

Crew AI: A Framework for Building Intelligent Agents

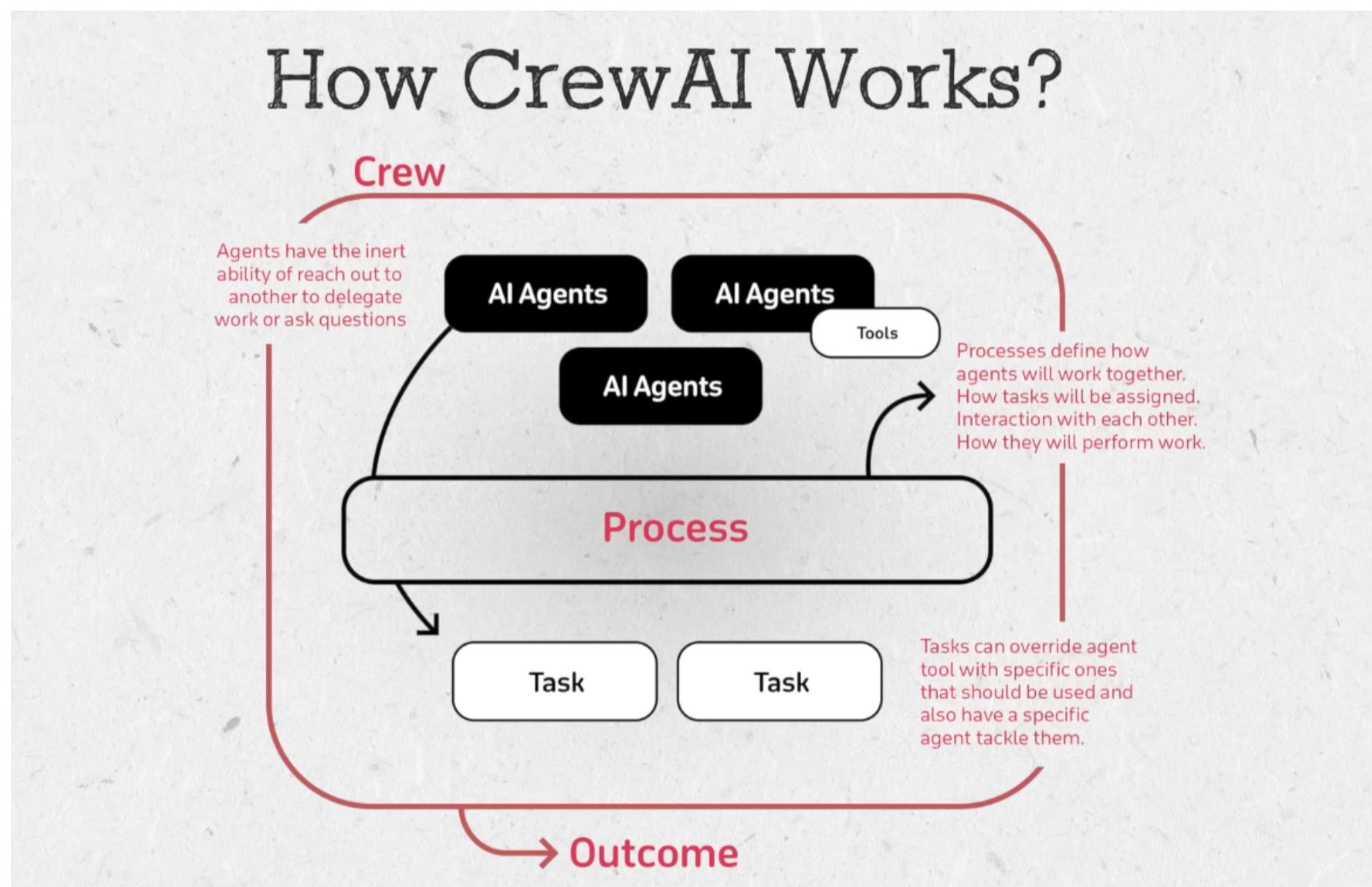
Crew AI Framework Overview

Crew AI is a framework designed for creating and orchestrating intelligent agents to solve complex problems. It's essentially a system for building collaborative AI teams that can work together to achieve a desired outcome.

Detail Examination : This Frame Work allows us to create AI agents where each agent has its own expertise and instructions. together, the agents will work towards solving one large, complex problems.

Core Components of Crew AI

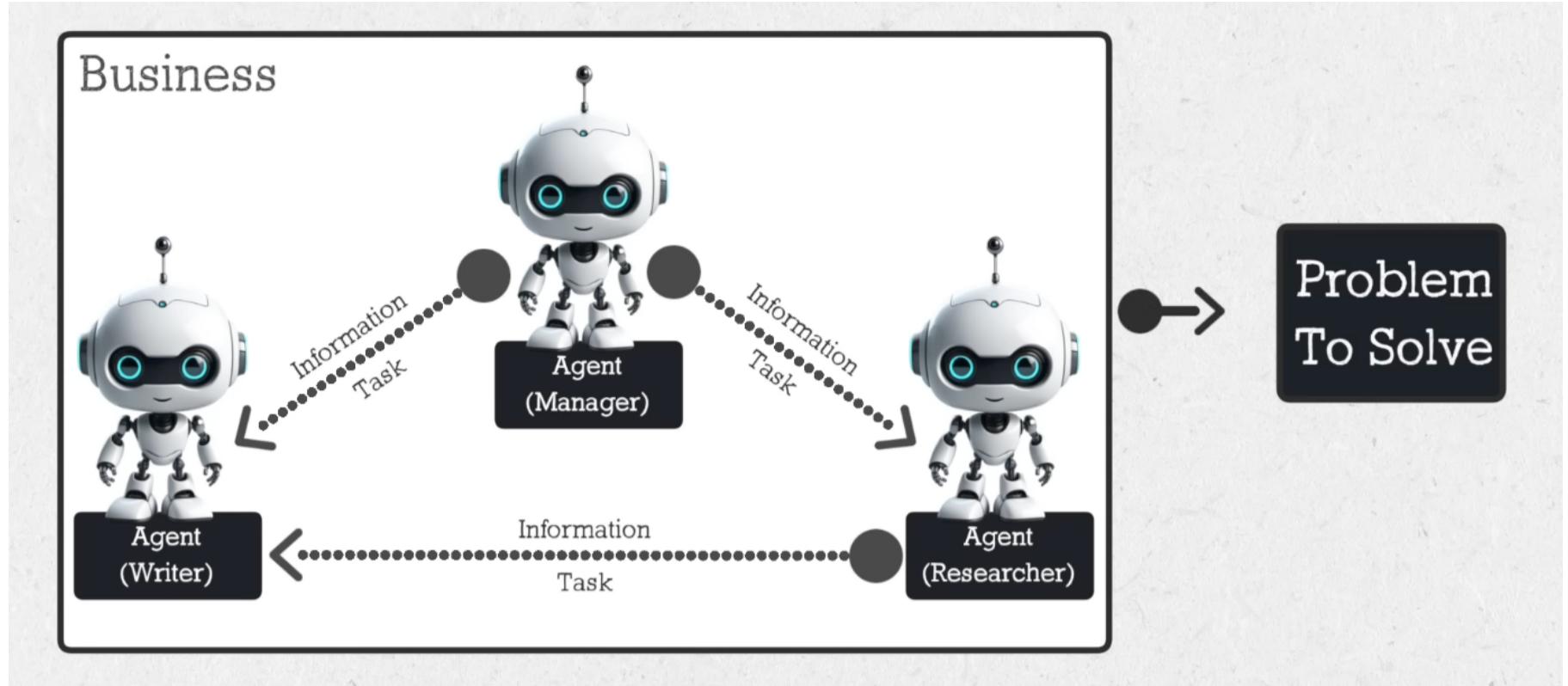
Crew AI is built around four key components that work together seamlessly:



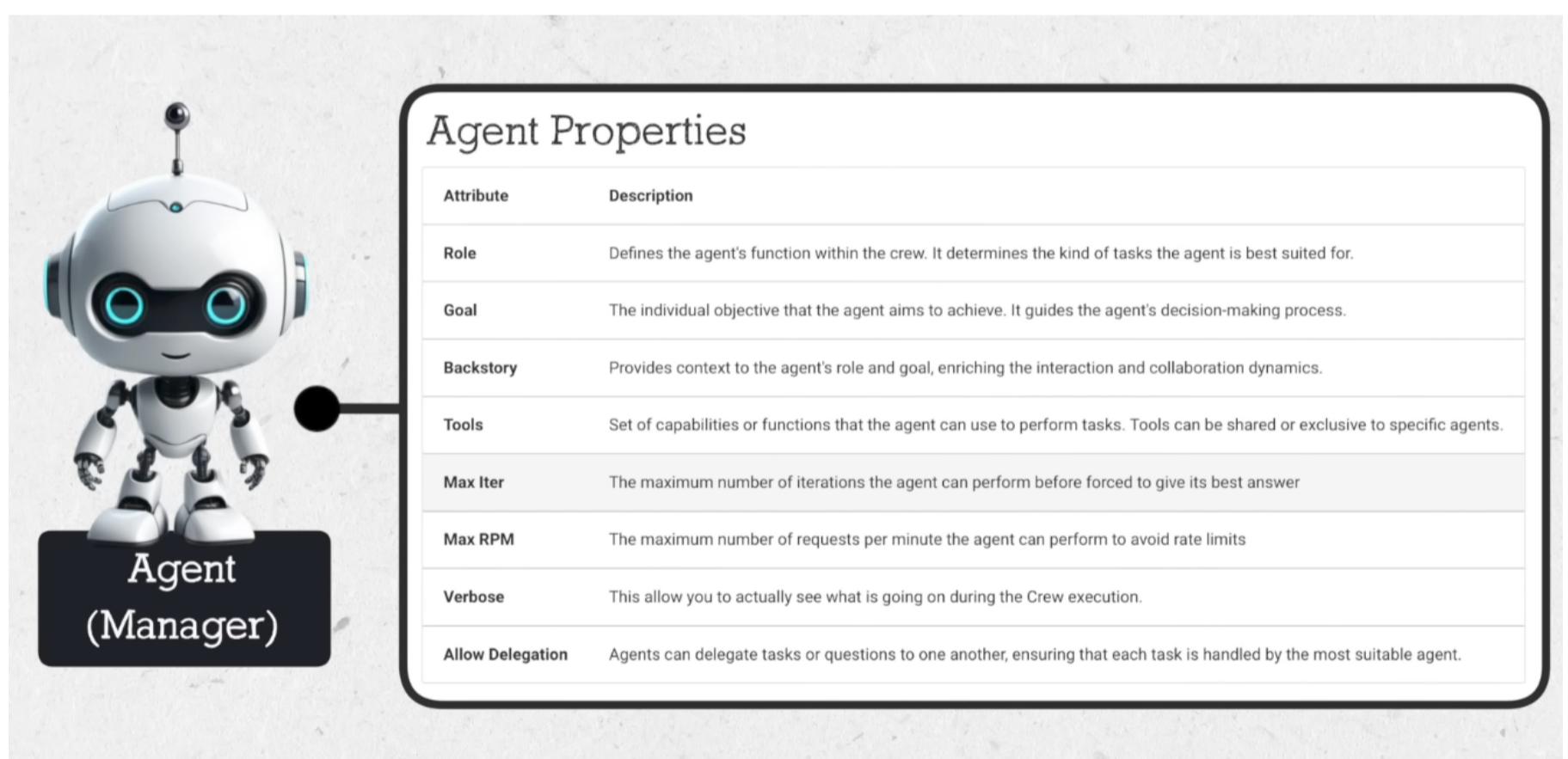
so this is where we're going to be covering AGENTS, TOOLS, TASK and PROCESSES, Let's go ahead and dive in each one of these one by one

1. Agents :

- Agents are like specialized employees in a business. Each agent is designed to have expertise in a specific area.
- Agents can be modeled after professionals like writers, researchers, managers, stock analysts, trip planners, or game developers.



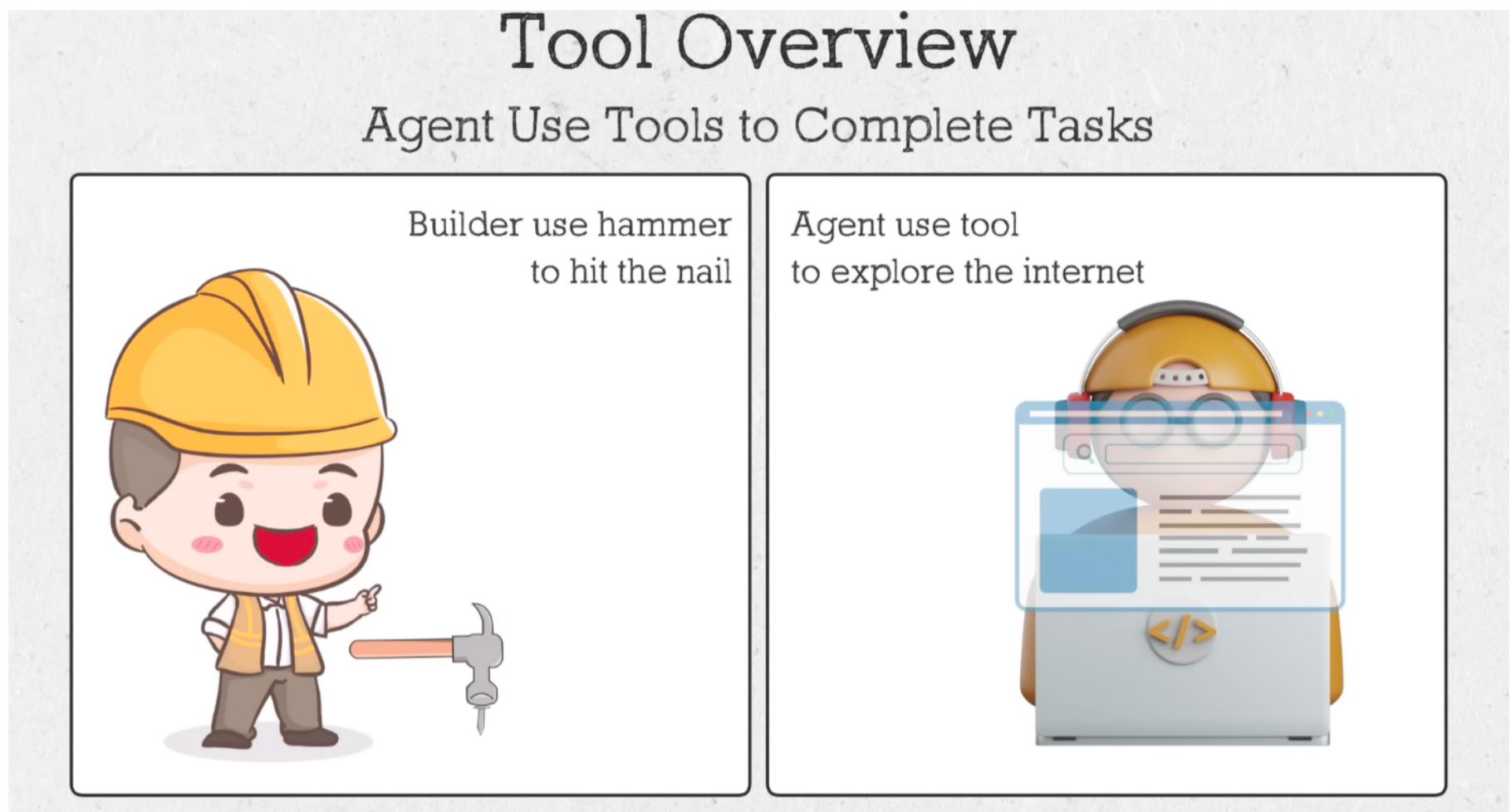
- **Detail Examination** : Now these employees make choices on their own and they're able to work together by sharing information and assigning tasks to one another and as a part of the business these employees are working together to solve one specific problem
 - And as programmers we've been able to assign properties to each one of these agents meaning we're able to assign a role, a goal, back stories and tools to help orient how each one of these agents should behave and to help this all make sense
- Each agent has unique properties:



- **Role** : Defines the agent's function within the crew.
- **Goal** : The specific objective the agent is designed to achieve.
- **Backstory** : Provides context and background for the agent's role and goal.
- **Tools** : A set of capabilities or functions that the agent can use to perform tasks.
- **Max Iter** : The maximum number of iterations the agent can perform before giving its best answer.
- **Max RPM** : The maximum number of requests per minute the agent can make to avoid rate limits.
- **Verbose** : Allows you to see the agent's reasoning and actions during execution.
- **Allow Delegation** : Enables agents to delegate tasks to other agents, ensuring that each task is handled by the most suitable agent.

2. Tools :

Tools are the resources that Agents use to complete tasks.



Detail Examination : If this was the real world you know think of builder that can use hammer to hit a nail well in our case Agents can use tools to go search on the internet or they can use to start actually performing calculation, And

- There are two types of tools:
 - **Built-in Tools** : Pre-existing tools that are part of the LangChain library, such as search tools, calculation tools, and API connectors.
 - **Custom Tools** : Tools that you create specifically for your project, often tailored to specific tasks or domains.

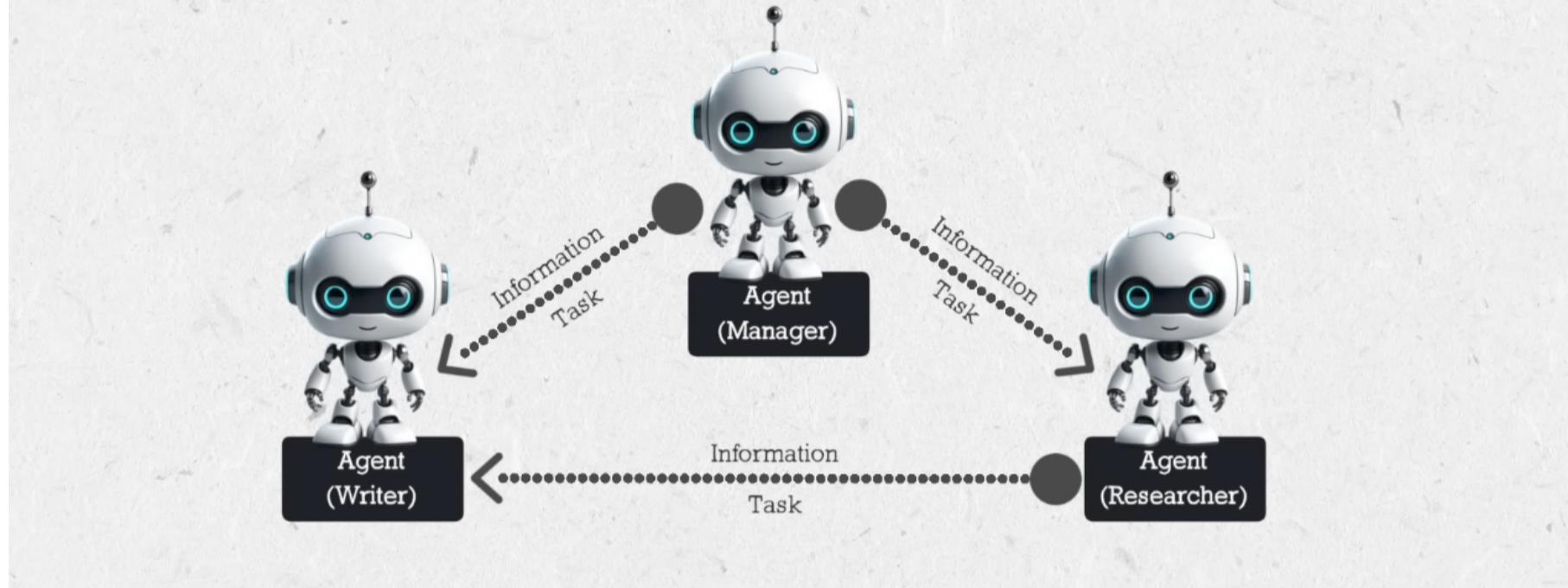
3. Task :

Tasks are the jobs that agents need to complete. Tasks define the specific work that needs to be done. Tasks can be designed to require collaboration between agents.

Task Overview

Tasks are Jobs that Agents need to Complete

Tasks in CrewAI can be designed to require collaboration between agents.
For example, one agent might gather data while another analyzes it.



Detail Examination : These task will define what needs to be done and it can also include additional information such as like which agent needs to go off and do the work and it also migh explicitly call out which tools the agent need to use

- Tasks have properties:

Task Overview

Task Properties

Attribute	Description
Description	A clear, concise statement of what the task entails.
Agent	Optionally, you can specify which agent is responsible for the task. If not, the crew's process will determine who takes it on.
Expected Output (optional)	Clear and detailed definition of expected output for the task.
Tools (optional)	These are the functions or capabilities the agent can utilize to perform the task. They can be anything from simple actions like 'search' to more complex interactions with other agents or APIs.
Async Execution (optional)	If the task should be executed asynchronously.
Context (optional)	Other tasks that will have their output used as context for this task, if one is an asynchronous task it will wait for that to finish
Callback (optional)	A function to be executed after the task is completed.

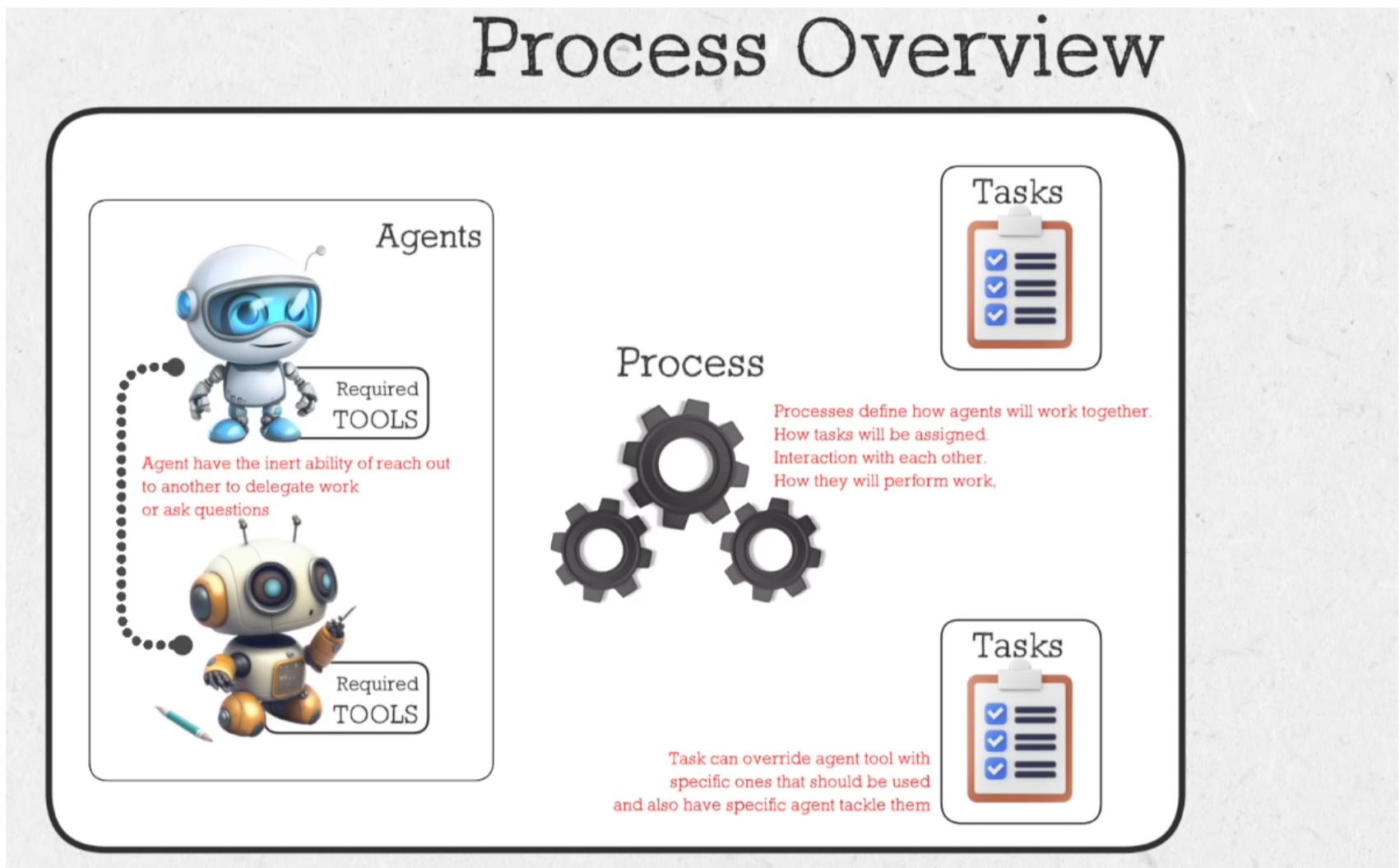
- **Description :** A clear and concise statement of the task's purpose.
- **Agent :** The agent assigned to perform the task (optional).
- **Expected Output :** The desired outcome or result of completing the task.
- **Tools (optional) :** Specific tools that the agent should use to complete the task.

- **Async Execution (optional)** : Whether the task should be performed asynchronously.
- **Context (optional)** : Any other tasks or information that should be considered as context for this task.
- **Callback (optional)** : A function to be executed after the task is completed.

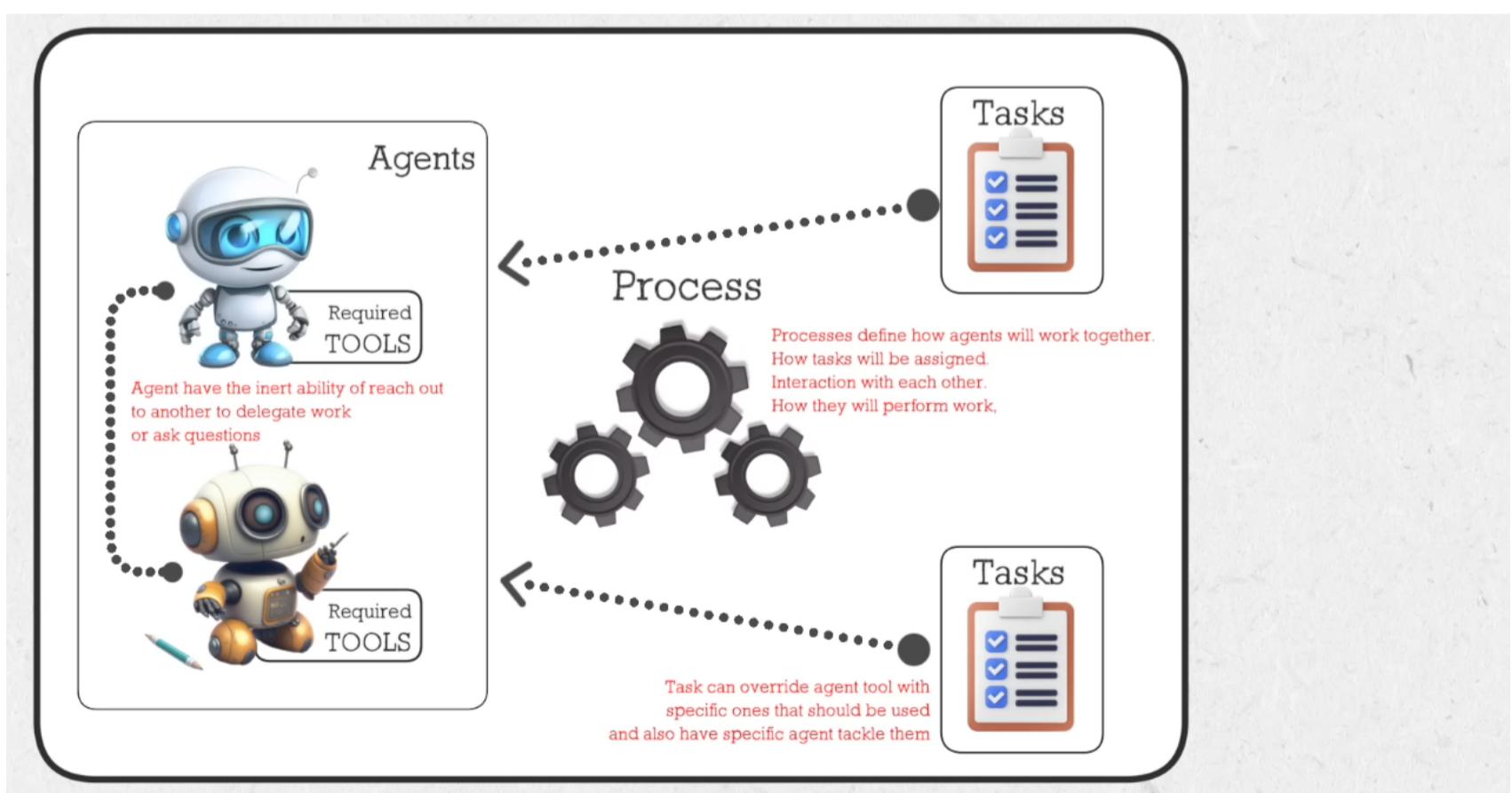
4. Process :

The process defines how agents collaborate and work together to solve a complex problem.

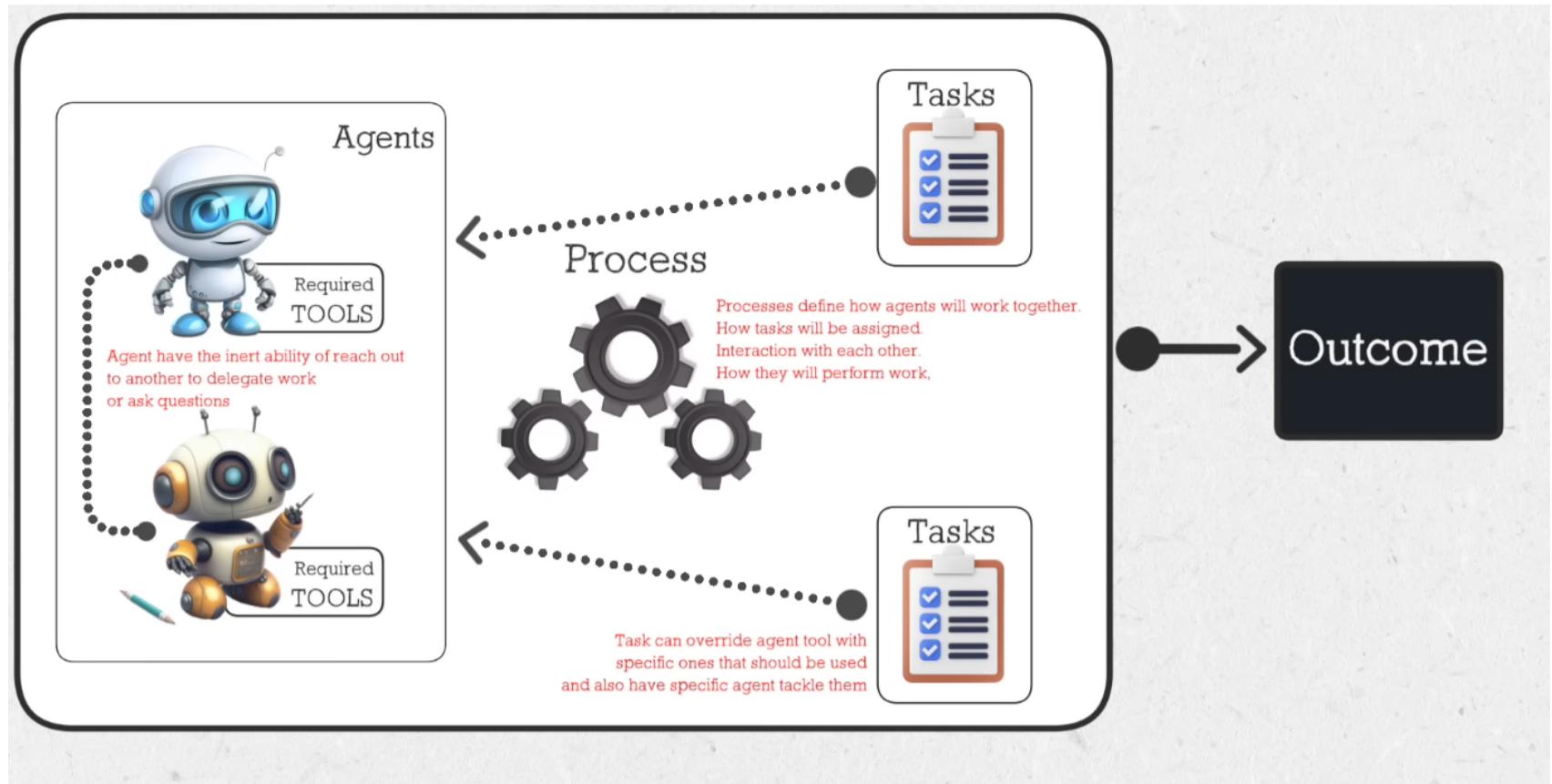
- The process governs : Agent Interaction, Task Assignment, Workflow.
 - **Agent Interaction** : How agents communicate and interact with each other.



- **Task Assignment** : How tasks are assigned to agents.



- **Workflow** : The overall sequence of actions and steps that agents take.



- When ever the agents need to work together it's going to handle all that glue to make sure that all the proper work gets done(OUTCOME)

How Crew AI Works in Practice

The PDF illustrates how Crew AI operates in real-world scenarios using several examples : We can use Crew AI for tasks like helping us pic Stocks (Stock Analyst), Planing Vacation (Trip Planner) & Build Python Games (Game Builder) and much more

1. Stock Analysis :

- The Crew AI system involves several agents : a Research Analyst, a Financial Analyst, and a Filing Analyst.
- Each agent is assigned tasks, such as collecting market data, analyzing financial statements, and reviewing company filings.
- The process defines how these agents work together to generate a comprehensive report that provides an investment recommendation.
- **Detail Examination :**
 - What this Analyst going to do is go off and research a company for us and put together a super hill concise report letting us know whether we should buy it ,hold it or sell it .

```

poetry run python main.py
## Welcome to Financial Analysis Crew
-----
What is the company you want to analyze?
TSLA
/Users/brandophancock/miniconda3/envs/crewai/lib/python3.11/site-packages/langchain_core/_api/deprecation.py:115:
LangChainDeprecationWarning: The class `ChatOpenAI` was deprecated in LangChain 0.1.0 and will be removed in 0.2
.0. Use langchain_openai.ChatOpenAI instead.
    warn_deprecated(
Working Agent: Staff Research Analyst
Starting Task:
Collect and summarize recent news articles, press
releases, and market analyses related to the stock and
its industry.
Pay special attention to any significant events, market
sentiments, and analysts' opinions. Also include upcoming
events like earnings and others.

Your final answer MUST be a report that includes a
comprehensive summary of the latest news, any notable
shifts in market sentiment, and potential impacts on
the stock.
Also make sure to return the stock ticker.

If you do your BEST WORK, I'll give you a $10,000 commission!

Make sure to use the most recent data as possible.

```

- so let me show you what the actual output from the Crew would look like so as you can see the Crew goes of and researches the internet to find reports for us from their it gona slowly short building up an internal memory bank of what's been happening.

```
Created a chunk of size 1349, which is longer than the specified 1000
Created a chunk of size 1853, which is longer than the specified 1000
Created a chunk of size 2128, which is longer than the specified 1000
Created a chunk of size 1256, which is longer than the specified 1000
Created a chunk of size 1010, which is longer than the specified 1000
Created a chunk of size 1210, which is longer than the specified 1000
Created a chunk of size 1571, which is longer than the specified 1000
Created a chunk of size 1110, which is longer than the specified 1000
Created a chunk of size 1124, which is longer than the specified 1000
Created a chunk of size 1340, which is longer than the specified 1000
Created a chunk of size 1157, which is longer than the specified 1000
Created a chunk of size 1084, which is longer than the specified 1000
Created a chunk of size 1381, which is longer than the specified 1000
Created a chunk of size 1343, which is longer than the specified 1000
Created a chunk of size 1762, which is longer than the specified 1000
```

- And then from their it's going to go off and research quarterly reports keep doing more research keep building up it's inband memory on what needs to happen and then finally at the very end it going to create a report for us that tells us excatly what we should do.

```
poetry fan python match.py
## Here is the Report
#####
**Investment Recommendation for Tesla Inc. (TSLA)**
Based on the analyses provided by our team, the investment recommendation for Tesla Inc. is a HOLD.
**Positive Indicators:**
1. Tesla's latest 10-Q filing exhibits several encouraging signs. The company is performing well financially, with increased long-lived assets and inventory and robust growth forecasts.
2. Tesla maintains a low debt-to-equity ratio, which signifies a healthy financial standing and lower risk for investors.
3. Recent news reports suggest that major tech companies like Microsoft and Apple are signaling positive outcomes ahead, which could also be true for Tesla.
**Concerns:**
1. Insider trading activity signals potential apprehension among key players in the company. Over the past 24 months, insiders have sold a total of 25,027,809 Tesla shares, which could potentially impact the stock negatively.
2. The voiding of Elon Musk's $56 billion pay plan could alter the dynamics of CEO compensation in companies, including Tesla. This could lead to potential volatility in the stock price.
3. The launch of the upgraded Model 3, while an exciting development, has sparked concerns about how the increased price might affect its demand.
**Upcoming Events:**
1. The 2022 Annual Meeting of Stockholders and the launch of an upgraded Model 3 are significant upcoming events.
```

- In this case, It says hey you should hold on to the Tesla stock here are some posivte indicate about the stock here are some concerns I have and here is some up comming event's that may change our outlook for the stock going forward, so this is awsome this could have taken us hours to do manually but with Crew AI it took 5 to 7 and 12 minutes that's insure the amount of work that this just saved us so let's go ahead and move on to the next amazing examples.

2. Trip Planning :

- The Crew AI system utilizes agents for city selection, local expertise, and travel concierge services.

```

9  class TripAgents():
10
11 def city_selection_agent(self):
12     return Agent(
13         role='City Selection Expert',
14         goal='Select the best city based on weather, season, and prices',
15         backstory=
16             'An expert in analyzing travel data to pick ideal destinations',
17         tools=[
18             SearchTools.search_internet,
19             BrowserTools.scrape_and_summarize_website,
20         ],
21         verbose=True)
22
23 def local_expert(self):
24     return Agent(
25         role='Local Expert at this city',
26         goal='Provide the BEST insights about the selected city',
27         backstory='''A knowledgeable local guide with extensive information
28         about the city, its attractions and customs''',
29         tools=[
30             SearchTools.search_internet,
31             BrowserTools.scrape_and_summarize_website,
32         ],
33         verbose=True)
34
35 def travel_concierge(self):
36     return Agent(
37         role='Amazing Travel Concierge',
38         goal='''Create the most amazing travel itineraries with budget and
39         packing suggestions for the city''',
40         backstory='''Specialist in travel planning and logistics with
41         decades of experience''',
42         tools=[
43             SearchTools.search_internet,
44             BrowserTools.scrape_and_summarize_website,
45             CalculatorTools.calculate,
46         ],
47         verbose=True)

```

- Each agent uses its specific tools and knowledge to assist in planning the trip, ultimately generating a detailed itinerary.

- Detail Examination :**

- Now the way this one works is you tell the Crew, "Hey I'm travelling from Atlanta i want to go to Thailand, I want to do this trip some time in the future and while I'm travelling I like to do these things" Things are Highlited below the image

```

## Welcome to Trip Planner Crew
-----
From where will you be traveling from?
Atlanta, GA
What are the cities options you are interested in visiting?
Thialand
What is the date range you are interested in traveling?
One week in November 2024
What are some of your high level interests and hobbies?
Site seeing, hiking, eating, drinking, night life
/Users/brandongancock/miniconda3/envs/crewai/lib/python3.11/site-packages/langchain_core/_api/deprecation.py:115:
LangChainDeprecationWarning: The class `ChatOpenAI` was deprecated in LangChain 0.1.0 and will be removed in 0.2
.0. Use langchain_openai.ChatOpenAI instead.
    warn_deprecated()
Working Agent: City Selection Expert
Starting Task:
Analyze and select the best city for the trip based
on specific criteria such as weather patterns, seasonal
events, and travel costs. This task involves comparing
multiple cities, considering factors like current weather
conditions, upcoming cultural or seasonal events, and
overall travel expenses.

Your final answer must be a detailed ...

```

- And then from their, This Crew will use three different agents to plan your trip one of the agents is going to go off and pick cities for us, the other agent is going to find cool things to do while we're in each of these cites and the third is going to be the Mastermind itinerary planner that going to connect all the dots and it's going to go off research everything for us and put together a budget looking at flight tickets and everything and at the very end it going to generate us this final report that you can see right here,

```
#####
## Here is your Trip Plan
#####

Sure, here's the expanded 7-day travel itinerary for Thailand in November 2024:

```

****Day 1: Arrival in Bangkok****

- Arrival at Suvarnabhumi Airport, transfer to Nasa Vegas Hotel.
- Lunch at a local restaurant.
- Visit the Grand Palace and Wat Phra Kaew (\$10).
- Dinner at Thip Samai Pad Thai.
- Drinks at Sky Bar.

****Day 2: Bangkok****

- Breakfast at the hotel.
- Visit Wat Arun (\$3) and explore the local market.
- Lunch at Or Tor Kor Market.
- Evening visit to Asiatique The Riverfront.
- Dinner at Jok Pochana.
- Nightlife at RCA (Royal City Avenue).

****Day 3: Bangkok to Krabi****

- Breakfast at the hotel and check out.
- Flight to Krabi (\$100) and check-in at Sea Seeker Krabi Resort.
- Visit to Krabi Town and local markets.

- where it's going to say your 7 Day for Thailand in November 2014 : And, Here is what you need to do each day this is amazing this would normally take people hours upon hours of research to come with an Awesome itinerary like this and the part that's even the coolest is it found that

```

- Visit Chatuchak Weekend Market.
- Dinner at Som Tam Nua.
- Nightlife at Soi Cowboy.

**Day 7: Bangkok**
- Breakfast at the hotel.
- Visit to the Floating Market.
- Lunch at Pier 21 Food Terminal.
- Participate in the Loy Krathong Festival.
- Farewell dinner at Sirocco & Sky Bar.

**Budget Breakdown:**
- Accommodation: $490 (7 nights at $70/night)
- Meals: $210 (21 meals at $10/meal)
- Public Transportation: $210 (7 days at $30/day)
- Flights (Bangkok to Krabi round-trip): $200
- Activities: $200
- Total: $1310

**Packing Suggestions:**
- Lightweight clothing due to warm weather
- Rain jacket or umbrella for unexpected showers
- Swimwear for beach activities
- Hiking shoes for treks
- Formal attire for nightlife

```

Enjoy your trip to Thailand and the Loy Krathong festival!

- There was a great festival going on in Thailand during November so it actually helped plan our entire trip around this festival to basically maximize our time while we're there so all around this is awesome.

3. Game Building :

- The Crew AI system helps build a Pong game, starting with a user's description of the game's mechanics.

```

## Welcome to the Game Crew
-----
What is the game you would like to build? What will be the mechanics?
Please recreate the game pong where there are two paddles, one on each side of the screen, and a ball bouncing in the middle. If the ball hits a paddle, it should bounce back towards the other side of the screen. If a player misses the ball, they should lose a point. One player should use the S and W key to move their paddle up and down, while player 2 should use the up and down on the arrow pad. The game should go to 5 and after that, you should say who the winner and loser is.
/Users/brandonhancock/miniconda3/envs/crewai/lib/python3.11/site-packages/langchain_core/_api/deprecation.py:117:
LangChainDeprecationWarning: The class `langchain_community.chat_models.openai.ChatOpenAI` was deprecated in langchain-community 0.0.10 and will be removed in 0.2.0. An updated version of the class exists in the langchain-openai package and should be used instead. To use it run `pip install -U langchain-openai` and import as `from langchain_openai import ChatOpenAI`.
warn_deprecated()
Working Agent: Senior Software Engineer
Starting Task: You will create a game using python, these are the instructions:

Instructions
-----
Please recreate the game pong where there are two paddles, one on each side of the screen, and a ball bouncing in the middle. If the ball hits a paddle, it should bounce back towards the other side of the screen. If a player misses the ball, they should lose a point. One player should use the S and W key to move their paddle up and down, while player 2 should use the up and down on the arrow pad. The game should go to 5 and after that, you should say who the winner and loser is.

Your Final answer must be the full python code, only the python code and nothing else.

```

- Agents collaborate, generate code, and refine the game logic until the final game is created.

The Power of Crew AI

Crew AI offers significant advantages for solving complex problems :

- Collaboration** : Agents can work together effectively to leverage their combined expertise and achieve a common goal.
- Scalability** : The system can be expanded to accommodate multiple agents and tasks, making it suitable for larger and more complex projects.
- Flexibility** : Crew AI is adaptable to different domains and tasks, allowing it to be applied to a wide range of problems.
- Automation** : It streamlines workflows by automating repetitive tasks and freeing up human resources for higher-level activities.

Next Steps: Building Your Own Crew AI

The PDF emphasizes that you can build your own Crew AI systems by defining Agents, Tools, Tasks, and Processes specific to your needs. By understanding these core components, you can begin to create your own intelligent AI teams to tackle your unique challenges.

In the future there's going to be multiple ways that these processes are going to handle work but for now all we need to know is that these processes make sure that works get done Sequentially (meaning each agent does the job and then all the work from that agent gets passed along to the next agent). In the future they're going to add HIERARCHICAL Processes and a bunch more but for right now I just want you to know, Stick to Sequential.

I hope these notes provide a comprehensive overview of Crew AI and its capabilities.