Can AI Build Your Next API Integration?

Lessons from Pandium's Experimentation with LLMs

Presented by Shon Urbas

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Shon Urbas

linkedin.com/in/shon-urbas/

- CTO & Co-Founder of Pandium
- Former Platform Enginering Manager at Handshake (Aquired by Shopify)

What is Pandium?

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What is Pandium?

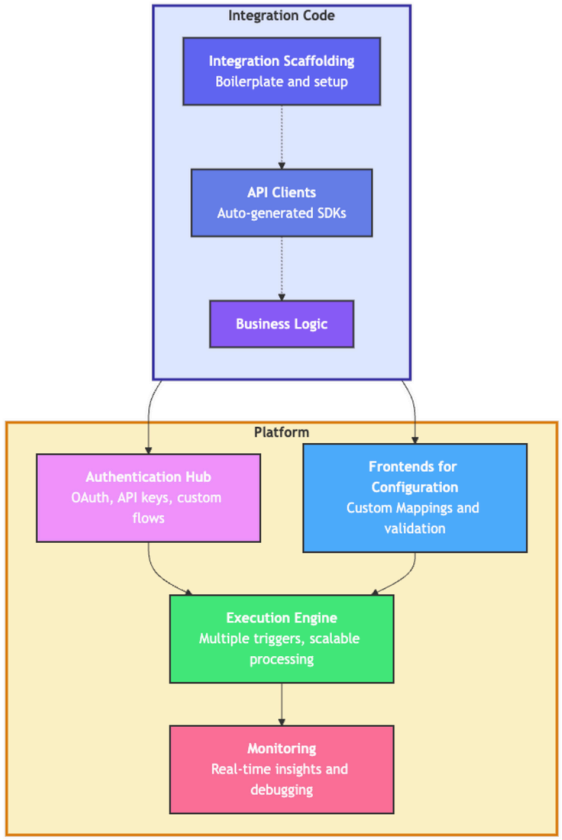
The Integration Challenge

Our typical engineer users face:

- **Time sink:** 60-80% of development time on integrations, not core features
- **Complexity creep:** Each integration touches authentication, data mapping, error handling, rate limiting
- **Maintenance burden:** APIs change, breaking existing integrations

What is Pandium?

Pandium's Solution



Our AI Journey: The Early Days

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Our AI Journey: The Early Days

Phase 1: The "Whole Shabang" Approach (Birth of ChatGPT Era)

Late 2022: Ambitious but Naive

- **Goal**: Generate entire integrations from natural language prompts
- **Reality**: Models produced syntactically correct but functionally broken code

Example: *"Connect Salesforce to Slack"* → 200 lines of code that didn't actually work, forget about at scale

Our AI Journey: The Early Days

The Expert Partnership Experiment

Mid-2023: Bringing in the Consultants

- Partnered with AI consulting firms
- Promise: "We'll make this production-ready"
- **Results:**
  - 3x longer timelines then quoted
  - Couldn’t even approach doing the whole thing
  - Drove us to think smaller so that's good, but even failed at that
  - **Key insight:** Hype was ahead of practicality

Our AI Journey: The Early Days

The Pivot: From Sky-High to Surgical

Discovery: Most integration work doesn't need AI

- **90%** can be handled deterministically
- **10%** requires intelligent transformation
- **Focus shift:** Target the 90% that we can, and give the AI stuff more time.

The Smallest Problem: JSON Key Path Mapping

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The Smallest Problem: JSON Key Path Mapping

The "Aha!" Moment

Problem: Mapping arbitrary JSON structures

```
// Source API
{
  "customer_info": {
    "full_name": "John Doe",
    "contact": {"email": "john@example.com"}
  }
}
// Target API expects
{
  "name": "John Doe",
  "email_address": "john@example.com"
}
```

```
$.customer_info.full_name -> $.name
$.customer_info.contact.email -> $.email_address
```

Building the Foundation

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Building the Foundation

What We Automated Deterministically

Q4 2024: Focus on the 90%

API Client Generation

- Parse OpenAPI specs
- Generate type-safe SDKs
- Handle authentication patterns

Project Scaffolding

- Standard project structure
- Configuration templates
- Testing frameworks

Documentation

- Auto-generated API docs
- Integration guides
- Specification

A Rekindling: AI in Production July, 2024

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A Rekindling: AI in Production July, 2024

Fresh off our JSON mapping struggles, I was convinced AI was all hype

- **My brilliant idea:** Submit talk proposal "AI Integration Hype vs Reality: Why It Doesn't Work"
- **Conference committee's response:** 🚫 REJECTED 🚫

What I Learned:

- Peoples enthusiasm in exploring the space was infectious
- Not all the things shown were production ready, but that wasn’t really the point
- Lots of clever design patterns.
- Early glimpses of what we'd later call "agentic programming"

Key insight: Reinforced the thought that by working on the deterministic parts first, we could build a foundation for a successful AI model

The Revival: Q4 2024 Success

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The Revival: Q4 2024 Success

What Changed?

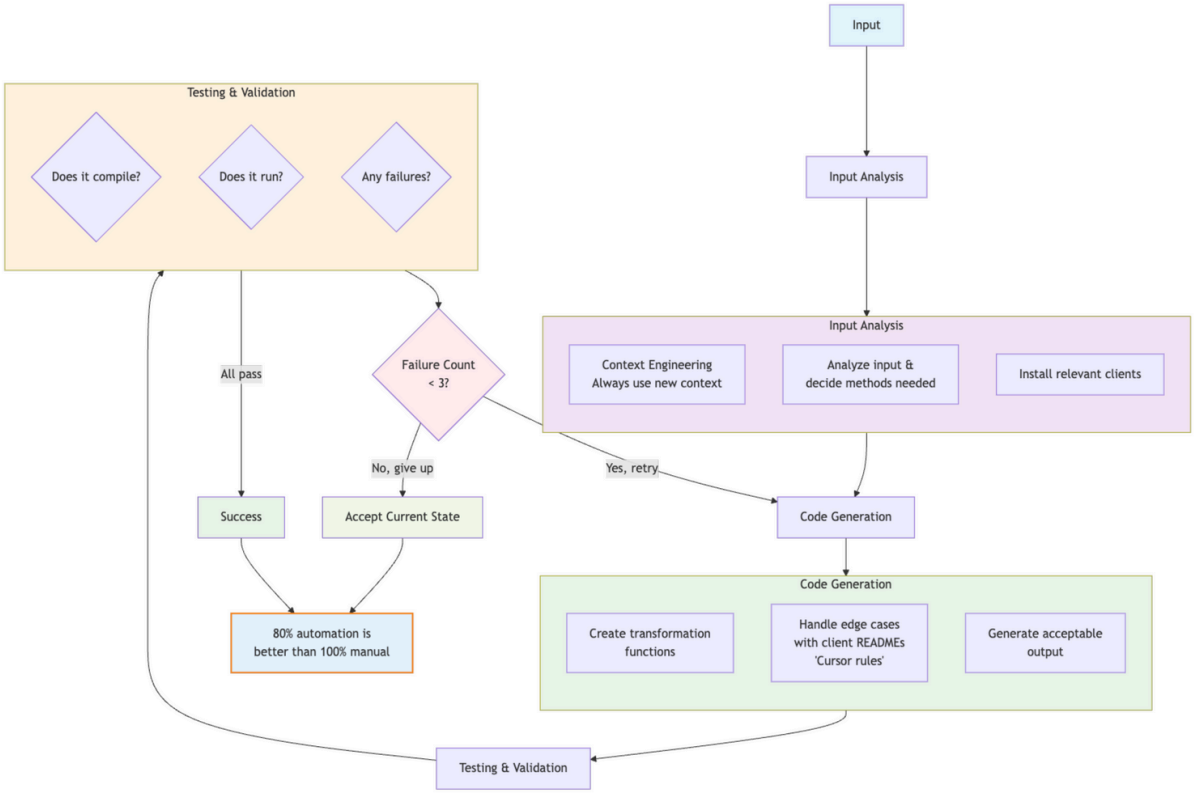
Technology maturation:

- Much larger contexts, but still has constraints.
- “Context Engineering:” i.e. making sure only needed info is in prompt
- More reliable code generation

Our refined “Agentic” approach:

- Narrow AI scope to mapping functions only (a huge upgrade from just JSON PATHs)
- Robust testing and validation
- Iterative failure handling

The Revival: Q4 2024 Success



The Revival: Q4 2024 Success

The "Give Up Early" Principle

Key insight: Not everything needs to be perfect. i.e. We only try 3 times, for a successful flow before moving on.

- **Deterministic parts:** Keep them deterministic
- **AI parts:** Allow controlled failure
- **Success criteria:** 90% automation is better than 100% manual

Example

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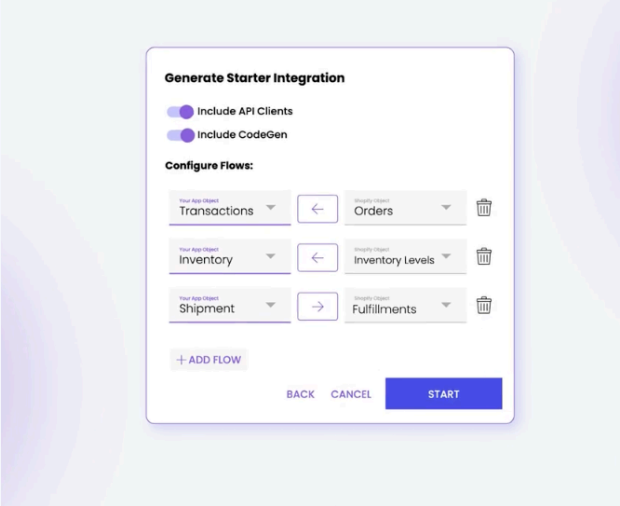
Example: Inputs



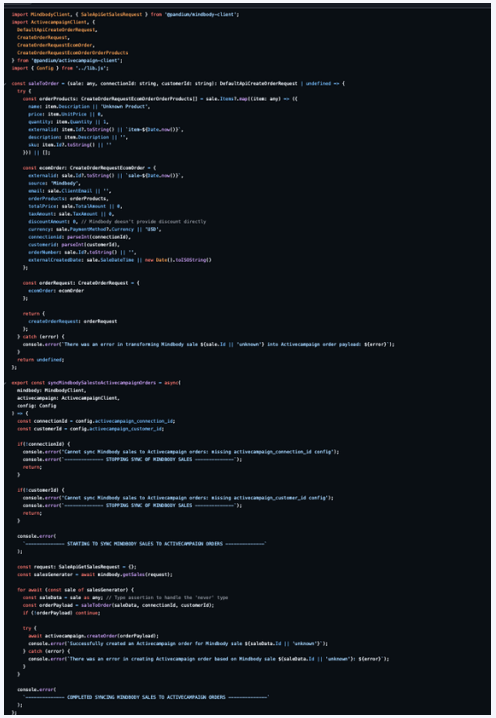
The “Prompt” for user:

Connector A: ActiveCampaign
Resource A: Sales
Connector B: MindBody
Resource B: Order

Example: Method Defs

Example of a “Product”

Example: All + Imports



All the Code Generated

```
import MindbodyClient, { SaleApiGetSalesRequest } from '@pandium/mindbody-client';
import ActivecampaignClient, {
  DefaultApiCreateOrderRequest,
  CreateOrderRequest,
  CreateOrderRequestEcomOrder,
  CreateOrderRequestEcomOrderOrderProducts
} from '@pandium/activecampaign-client';
import { Config } from '../lib.js';
```

Imports

Example: Mapper

```typescript
const saleToOrder = (sale: any, connectionId: string, customerId: string): DefaultApiCreateOrderRequest | undefined => {
  try {
    const orderProducts: CreateOrderRequestEcomOrderOrderProducts[] = sale.Items?.map((item: any) => ({
      name: item.Description || 'Unknown Product',
      price: item.UnitPrice || 0,
      quantity: item.Quantity || 1,
      externalid: item.Id?.toString() || `item-${Date.now()}`,
      description: item.Description || '',
      sku: item.Id?.toString() || ''
    })) || [];

    const ecomOrder: CreateOrderRequestEcomOrder = {
      externalid: sale.Id?.toString() || `sale-${Date.now()}`,
      source: 'Mindbody',
      email: sale.ClientEmail || '',
      orderProducts: orderProducts,
      totalPrice: sale.TotalAmount || 0,
      taxAmount: sale.TaxAmount || 0,
      discountAmount: 0, // Mindbody doesn't provide discount directly
      currency: sale.PaymentMethod?.Currency || 'USD',
      connectionid: parseInt(connectionId),
      customerid: parseInt(customerId),
      orderNumber: sale.Id?.toString() || '',
      externalCreatedDate: sale.SaleDateTime || new Date().toISOString()
    };

    const orderRequest: CreateOrderRequest = {
      ecomOrder: ecomOrder
    };

    return {
      createOrderRequest: orderRequest
    };
  } catch (error) {
    console.error(`There was an error in transforming Mindbody sale ${sale.Id || 'unknown'} into Activecampaign order payload: ${error}`);
  }
  return undefined;
};
```

Example: The loop

```
export const syncMindbodySalestoActivecampaignOrders = async(
  mindbody: MindbodyClient,
  activecampaign: ActivecampaignClient,
  config: Config
) => {
  const connectionId = config.activecampaign_connection_id;
  const customerId = config.activecampaign_customer_id;

  if(!connectionId) {
    console.error('Cannot sync Mindbody sales to Activecampaign orders: missing activecampaign_connection_id config');
    console.error(`-------------- STOPPING SYNC OF MINDBODY SALES --------------`);
    return;
  }

  if(!customerId) {
    console.error('Cannot sync Mindbody sales to Activecampaign orders: missing activecampaign_customer_id config');
    console.error(`-------------- STOPPING SYNC OF MINDBODY SALES --------------`);
    return;
  }

  console.error(
    `-------------- STARTING TO SYNC MINDBODY SALES TO ACTIVECAMPAIGN ORDERS --------------`
  );

  const request: SaleApiGetSalesRequest = {};
  const salesGenerator = await mindbody.getSales(request);

  for await (const sale of salesGenerator) {
    const saleData = sale as any; // Type assertion to handle the 'never' type
    const orderPayload = saleToOrder(saleData, connectionId, customerId);
    if (!orderPayload) continue;

    try {
      await activecampaign.createOrder(orderPayload);
      console.error(`Successfully created an Activecampaign order for Mindbody sale ${saleData.Id || 'unknown'}`);
    } catch (error) {
      console.error(`There was an error in creating Activecampaign order based on Mindbody sale ${saleData.Id || 'unknown'}: ${error}`);
    }
  }

  console.error(
    `-------------- COMPLETED SYNCING MINDBODY SALES TO ACTIVECAMPAIGN ORDERS --------------`
  );
};
```

Example: Result

99.999% deterministic code

User given (including API clients) ~200k of code to start integration

With 96 lines trully generated by LLM. Rest is all normal Code Gen

Key Lessons Learned

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Key Lessons Learned

Technical Lessons

- Scope Limitation: AI excels at narrow, well-defined tasks
- Hybrid Approach: Combine AI with deterministic systems
- Validation is Critical: AI output must be thoroughly tested
- Failure Recovery: Build systems that handle AI mistakes gracefully

Key Lessons Learned

Business Lessons

- Solution-First Thinking: Find problems that fit AI capabilities
- Avoid "AI for AI's Sake": Value must be demonstrable
- Developer Experience: AI should enhance, not replace, developer control
- Iterative Development: Start small, prove value, scale up

The Future of AI in Integration Development

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The Future of AI in Integration Development

What's Next for Pandium

Short-term (next 3 months):

- Multiple Objects to Single Objects Flows
- Event Based
- CLI Access

Medium-term (3+ months):

- Forking and Build (i.e. I have a Xero Integration... now make a QBO one.)
- AI Assisted API Client generation
- Automated performance tuning

The Future of AI in Integration Development

Industry Predictions

What will happen:

- AI will augment, not replace, developers
- Hybrid human-AI workflows will become standard
- Domain-specific AI tools will outperform general-purpose ones (just like real life)

What won't happen:

- Complete automation of complex integrations
- AI replacing the need for technical expertise
- One-size-fits-all AI solutions

Closing: The Real AI Revolution

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Closing: The Real AI Revolution

The Bottom Line

AI's true value in integration development:

- Not: Building entire systems from scratch
- But: Accelerating the tedious, repetitive work
- Result: Developers focus on business logic

Questions?

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Shon Urbas

Linkedin.com/in/shon-urbas/

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Thank You! Any Questions?