Agentic AI Workflows

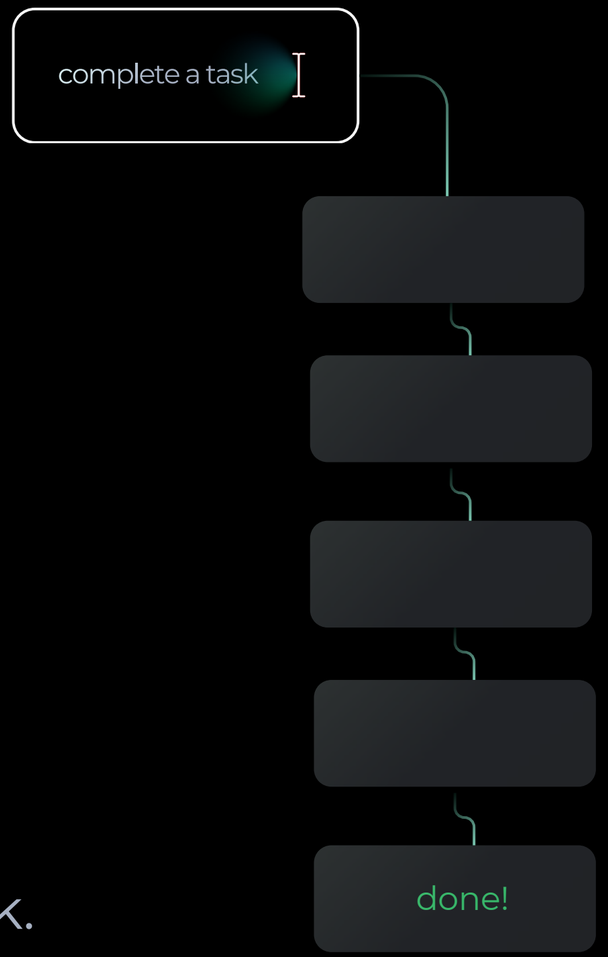
From Direct Generation to Iterative Intelligence

Vanilson Burégio

works

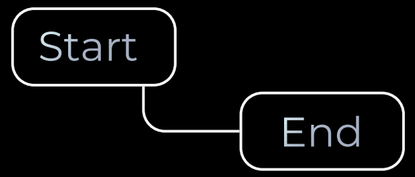
What is an Agentic Workflow?

An Agentic AI workflow is a process where an LLM-based app executes multiple steps to complete a task.



Example

Planning a 5-day trip to Tokyo



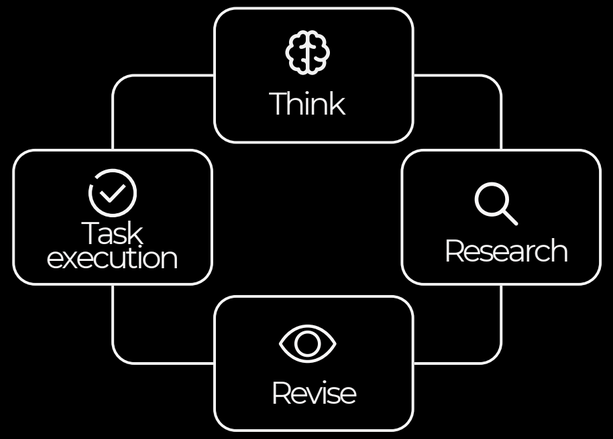
Single-shot Prompting Approach

Generate complete itinerary in one go

No research or verification

Generic recommendations

May miss key details or conflicts



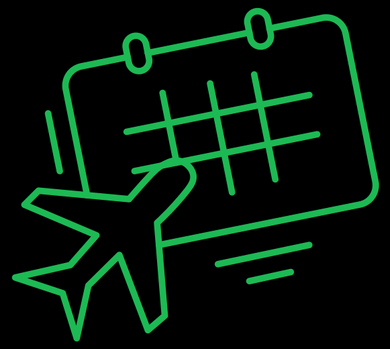
Agentic Approach

Research destinations and activities

Check availability and hours

Verify logistics and timing

Iterate and optimize the plan



Agentic Trip Planning Process

Planning a 5-day trip to Tokyo

Research top attractions & neighborhoods

Check opening hours & seasonal events

Create initial day-by-day itinerary (draft)

Review travel times & logistics (review draft)

Add restaurant recommendations

Optimize for time & proximity

Each step involves multiple API calls, data validation, and decision-making.

Degree of Autonomy

"Agentic" acknowledges that systems can be autonomous to different degrees not a binary choice of agent vs. non-agent.

Less Autonomous

Fixed sequence

→ Search

→ Select

→ Schedule Tokyo temples

→ lunch spots

→ evening activities

Semi-Autonomous

LLM chooses tools:

Web search
OR review sites

Decide:
TripAdvisor
vs Google Maps
vs blogs

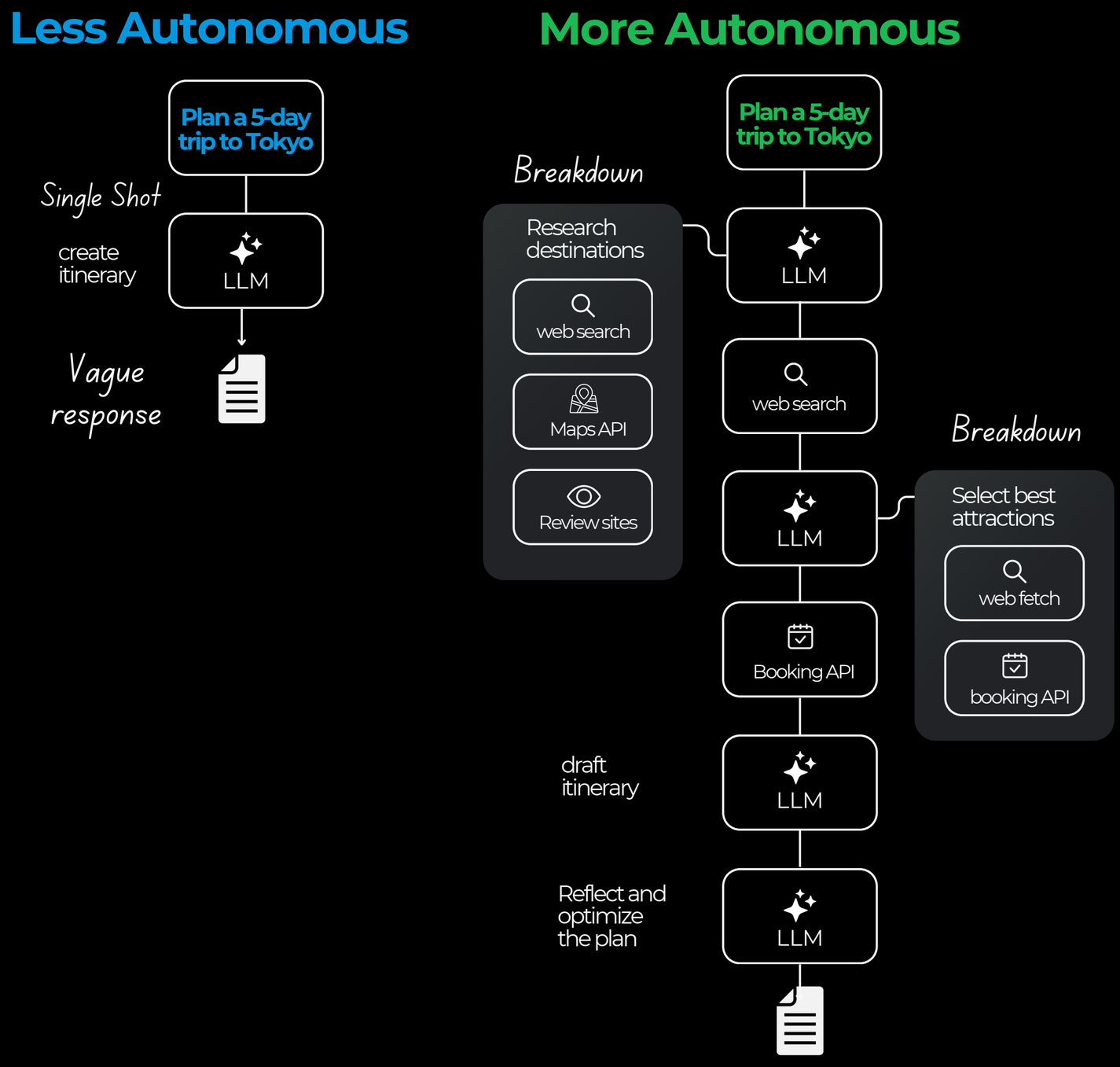
Highly Autonomous

Plans entire workflow:

Decides steps dynamically

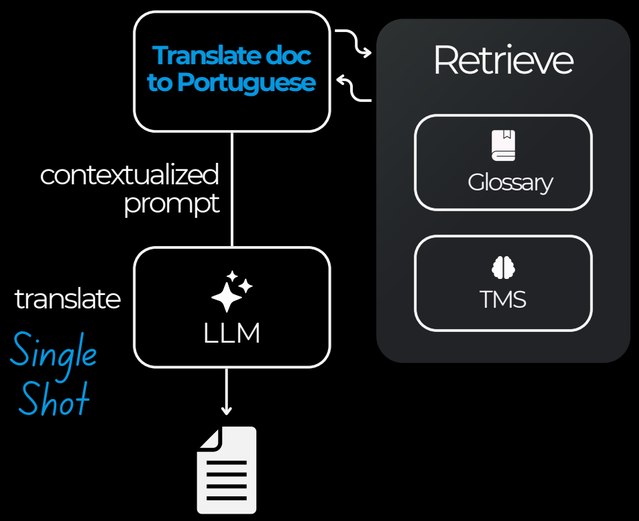
Adapts to weather, finds alternatives, rebooks

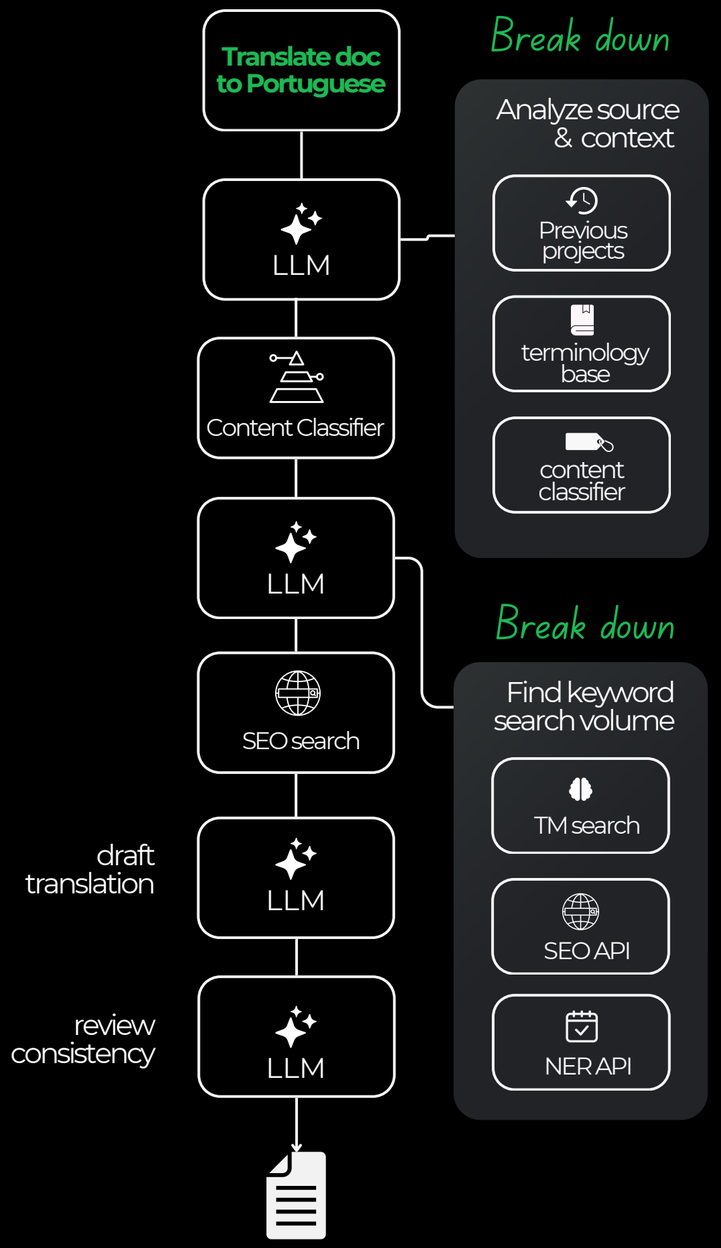
Degree of Autonomy



Degree of Autonomy

Less Autonomous Versus More Autonomous





When to Delegate Autonomy

to an Agentic System?

The workflow is not deterministic

The next step depends on what happens during execution

Step execution depends on many factors that are hard to encode as rules

Context, **unknown**, incomplete or changing information

Rule-based implementations would be costly or complex

Too many if–else conditions to build and maintain.

User intent must be interpreted

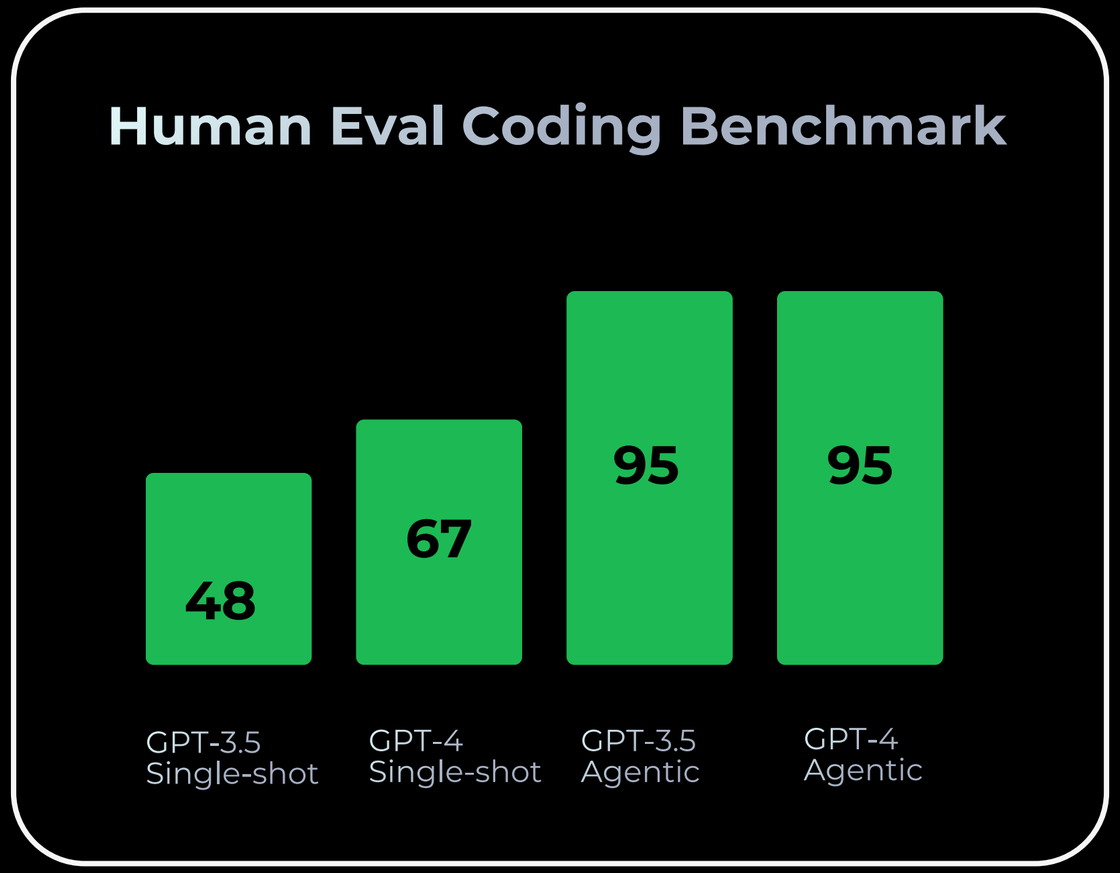
Common in chat-based or open-ended interactions

Performance needs to go beyond single-shot prompting

When iterative reasoning, reflection, or tool use is required to outperform a one-pass solution

Benefits

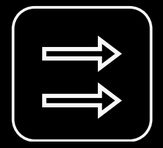
Dramatic Performance Gains



Agentic workflows often outperform even upgrading to the next generation model.

Additional Benefits

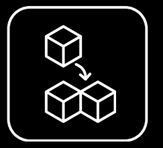
Parallelism



Trip Planning Example:

- Check 10 hotel availabilities simultaneously
- Fetch reviews from multiple sources in parallel
- Query weather data for all destinations
- Verify opening hours for 20+ attractions at once

Modularity



Swap Components:

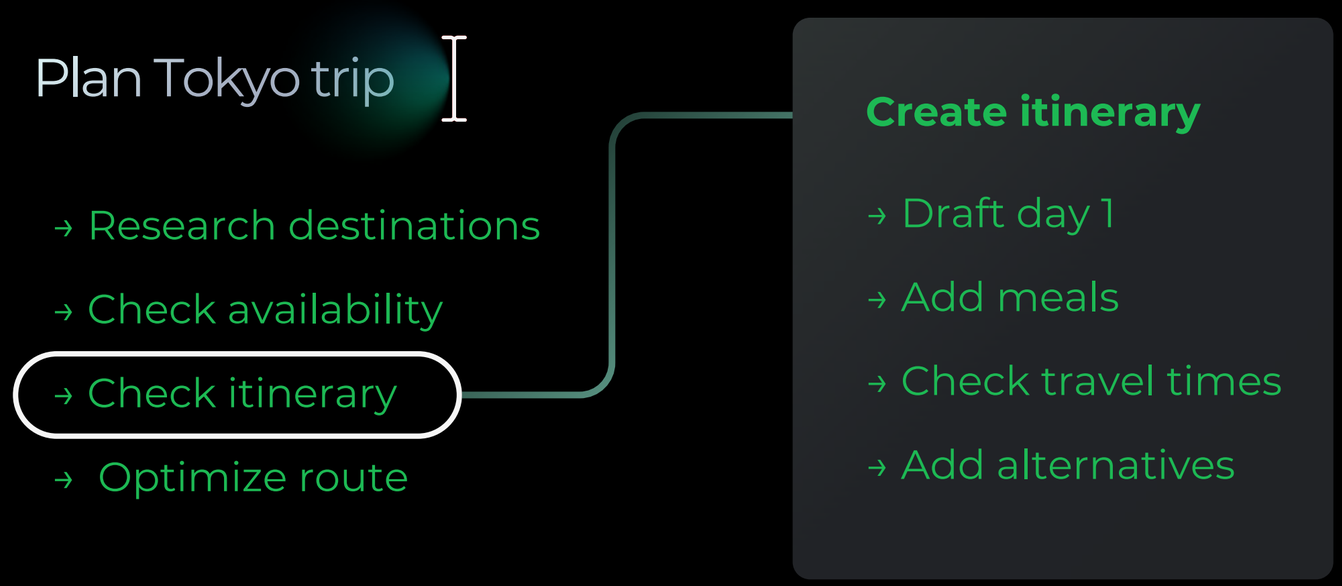
- Different map providers (Google, Apple, Mapbox)
- Multiple booking APIs (Expedia, Booking.com)
- Various review sources (TripAdvisor, Yelp)
- Test different LLMs for each step

Designing Agentic Workflows is all about

Decomposition

Task Decomposition

Breaking trip planning into discrete, implementable steps:



Key Question

Can each step be done by an LLM, code, function call, or tool?

✓ Search attractions
→ Web search API

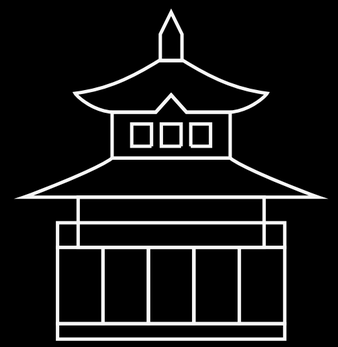
✓ Check hours
→ Google Maps API

✓ Calculate routes
→ Mapping service

✓ Draft schedule
→ LLM with context

Detailed Example

Day 1 Planning



User Query

“Plan my first day in Tokyo visiting temples”

Research Phase

Search top temples

→ Senso-ji,

Meiji Shrine

Verify Details

Check opening hours

Senso-ji: 6am–5pm

Meiji Shrine: sunrise–sunset

Add Context

Find nearby

Nakamise Shopping Street,

Ueno Park

Create Draft

Morning: Senso-ji

Afternoon: Meiji Shrine

Evening: Harajuku

Review & Optimize

Check travel times (45 min between locations)

Add lunch at 12:30pm

Final Output

Optimized itinerary with times, addresses, directions, alternatives

Building Blocks for Trip Planning

AI Models

LLMs for planning

Recommendation engines

Image recognition

Translation models

Travel APIs

Google Maps/Places

Booking.com API

TripAdvisor

Weather APIs

Data Tools

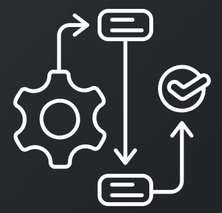
Review aggregation

Price comparison

Real-time availability

User preferences DB

Four Key Agentic **Design Patterns**



Reflection

Review itinerary for conflicts, improve recommendations

Tool Use

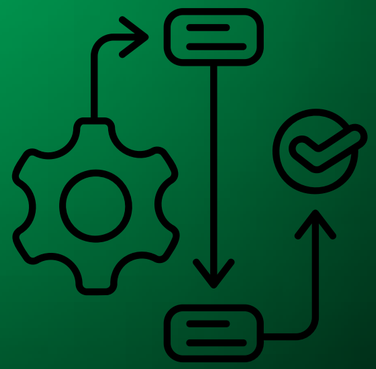
Call APIs for maps, bookings, weather, reviews

Planning

Determine steps:
→ research
→ verify
→ book
→ optimize

Multi-Agent

Specialist agents: researcher, logistics, food expert



Pattern 1

Reflection

Generate Itinerary v1 →

Initial Plan

Morning Senso-ji
→ Afternoon

Critique Plan →

Critique

“Inefficient route. Asakusa and Senso-ji are in same area!”

Improved Itinerary v2

Improved Plan:

Morning Senso-ji
+ Asakusa area
→ Afternoon Shibuya
→ Evening Shinjuku

Pattern 2

Tool use

LLM decides which travel tools to use

Google Places
→ Find top-rated temples

Maps API
→ Calculate travel time

Weather API
→ Check rain forecast

Booking API
→ Check hotel availability

Review Scraper
→ Aggregate ratings

Translation
→ Convert addresses

Pattern 3

Planning

LLM autonomously determines the workflow sequence

"Plan a cherry blossom viewing trip to Japan in April"

Research ✓
cherry blossom forecast (April 2026)

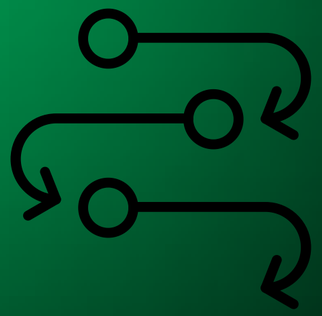
Prioritize ✓
best viewing locations (Kyoto, Tokyo, Osaka)

Check ✓
peak bloom dates by city

Book ✓
hotels near viewing spots

Plan ✓
daily itineraries around parks

✓ Agent decides: research timing before location, then optimize bookings.



Pattern 4

Multi-Agent Collaboration

Specialized agents working together on trip planning

Plan 10-day multi-country Europe trip

Research Agent

Find attractions
Read reviews
Check events

Logistics Agent

- Book trains
- Check timings
- Route optimization

Food Agent

- Find restaurants
- Dietary preferences
- Local cuisine

Agents collaborate:
→ Researcher finds options
→ Logistics checks feasibility
→ Food adds meals

What are the implementation Building Blocks?

📚 **Skills**

Procedural knowledge

The HOW

⚙️ **Tools**

Executable capabilities

The WHAT

🔌 **MCP**

External connectivity

The WHERE

🤖 Subagents

Task specialists

The WHO

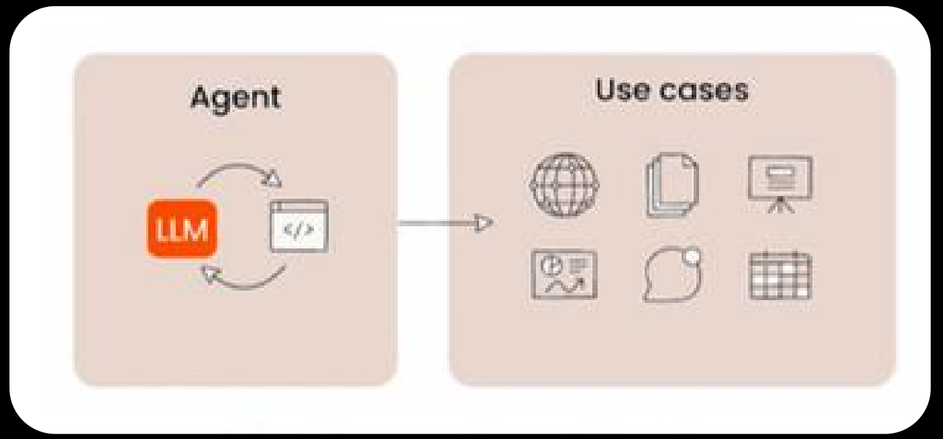
Models

Specialist Agents

Domain-specific Agents
Single-purpose agents

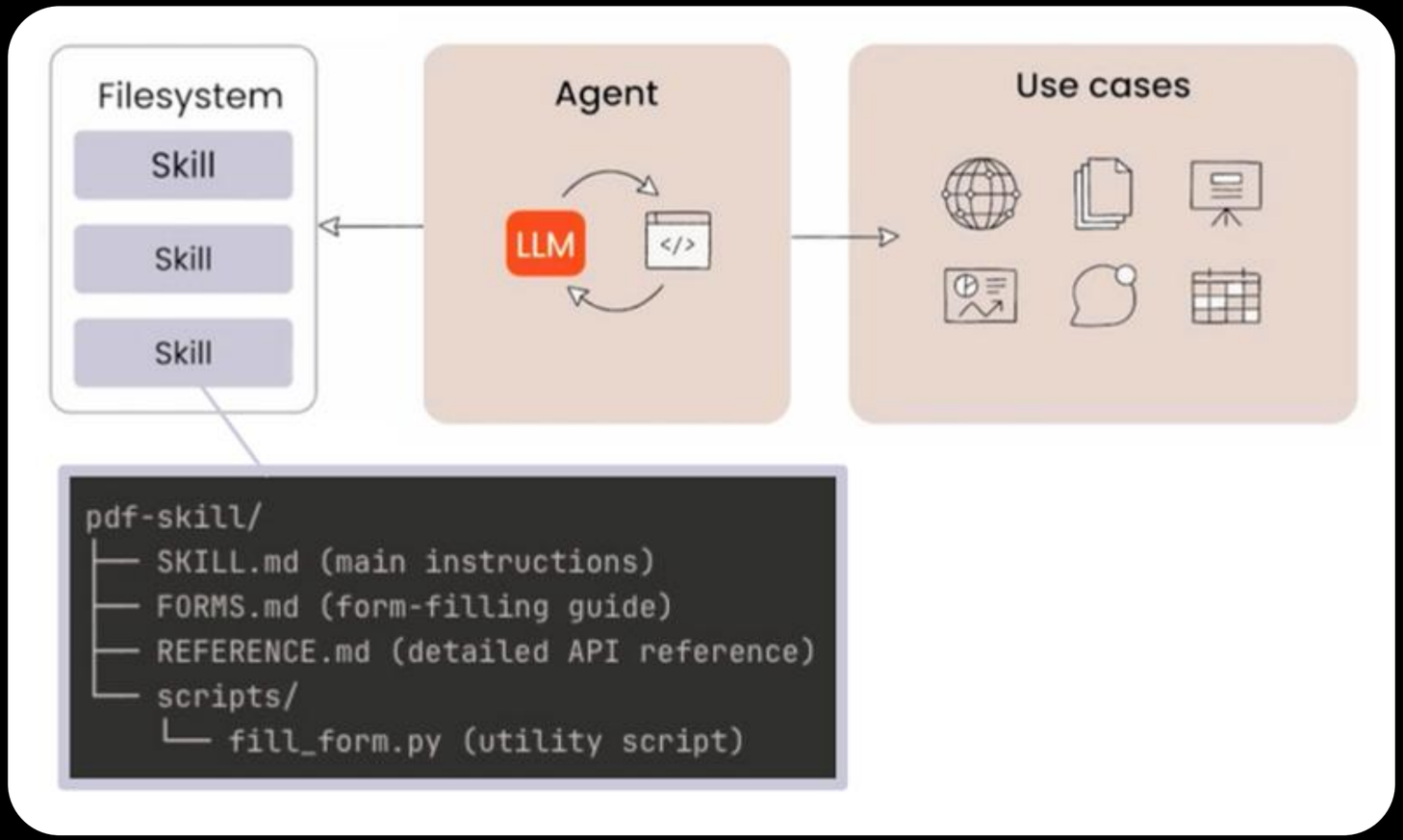
Generalist Agents

General-purpose Agents
One agent, many use cases



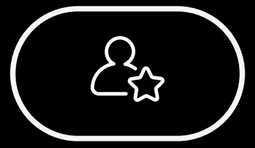
✓ Code as universal interface

General-purpose Agents with Skills

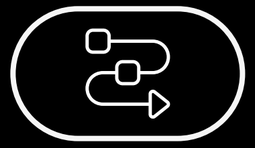


What Are Agent Skills?

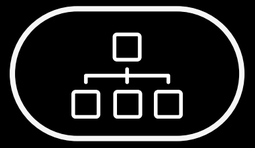
Modular, dynamically-loadable units of procedural knowledge that transform general-purpose agents into domain specialists.



Domain Expertise



Repeatable Workflows



Org-Specific Context

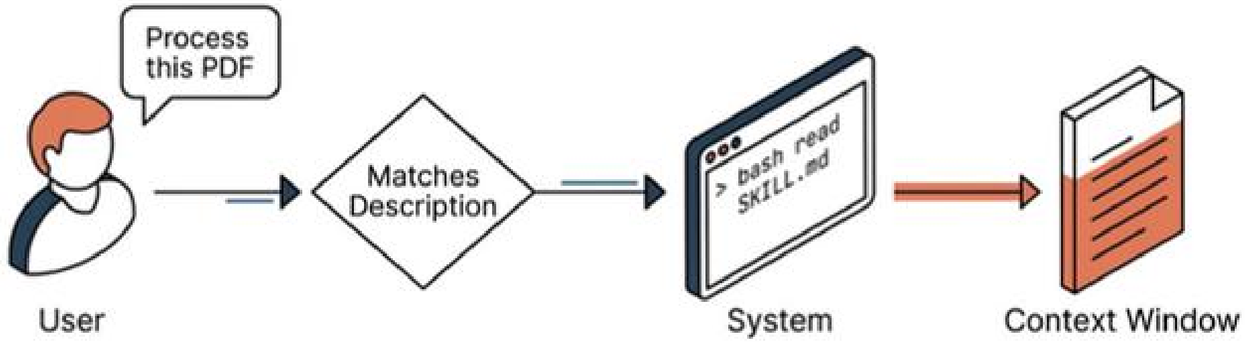
New Capabilities

Skills encode how to do things, not just what to say.
They transform agents from conversational to operational systems.

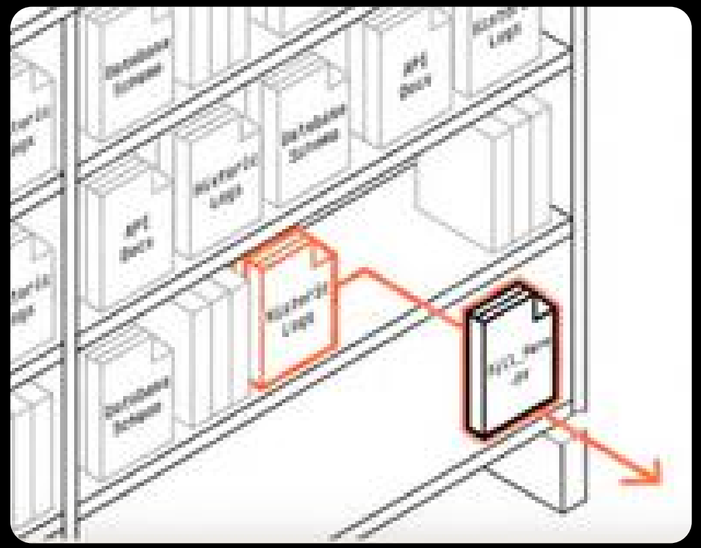
Skill Structure

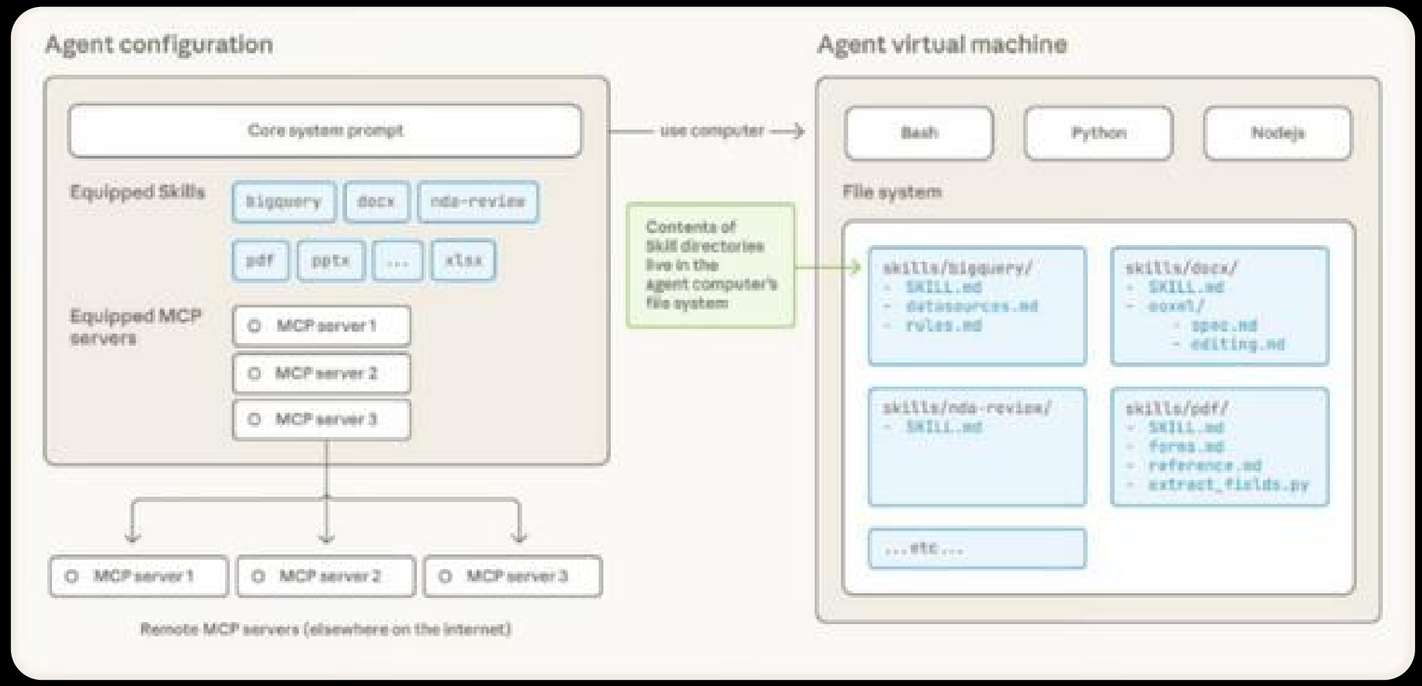
```yaml
---
name: your-skill-name
description: Brief description of what this Skill does and when to use it
---

# Your Skill Name

## Instructions
[Clear, step-by-step guidance for Claude to follow]

## Examples
[Concrete examples of using this Skill]
```

This text triggers the skill loading

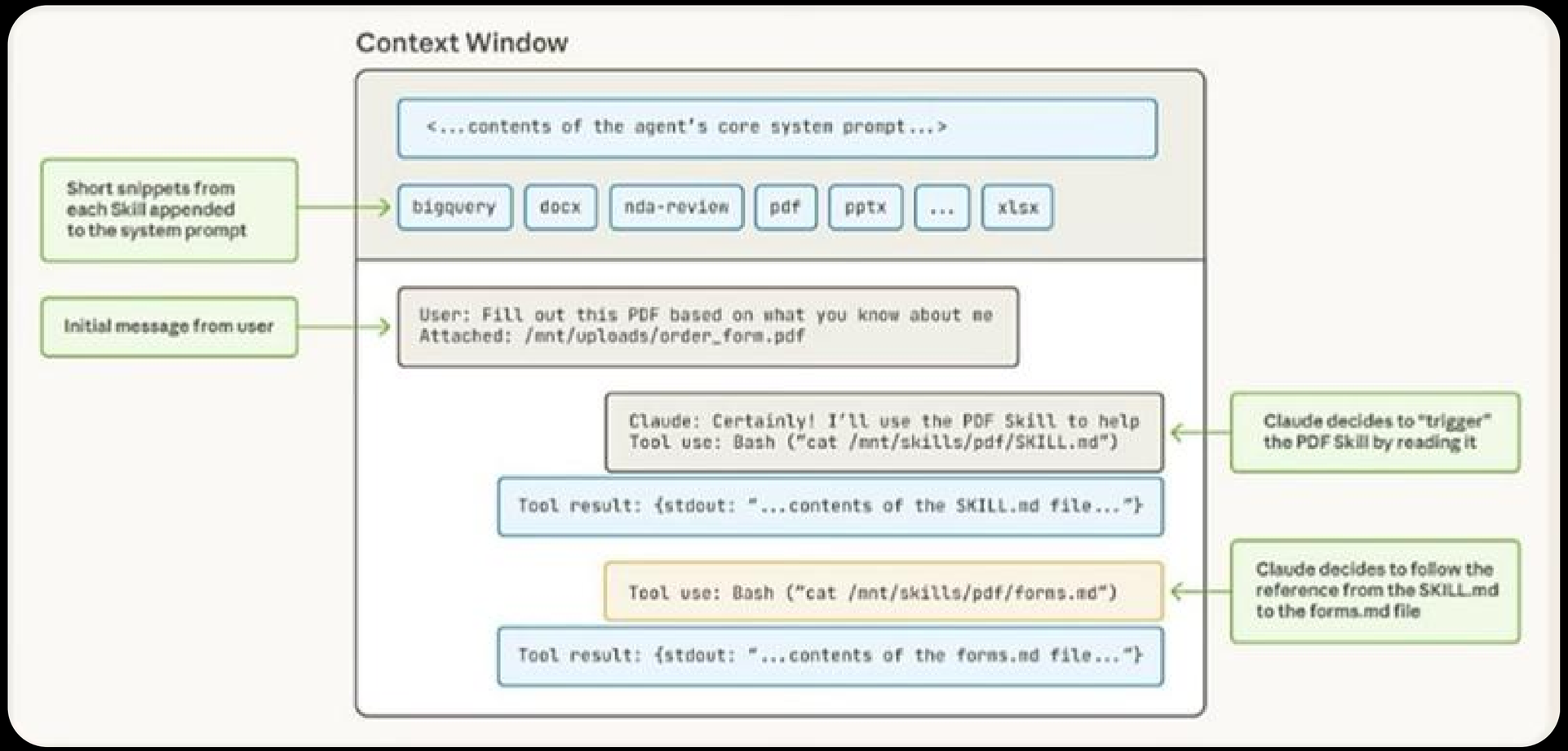


“Unlimited” Resource Library

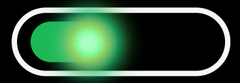




Skills in Claude



Implementation Difficulty Spectrum



Easier

Weekend city trip with popular attractions

- Pre-defined templates
- Standard destinations
- Clear step sequence
- Limited customization

Medium

Multi-country itinerary with logistics coordination

Harder

Adventure trip with weatherdependent activities & real-time rebooking

- Complex multi-city trips
- Dynamic replanning
- Real-time adaptations
- Handling uncertainties

Key Takeaways

Agentic workflows execute multiple steps iteratively

a workflow goes from generic to personalized

→ Research
→ Verify
→ Draft
→ Optimize
produces superior itineraries with validated information

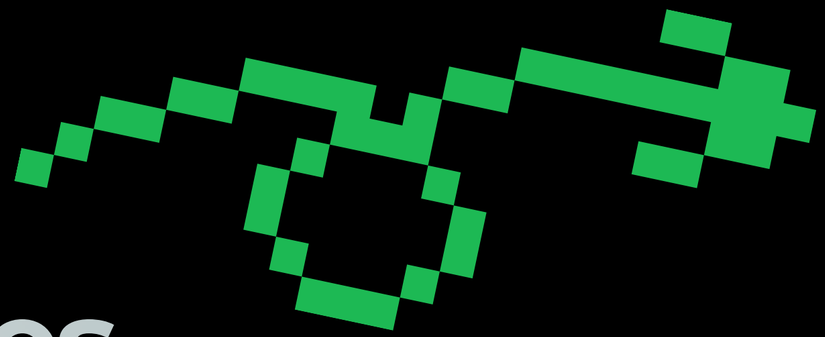
Break complex tasks into discrete steps

Four design patterns enable sophisticated workflows: Reflection, Tool Use, Planning, Multi-Agent

Start simple and add complexity gradually

Next Round:
From Concepts to Practice

How can we apply these concepts to both our engineering practices and the system itself?



Agentic AI Workflows

From Direct Generation to Iterative Intelligence

wxrks