

okagent: An agent submitted to the ANAC 2026 SCM league

Okashita Kohga, ²Takanobu Otsuka

Nagoya Institute of Technology, Aichi, Japan

¹ kohga.okashita@otsukalab.nitech.ac.jp, ² otsuka.takanobu@nitech.ac.jp

June 22, 2026

Abstract

This report presents okagent, a lightweight rule-based negotiation agent developed for the ANAC Supply Chain Management League (SCML) Standard Track. The agent aims to maintain stable production while maximizing profit through inventory-aware purchasing and market-price-oriented negotiation.

okagent estimates the required quantity of raw materials based on current inventory levels and evaluates offers using an estimated trading price derived from the negotiation domain. For purchasing, the agent prefers offers below the estimated market value and generates counter-offers when prices are unfavorable. For selling, it accepts profitable offers and proposes higher prices when necessary. The strategy emphasizes simplicity, transparency, and computational efficiency rather than complex forecasting or learning mechanisms. Experimental implementation demonstrates that a straightforward rule-based approach can provide stable negotiation behavior and serve as a foundation for future extensions involving demand forecasting, partner evaluation, and adaptive pricing strategies.

1 Introduction

In the Supply Chain Management League (SCML), agents act as autonomous manufacturing companies that negotiate with suppliers and customers while managing production resources. The objective of okagent is to maintain stable production and maximize profit using a simple rule-based negotiation strategy.

Unlike advanced agents that rely on prediction models or machine learning, okagent focuses on inventory management and market-price-based decision making.

2 Demand and Price Estimation

To determine how many raw materials are needed, okagent calculates the required quantity using the current inventory level.

Let (L) be the number of production lines and (I_t) be the current inventory. The required quantity is defined as

$$Q_t = \max(0, L - I_t)$$

This allows the agent to purchase only the amount necessary for production.

For each negotiation partner, the estimated trading price is calculated as the midpoint of the feasible price range:

$$p_t = \frac{p_{min} + p_{max}}{2}$$

This value serves as the reference price during negotiations.

3 Purchasing Strategy

When negotiating with suppliers, okagent prefers offers that are cheaper than the estimated market price.

Offers are accepted when:

- the offered price is at most 80% of the estimated trading price, or
- the offered price is at most 90% of the estimated trading price and the quantity is within twice the required amount, or
- the offered price does not exceed the estimated trading price and the quantity does not exceed the required amount. If an offer is considered too expensive, the agent rejects it and proposes a counter-offer using the required quantity and a lower target price.

This strategy helps secure materials while avoiding excessive purchasing costs.

4 Selling Strategy

When negotiating with customers, okagent attempts to sell products at prices above the estimated market value.

An offer is accepted when:

$$p \geq p_t$$

Otherwise, the agent generates a counter-offer with a higher price request.

This approach prioritizes profitability while maintaining active negotiations.

5 Experimental Evaluation

To evaluate okagent, experiments were conducted against two baseline agents provided in the SCML framework: GreedyStdAgent and SyncRandomStdAgent. The average scores obtained before and after introducing the over-contracting prevention mechanism are shown below.

Before Improvement

Agent	Average Score
GreedyStdAgent	0.746
SyncRandomStdAgent	0.682
okagent	0.660

After Improvement

Agent	Average Score
GreedyStdAgent	0.739
okagent	0.691
SyncRandomStdAgent	0.600

The purchasing strategy was improved by using `awi.needed_supplies` to prevent over-contracting. Before the modification, okagent achieved an average score of

0.660. After the modification, the score increased to 0.691, representing an improvement of approximately 4.7%.

Although GreedyStdAgent still achieved the highest score, the gap between GreedyStdAgent and okagent became smaller after the improvement. These results suggest that considering existing commitments when evaluating supplier offers helps reduce unnecessary purchases and improves overall negotiation performance.

6 Advantages and Limitations

The main advantage of OkAgent is its simplicity. The decision process is easy to understand, computationally efficient, and directly connected to inventory requirements.

However, the current implementation has several limitations:

- delivery times are not considered,
- partner reliability is not tracked,
- future demand is not predicted,
- no learning mechanism is used.

As a result, the agent may miss opportunities that require long-term planning or adaptive behavior.

7 Conclusion

okagent is a lightweight rule-based SCML agent that combines inventory-aware purchasing with market-price-oriented negotiation. The strategy uses required-quantity estimation, midpoint-based price estimation, and simple acceptance rules for buying and selling.

Although the approach is intentionally simple, it provides stable negotiation behavior and serves as a foundation for future improvements such as demand forecasting, partner evaluation, and adaptive pricing strategies.