

SwarmRearrange Documentation

SwarmRearrange is a class for orchestrating multiple swarms in a sequential or parallel flow pattern. It provides thread-safe operations for managing swarm execution, history tracking, and flow validation.

Constructor Arguments

Parameter	Type	Default	Description
id	str	UUID	Unique identifier for the swarm arrangement
name	str	"SwarmRearrange"	Name of the swarm arrangement
description	str	"A swarm of swarms..."	Description of the arrangement
swarms	List[Any]	[]	List of swarm objects to be managed
flow	str	None	Flow pattern for swarm execution
max_loops	int	1	Maximum number of execution loops
verbose	bool	True	Enable detailed logging
human_in_the_loop	bool	False	Enable human intervention
custom_human_in_the_loop	Callable	None	Custom function for human interaction
return_json	bool	False	Return results in JSON format

Methods

add_swarm(swarm: Any)

Adds a single swarm to the arrangement.

```
### remove_swarm(swarm_name: str)
```

Removes a swarm by name from the arrangement.

```
### add_swarms(swarms: List[Any])
```

Adds multiple swarms to the arrangement.

```
### validate_flow()
```

Validates the flow pattern syntax and swarm names.

```
### run(task: str = None, img: str = None, custom_tasks: Dict[str, str] = None)
```

Executes the swarm arrangement according to the flow pattern.

Flow Pattern Syntax

The flow pattern uses arrow notation (``->``) to define execution order:

- Sequential: ``"SwarmA -> SwarmB -> SwarmC"``
- Parallel: ``"SwarmA, SwarmB -> SwarmC"``
- Human intervention: Use ``"H"`` in the flow

Examples

Basic Sequential Flow

```
```python
```

```
from swarms.structs.swarm_arange import SwarmRearrange
```

```
import os
```

```
from swarms import Agent, AgentRearrange
```

```
from swarm_models import OpenAIChat
```

```
model = Anthropic(anthropic_api_key=os.getenv("ANTHROPIC_API_KEY"))
```

```
company = "TGSC"
```

```
Get the OpenAI API key from the environment variable
```

```
api_key = os.getenv("GROQ_API_KEY")
```

```
Model
```

```
model = OpenAIChat(
```

```
 openai_api_base="https://api.groq.com/openai/v1",
```

```
 openai_api_key=api_key,
```

```
 model_name="llama-3.1-70b-versatile",
```

```
 temperature=0.1,
```

```
)
```

```
Initialize the Managing Director agent
```

```
managing_director = Agent(
```

```
 agent_name="Managing-Director",
```

```
 system_prompt=f"""
```

```
 As the Managing Director at Blackstone, your role is to oversee the entire investment analysis
process for potential acquisitions.
```

```
 Your responsibilities include:
```

```
 1. Setting the overall strategy and direction for the analysis
```

2. Coordinating the efforts of the various team members and ensuring a comprehensive evaluation
3. Reviewing the findings and recommendations from each team member
4. Making the final decision on whether to proceed with the acquisition

For the current potential acquisition of {company}, direct the tasks for the team to thoroughly analyze all aspects of the company, including its financials, industry position, technology, market potential, and regulatory compliance. Provide guidance and feedback as needed to ensure a rigorous and unbiased assessment.

```
""",

llm=model,

max_loops=1,

dashboard=False,

streaming_on=True,

verbose=True,

stopping_token="<DONE>",

state_save_file_type="json",

saved_state_path="managing-director.json",

)
```

# Initialize the Vice President of Finance

```
vp_finance = Agent(

 agent_name="VP-Finance",

 system_prompt=f"""
```

As the Vice President of Finance at Blackstone, your role is to lead the financial analysis of potential acquisitions.

For the current potential acquisition of {company}, your tasks include:

1. Conducting a thorough review of {company}' financial statements, including income statements, balance sheets, and cash flow statements
2. Analyzing key financial metrics such as revenue growth, profitability margins, liquidity ratios, and debt levels
3. Assessing the company's historical financial performance and projecting future performance based on assumptions and market conditions
4. Identifying any financial risks or red flags that could impact the acquisition decision
5. Providing a detailed report on your findings and recommendations to the Managing Director

Be sure to consider factors such as the sustainability of {company}' business model, the strength of its customer base, and its ability to generate consistent cash flows. Your analysis should be data-driven, objective, and aligned with Blackstone's investment criteria.

```
"" ,

llm=model,

max_loops=1,

dashboard=False,

streaming_on=True,

verbose=True,

stopping_token="<DONE>",

state_save_file_type="json",

saved_state_path="vp-finance.json",

)

Initialize the Industry Analyst

industry_analyst = Agent(
```

```
agent_name="Industry-Analyst",
```

```
system_prompt=f"""
```

As the Industry Analyst at Blackstone, your role is to provide in-depth research and analysis on the industries and markets relevant to potential acquisitions.

For the current potential acquisition of {company}, your tasks include:

1. Conducting a comprehensive analysis of the industrial robotics and automation solutions industry, including market size, growth rates, key trends, and future prospects
2. Identifying the major players in the industry and assessing their market share, competitive strengths and weaknesses, and strategic positioning
3. Evaluating {company}' competitive position within the industry, including its market share, differentiation, and competitive advantages
4. Analyzing the key drivers and restraints for the industry, such as technological advancements, labor costs, regulatory changes, and economic conditions
5. Identifying potential risks and opportunities for {company} based on the industry analysis, such as disruptive technologies, emerging markets, or shifts in customer preferences

Your analysis should provide a clear and objective assessment of the attractiveness and future potential of the industrial robotics industry, as well as {company}' positioning within it. Consider both short-term and long-term factors, and provide evidence-based insights to inform the investment decision.

```
""",
```

```
llm=model,
```

```
max_loops=1,
```

```
dashboard=False,
```

```
streaming_on=True,
```

```
verbose=True,
```

```
stopping_token="<DONE>",
state_save_file_type="json",
saved_state_path="industry-analyst.json",
)
```

# Initialize the Technology Expert

```
tech_expert = Agent(
 agent_name="Tech-Expert",
 system_prompt=f"""
```

As the Technology Expert at Blackstone, your role is to assess the technological capabilities, competitive advantages, and potential risks of companies being considered for acquisition.

For the current potential acquisition of {company}, your tasks include:

1. Conducting a deep dive into {company}' proprietary technologies, including its robotics platforms, automation software, and AI capabilities
2. Assessing the uniqueness, scalability, and defensibility of {company}' technology stack and intellectual property
3. Comparing {company}' technologies to those of its competitors and identifying any key differentiators or technology gaps
4. Evaluating {company}' research and development capabilities, including its innovation pipeline, engineering talent, and R&D investments
5. Identifying any potential technology risks or disruptive threats that could impact {company}' long-term competitiveness, such as emerging technologies or expiring patents

Your analysis should provide a comprehensive assessment of {company}' technological strengths and weaknesses, as well as the sustainability of its competitive advantages. Consider both the current state of its technology and its future potential in light of industry trends and advancements.

```
""",

llm=model,

max_loops=1,

dashboard=False,

streaming_on=True,

verbose=True,

stopping_token="<DONE>",

state_save_file_type="json",

saved_state_path="tech-expert.json",

)
```

# Initialize the Market Researcher

```
market_researcher = Agent(

 agent_name="Market-Researcher",

 system_prompt=f"""
```

As the Market Researcher at Blackstone, your role is to analyze the target company's customer base, market share, and growth potential to assess the commercial viability and attractiveness of the potential acquisition.

For the current potential acquisition of {company}, your tasks include:

1. Analyzing {company}' current customer base, including customer segmentation, concentration risk, and retention rates
2. Assessing {company}' market share within its target markets and identifying key factors driving its market position
3. Conducting a detailed market sizing and segmentation analysis for the industrial robotics and automation markets, including identifying high-growth segments and emerging opportunities
4. Evaluating the demand drivers and sales cycles for {company}' products and services, and



identifying any potential risks or limitations to adoption

5. Developing financial projections and estimates for {company}' revenue growth potential based on the market analysis and assumptions around market share and penetration

Your analysis should provide a data-driven assessment of the market opportunity for {company} and the feasibility of achieving our investment return targets. Consider both bottom-up and top-down market perspectives, and identify any key sensitivities or assumptions in your projections.

```
""",

llm=model,

max_loops=1,

dashboard=False,

streaming_on=True,

verbose=True,

stopping_token="<DONE>",

state_save_file_type="json",

saved_state_path="market-researcher.json",

)
```

# Initialize the Regulatory Specialist

```
regulatory_specialist = Agent(

 agent_name="Regulatory-Specialist",

 system_prompt=f"""
```

As the Regulatory Specialist at Blackstone, your role is to identify and assess any regulatory risks, compliance requirements, and potential legal liabilities associated with potential acquisitions.

For the current potential acquisition of {company}, your tasks include:

1. Identifying all relevant regulatory bodies and laws that govern the operations of {company},

including industry-specific regulations, labor laws, and environmental regulations

2. Reviewing {company}' current compliance policies, procedures, and track record to identify any potential gaps or areas of non-compliance

3. Assessing the potential impact of any pending or proposed changes to relevant regulations that could affect {company}' business or create additional compliance burdens

4. Evaluating the potential legal liabilities and risks associated with {company}' products, services, and operations, including product liability, intellectual property, and customer contracts

5. Providing recommendations on any regulatory or legal due diligence steps that should be taken as part of the acquisition process, as well as any post-acquisition integration considerations

Your analysis should provide a comprehensive assessment of the regulatory and legal landscape surrounding {company}, and identify any material risks or potential deal-breakers. Consider both the current state and future outlook, and provide practical recommendations to mitigate identified risks.

```
""",

llm=model,

max_loops=1,

dashboard=False,

streaming_on=True,

verbose=True,

stopping_token="<DONE>",

state_save_file_type="json",

saved_state_path="regulatory-specialist.json",

)

Create a list of agents

agents = [
```

```
managing_director,
vp_finance,
industry_analyst,
tech_expert,
market_researcher,
regulatory_specialist,
]
```

```
Define multiple flow patterns
```

```
flows = [
 "Industry-Analyst -> Tech-Expert -> Market-Researcher -> Regulatory-Specialist ->
Managing-Director -> VP-Finance",
 "Managing-Director -> VP-Finance -> Industry-Analyst -> Tech-Expert -> Market-Researcher ->
Regulatory-Specialist",
 "Tech-Expert -> Market-Researcher -> Regulatory-Specialist -> Industry-Analyst ->
Managing-Director -> VP-Finance",
]
```

```
Create instances of AgentRearrange for each flow pattern
```

```
blackstone_acquisition_analysis = AgentRearrange(
 name="Blackstone-Acquisition-Analysis",
 description="A system for analyzing potential acquisitions",
 agents=agents,
 flow=flows[0],
)
```

```
blackstone_investment_strategy = AgentRearrange(
 name="Blackstone-Investment-Strategy",
 description="A system for evaluating investment opportunities",
 agents=agents,
 flow=flows[1],
)
```

```
blackstone_market_analysis = AgentRearrange(
 name="Blackstone-Market-Analysis",
 description="A system for analyzing market trends and opportunities",
 agents=agents,
 flow=flows[2],
)
```

```
swarm_arrange = SwarmRearrange(
 swarms=[
 blackstone_acquisition_analysis,
 blackstone_investment_strategy,
 blackstone_market_analysis,
],
 flow=f"{blackstone_acquisition_analysis.name} -> {blackstone_investment_strategy.name} ->
{blackstone_market_analysis.name}",
)
```

```
print(
 swarm_arrange.run(

```

"Analyze swarms, 150k revenue with 45m+ agents build, with 1.4m downloads since march 2024"

)

)

...

### Human-in-the-Loop

```python

def custom_human_input(task):

return input(f"Review {task} and provide feedback: ")

Create arrangement with human intervention

arrangement = SwarmRearrange(

name="HumanAugmented",

swarms=[swarm1, swarm2],

flow="SwarmA -> H -> SwarmB",

human_in_the_loop=True,

custom_human_in_the_loop=custom_human_input

)

Execute with human intervention

result = arrangement.run("Initial task")

...

Complex Multi-Stage Pipeline

```
```python
```

```
Define multiple flow patterns
```

```
flows = [
```

```
 "Collector -> Processor -> Analyzer",
```

```
 "Analyzer -> ML -> Validator",
```

```
 "Validator -> Reporter"
```

```
]
```

```
Create arrangements for each flow
```

```
pipelines = [
```

```
 SwarmRearrange(name=f"Pipeline{i}", swarms=swarms, flow=flow)
```

```
 for i, flow in enumerate(flows)
```

```
]
```

```
Create master arrangement
```

```
master = SwarmRearrange(
```

```
 name="MasterPipeline",
```

```
 swarms=pipelines,
```

```
 flow="Pipeline0 -> Pipeline1 -> Pipeline2"
```

```
)
```

```
Execute complete pipeline
```

```
result = master.run("Start analysis")
```

```
```
```

Best Practices

1. **Flow Validation**: Always validate flows before execution
2. **Error Handling**: Implement try-catch blocks around run() calls
3. **History Tracking**: Use track_history() for monitoring swarm execution
4. **Resource Management**: Set appropriate max_loops to prevent infinite execution
5. **Logging**: Enable verbose mode during development for detailed logging

Error Handling

The class implements comprehensive error handling:

```
```python
try:
 arrangement = SwarmRearrange(swarms=swarms, flow=flow)
 result = arrangement.run(task)
except ValueError as e:
 logger.error(f"Flow validation error: {e}")
except Exception as e:
 logger.error(f"Execution error: {e}")
```
```