Chapter XII

Comparison of Ten Agent-Oriented Methodologies

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Abstract

This chapter provides a comparison of the 10 agent-oriented software engineering methodologies presented in the preceding chapters. An evaluation framework comprising process-related, technique-related, model-related and supportive-feature criteria is used in this comparison. As each application entails a different set of requirements that indicate which evaluation criteria are the most important and should be supported by the chosen methodology, the "best" methodology is dependent on the target application. The results provide a useful framework to assist the developer in selecting the most appropriate methodology for any target application.

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Introduction

This chapter presents an evaluation and comparison of the 10 agent-oriented software engineering (AOSE) methodologies discussed in the preceding chapters. The objective is to assist researchers and practitioners in selecting the most appropriate methodology for a particular application. In order to achieve this, we discuss the similarities and differences between the methodologies, noting their strengths and weaknesses with regard to their support for multi-agent systems (MAS) development. This comparison is not a straightforward task, considering the heterogeneity of the methodologies in terms of their scope, approaches, terminology, development activities, and modelling notations.

The evaluation and comparison are conducted using the feature analysis approach. Feature Analysis is the most common and cost-effective approach compared to other evaluation techniques such as survey, case study, and field experiment (Siau & Rossi, 1998). Feature analysis employs a checklist of evaluation criteria to assess and compare methodologies based on selected methodological features.

We have adopted the feature analysis framework proposed by Tran, Low, and Williams (2003). This framework was developed from a synthesis of previous evaluation efforts and is capable of assessing AOSE methodologies from both the dimensions of conventional system development methodologies and those specific to AOSE. Its evaluation criteria are comprehensive, case-generic, and multi-dimensional, covering AOSE methodology’s process, techniques, and models.

We will describe the evaluation framework in more detail in the next section. The section entitled “Comparative Analysis” presents the evaluation and comparison of the 10 AOSE methodologies, using the framework.

The Evaluation Framework

The selected evaluation framework was formed by identifying and integrating the evaluation criteria from various feature analysis frameworks, including those for assessing conventional system development methodologies – namely Wood, Pethia, Gold, and Firth (1988), Jayaratna (1994), Olle, Sol, and Tully (1983), and the Object Agency Inc. (1995), and those for evaluating AOSE methodologies – namely Shehory and Sturm (2001), O’Malley and DeLoach (2001), Cernuzzi and Rossi (2002), and Sabas, Badri, and Delisle (2002). The former category provides a well-established list of generic system engineering features to be
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