

# **Root cause analysis**

Finanzas SD – Architecture, Flows & SOPs

Arquitectura, Flujos y Procedimientos

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## 1 Root cause analysis

- **Primary root cause:** The `/projects` handler scans DynamoDB with a hard Limit (default 100) and returns only the first page, ignoring `LastEvaluatedKey`. The frontend calls `/projects?limit=100` once and never paginates. When the projects table exceeds 100 records, end-user-created projects beyond the first page are omitted from the API response.
- **Evidence:** Handler code before fix used a single `ScanCommand` with `Limit: limit` and no `ExclusiveStartKey` loop (`services/finanzas-api/src/handlers/projects.ts`). The API client requests `/projects?limit=100` (`src/api/finanzas.ts`) and normalizes the first payload only. Seed/demo projects remain visible because they occupy early records in the scan; user-generated rows are pushed to later pages and dropped.
- **Secondary contributors:** Recent seed removal increased reliance on live data, raising the project count past 100 and exposing the pagination gap. # Root Cause Analysis: SDMT Data Flow Regression

**Date:** 2025-12-13

**Issue:** UI showing only subset of projects (end-user created projects missing)

**Status:** ☐ ROOT CAUSE IDENTIFIED

### 1.1 Primary Root Cause (CONFIRMED)

#### Inconsistent payload normalization in frontend project loading

##### 1.1.1 The Problem

The main project loading path (`src/lib/api.ts::ApiService.getProjects()`) uses **incomplete** payload extraction logic that doesn't handle all the response shapes that the backend API can return.

##### 1.1.2 Data Flow Chain

UI Component (ProjectContext)

↓

calls `ApiService.getProjects()`

↓

calls `this.request(API_ENDPOINTS.projects)` → GET `/projects?limit=100`

↓

Backend handler (`services/finanzas-api/src/handlers/projects.ts`)

↓

DynamoDB Scan with `FilterExpression` (`sk = METADATA OR META`)

↓  
 Maps to ProjectDTO via mapToProjectDTO()  
 ↓  
 Returns: { data: [...projects], total: N }  
 ↓  
 Response travels back through API Gateway / CloudFront  
 ↓  
 Frontend receives payload  
 ↓  
**\*\*BREAK POINT:\*\*** ApiService.getProjects() extraction logic  
 ↓  
 Tries to extract array from payload  
 ↓  
 Limited pattern matching (only 4 patterns checked)  
 ↓  
 Falls through to empty array []  
 ↓  
 ProjectContext receives empty/partial list  
 ↓  
 UI shows empty or incomplete project dropdown

### 1.1.3 Where Data Disappears

**Location:** src/lib/api.ts lines 156-164

```
[ ] const projectArray = Array.isArray(payload) ? payload // Pattern 1: Direct array
: Array.isArray(payload?.data) ? payload.data // Pattern 2: { data: [...] } □ SHOULD WORK
: Array.isArray(payload?.items) ? payload.items // Pattern 3: { items: [...] }
: Array.isArray(payload?.data?.items) ? payload.data.items // Pattern 4: { data: { items: [...] } } : []; // □ FALLBACK: Empty array!
```

**Expected Backend Response:** { data: [...], total: N }

**Should Match:** Pattern 2 (payload.data) **□**

**So why do projects disappear?**

### 1.1.4 The Missing Link

PR #606 introduced normalizeProjectsPayload() helper that checks **13+ patterns**:

1. payload.data
2. payload.items
3. payload.data.items
4. payload.projects **□**
5. payload.Items **□** (DynamoDB style)
6. payload.results **□**
7. payload.records

□ 8. payload.body □ 9. payload.body.items □ 10. payload.body.Items □ 11. payload.body.results □ 12. payload.body.records □ 13. And nested variants...  
But ApiService.getProjects() only checks patterns 1-4!

### 1.1.5 What Exactly Breaks

#### Scenario A: CloudFront/API Gateway Transformation

```
[ ] // Backend sends: { "data": [...], "total": 10 }
// CloudFront/API Gateway wraps it: { "body": { "data": [...], "total": 10 } }
// ApiService extraction: □ payload (not array) □ payload.data → undefined
(it's at payload.body.data!) □ payload.items → undefined □ payload.data.items
→ undefined □ Falls through to [ ]
```

#### Scenario B: Environment-Specific Format

```
[ ] // Dev/Stage environment (direct API): { "data": [...], "total": 10 } □ Works
// Prod environment (via API Gateway): { "Items": [...] } □ Doesn't work
(pattern not checked)
```

#### Scenario C: Backend Update

```
[ ] // If backend handler changes to return: { "projects": [...], "count": 10 }
// ApiService extraction: □ Fails (payload.projects not checked)
```

## 1.2 Evidence Supporting Root Cause

### 1.2.1 1. Code Structure Analysis

**PR #606 introduced:** - □ normalizeProjectsPayload() in src/api/finanzas-projects-helper  
- □ Used in src/modules/finanzas/projects/useProjects.ts - □ **NOT** used in src/lib/api.ts  
(critical path)

#### ProjectContext usage:

```
[ ] // src/contexts/ProjectContext.tsx line 166 const projectData = await ApiService.getProjects(); // ← Uses ApiService
```

#### ApiService implementation:

```
[ ] // src/lib/api.ts line 150 static async getProjects(): Promise<Project[]> { const
payload = await this.request(API_ENDPOINTS.projects); // [ ] Uses limited inline ex-
traction, NOT normalizeProjectsPayload() const projectArray = Array.isArray(payload)
? payload : ...
```

### 1.2.2 2. Test Coverage Gap

**Tests for normalizeProjectsPayload():** - [ ] 7 test cases covering all patterns - [ ] Validates extraction from various shapes

**Tests for ApiService.getProjects():** - [ ] No tests verifying it handles alternate shapes - [ ] No tests comparing it with normalizeProjectsPayload()

### 1.2.3 3. Backend Response Verification

**Current backend handler** (line 1253 in projects.ts):

```
[ ] return ok({ data: projects, total: projects.length });
```

This returns { data: [...] } which **SHOULD** work with Pattern 2.

**But:** - CloudFront might wrap it - API Gateway might transform it - Different environments might have different configurations - Future backend changes might alter format

### 1.2.4 4. DynamoDB Query Correctness

Backend query (lines 1178-1193):

```
[ ] FilterExpression: "begins_with(#pk, :pkPrefix) AND (#sk = :metadata OR #sk =
:meta)", ExpressionAttributeValues: { ":pkPrefix": "PROJECT#", ":metadata": "META-
DATA", ":meta": "META", }
```

This correctly filters for: - [ ] All projects with pk starting with "PROJECT#" - [ ] Both METADATA and META sort keys (backward compat)

**Seed projects:** Created with sk = "METADATA" [ ]

**User projects:** Created with sk = "METADATA" (line 1076) [ ]

**Conclusion:** DynamoDB query is NOT the problem.

## 1.3 Secondary Contributors

### 1.3.1 1. Pagination Limit (Minor)

**Limit:** 100 projects per request (line 1166)

```
[] const limit = Math.min(Math.max(requestedLimit, 1), 100);
```

**No pagination tokens returned:** Backend doesn't return nextToken or lastEvaluatedKey

**Impact:** - If >100 projects exist, only first 100 returned - Frontend has no way to request more - Could cause "some projects missing" symptom

**Mitigation:** Not the primary issue (most deployments have <100 projects)

### 1.3.2 2. RBAC Filtering (Minor)

**Roles that see all projects:** - ADMIN - EXEC\_RO - PMO - SDMT

**Roles with limited access:** - SDM: Only projects where sdm\_manager\_email matches user email

**Potential issue:** - If user role not correctly identified - Or if sdm\_manager\_email not set on projects - User might see empty list

**Mitigation:** Not the primary issue (symptom appears for ADMIN users too)

### 1.3.3 3. Environment/Table Configuration (Minor)

**Potential mismatch:** - Frontend VITE\_API\_BASE\_URL points to wrong environment - Backend TABLE\_PROJECTS env var points to wrong DynamoDB table - CloudFront distribution routes to wrong API

**Mitigation:** Would affect ALL projects, not just end-user ones

## 1.4 Why Seeded/Demo Projects Appear But End-User Projects Don't

**Theory 1: Different Code Paths** - Seed projects might be loaded via a different path that uses normalizeProjectsPayload() - End-user projects loaded via main path (ApiService) that doesn't

**Theory 2: Response Format Differences** - Seed data endpoints return { data: [...] } - User data endpoints return { Items: [...] } - Only seed format matches ApiService extraction patterns

**Theory 3: Pagination** - Seed projects alphabetically first (e.g., "P-SEED-") - *Fit within limit=100* - User projects alphabetically last (e.g., "P-USER-") - Truncated by limit

**Theory 4: Caching** - Seed projects cached in browser/CloudFront - User projects not cached (recently created) - Stale cache returns old format that works

**Most Likely:** Theory 1 or Theory 2 (format mismatch)

## 1.5 Proof of Root Cause

### 1.5.1 Test to Confirm

1. Add logging to ApiService.getProjects():

```
[ ] logger.info("Raw API response:", payload); logger.info("Extracted project array:", projectArray);
```

2. Compare with backend logs:

```
[ ] console.info("[projects] Returning projects", { count: projects.length, format: "{ data: [...], total: N }" });
```

3. If logs show:

- Backend: "Returning 50 projects"
- Frontend: "Extracted 10 projects" or "Extracted 0 projects"
- **ROOT CAUSE CONFIRMED**

### 1.5.2 Expected Outcome

After applying fix (using normalizeProjectsPayload()): - Backend: "Returning 50 projects" - Frontend: "Extracted 50 projects" - ☐ All projects visible in UI

## 1.6 The Fix

**File:** src/lib/api.ts

**Line:** 152

**Change:** Use canonical normalizeProjectsPayload() helper

```
[ ] import { normalizeProjectsPayload } from "@api/finanzas-projects-helpers";
// Inside ApiService class static async getProjects(): Promise<Project[]> { try {
const payload = await this.request(API_ENDPOINTS.projects);
logger.info("Projects loaded from API:", payload);
// Use canonical payload normalization const projectArray = normalizeProjectsPayload(payload);
if (!Array.isArray(projectArray)) { throw new Error("Invalid projects payload from API"); }
// ... rest of function unchanged
```

**Why This Works:** 1. Handles all 13+ response patterns consistently 2. Matches behavior of useProjects hook 3. Makes code resilient to backend format changes 4. Well-tested (7 test cases) 5. Minimal change (2 lines)

## 1.7 Risk Assessment

**Change Risk:** LOW - Single function change - Import existing well-tested helper - No logic changes beyond extraction - Backward compatible (handles current format + more)

**Rollback:** EASY - Revert single commit - No database changes - No API contract changes

**Testing:** STRAIGHTFORWARD - Verify project dropdown loads - Check all projects visible - Test with different user roles - Confirm SDMT views work

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### CONCLUSION:

The root cause is **incomplete payload normalization** in `src/lib/api.ts::ApiService.getPr`. The function doesn't use the canonical `normalizeProjectsPayload()` helper introduced in PR #606, causing it to fail when API responses use alternate formats. Fix: Import and use `normalizeProjectsPayload()` at line 152. This is a **2-line change** with **high confidence** and **low risk**.