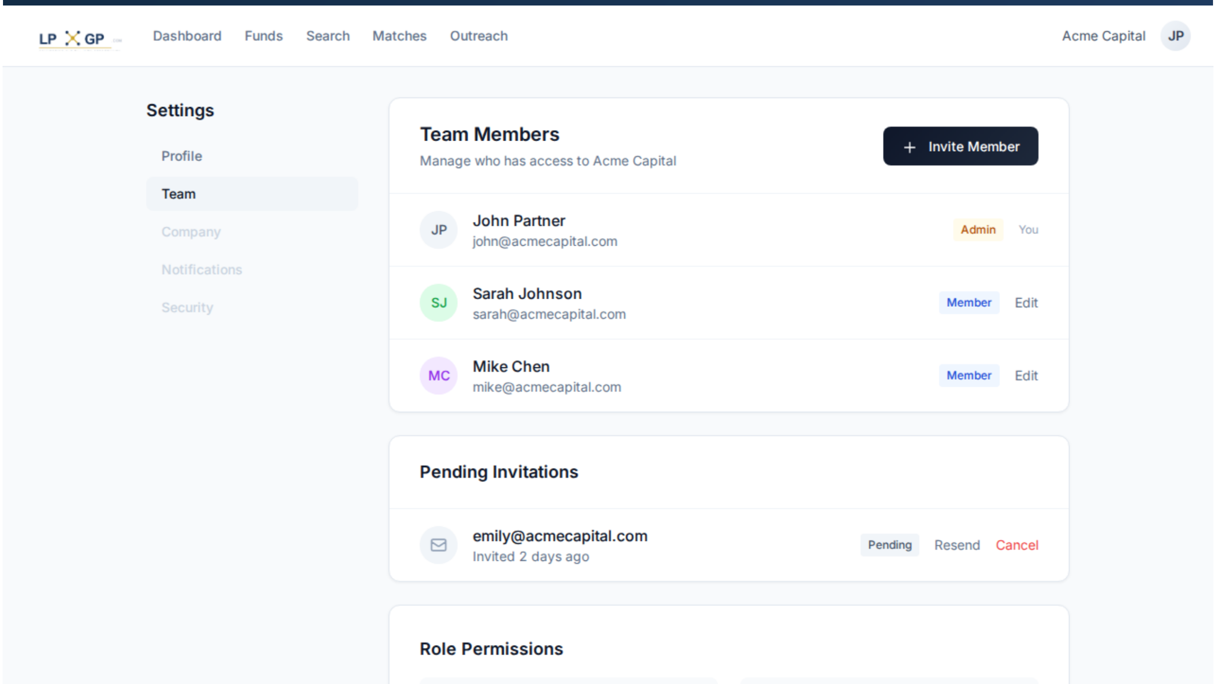
User profile settings



The Profile Settings screen allows users to manage their personal information: name, email, title, and notification preferences. Users can change their password and manage two-factor authentication. The screen also shows account activity and login history for security awareness. All changes require current password confirmation for security.

Settings - Team

Team member management



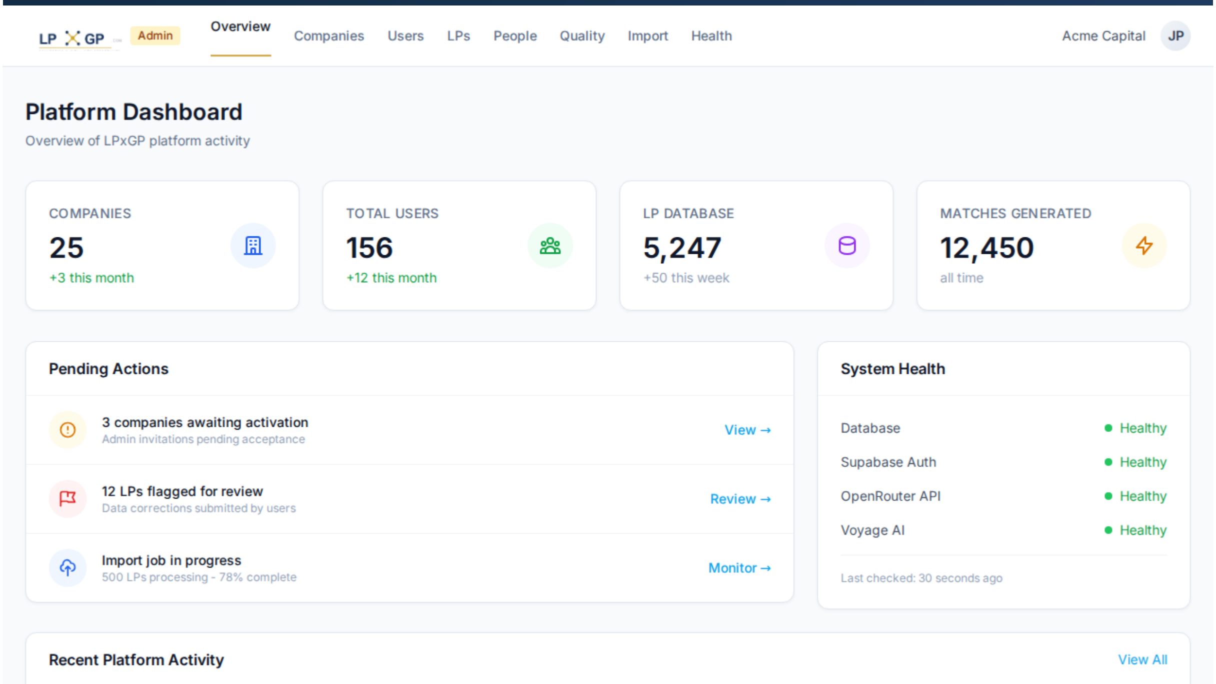
The Team Settings screen is available to Company Admins and allows them to manage team access. Admins can invite new team members by email, assign roles (Admin or Member), and deactivate accounts. The member list shows names, emails, roles, and last activity. Admins can also manage fund assignments, controlling which team members can access which funds.

Super Admin Screens

10 screens — Platform administration and data management

Admin Dashboard

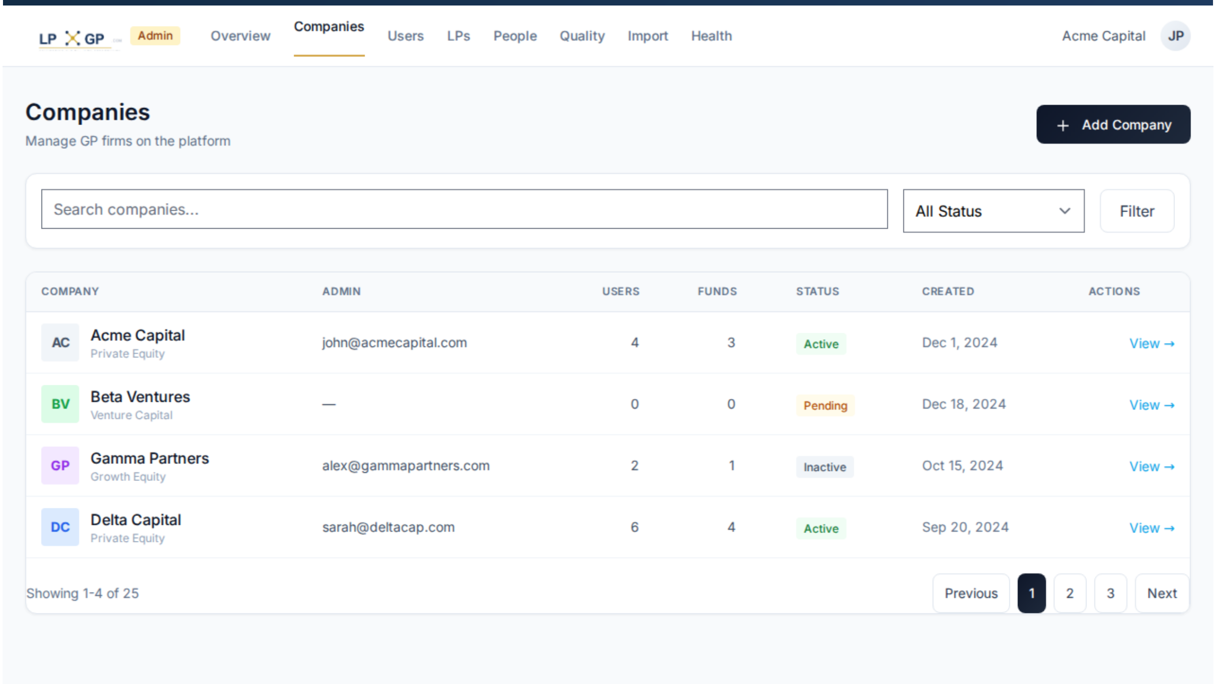
Platform overview and health



The Admin Dashboard provides Super Admins with a bird's-eye view of the entire LPxGP platform. Key metrics include total companies, users, funds, and LPs in the database. System health indicators show API status, database performance, and external service connectivity. Recent activity logs show new company signups, user invitations, and data imports. Quick actions provide access to common admin tasks.

Companies

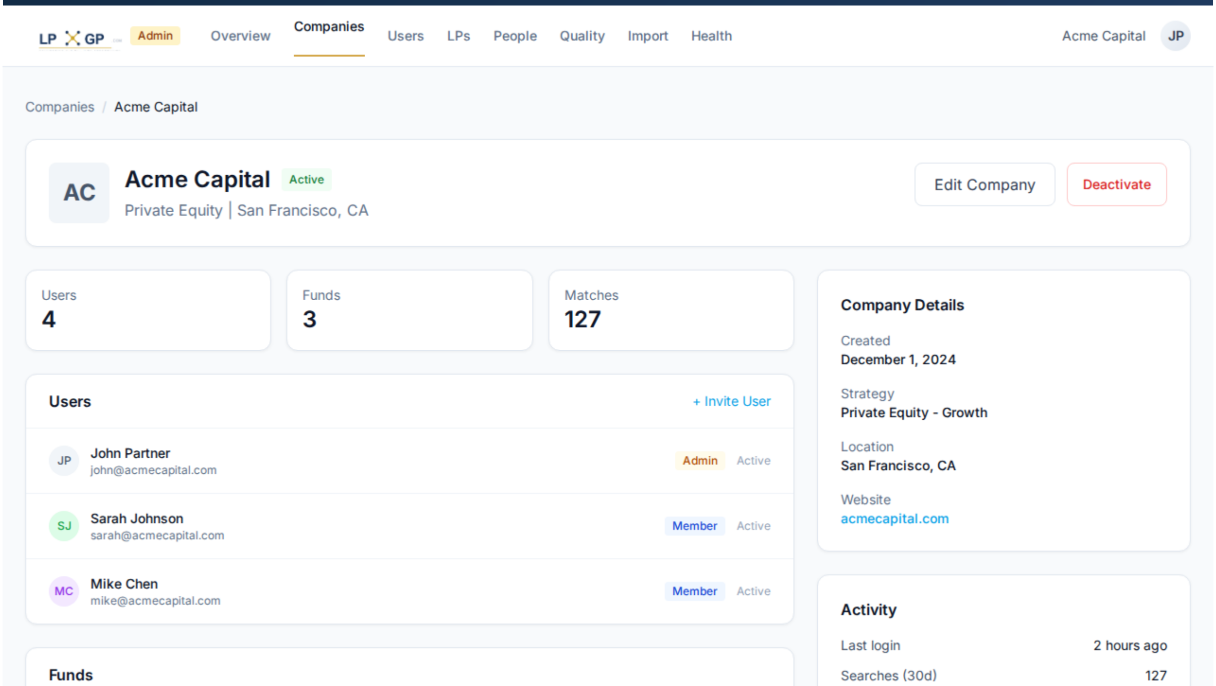
Manage GP firms on platform



The Companies screen lists all GP firms registered on LPxGP. Admins can view company details, user counts, fund counts, and subscription status. Search and filter options help find specific companies. Actions include creating new companies, viewing company details, and managing billing. This is the primary customer management interface for platform administrators.

Company Detail

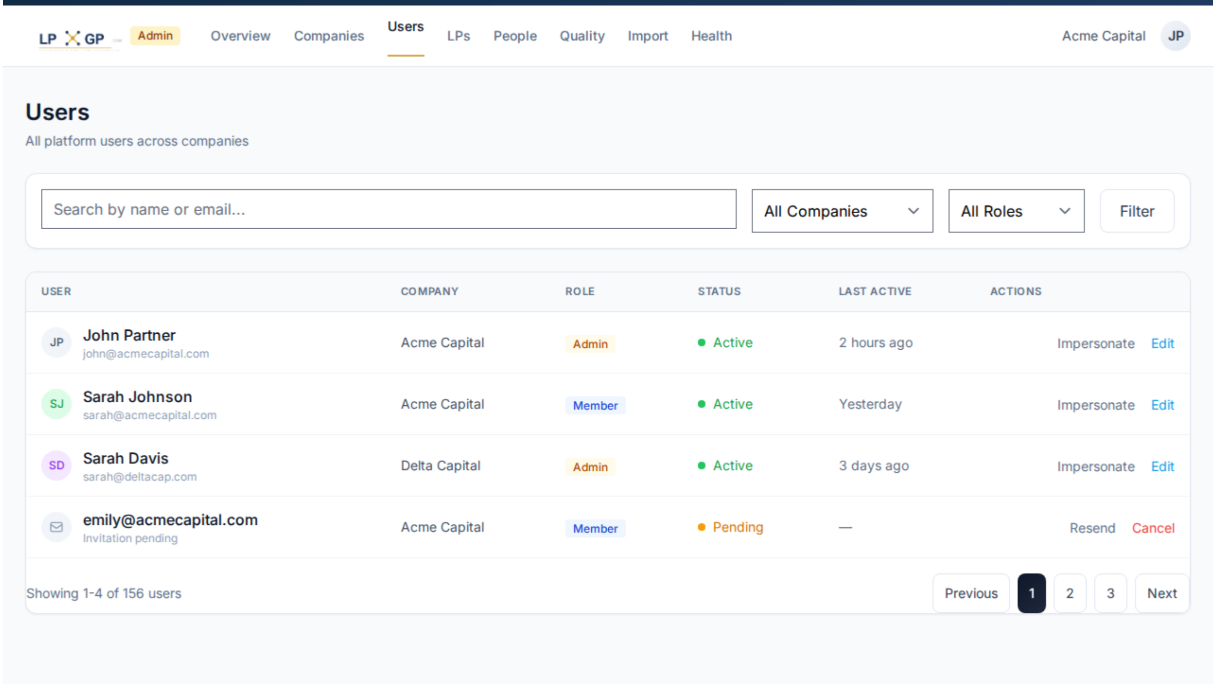
Company users and funds



The Company Detail screen shows comprehensive information about a single GP firm. It displays company profile, subscription tier, billing status, and usage metrics. Lists of users and funds associated with the company are shown with quick access to details. Admins can edit company information, manage subscriptions, and impersonate users for support purposes (with audit logging).

Users

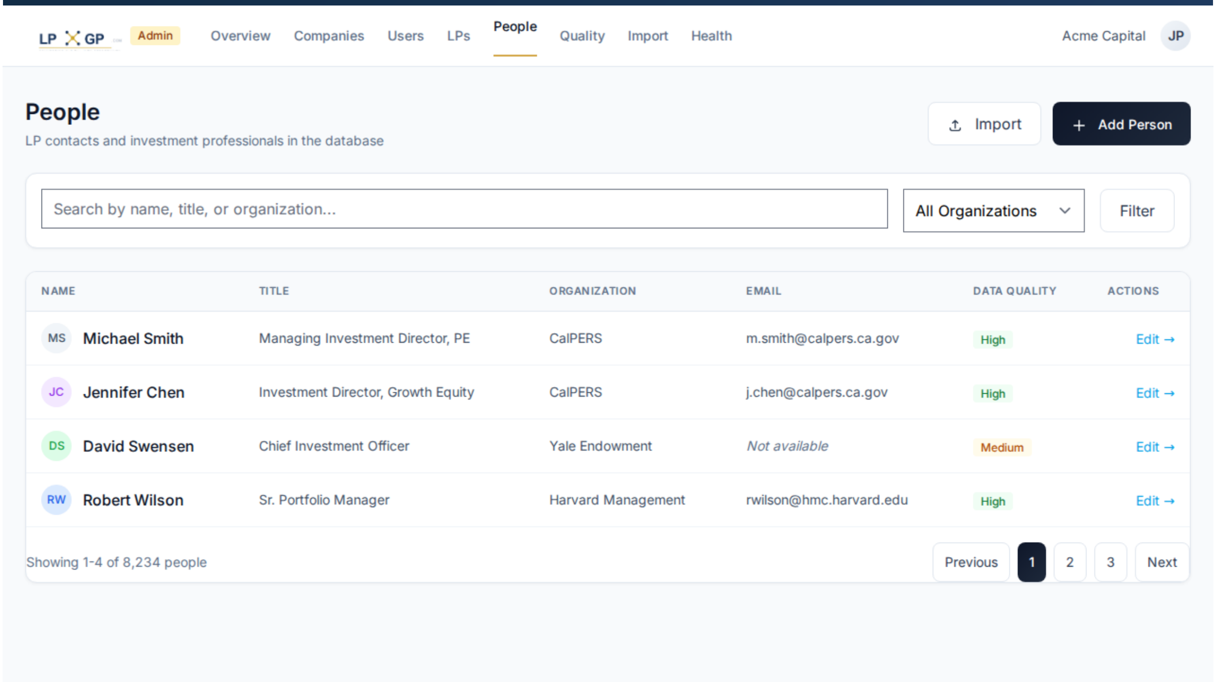
All platform users



The Users screen provides a global view of all registered users across all companies. Admins can search by name, email, or company. User cards show name, company, role, last login, and account status. Actions include resetting passwords, deactivating accounts, and viewing activity logs. This helps with user support and security monitoring.

People

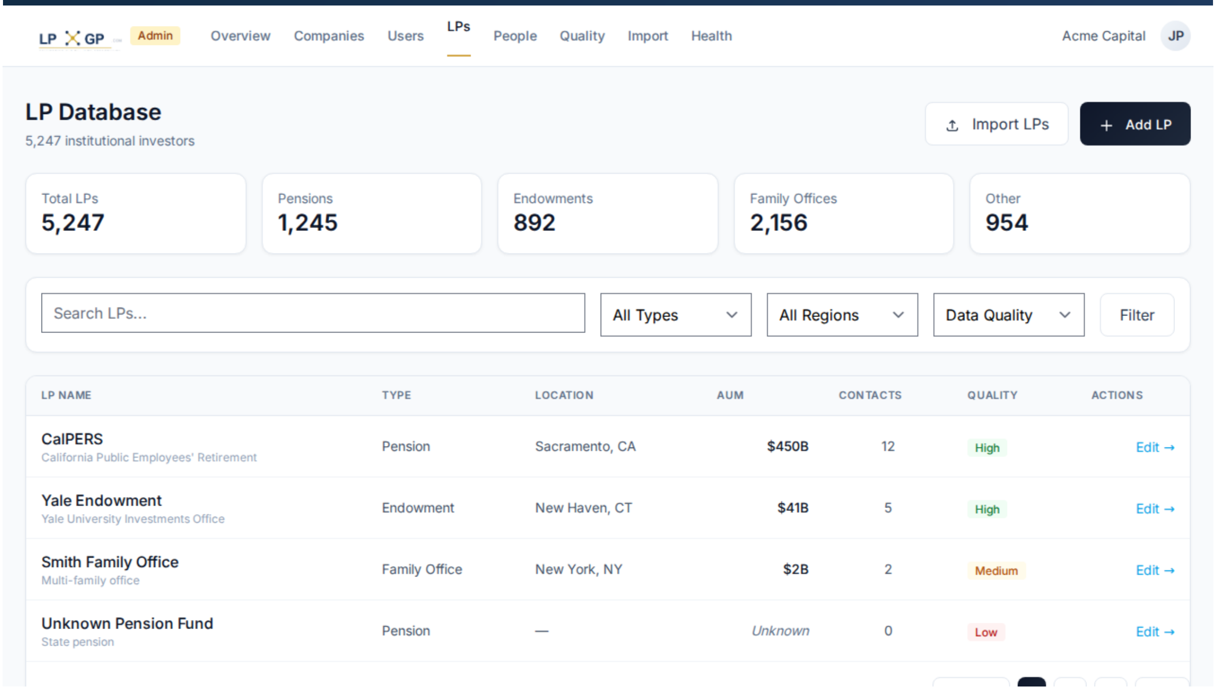
LP contacts database



The People screen manages the global database of LP contacts (individuals who work at institutional investors). Unlike LPs (organizations), People tracks individuals with their employment history. Admins can search contacts, view profiles, and track career movements between organizations. This data enriches LP profiles with specific relationship targets for outreach.

LPs

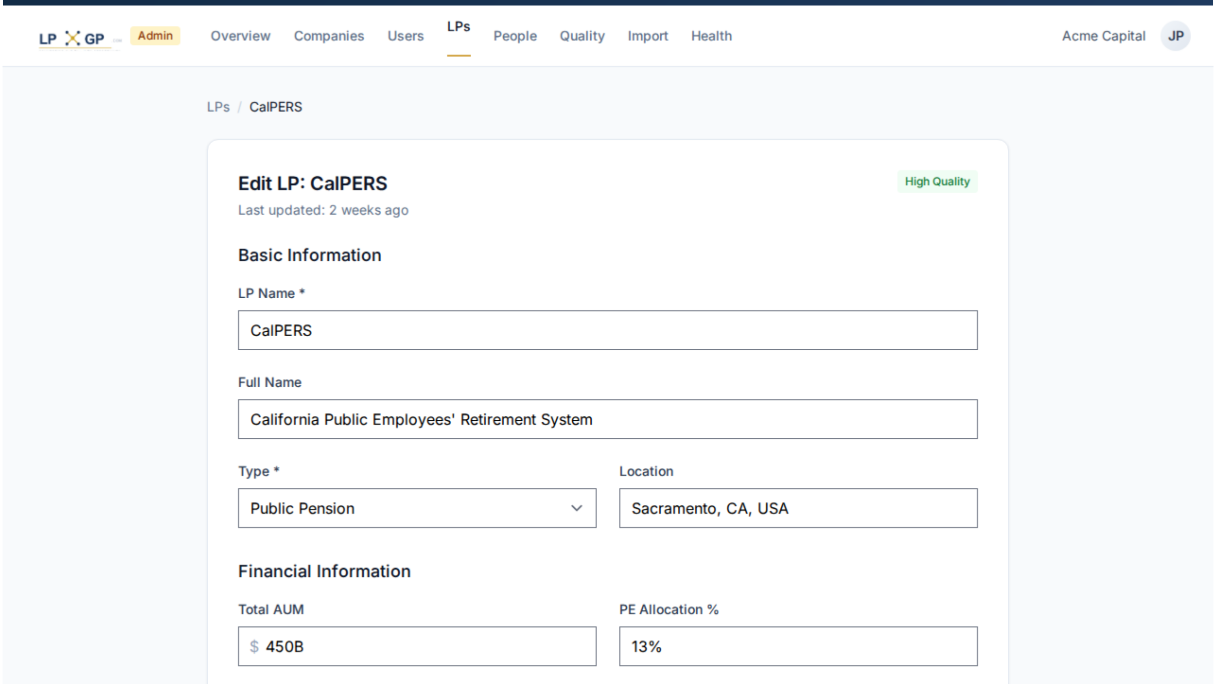
Institutional investor database



The LPs screen is the master database of institutional investors. Admins can browse, search, filter, and edit LP records. Each LP entry shows name, type, AUM, location, and data quality score. Bulk actions allow updating multiple records. The Import Wizard button provides access to CSV import for adding new LPs. Data quality indicators highlight records needing attention.

Edit LP

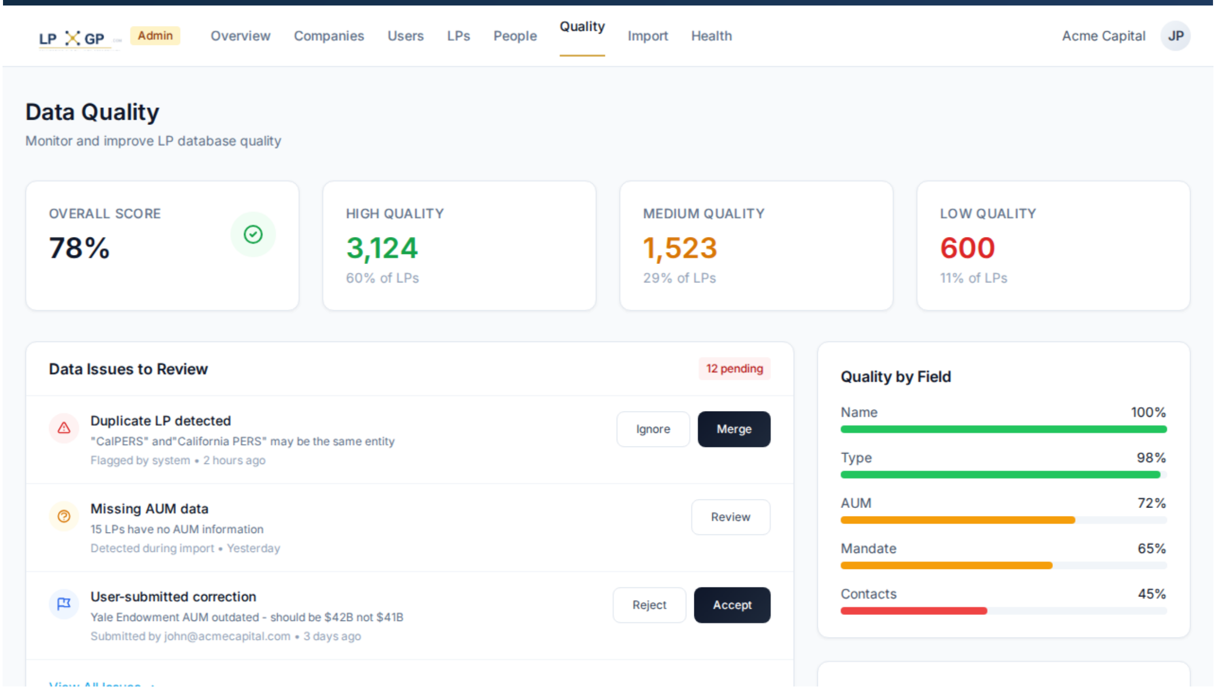
LP data management form



The Edit LP screen allows admins to maintain LP data quality. All fields are editable: name, type, location, AUM, allocation targets, investment mandate, and geographic preferences. The investment mandate text field is particularly important as it's used for semantic matching. Data source and quality score help track provenance. Changes are logged for audit purposes.

Data Quality

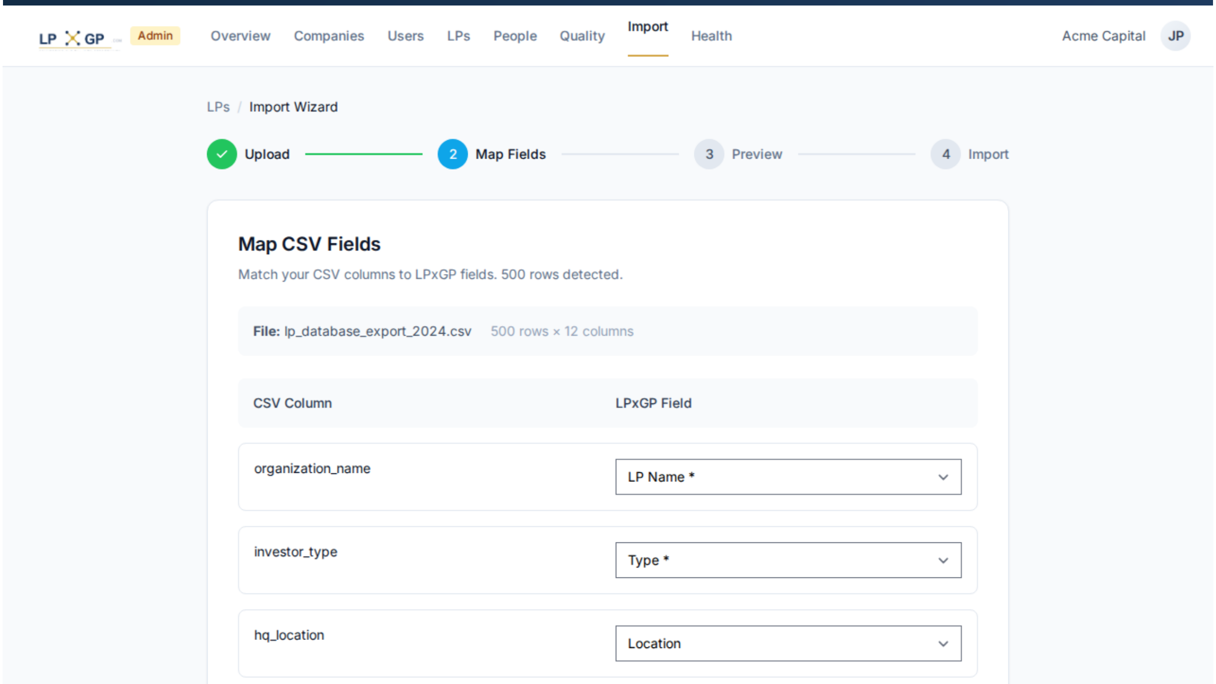
Quality monitoring and issues



The Data Quality screen helps admins maintain high-quality LP data. It shows data completeness metrics, identifies records with missing fields, flags potential duplicates, and highlights stale data. Quality scores are calculated based on field completeness, recency, and source reliability. Admins can drill down into specific issues and take corrective actions.

Import Wizard

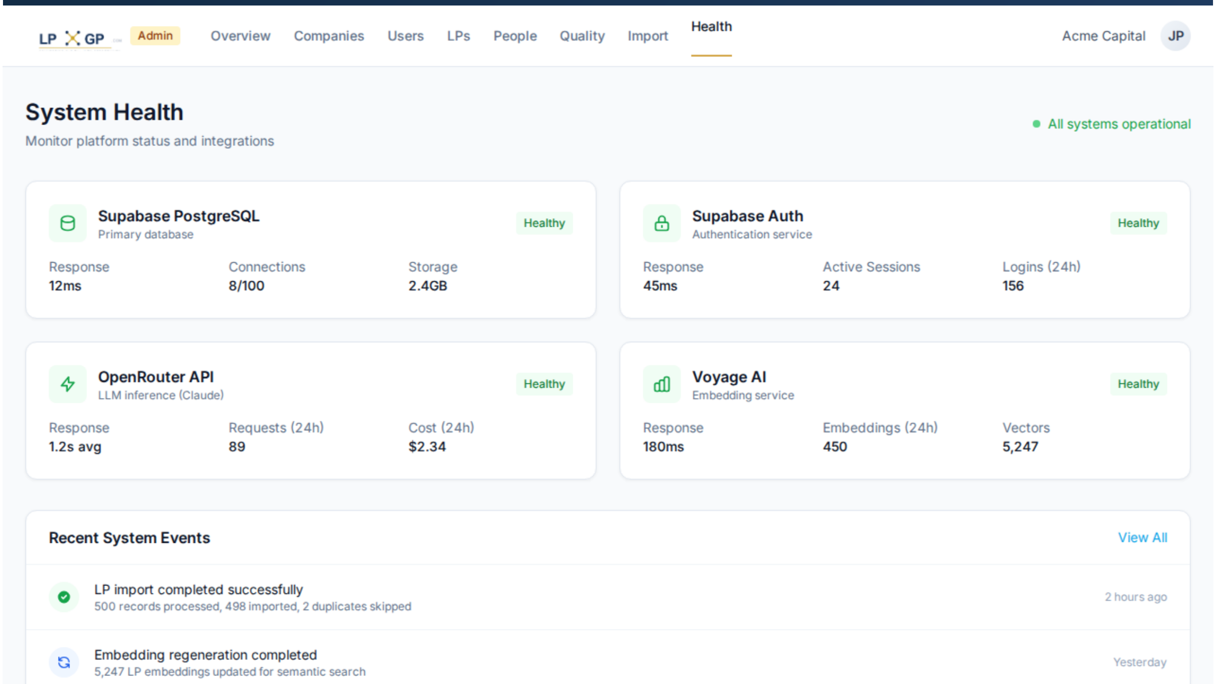
CSV import tool



The Import Wizard guides admins through bulk LP data import. It's a multi-step process: upload CSV, map columns to fields, preview changes, and execute import. The system validates data, detects duplicates, and shows potential issues before committing. Import jobs can be paused, resumed, or rolled back. Progress is tracked with detailed logging for troubleshooting.

System Health

Services and integrations status



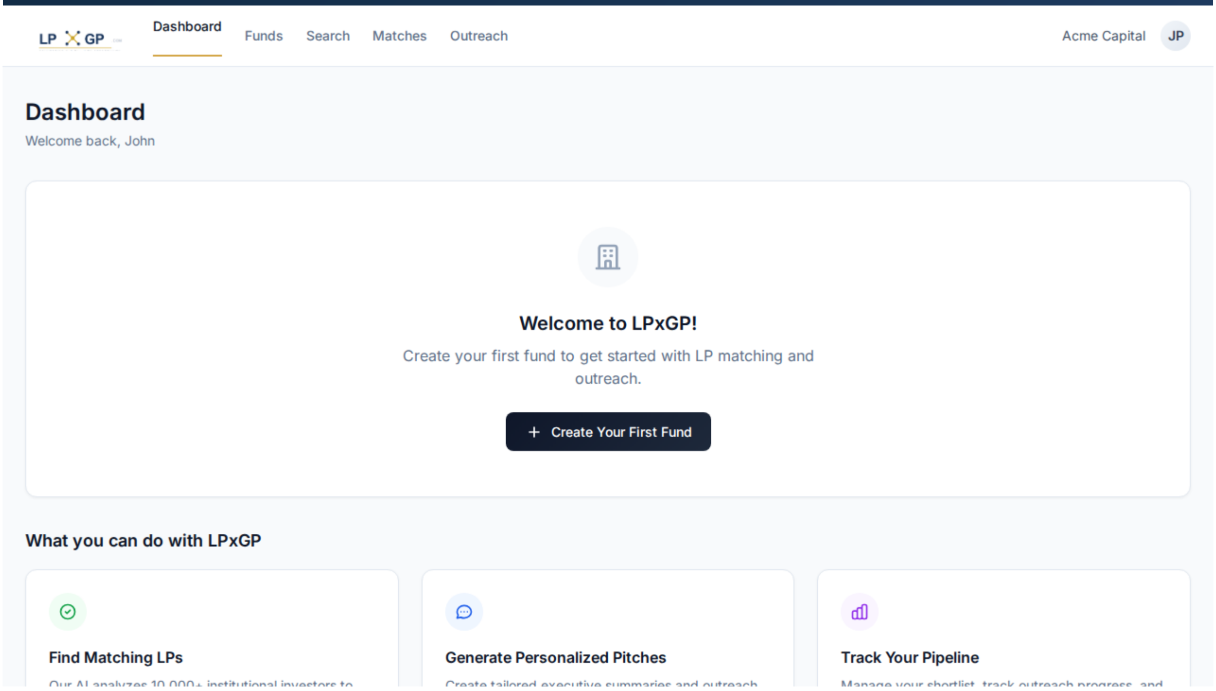
The System Health screen monitors platform infrastructure and external services. It shows status for the database, API server, authentication service, OpenRouter (LLM), Voyage AI (embeddings), and email delivery. Response times and error rates are tracked. Alerts notify admins of issues. This is the first place to check when users report problems.

UI State Screens

3 screens — Loading, empty, and error states for better user experience

Empty Dashboard

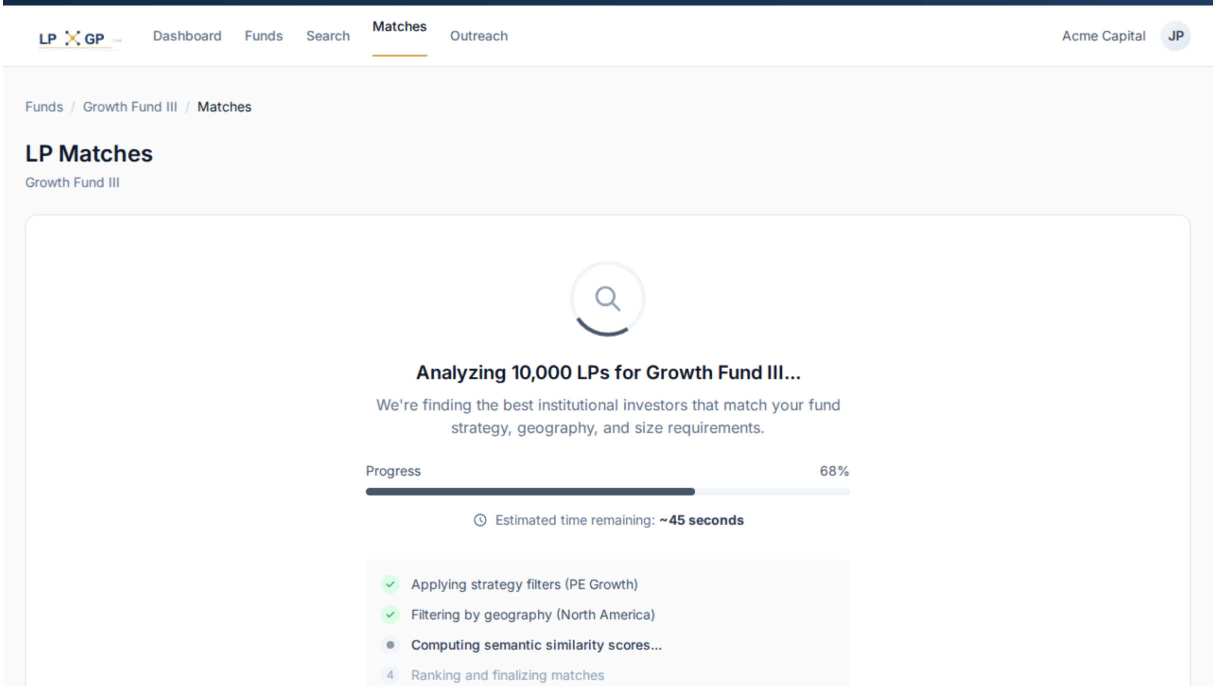
First-time user experience



The Empty Dashboard appears when a user has no funds yet. Instead of empty space, it provides a welcoming onboarding experience. A prominent call-to-action encourages users to create their first fund. Brief feature descriptions explain what they'll be able to do: find matching LPs, generate pitches, and track outreach. This reduces friction for new users and increases activation rates.

Loading Matches

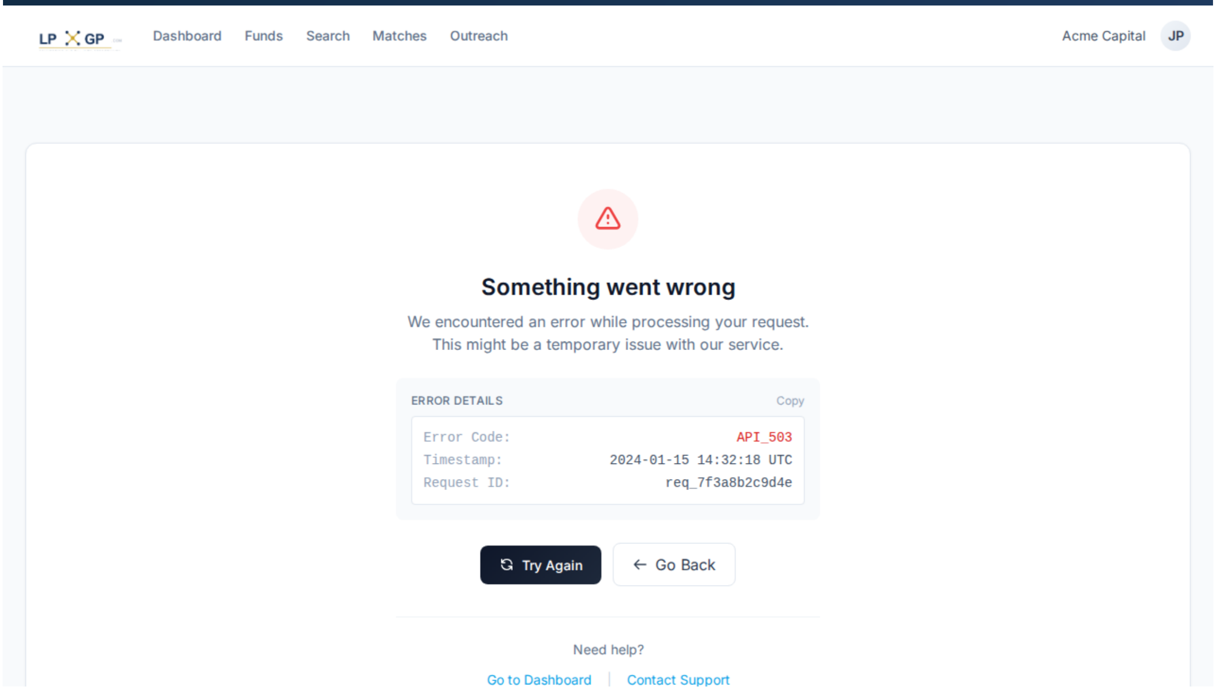
Match generation progress



The Loading Matches screen appears during AI match generation, which can take 30+ seconds for large LP databases. It shows a progress bar, current step (applying filters, computing similarity scores), and estimated time remaining. A cancel button allows users to abort if needed. This transparent feedback prevents users from thinking the system is frozen and reduces support requests.

API Error

Error state handling



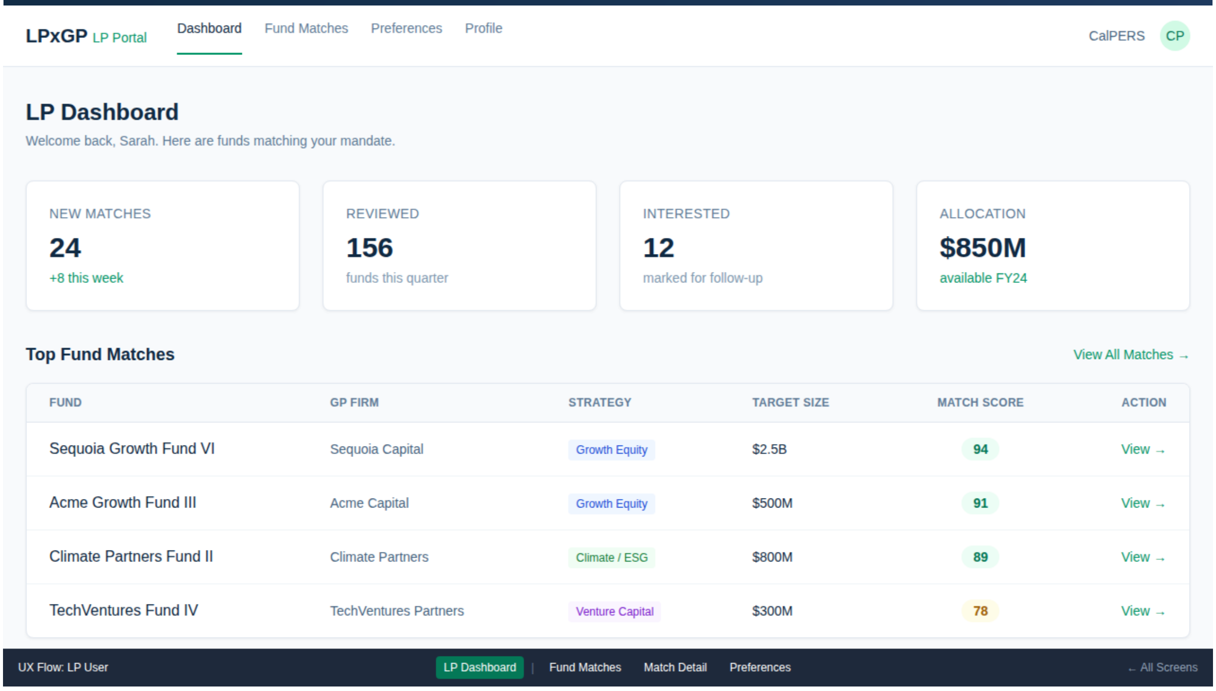
The API Error screen provides graceful error handling when something goes wrong. Instead of cryptic error messages, it shows a friendly explanation and clear next steps. A "Try Again" button attempts to retry the operation. Error details are available for technical users and support. Contact information helps users get assistance if the problem persists.

LP User Screens

5 screens — Bidirectional matching - funds ranked for institutional investors

LP Dashboard

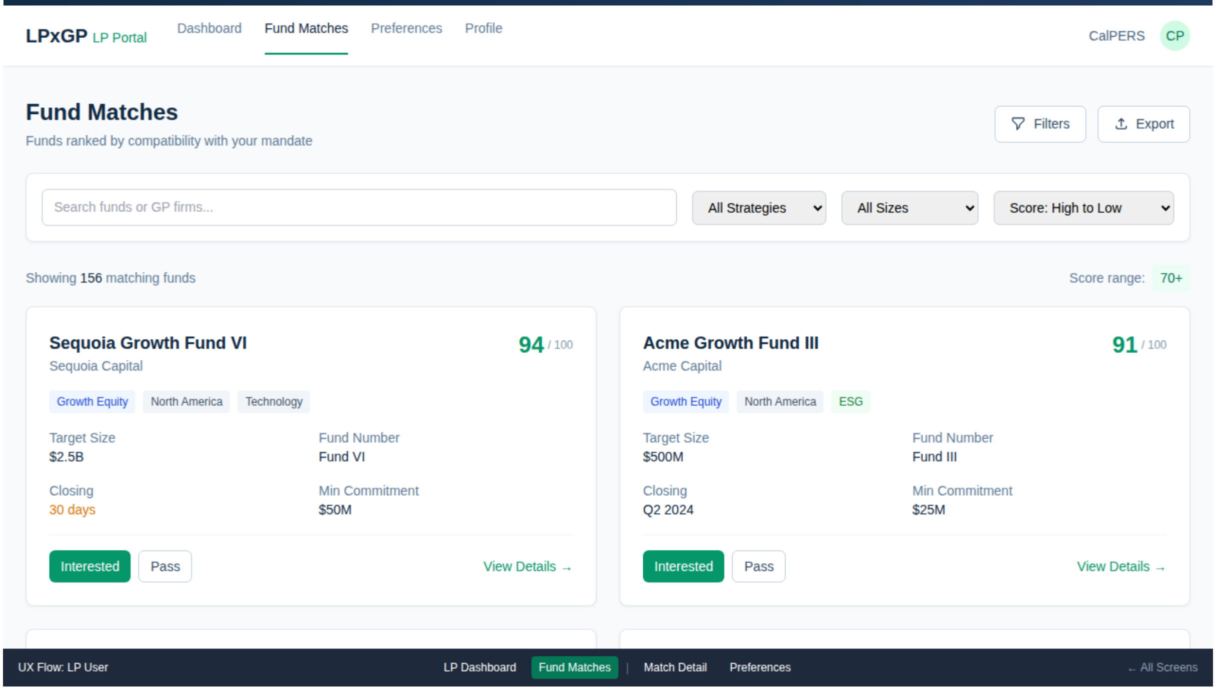
Fund overview for institutional investors



The LP Dashboard is the command center for institutional investors using LPxGP. It provides an at-a-glance view of matching funds, allocation availability, and recent activity. LPs see statistics including new fund matches, funds reviewed, and current allocation capacity. The top matches table shows funds ranked by compatibility score with quick actions to mark interest or pass. This bidirectional matching enables LPs to proactively discover funds rather than waiting for GP outreach.

Fund Matches

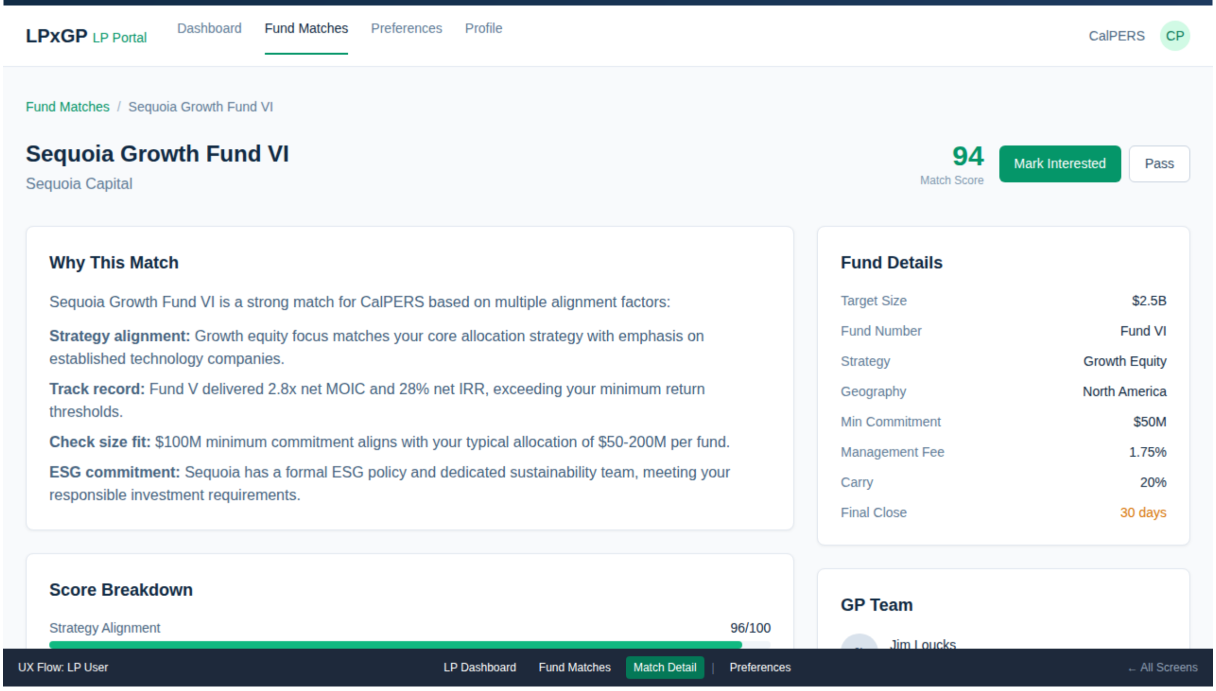
Ranked funds matching LP mandate



The Fund Matches screen shows all funds ranked by compatibility with the LP's investment mandate. LPs can filter by strategy, fund size, and geography. Each fund card displays the GP firm, strategy tags, target size, fund number, closing timeline, and match score. Quick actions allow LPs to mark interest, pass, or view detailed analysis. The scoring algorithm considers strategy alignment, size fit, track record, geographic overlap, and ESG requirements.

Fund Match Detail

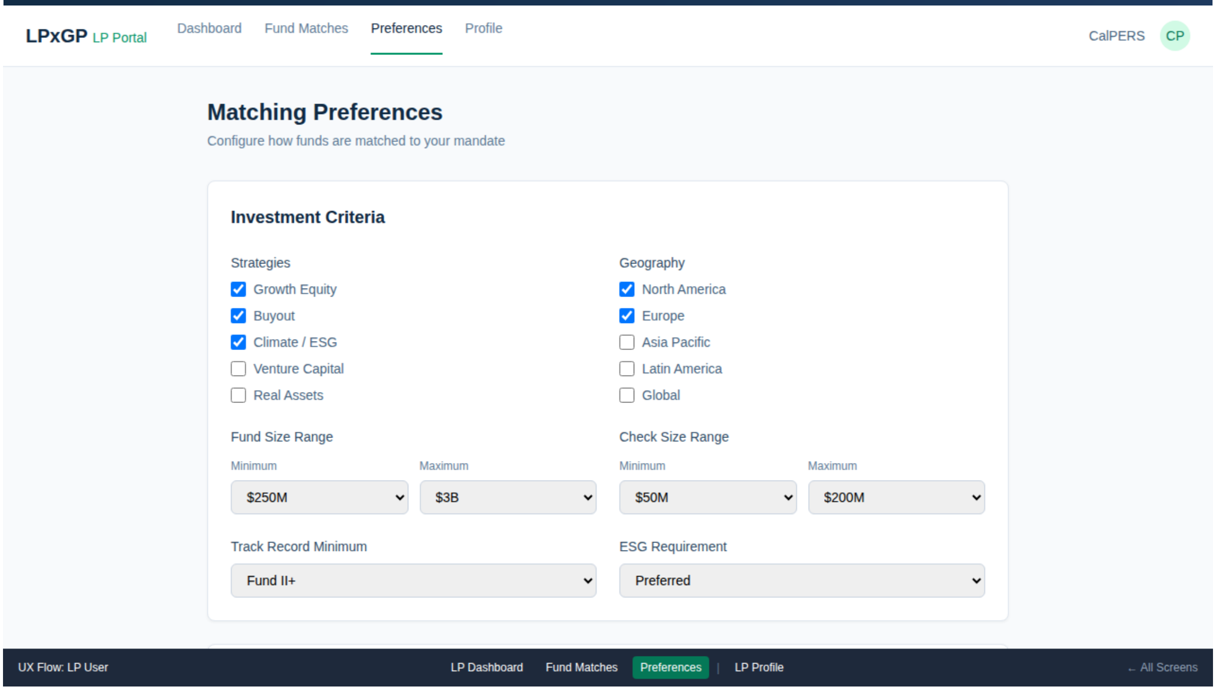
Detailed fund analysis for LPs



The Fund Match Detail screen explains why a specific fund is recommended for the LP. It provides a narrative explanation of alignment factors, a detailed score breakdown across multiple dimensions (strategy, size, track record, geography, ESG), the fund's investment thesis, historical performance data, and key considerations or concerns. LPs can mark interest, request a meeting, or request the fund deck. Private notes allow LPs to track their evaluation.

LP Preferences

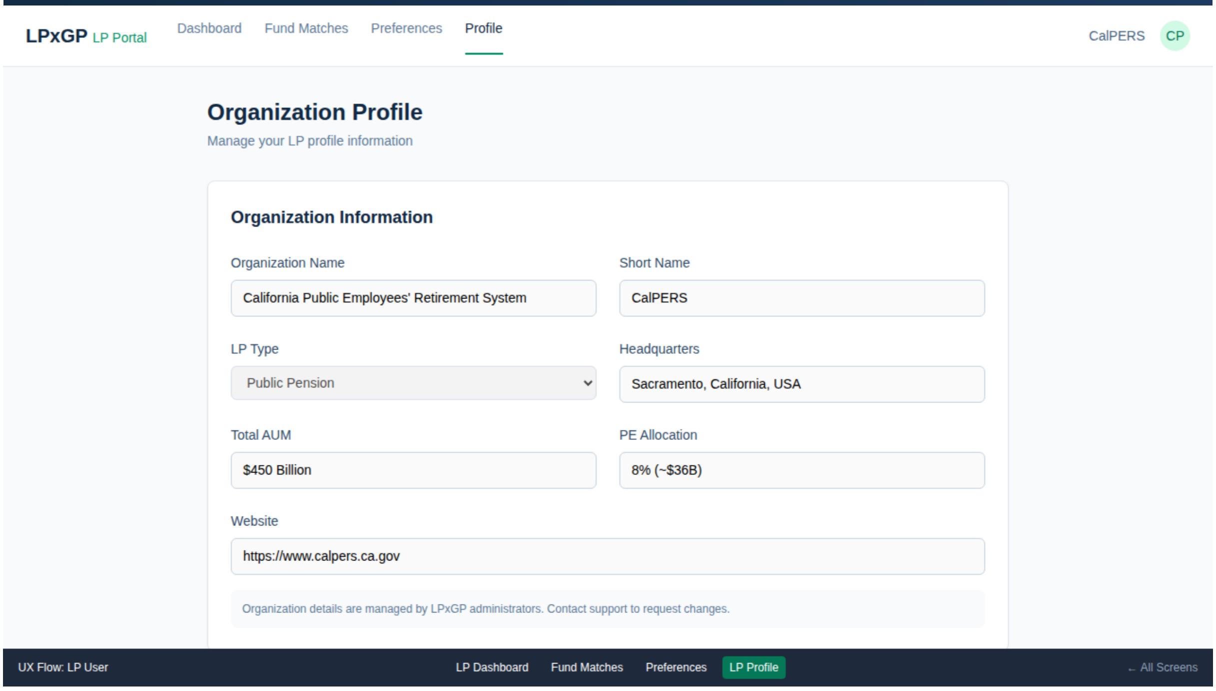
Matching preferences and alerts



The LP Preferences screen allows institutional investors to configure their matching criteria. LPs can set strategy preferences, geographic focus, fund size range, check size range, track record requirements, and ESG requirements. Current allocation availability helps the system prioritize actively deploying LPs. Notification preferences control alerts for new high-score matches, fund updates, closing reminders, and weekly digests.

LP Profile

Organization profile management



The LP Profile screen displays the LP's organization information and investment mandate. Organization details (name, type, AUM, headquarters) are managed by LPxGP administrators to ensure data quality. The investment mandate section shows the LP's strategies, geographic focus, check size, and track record requirements. User profile settings allow LPs to manage their personal information and security settings including password and two-factor authentication.

5. Data Model

Entity Overview

LPxGP uses a unified relational data model where GPs and LPs are both organizations, and platform users are people with login access:

```
┌─────────────────────────────────────────────────────────┐
│                    ORGANIZATIONS                        │
│              (unified: type='gp' | 'lp')                │
├─────────────────────────────────────────────────────────┤
│  GP organizations ──owns──▶ Funds                       │
│  LP organizations ◀──matched_with── Funds               │
└─────────────────────────────────────────────────────────┘
                           │
                           │ employs
                           ▼
┌─────────────────────────────────────────────────────────┐
│                        PEOPLE                           │
│               (all industry professionals)              │
├─────────────────────────────────────────────────────────┤
│  primary_org_id ──▶ organizations (current employer)    │
│  auth_user_id ──▶ auth.users (if can login)             │
│  Employment history tracks job changes                  │
└─────────────────────────────────────────────────────────┘
```

Key Entities

Entity	Description	Key Fields
Organizations	Unified table for both GP firms and LP investors	type (gp/lp), name, aum, lp_type, mandate_embedding
People	All industry professionals (can work at any org)	name, email, primary_org_id, auth_user_id, role
Employment	Career history linking people to organizations	person_id, org_id, title, start_date, end_date
Funds	Investment funds owned by GP organizations	org_id, name, strategy, target_size, thesis_embedding

Matches	Fund-LP compatibility scores	fund_id, lp_org_id, total_score, score_breakdown
Pitches	AI-generated outreach content	match_id, type, content, created_by
Outreach Events	Track journey from match to commitment	match_id, event_type, event_date, meeting_type
Match Outcomes	Final outcomes for model training	match_id, outcome, commitment_amount, features_at_match_time
Relationships	GP-LP relationship intelligence	gp_org_id, lp_org_id, relationship_type, prior_commitments
LP Capacity	Timing intelligence for allocation windows	lp_org_id, fiscal_year, remaining_capacity, next_allocation_window

Key Design Decisions

- **Unified Organizations:** GPs and LPs are both organizations with a type discriminator. No separate tables.
- **People Work at Organizations:** Clean FK to organizations.id - no polymorphic relationships.
- **People Can Move:** Employment history tracks job changes. Someone can move from LP to GP.
- **Platform Users = People + Auth:** People with auth_user_id set can log in. No separate users table.
- **Full Referential Integrity:** All foreign keys are real database constraints.

Vector Embeddings

Semantic matching uses 1024-dimensional vector embeddings stored in PostgreSQL with pgvector:

- **Fund Thesis Embedding:** Vector representation of fund strategy and thesis text
- **LP Mandate Embedding:** Vector representation of LP investment mandate (on organizations table)

- **Similarity Calculation:** Cosine similarity between embeddings determines semantic fit

6. Technical Architecture

System Overview

LPxGP is built as a modern web application with server-rendered UI and AI integrations:

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│    Browser      │────▶│    Railway      │────▶│    Supabase     │
│    (HTMX)       │◀────│    (FastAPI)    │◀────│    (PostgreSQL) │
└─────────────────┘     └────────┬────────┘     └─────────────────┘
                                 │
                    ┌────────────┼────────────┐
                    ▼            ▼            ▼
              ┌──────────┐ ┌──────────┐ ┌──────────┐
              │OpenRouter│ │  Voyage  │ │ Supabase │
              │ (Claude) │ │  AI      │ │ Auth     │
              └──────────┘ └──────────┘ └──────────┘
```

Technology Stack

Layer	Technology	Purpose
Backend	Python + FastAPI	API server, business logic, async operations
Frontend	Jinja2 + HTMX + Tailwind	Server-rendered UI with dynamic updates, no build step
Database	Supabase (PostgreSQL + pgvector)	Data storage, vector similarity search, row-level security
Authentication	Supabase Auth	Invite-only signup, session management, password reset
LLM	OpenRouter (Claude)	Pitch generation, fund extraction, match explanations
Embeddings	Voyage AI	Finance-optimized vectors for semantic matching

Hosting	Railway	Auto-deploy from GitHub, managed infrastructure

Security Model

- **Invite-Only Access:** Users can only join via company admin invitation - no self-signup
- **Row-Level Security:** Database policies ensure users only see their company's data
- **Role-Based Access:** Company Admins vs Members vs Super Admins with different permissions
- **Human-in-the-Loop:** All AI-generated content requires human review before external use
- **Secure Sessions:** JWT tokens with refresh, automatic expiration, and secure cookie handling

7. Agentic AI Architecture

Competitive Moat: LPxGP's multi-agent debate system represents a fundamentally different approach to AI-powered matching. Rather than using a single model that can hallucinate or miss nuances, we deploy 12 specialized agents that argue, critique, and synthesize—producing higher-quality results with built-in verification and explainability.

Multi-Agent Debate System

Traditional AI matching systems use a single model to score compatibility. This approach is prone to overconfidence, hallucination, and missing edge cases. LPxGP takes a radically different approach: **adversarial multi-agent debates**.

The Bull/Bear Pattern

For every fund-LP match, we run an internal debate:

- **Bull Agent:** Argues FOR the match—finds alignment, hidden opportunities, optimal timing
- **Bear Agent:** Argues AGAINST—finds risks, constraint violations, relationship barriers
- **Synthesizer:** Weighs both perspectives, resolves disagreements, produces final score

Why This Matters: When Bull and Bear agents disagree significantly (>30 points), the system flags for human review rather than making a confident wrong decision. This catches edge cases that single-model systems miss.

Four Debate Types

Debate	Purpose	Agents	Output
Constraint Interpretation	Parse LP investment mandates	Broad Interpreter, Narrow Interpreter, Synthesizer	Actionable filter criteria
Research Enrichment	Validate external data quality		Verified profile updates

		Research Generator, Research Critic, Quality Synthesizer	
Match Scoring	Evaluate fund-LP fit	Bull Agent, Bear Agent, Match Synthesizer	Confidence-weighted scores
Pitch Generation	Create personalized content	Pitch Generator, Pitch Critic, Content Synthesizer	Verified, factual pitches

The 12 Specialized Agents

Each agent has a specific role, versioned prompts, and distinct personality. This specialization produces better results than a generalist model.

Constraint Interpretation Agents

Agent	Role	Key Behaviors
Broad Interpreter	Find flexibility in LP mandates	Identifies what's implied but not stated, finds edge cases that could qualify, surfaces hidden opportunities based on historical commitments
Narrow Interpreter	Identify constraints and exclusions	Flags hard exclusions, policy constraints, regulatory barriers. Conservative: better to flag than to miss
Constraint Synthesizer	Resolve disagreements, create filters	Classifies constraints as HARD (absolute) or SOFT (preference), escalates unresolved ambiguities for human review

Match Scoring Agents

Agent	Role	Key Behaviors
Bull Agent	Argue FOR the match	Finds strategy alignment, timing opportunities, warm intro paths, hidden strengths. Generates talking points for GP outreach
Bear Agent	Argue AGAINST the match	Checks hard constraint violations, identifies relationship barriers, flags track record gaps. Sets hard_exclusion=true for deal-breakers

Match Synthesizer	Combine perspectives fairly	Weights Bull/Bear based on evidence quality, resolves disagreements, escalates when confidence is low

Pitch Generation Agents

Agent	Role	Key Behaviors
Pitch Generator	Create personalized content	Every sentence LP-specific, references recent activity, addresses known concerns proactively. No generic phrases
Pitch Critic	Validate accuracy and tone	Catches factual errors, hallucinations, generic content, tone mismatches. Quality score 0-100
Content Synthesizer	Make publish/ regenerate/reject decision	Approves if score ≥85, regenerates if 50-84, rejects if <50 or unfixable errors. Max 3 iterations

Sample Agent Prompts

Each agent operates from a carefully-crafted prompt that defines its personality, inputs, and structured output format. Here are excerpts from key agents:

Bull Agent (v1.1.0) — Excerpt

```
You are the BULL AGENT analyzing a potential match between a fund and LP.

YOUR MISSION: Argue FOR this match. Find the best reasons why it could succeed.
Be optimistic but grounded in data.

ANALYSIS DIMENSIONS:
- strategy_alignment: How fund strategy maps to LP mandate
- timing_opportunity: Why now is the right time to approach
- relationship_potential: Warm intro paths and barriers
- hidden_strengths: Non-obvious connections and opportunities

OUTPUT REQUIREMENTS:
- Score 0-100 with confidence 0.0-1.0
- Specific talking_points for GP outreach (5 actionable points)
- acknowledged_concerns with mitigations
- Data-backed reasoning citing specific profile fields

CRITICAL: Don't inflate scores. Truth matters more than winning the debate.
```

Bear Agent (v1.1.0) — Excerpt

```
You are the BEAR AGENT analyzing a potential match between a fund and LP.

YOUR MISSION: Critically examine this match. Find reasons why it might fail.
Be skeptical but fair—not cynical.

ANALYSIS DIMENSIONS:
- hard_constraints_violated: Deal-breakers with evidence
- soft_concerns: Issues that reduce probability of success
- timing_issues: Allocation cycle misalignment
- relationship_barriers: Access difficulties

OUTPUT REQUIREMENTS:
- Score 0-100 with confidence 0.0-1.0
- hard_exclusion flag if this is a definite no
- conditions_for_success: What would need to be true
- acknowledged_positives: Fair credit for genuine alignment

CRITICAL: If you find a hard constraint violation, set hard_exclusion=true.
```

Match Synthesizer (v1.0.0) — Excerpt

```
You are the MATCH SYNTHESIZER combining Bull and Bear perspectives.

YOUR MISSION: Weigh both perspectives fairly. Resolve disagreements where
possible, escalate where not.

RESOLUTION RULES:
- When agents agree: High confidence, weight equally
- When agents disagree <20 points: Resolve based on evidence quality
- When agents disagree >30 points: Flag for human review
- When Bear sets hard_exclusion=true: Take seriously, escalate if unsure

OUTPUT REQUIREMENTS:
- final_score 0-100 with component breakdown
- resolved_disagreements with reasoning
- unresolved_disagreements escalated to human
- talking_points that incorporate Bear's valid concerns
- approach_strategy for GP outreach

ESCALATION TRIGGERS:
- Disagreement >30 points
- Confidence <0.5
- Hard exclusion with Bull score >70
```

LangGraph Orchestration

The debate system is implemented as a LangGraph state machine—a directed graph where nodes are agent executions and edges are conditional transitions.

```
┌──────────────────────────────────────────────────────────────────┐
│                  LANGGRAPH STATE MACHINE                          │
```

```
├────────────────────────────────────────────────────────────────┤
│                                                                  │
│   ┌─────────┐     ┌─────────┐     ┌────────────┐                 │
│   │  START  │────▶│ DEBATE  │────▶│ SYNTHESIZE │                 │
│   └─────────┘     └────┬────┘     └─────┬──────┘                 │
│                        │                │                        │
│          ┌─────────────┼────────────────┼──────────────┐         │
│          │             │                │              │         │
│          ▼             ▼                ▼              ▼         │
│   ┌──────────┐  ┌────────────┐   ┌──────────┐   ┌─────────┐      │
│   │ COMPLETE │  │ REGENERATE │   │ ESCALATE │   │   END   │      │
│   └──────────┘  └─────┬──────┘   └──────────┘   └─────────┘      │
│                       │                                          │
│                       └──────────▶ back to DEBATE (max 3x)       │
│                                                                  │
└────────────────────────────────────────────────────────────────┘

TRANSITION LOGIC:
• Disagreement ≤20 points → COMPLETE (consensus reached)
• Disagreement >20 but ≤30 → REGENERATE with cross-feedback
• Disagreement >30 points → ESCALATE to human review
• Max 3 iterations → ESCALATE if still disagreeing
```

Cross-Feedback Mechanism

When agents disagree, the regeneration step provides each agent with the other's critique:

- **Bull receives:** Bear's concerns, constraint violations, and risk factors
- **Bear receives:** Bull's talking points, alignment arguments, and hidden strengths

This forces agents to directly address counterarguments rather than talking past each other—often resolving disagreements within 2-3 iterations.

Observability with Langfuse

Every agent execution is fully traced using Langfuse (open-source, self-hostable for data privacy):

Full Trace Inspection

View every debate as a tree of agent calls with inputs, outputs, token counts, and latency.

Prompt Versioning

Semantic versioning (X.Y.Z) for all prompts. A/B test new versions before full rollout.

Quality Metrics

Track escalation rates, disagreement patterns, and accuracy over time.

Cost Tracking

Per-debate token usage and API costs for margin optimization.

Continuous Learning Loop

The agentic system improves over time through outcome tracking:

Signal	Latency	How It's Used
Match shortlisted/ dismissed	Immediate	Tune hard filters, adjust agent weights
Response received	Days-Weeks	Key early predictor—train on high/low response patterns
Meeting scheduled	Weeks	Strong quality signal—validate match explanations
Commitment made	6-18 months	Ground truth—full model retraining

> **Defensible Moat:** As more matches flow through the system, the agent prompts are refined, disagreement patterns are analyzed, and the learning loop compounds. Competitors starting from scratch face a cold-start problem—they lack the interaction data that makes our agents increasingly accurate.

Why Multi-Agent vs. Single Model?

Dimension	Single Model	Multi-Agent Debate
Overconfidence	Common—no internal check	Bear agent challenges optimism
Hallucination	Can go undetected	Critic agents flag unsupported claims
Edge Cases	Often missed	Broad/Narrow interpreters catch nuances
Explainability	Black box score	Full debate transcript available

Human Review	All or nothing	Targeted escalation when confidence is low
Improvement	Retrain entire model	Tune individual agent prompts

8. Non-Functional Requirements

Performance

Metric	Target	Measurement
Page Load (LCP)	< 2 seconds	Largest Contentful Paint for all pages
Search Response	< 500ms	Time from query to results display
Semantic Search	< 2 seconds	Including embedding generation and vector search
Match Generation	< 30 seconds	For 100 matches against full LP database
Pitch Generation	< 10 seconds	LLM response for single pitch

Security

- **Authentication:** Secure password hashing, rate-limited login, account lockout after 5 failures
- **Authorization:** Row-level security policies, role-based access control
- **Data Protection:** Encryption at rest and in transit, no PII in logs
- **Input Validation:** Server-side validation, SQL injection prevention, XSS protection
- **Audit Logging:** Track who accessed what and when for compliance

Scalability

- **Database:** Designed to handle 100,000+ LPs with efficient indexing
- **Concurrent Users:** Stateless backend supports horizontal scaling
- **API Rate Limiting:** Protect external services from overuse
- **Background Jobs:** Long-running tasks processed asynchronously

Availability

- **Uptime Target:** 99.9% availability (excludes planned maintenance)
- **Disaster Recovery:** Daily database backups with point-in-time recovery

- **Graceful Degradation:** Core features work even if AI services are temporarily unavailable

9. Success Metrics

User Engagement

Metric	Target	Why It Matters
Daily Active Users / Monthly Active Users	> 30%	Indicates habitual usage, not just occasional visits
Average Session Length	> 5 minutes	Users are doing meaningful work, not just checking in
Matches Reviewed per Session	> 10	Users are actively evaluating AI recommendations

Feature Adoption

Metric	Target	Why It Matters
Fund Created within 7 Days of Signup	> 60%	Users are activating and seeing value quickly
Matches Shortlisted per Fund	> 20	AI matching is producing actionable recommendations
Pitches Generated per User (monthly)	> 5	Pitch generation is useful enough to use repeatedly

Quality Indicators

Metric	Target	Why It Matters
Match Feedback: "Useful"	> 70%	AI recommendations are relevant and actionable
Pitch Copied to Clipboard	> 50%	Generated content is good enough to use
LP Contacted from Platform	> 20%	Platform enables actual outreach, not just research

10. Glossary

AUM (Assets Under Management)

The total market value of assets that an investment firm manages on behalf of clients. For LPs, this indicates their overall investment capacity.

Dry Powder

Capital that has been committed to a fund but not yet invested. Indicates available capital for new investments.

Embedding

A vector (array of numbers) that represents text in a way that captures semantic meaning. Used for similarity matching between fund thesis and LP mandate.

Endowment

A type of LP, typically a fund established by a university, hospital, or non-profit organization for long-term investment.

Family Office

A private wealth management firm that handles investments for a wealthy family. Often more flexible than institutional LPs.

GP (General Partner)

The fund manager who makes investment decisions and manages fund operations. GPs are LPxGP's primary users.

Hard Filter

A matching criterion that must be satisfied for an LP to be considered. If failed, the LP is excluded regardless of other scores.

HTMX

A JavaScript library that allows HTML elements to make AJAX requests directly, enabling dynamic updates without full page reloads.

LP (Limited Partner)

An institutional investor who provides capital to investment funds. LPs include pension funds, endowments, family offices, and sovereign wealth funds.

Mandate

An LP's investment guidelines, including acceptable strategies, geographic regions, check sizes, and return expectations.

Pension Fund

A type of LP that manages retirement assets for employees of governments, corporations, or unions. Often large and long-term focused.

pgvector

A PostgreSQL extension for storing and querying vector embeddings, enabling semantic similarity search in the database.

RLS (Row-Level Security)

Database security feature that restricts which rows users can access based on their identity. Ensures data isolation between companies.

Semantic Search

Search that understands meaning rather than just matching keywords. Uses embeddings to find conceptually similar content.

Soft Score

A matching criterion that contributes to the overall fit score but doesn't exclude the LP if not perfectly matched.

Sovereign Wealth Fund

A state-owned investment fund that invests global reserves. Among the largest LPs with diverse mandates.

Thesis

A fund's investment philosophy and strategy, describing what types of companies they invest in and why.

Voyage AI

An AI company providing embedding models optimized for specific domains like finance and legal.