

# PartnerScope V2 Search Method

## PartnerScope V2: Deep Research Partner Search

A 5-Phase Intelligent Search Architecture for Strategic Partner Discovery

---

### Executive Summary

PartnerScope V2 employs a multi-phase deep research methodology to identify high-quality strategic partners for startups. Unlike simple keyword searches, our approach combines iterative query refinement, need decomposition, and an innovative batch-scoring system inspired by Recursive Language Models (arXiv:2512.24601).

**Key Metrics:** - Top-8 Average Score: **88.2/100** - Cost per search: **\$0.80-1.50** - Candidates evaluated: **50-60 per search** - Final output: **20 ranked partners**

---

### Data Sources

PartnerScope supports two complementary data sources that can be used independently or combined:

#### 1. Database/CSV Source (Simulated Crunchbase)

**Purpose:** Leverage structured company databases for high-quality, pre-vetted candidates.

**How it works:** - Pre-curated CSV files exported from Crunchbase or similar databases - Keyword-based matching maps user queries to relevant CSV files - Provides structured data: company name, description, industry, location, CB Rank

**Use case:** When you have access to premium databases (Crunchbase, PitchBook, CB Insights) and want to search their curated company data.

**Configuration:**

```

# Keyword mappings connect queries to CSV files
mappings = {
    'pilot': {
        'keywords': ['housing', 'university', 'wellness',
                     'student'],
        'csv_path': 'test_data/csv/pilot-partners.csv'
    },
    'validation': {
        'keywords': ['research', 'clinical', 'hospital',
                     'academic'],
        'csv_path': 'test_data/csv/validation-partners.csv'
    }
}

```

**Advantages:** - Fast lookups (no API calls) - High data quality from curated sources  
- No per-query costs - Consistent, structured output

**Limitations:** - Requires manual CSV preparation/export - Data freshness depends on export frequency - Limited to companies in your database

---

## 2. AI Web Search Source

**Purpose:** Real-time discovery of partners across the entire web using LLM-powered search.

**How it works:** - OpenAI's web search tool performs live internet searches - LLM interprets results and extracts structured company data - 5-phase deep research methodology (detailed below)

**Use case:** When you need comprehensive discovery beyond your database, or don't have access to premium data sources.

**Advantages:** - Real-time, up-to-date information - Discovers companies not in databases - No data preparation required - Finds non-obvious partners through reflection

**Limitations:** - Per-query API costs (\$0.80-1.50) - Slower than database lookups - May require enrichment for missing fields

---

## Hybrid Mode (Recommended)

**Best practice:** Enable both sources for maximum coverage.

Source	Finds	Example
CSV/Database	Known players, established companies	Fortune 500 healthcare distributors
Web Search	Emerging players, niche specialists	New hospital networks, regional GPOs

**Combined Output:** - Database candidates provide reliable baseline - Web search adds discovery of non-obvious partners - Phase 4 (RLM Filtering) ranks ALL candidates together - Best partners surface regardless of source

---

## The 5-Phase Architecture

Phase	Name	Process	Output
<b>INPUT</b>	User Need	"Distribution partners with hospital networks"	Search request
<b>1</b>	<b>Initial Discovery</b>	Generate 4 search queries from different angles. Execute web searches (6 companies per query). Capture obvious/direct matches.	~24 candidates
<b>2</b>	<b>Strategic Reflection</b>	Analyze gaps in Phase 1 results. Identify overlooked industries & partner types. Generate 3 "creative" queries for non-obvious fits.	+18 candidates
<b>3</b>	<b>Need Decomposition</b>	Decompose partner need into 3-4 specific sub-needs. Run targeted search for EACH sub-need. Ensure comprehensive coverage.	+16 candidates
<b>4</b>	<b>Batch Filtering</b>	Process candidates in batches of 8 (avoids context rot). Score each 1-10 on partnership fit. Aggregate scores programmatically.	Top 20 ranked
<b>5</b>	<b>Enrichment</b>	Identify candidates with missing data. Web search to fill gaps. Ensure clean, complete output.	20 final partners

**Pipeline Flow:**

**User Input** → Phase 1 (Discovery) → Phase 2 (Reflection) → Phase 3 (Decomposition) → Phase 4 (Filtering) → Phase 5 (Enrichment) → **20 Ranked Partners**

---

## Phase Details

### Phase 1: Initial Discovery

**Objective:** Cast a wide net to capture obvious partnership candidates.

**Process:** 1. Generate 4 distinct search queries based on: - Startup profile (name, industry, stage) - Stated partnership needs - Keywords and context

1. Execute each query via OpenAI's web search tool
2. For each company found, extract:

- Company name & website
- Industry/sector
- Location & size
- Description
- Needs satisfied (tags)
- Partnership fit rationale

**Query Generation Rules:** - Keep queries short (5-10 words) - Use natural language (no boolean operators) - Each query takes a different angle

**Example:**

Input: "Distribution partners with hospital networks"

Generated Queries:

1. "hospital distribution partners healthcare startups"
  2. "medical device distributors US market"
  3. "healthcare supply chain companies partnerships"
  4. "hospital network vendor programs"
- 

### Phase 2: Strategic Reflection

**Objective:** Identify gaps and find non-obvious partners.

**Process:** 1. Analyze companies found in Phase 1 2. Identify patterns and gaps: - Which industries are over-represented? - What partner types are missing? - What adjacent markets weren't explored?

1. Generate 3 “creative” queries targeting gaps

**Reflection Framework:** - What's the REAL underlying problem? - What types of partners did we NOT search for? - What unconventional partners could help?

### **Example Output:**

#### **Gap Analysis:**

"Companies found are mostly large national distributors.

Missing: Regional hospital networks, GPO buying groups, specialty clinic chains, healthcare IT integrators"

#### **Creative Queries:**

1. "group purchasing organizations healthcare startups"
  2. "regional hospital systems vendor partnerships"
  3. "healthcare IT companies distribution partnerships"
- 

## **Phase 3: Need Decomposition & Targeted Search**

**Objective:** Ensure comprehensive coverage by addressing each need individually.

**Process:** 1. Decompose the partner need into 3-4 specific, non-overlapping sub-needs

1. For each sub-need:
  - Generate targeted search query
  - Find companies that SPECIALIZE in that specific area
  - Tag results with the sub-need they address

#### **Example:**

Original Need: "Distribution partners with hospital networks"

#### **Decomposed Sub-Needs:**

1. Medical device distribution and logistics
2. Hospital group purchasing organization relationships
3. Healthcare supply chain management
4. Clinical trial site network access

Each sub-need gets its own targeted search.

---

## **Phase 4: Batch Filtering & Ranking**

**Objective:** Intelligently filter and rank candidates without quality degradation.

**The Problem:** Evaluating 50+ candidates in a single LLM context causes “context rot” - the model’s attention degrades for items in the middle of long lists, leading to inconsistent scoring.

**The Solution:** Inspired by insights from Recursive Language Models (arXiv:2512.24601), we use **batch processing with external state management** to evaluate candidates in small groups, avoiding quality degradation from long contexts.

**Note:** This is not true RLM (which involves recursive self-calls). We apply the core insight—“don’t stuff everything in one context”—through iterative batch processing.

**Process:** 1. Store all candidates in external state (not in LLM context) 2. Process in batches of 8 candidates 3. For each batch: - Present candidates to LLM - Score each 1-10 on partnership fit - Store scores externally (outside LLM) 4. Aggregate all scores programmatically 5. Return top-K by score

**Scoring Criteria:** | Score | Meaning ||——|——|| 9-10 | DIRECTLY addresses multiple stated needs || 7-8 | Addresses at least one stated need well || 5-6 | Tangentially related but not clear fit || 1-4 | Does NOT address the specific needs |

**Why Batch Size 8?** - Small enough to avoid context rot (~2K tokens) - Large enough for efficient processing - Empirically validated for consistent scoring

---

## Phase 5: Selective Enrichment

**Objective:** Ensure all output data is complete and accurate.

**Process:** 1. Identify candidates missing: - Valid website URL - Adequate description (>30 chars)

1. For each incomplete candidate (up to 10):
    - Execute targeted web search
    - Extract missing fields
    - Update candidate record
  2. Mark candidates as enriched
- 

# Technical Implementation

## Model Configuration

Operation	Model	Cost/1M tokens
Query Generation	gpt-4.1	\$2.00 / \$8.00
Web Search	gpt-4.1 + web	\$2.00 / \$8.00 + \$0.01/call
Reflection	gpt-4.1	\$2.00 / \$8.00
Batch Scoring	gpt-4.1	\$2.00 / \$8.00
Enrichment	gpt-4.1 + web	\$2.00 / \$8.00 + \$0.01/call

## Cost Breakdown (Typical Search)

Phase	API Calls	Est. Cost
Phase 1	5 (1 query gen + 4 search)	\$0.25
Phase 2	4 (1 reflection + 3 search)	\$0.20

<b>Phase</b>	<b>API Calls</b>	<b>Est. Cost</b>
Phase 3	5 (1 decompose + 4 search)	\$0.25
Phase 4	7 batches	\$0.15
Phase 5	Up to 10 enrichments	\$0.15
<b>Total</b>	<b>~25 calls</b>	<b>\$0.80-1.50</b>

---

## Output Format

Each candidate includes:

```
{
  "name": "Company Name",
  "website": "https://company.com",
  "industry": "Healthcare Technology",
  "location": "San Francisco, CA",
  "size": "500-1000 employees",
  "description": "Brief description of the company...",
  "needs_satisfied": ["distribution", "hospital networks"],
  "how_it_helps": "Why this company is a good partnership fit",
  "discovery_phase": "phase1",
  "validation_score": 8,
  "validation_reasoning": "Strong hospital network
    relationships..."
}
```

---

## Performance Benchmarks

### Evaluation Methodology

Partners are evaluated using the PartnerMAS framework across 6 dimensions: - Strategic Alignment - Resource Complementarity - Market Access - Operational Compatibility - Risk Assessment - Value Creation Potential

### Results

<b>Metric</b>	<b>V2 Score</b>
Top-8 Average	88.2
Overall Average	78.5
Score Std Dev	8.3
Min Score	62
Max Score	96

## Comparison with External Tools

Tool	Top-8 Avg	Method
PartnerScope V2	<b>88.2</b>	5-phase deep research + batch filtering
Gemini Deep Research	82.6	Single-pass research
OpenAI Deep Research	79.4	Single-pass research

## Key Innovations

### 1. Multi-Phase Query Refinement

Unlike single-query searches, we iterate through discovery → reflection → targeted phases to find both obvious and non-obvious partners.

### 2. Need Decomposition

Breaking complex needs into specific sub-needs ensures comprehensive coverage and prevents blind spots.

### 3. Batch Processing with External State

Inspired by RLM insights (arXiv:2512.24601), we process candidates in small batches with external state management. This preserves evaluation quality across large candidate sets, avoiding the “context rot” problem in long-context LLM evaluations. (Note: This is iterative batch processing, not true recursive LLM calls.)

### 4. Programmatic Score Aggregation

Scores are stored externally and aggregated programmatically, enabling consistent ranking across any number of candidates.

## References

1. “Recursive Language Models.” arXiv:2512.24601, 2025. <https://arxiv.org/abs/2512.24601>
2. “PartnerMAS: An LLM Hierarchical Multi-Agent Framework for Business Partner Selection on High-Dimensional Features.” arXiv:2509.24046v1, 2025. <https://arxiv.org/abs/2509.24046>
3. OpenAI. “GPT-4.1 Technical Report.” 2025.

*Document Version: 2.0 Last Updated: January 2026 PartnerScope by UTokyo  
Research*