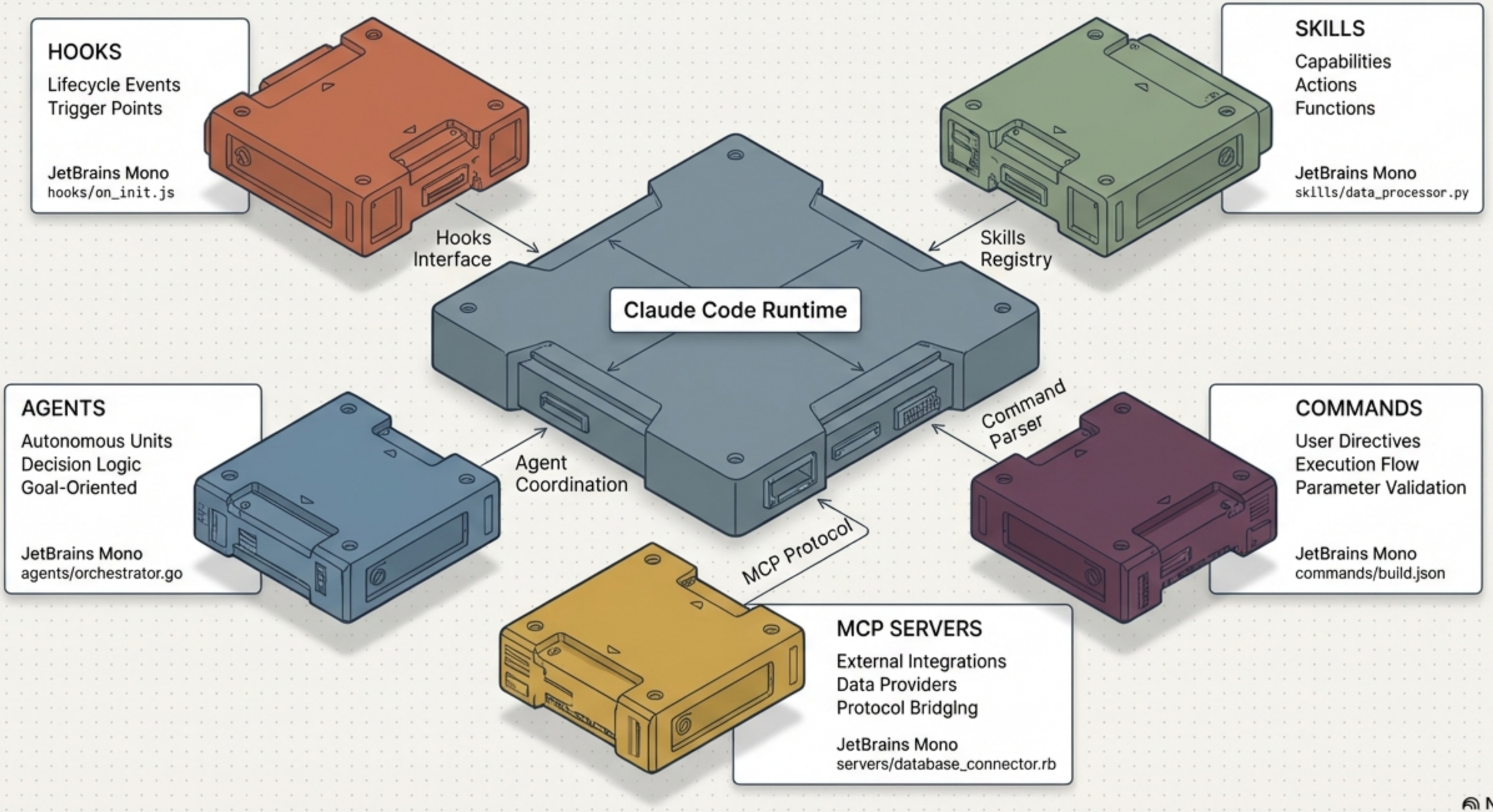
Building Your First Plugin: The CC-203 Architecture Guide

From Manifest to Orchestration: Mastering the Claude Code Mastery Assessment



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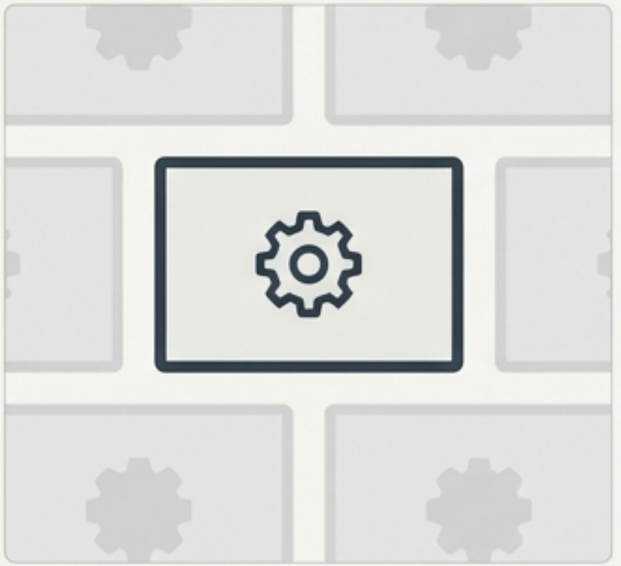
The Three Pillars of Plugin Execution

Isolation Diagram



Isolation

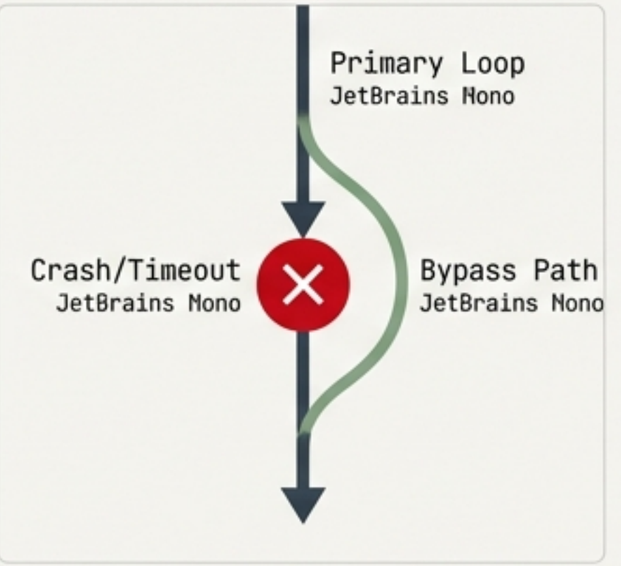
No shared state. No cross-plugin function calls. A crash in Plugin A never affects Plugin B.

Composability Diagram

Composability

Plugins run parallel to the core system. A governance plugin and a docs plugin operate simultaneously on different events without conflict.

Fail-Open Safety Diagram



Fail-Open Safety

If a plugin hook crashes or times out, Claude Code proceeds as if the hook returned “allow”. Plugins enhance the system; they never break the primary loop.

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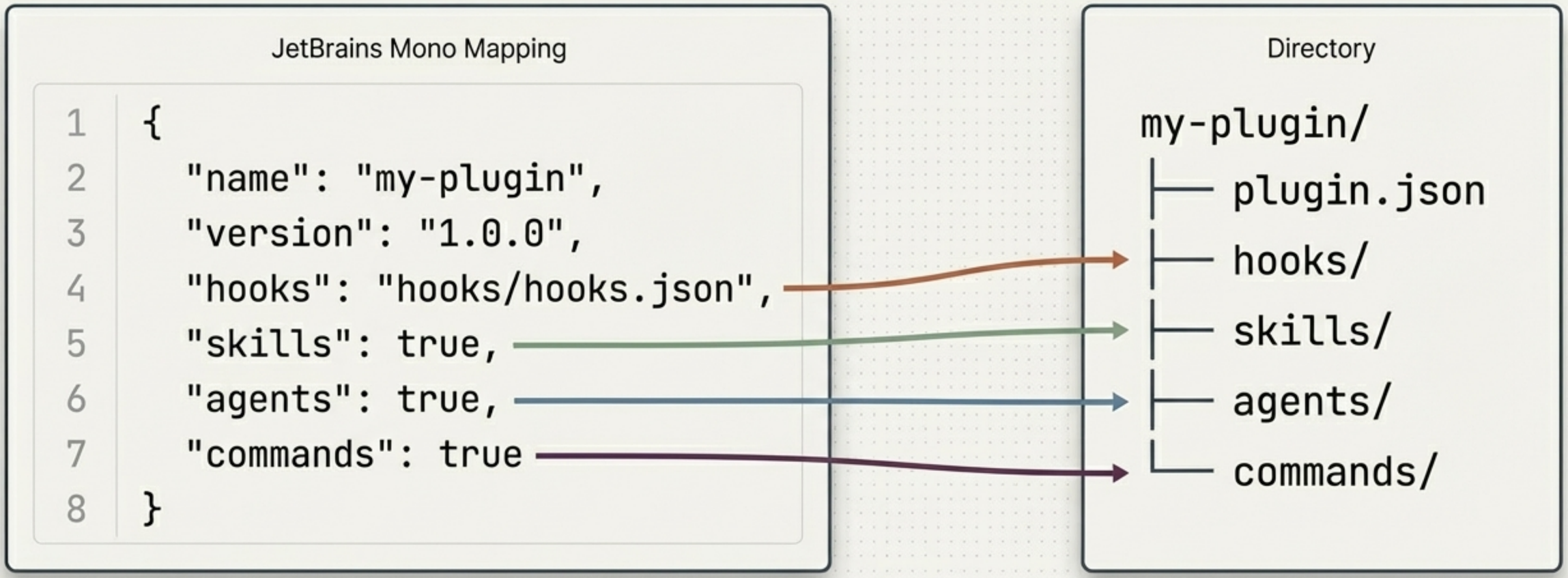
Anatomy of a Plugin: The Manifest and the Directory Tree



Convention over Configuration: Drop files in the right directories, set the manifest flag, and they are discovered automatically. No boilerplate required.

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The Component Diagnostic Matrix

Component	Trigger	Execution	Best For
Hooks	Automatic / Event-Driven	Silent / Background	Guardrails, auditing, automated validation without user input.
Skills	On-Demand (Context Match)	Guided / Step-by-Step	Specialized knowledge, loaded-on-demand checklists, process standardizations.
Agents	Dispatched via Task Tool	Autonomous / Parallel	Isolated sub-tasks requiring dedicated focus and their own context windows.
Commands	Manual (User Slash Command)	Interactive	User-invoked shortcuts, explicit multi-step macros.
MCP Servers	Automatic / Tool Call	External Connection	Bridging the sandbox to external silos (Jira, databases, custom APIs).

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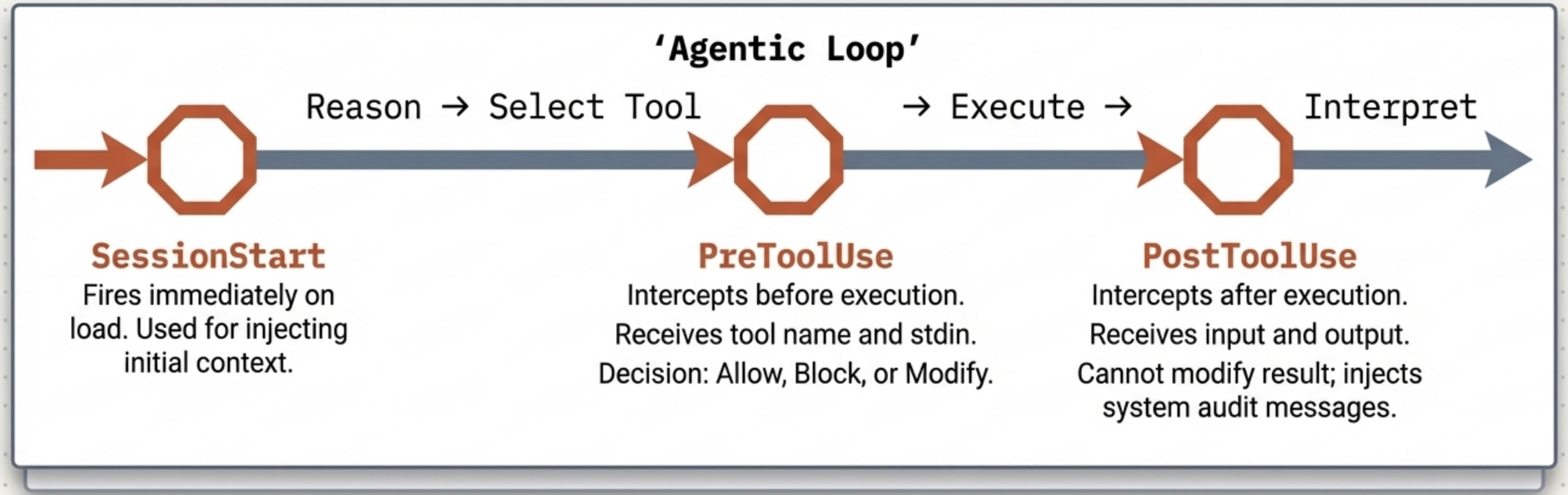
Component 1: Hooks (Automated Interception)



Hooks must be lightweight, fast, and silent. They are the only component that can outright block a Claude Code action.

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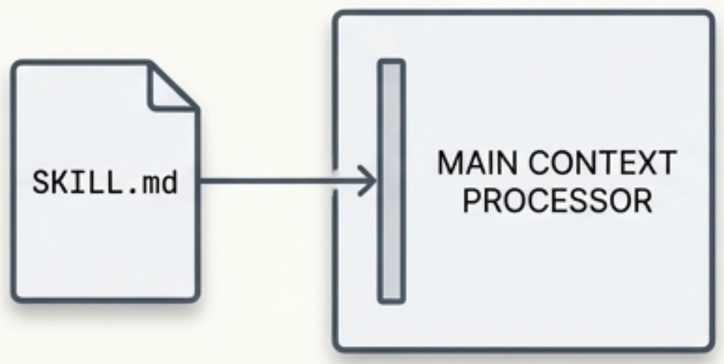
Component 2 & 3: Differentiating Knowledge from Autonomy

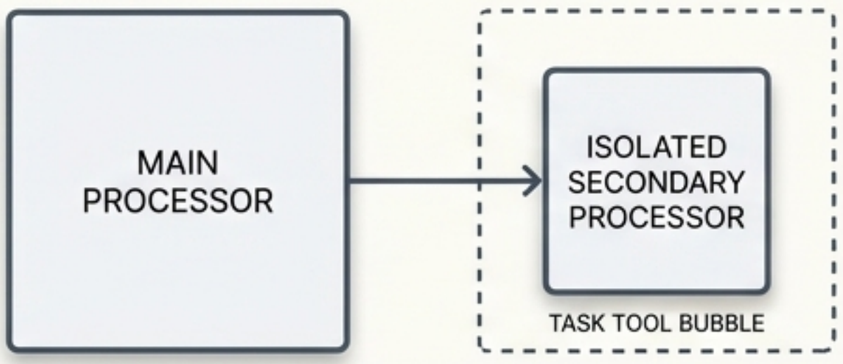
Skills (Passive Knowledge)



Mechanism:
Loaded dynamically into the main context window.

Usage:
Guided workflows and checklists: "Here is the 5-step process for code reviews. Follow it."

Agents (Active Workers)



Mechanism:
A defined role dispatched via the Task tool, operating in its own isolated bubble.

Usage:
Autonomous parallel execution: "Take this specification, go into a separate context, write the code, and return the file."

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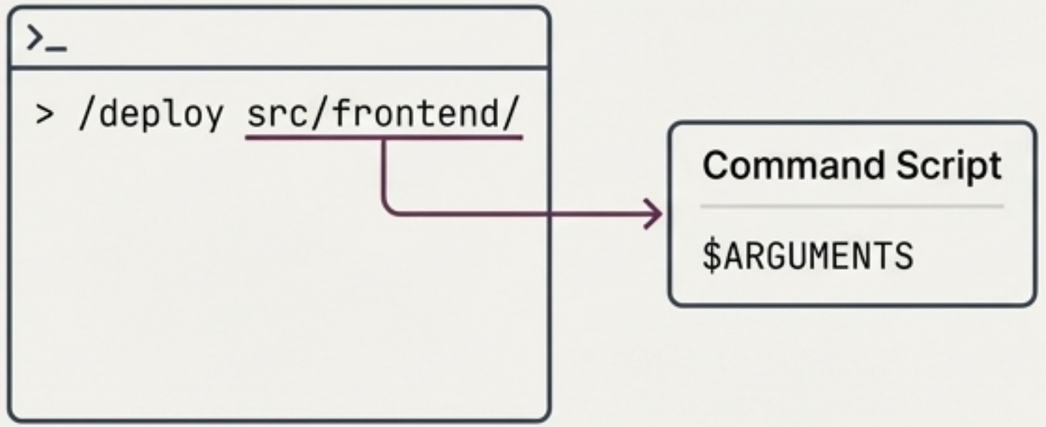
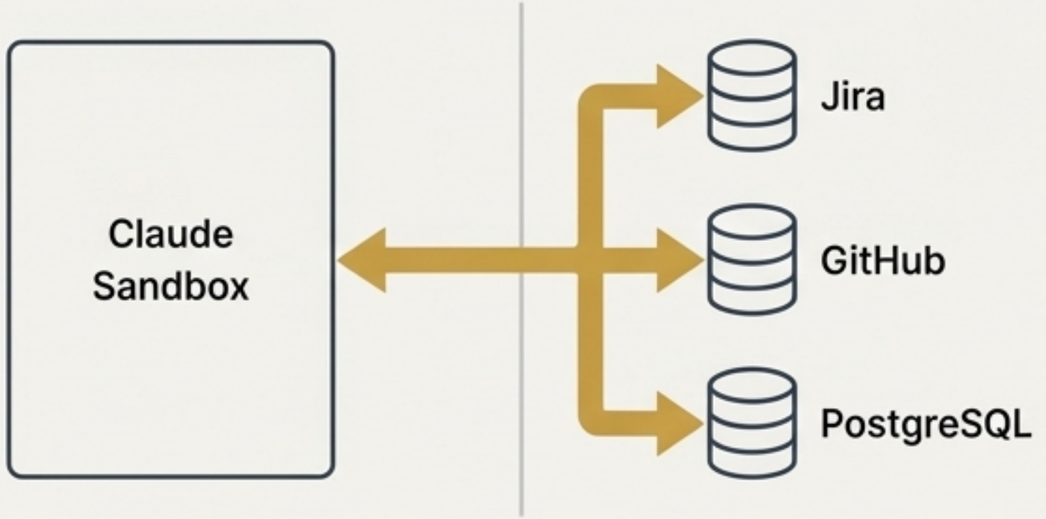
Component 4 & 5: User Invocations and External Bridges

Commands (User Invocation)



User-initiated slash commands trigger explicit commands, passing dynamic text directly into the command body via the $ARGUMENTS variable.

MCP Servers (External Bridges)



Model Context Protocol (MCP) servers expose external systems as callable tools that Claude can use natively, bridging the isolated sandbox to external silos.

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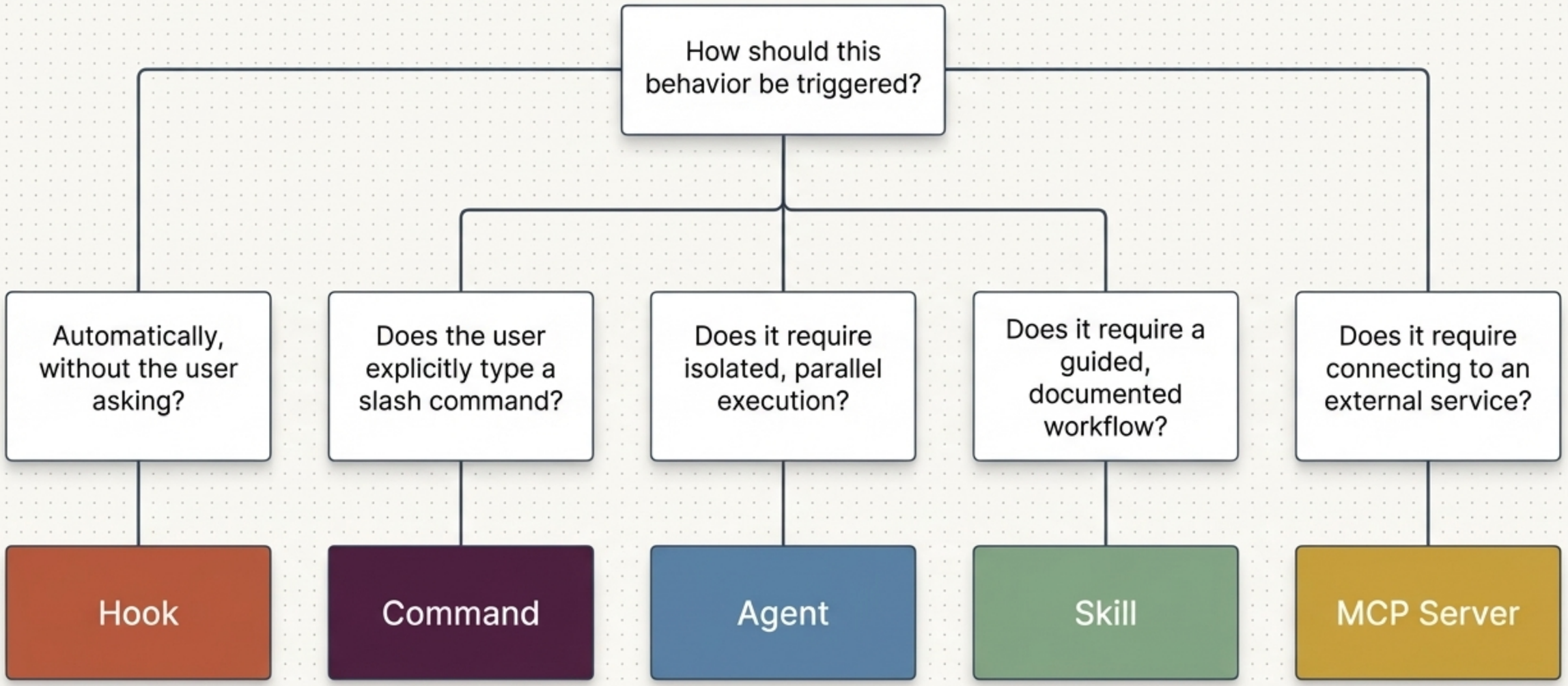
The Component Decision Tree



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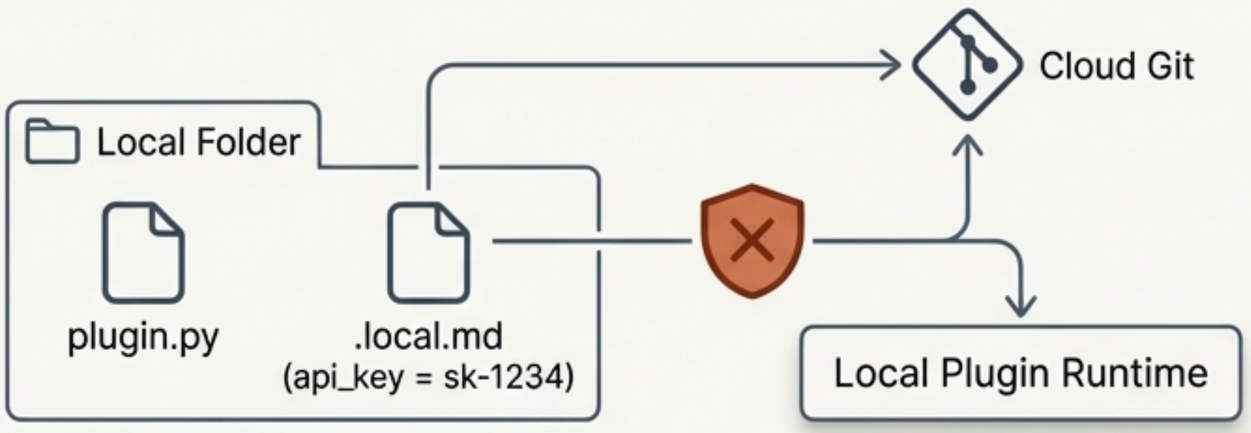
Portability & Security Constraints

The Portability Fix

Never hardcode absolute paths. Use ${CLAUDE_PLUGIN_ROOT} to ensure cross-machine portability.

The .local.md Pattern



Store per-environment API keys and feature flags in .local.md. It is strictly .gitignored and ingested dynamically at runtime.

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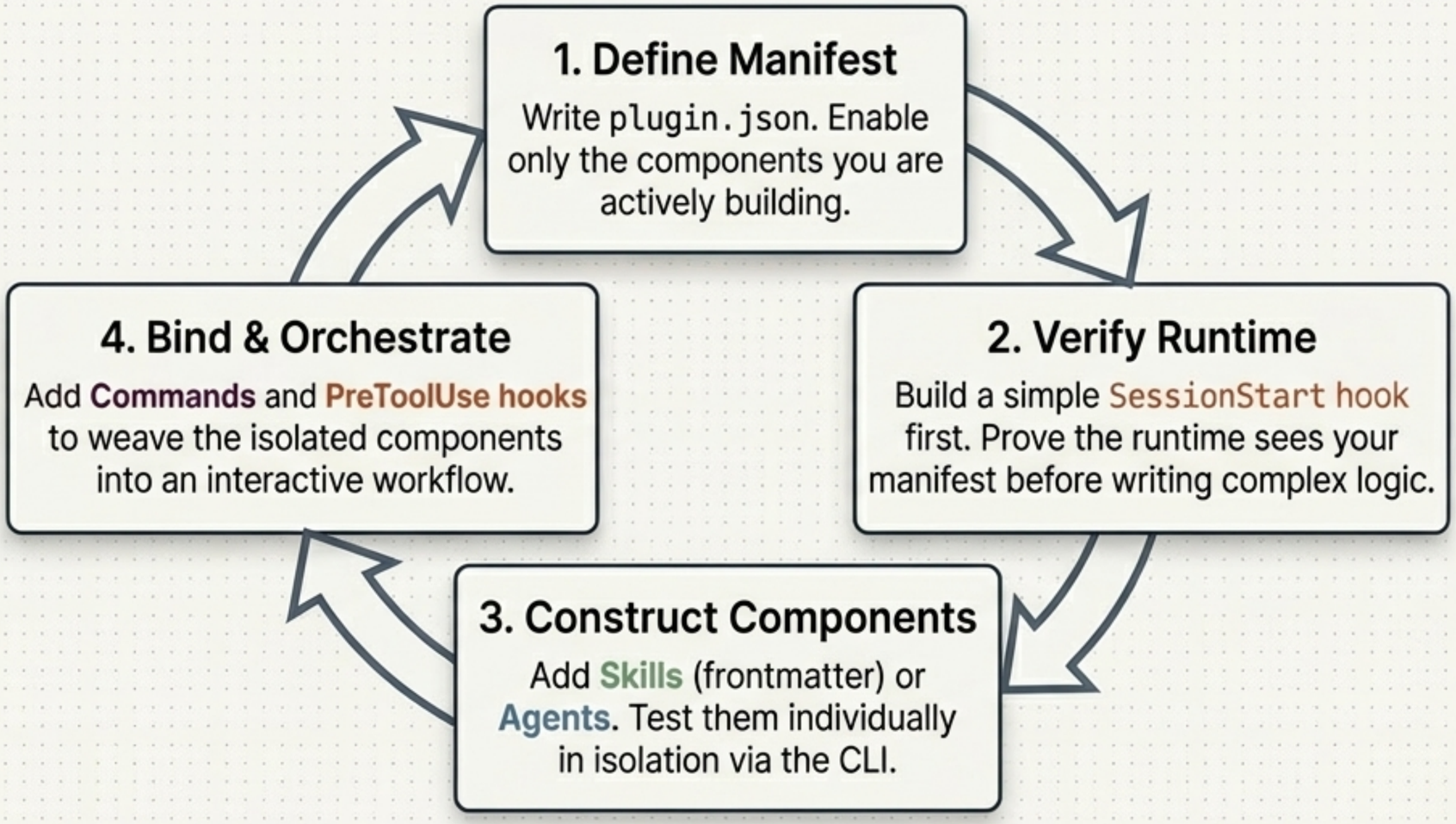
The Iterative Build Workflow



Architectural Rule: Never build the entire plugin at once. Build, test in isolation, bind, repeat.

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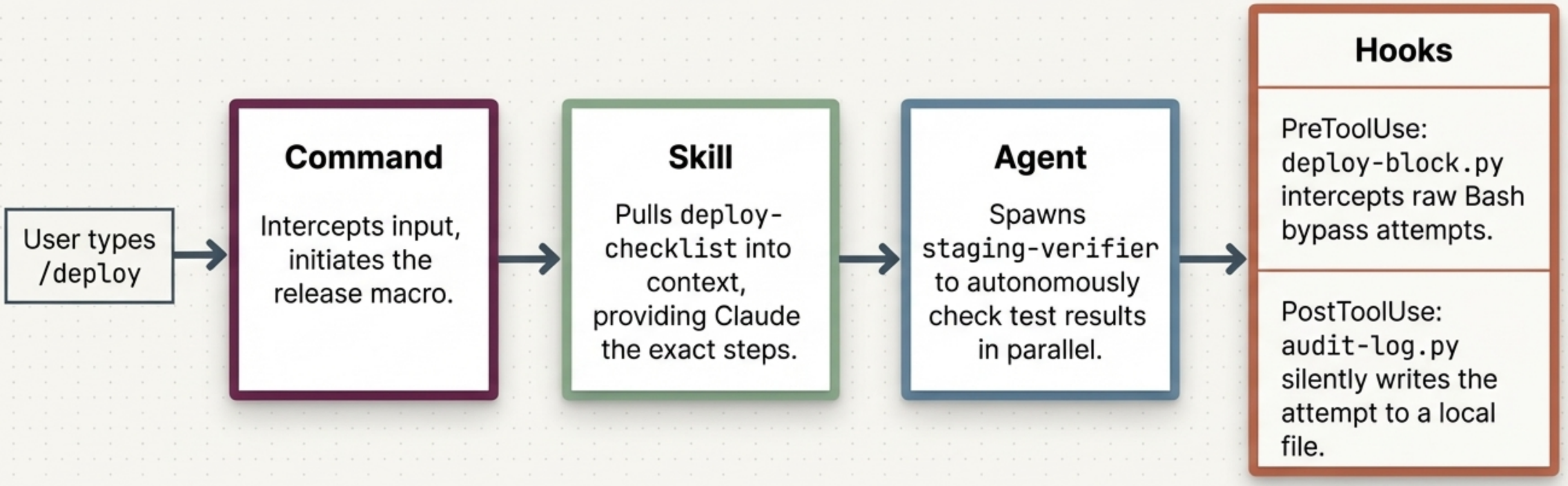
System Synthesis: **The Deploy-Guard Ecosystem**



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CC-203 Assessment: The Scenario Briefing

Objective: Build the ‘Deploy-Guard’ plugin for a web-app deployment team.

1. **Automatic Block**: Prevent all deployments on Fridays and weekends (no user action required).
2. **Guided Process**: Provide a strict deployment checklist for the team to follow.
3. **User Interface**: Offer a `/deploy` command that executes the deployment sequence.
4. **Autonomous Verification**: Include an agent to verify staging tests independently.
5. **Compliance Logging**: Audit log every single deployment attempt (both successful and blocked) to a local file.

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Assessment Deliverables: The Required Architecture

☐ plugin.json		The complete manifest
☐ ARCHITECTURE.md		Component justification document
☐ hooks/		
☐ hooks.json		Registration mapping
☐ hooks/deploy-block.py	Rust Terracotta block	PreToolUse hook for Friday blocking
☐ hooks/audit-log.py	Rust Terracotta block	PostToolUse hook for logging
☐ skills/		
☐ skills/deploy-checklist/SKILL.md	Sage Green block	Checklist with frontmatter
☐ agents/		
☐ agents/staging-verifier.md	Steel Blue block	Agent prompt + model selection
☐ commands/		
☐ commands/deploy.md	Deep Plum block	The /deploy command logic

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The 50-Point Grading Rubric

Criteria		Points
Hook Implementation	Rust Terracotta	10 pts
Hook Registration	Rust Terracotta	8 pts
Skill Content	Sage Green	7 pts
Manifest Correctness		5 pts
Directory Structure		5 pts
Agent Definition	Steel Blue	5 pts
Command Definition	Deep Plum	5 pts
Component Justification		5 pts

Pass Threshold: 40/50 (80%)

⚠ **+5 Bonus Points:** Identify the critical security flaw in the fail-open design of `deploy-block.py`. (Hint: What happens to the deployment if the Python script crashes on a Friday? How do you mitigate this?)

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Pre-Flight Validation Checklist

- [ ] Is `plugin.json` strictly valid JSON with no trailing commas?
- [ ] Do all Python hook scripts use `${CLAUDE_PLUGIN_ROOT}` for file paths?
- [ ] Do all .md components (Skills, Agents, Commands) feature valid YAML frontmatter?
- [ ] Is the fail-open security risk in the blocking hook explicitly mitigated?
- [ ] Does the plugin load into Claude Code without runtime errors?

Architecture verified. Initialize your repository.

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