

Static vs Dynamic Planning in Agentic AI

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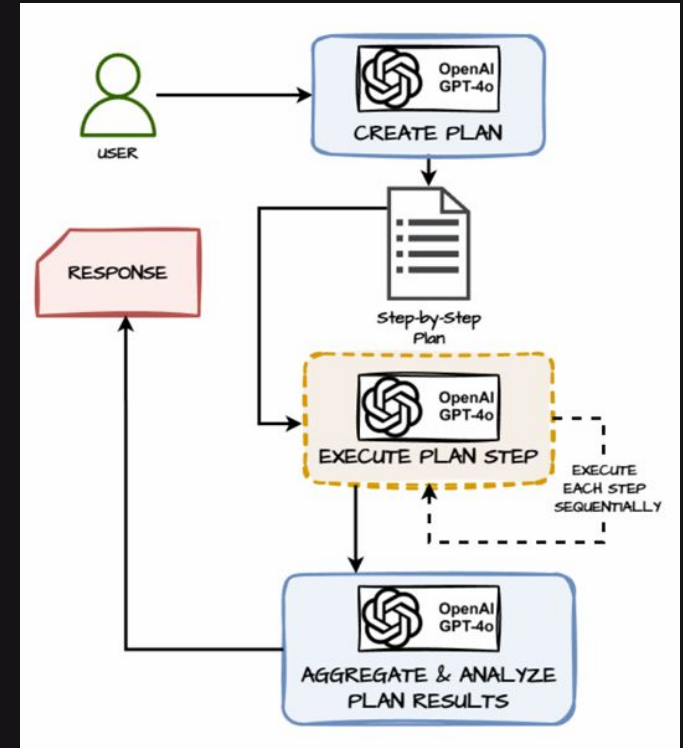
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Static Sequential Planning Agentic AI Systems

The system creates a detailed step-by-step plan for a user request and executes each step in sequence.

- **Plan Creation**
 - The AI generates a static task plan based on the user query.
- **Task Execution**
 - Each step is executed one at a time, following the defined order.
- **Result Aggregation**
 - The outcomes of all steps are compiled and analyzed to generate a final result.
- **Final Response**
 - The final generated response is returned to the user.

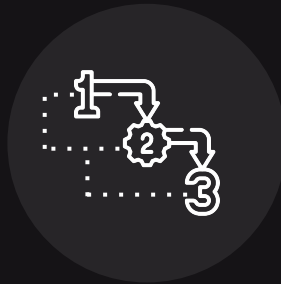


Static Sequential Planning Agentic AI Systems

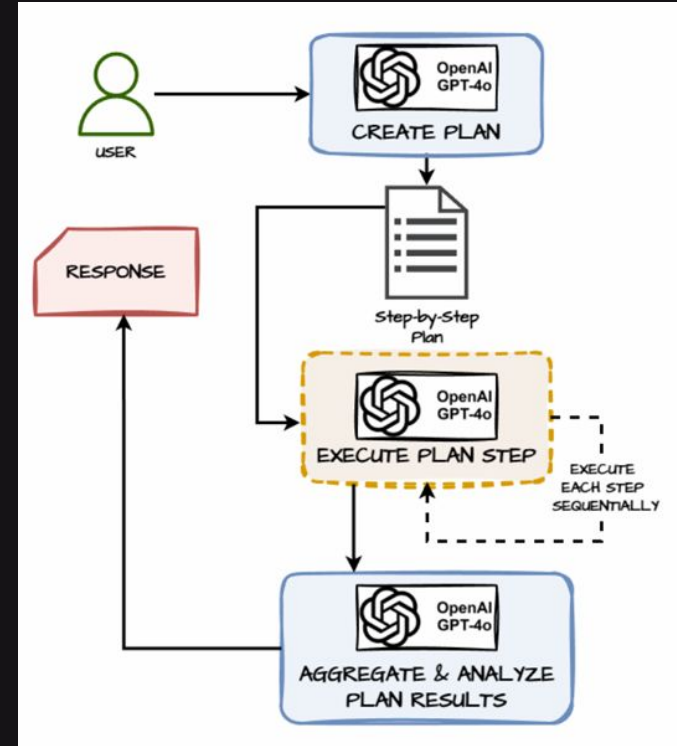
Advantages:



Ensures steps are executed in the **correct** order.

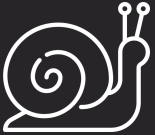


Suitable for tasks where **outputs from earlier steps are required for later steps.**



Static Sequential Planning Agentic AI Systems

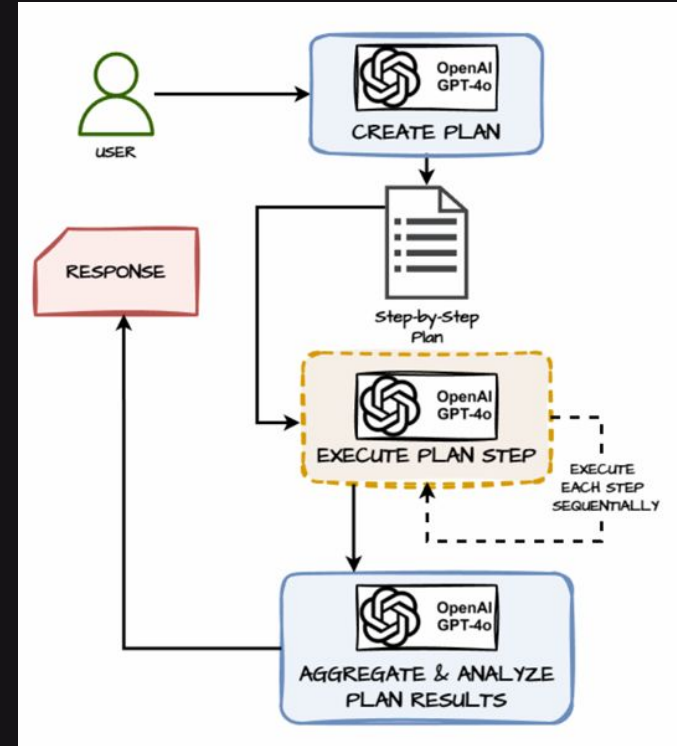
Limitations:



Slower execution as tasks are processed in a **sequential manner**.



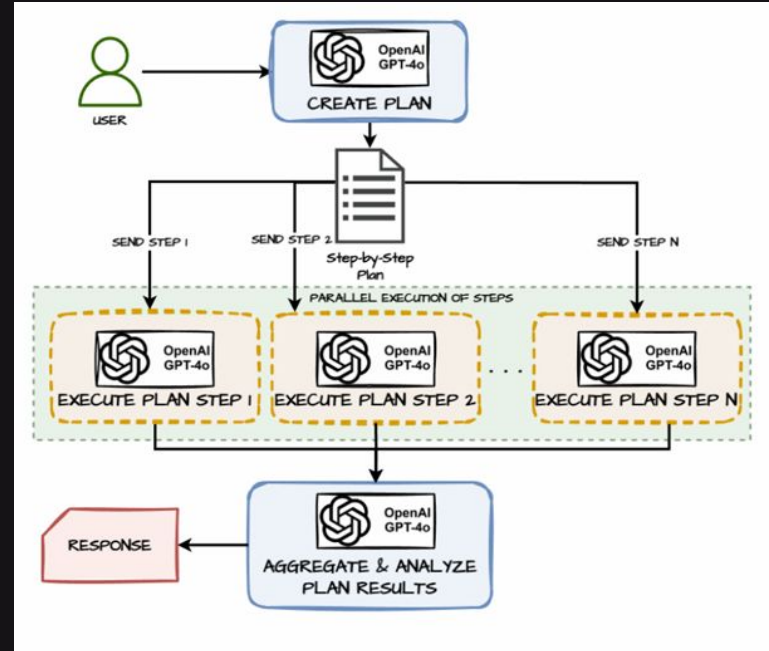
It is not ideal for **independent tasks**.



Static Parallel Planning Agentic AI Systems

The system creates a detailed step-by-step plan for a user request and executes each step in parallel.

- **Plan Creation**
 - The AI generates a static task plan based on the user query.
- **Task Execution**
 - All tasks in the plan are processed concurrently by different agent nodes or sub agents.
 - Steps are independent and do not require sequential dependencies
- **Result Aggregation**
 - The outputs from parallel tasks are combined and analyzed (map-reduce)
- **Final Response**
 - The final generated response is returned to the user.



Static Parallel Planning Agentic AI Systems

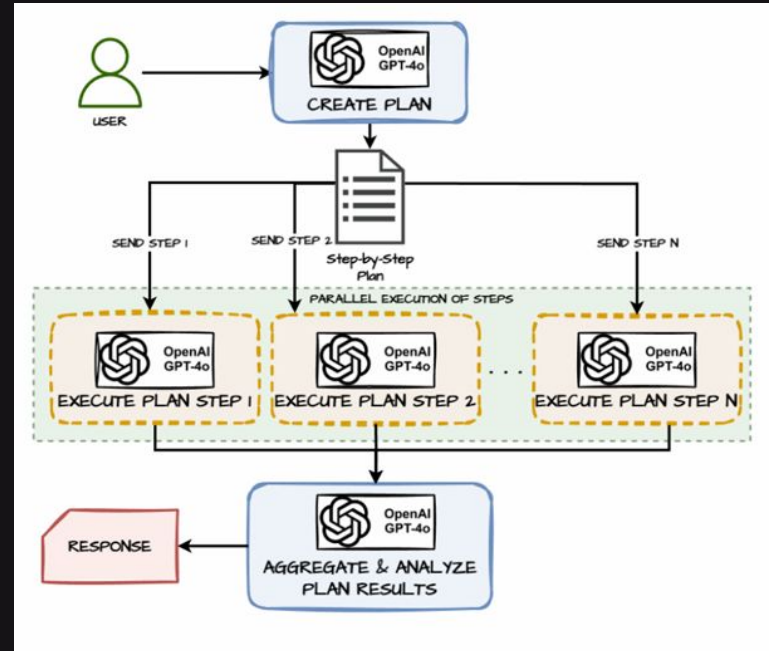
Advantages:



Faster task completion due to **simultaneous execution**.



Ideal for **independent** or **modular tasks**.



Static Parallel Planning Agentic AI Systems

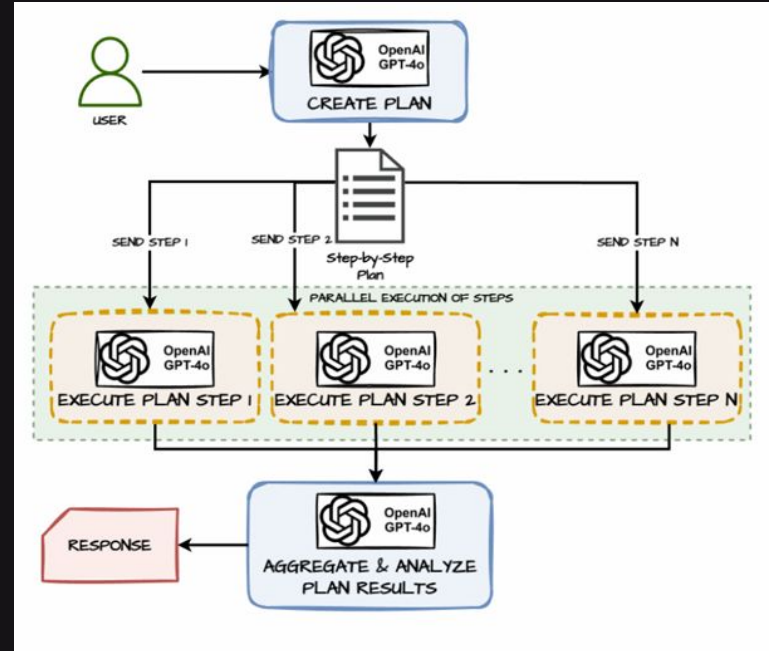
Limitations:



- Requires tasks to be independent.
- Dependencies can complicate execution.



Increased **complexity** in managing parallel processing.

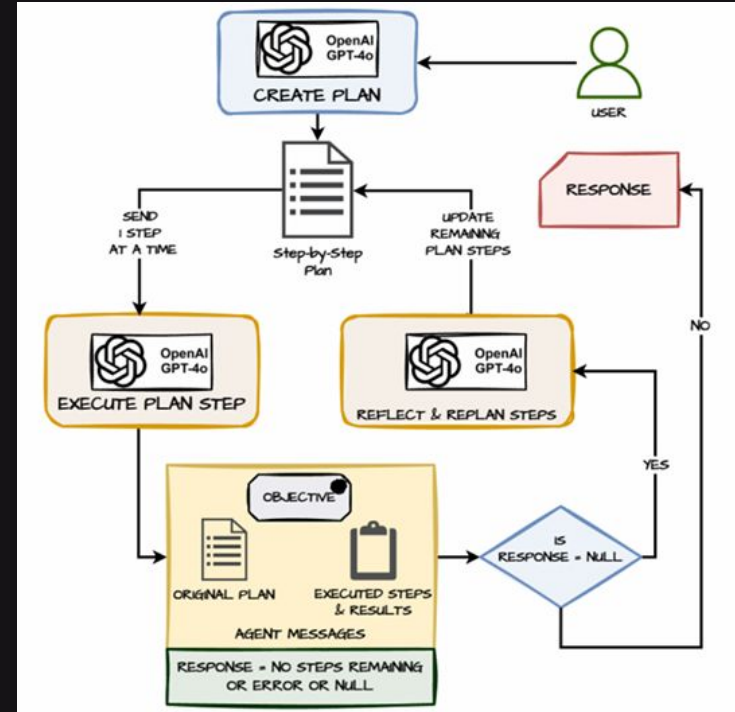


Reflective Dynamic Planning Agentic AI Systems

The system combines planning and reflection to execute steps, send results to an LLM for further analysis, and replans if needed until the final response is generated.

Workflow

- **Plan Creation**
 - The AI generates an initial step-by-step plan for task execution.
 - The plan is dynamic and can change based on intermediate step results
- **Task Execution**
 - Tasks are executed sequentially, with results feeding back into the system for further replanning.
- **Reflection & Replanning**
 - After each step, the system evaluates executed steps and results and adjusts the remaining plan dynamically.
 - Handles unexpected scenarios by recalculating or changing steps as needed



Reflective Dynamic Planning Agentic AI Systems

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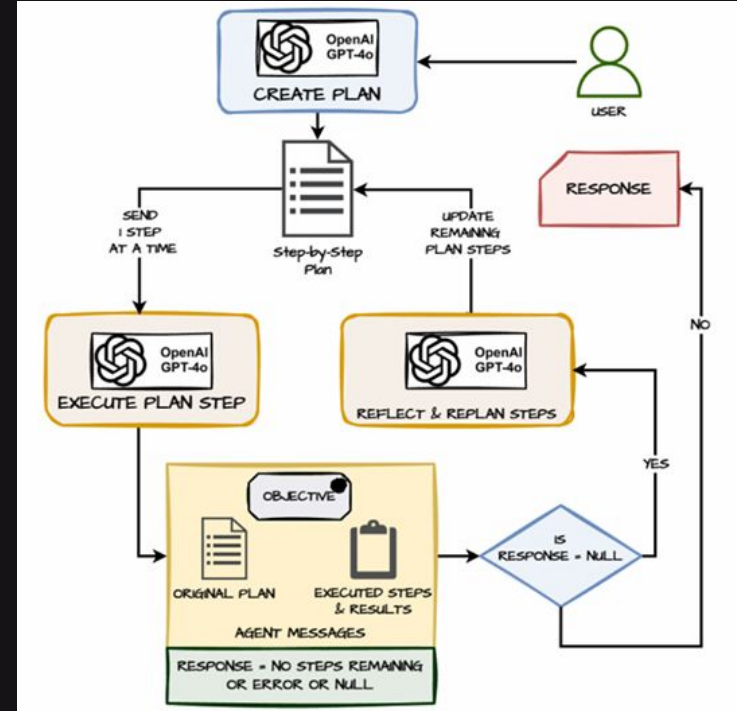
Workflow

- **Objective Tracking**

- Keeps a record of the original plan, executed steps, and results to ensure alignment with the user's goal.

- **Final Response**

- If all steps are completed or there was an error, returns the final response.



Reflective Dynamic Planning Agentic AI Systems

Advantages



Adaptive Workflow

Dynamically adjusts tasks based on progress or changing requirements.



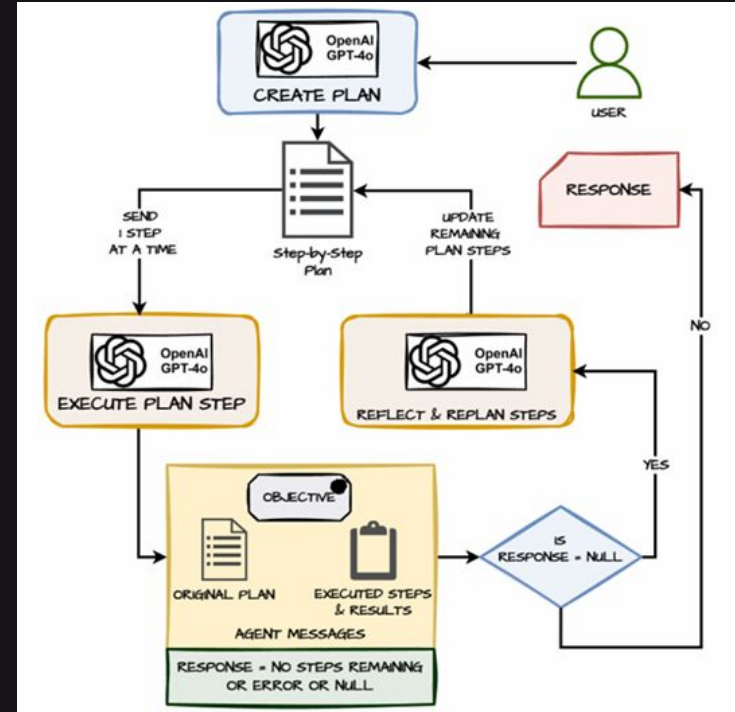
Reflect & Iterate

Capable of looking at already executed steps to update the plan iteratively and dynamically instead of sticking to a static fixed plan.



Goal-Oriented

Maintains focus on achieving the desired objective, by sticking to it in the plan execution, reflection and replanning steps.



Reflective Dynamic Planning Agentic AI Systems

Limitations:



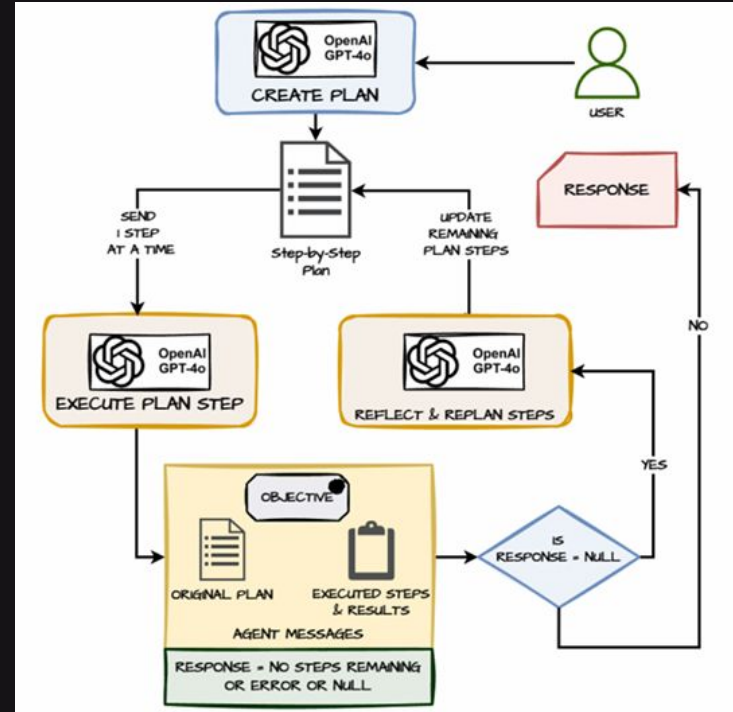
Execution Time

Reflection and replanning may increase overall time for task completion.



Resource Intensive

Requires additional computational resources to continuously evaluate and adjust plans.



The most popular example of the planning pattern is the **ReAct technique**.

Thanks!