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TAC-03
A Supply-Chain Trading Competition

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■ The Trading Agent Competition (TAC) has now become an annual fixture since its inception in 2000. The competition was conceived with the objective of studying automated trading strategies by focusing the research community on the development of competing solutions to a common trading scenario. The success of past TAC events has motivated broadening the scope of the competition beyond the context of the travel agent scenario used thus far. For the fourth edition of this competition, TAC-03, to be held in August 2003, the authors have created a novel supply-chain trading game with the aim of investigating automated agents in the context of dynamic supply-chain management.

Supply-chain management is concerned with planning and coordinating the activities of organizations across the supply chain, from raw material procurement to finished goods delivery. In today's global economy, effective supply-chain management is vital to the competitiveness of manufacturing enterprises because it directly impacts their ability to meet changing market demands in a timely and cost-effective manner. With annual worldwide supply-chain transactions in the trillions of dollars, the potential impact of performance improvements is tremendous. Although today's supply chains are essentially static, relying on long-term relationships among key trading partners, more flexible and dynamic practices offer the prospect of better matches between suppliers and customers as market conditions change. Adoption of such practices has however proven elusive because of the complexity of many supply-chain relationships and the difficulty in effectively supporting more dynamic trading practices. TAC-03 was designed to capture many of the challenges involved in supporting dynamic supply-chain practices and keeping the rules of the game simple enough to allow easy participation. The game has been designed jointly by a team of researchers from the e-Supply Chain Management Lab at Carnegie Mellon University and the Swedish Institute of Computer Science (SICS).

Specifically, TAC-03 features rounds where six PC assembly agents compete for customer orders and procurement of a variety of components (figure 1). Customers issue requests for quotes and select from quotes submitted by the PC assemblers, based on delivery dates and prices. The assembly agents are limited by the capacity of their assembly lines and have to procure components from a set of eight suppliers. The game distinguishes between four types of components: (1) central processing units (CPUs), (2) motherboards, (3) memory units, and (4) disk drives. It features a variety of components of each type (for example, different CPUs, different motherboards). Customer demand comes in the form of requests for quotes for different types of PCs, each requiring a different combination of components.

The PC assembly agents compete over a relatively long period of time during which customer demand and availability of supplies varies according to predefined stochastic distributions (figure 1). The aim of each competitor agent (PC assembly agent) is to maximize its profit, by (1) competing with other agents for valuable customer orders and profitable supplier commitments and (2) managing the assembly of products to meet its existing customer

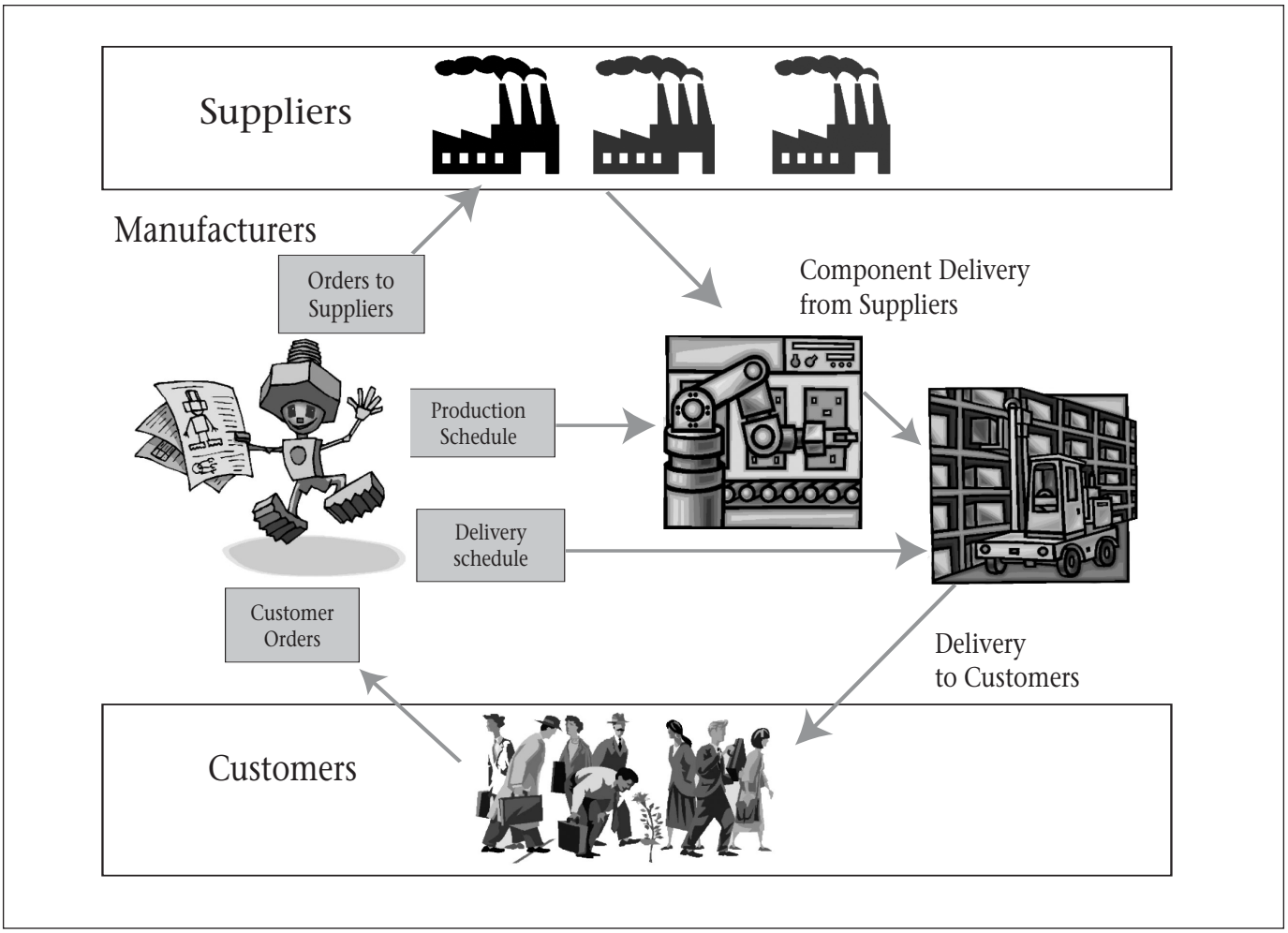

Figure 1. Overview of the Supply-Chain Trading Game.

delivery commitments.

The game is representative of a broad range of supply-chain situations. It is challenging in that it requires agents to concurrently compete in multiple markets (markets for different components on the supply side and markets for different products on the customer side) with interdependencies and incomplete information. It allows agents to strategize (for example, specializing in particular types of products, stocking up components that are in low supply). To succeed, agents will have to demonstrate their ability to react to variations in customer demand and availability of supplies as well as adapt to the strategies adopted by other competing agents.

A detailed game description, including the rules of TAC-03, are available on the TAC web site.[1] The TAC-03 game server and some simple PC assembly agents will be available for practice games on the TAC web site by 15 February 2003, enabling prospective agent designers to test and fine-tune their designs by playing practice games. The competition itself will be played in a format similar to earlier TAC games with six agents competing in each round. Qualification rounds will be held in May 2003, with the finals held on 11 August 2003, as part of the Trading Agent Design and Analysis Workshop to be held in conjunction with the International Joint Conference on Artificial Intelligence (IJCAI-03).[2,3] For more up-to-date information, turn to the web site.[4]

Notes

1. www.sics.se/tac/.
2. www.csc.ncsu.edu/faculty/wurman/IJCAI-03/IJCAI-03_TADA.html.
3. www.ijcai-03.org/.
4. www.sics.se/tac/.

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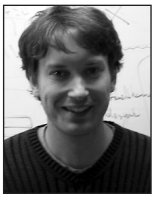

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