

5.5.4 Analysis tools

As was pointed out in the previous chapter, there are several techniques for analyzing workflow systems. Unfortunately, contemporary workflow management systems hardly support any form of analysis. In Chapter 4 we differentiated between qualitative analysis

(concerned with the logical correctness) and quantitative analysis (concerned with the performance and capacity requirements). Only a few workflow tools focus on qualitative analysis. Most of the workflow management systems have only trivial correctness checks, e.g., Is the workflow graph connected? More advanced checks like the absence of deadlocks, guaranteed termination, and proper termination are not supported. A few research tools have been developed to tackle the problem of qualitative analysis. Most notable are *Woflan* (SMIS/I&T, Eindhoven University of Technology, The Netherlands) and *FlowMake* (DSTC Pty Ltd, The University of Queensland, Australia). Both tools are capable of analyzing properties similar to the soundness property defined in Chapter 4. Many of the workflow management systems available today support some export facility to simulation tools. This export facility is used to analyze the quantitative aspects of a workflow process. An example is the link between *Staffware* and *Structware/BusinessSpecs* (IvyTeam, Zug, Switzerland). Another example is the link between *COSA* and *ExSpect* (Deloitte & Touche Bakkenist, The Netherlands).

To illustrate the functionality of these analysis tools we briefly describe two products: *Woflan* and *ExSpect*.

Woflan

Woflan (WOrkFLOW Analyzer) is a tool that analyzes workflow process definitions specified in terms of Petri nets. It has been designed to verify process definitions that are downloaded from a workflow management system such as *Staffware* and *COSA*. As indicated in Chapter 4, there is a clear need for such a verification tool. Today's workflow management systems do not verify the correctness of workflow process definitions. Therefore, errors made at design time such as deadlocks and livelocks may remain undetected. This means that an erroneous workflow may go into production, thus causing dramatic problems for the organization. To avoid these costly problems, it is important to verify the correctness of a workflow process definition before it becomes operational.

The development of the tool *Woflan* started at the end of 1996 and the first version was released in 1997. Basically, *Woflan* takes a workflow process definition imported from some workflow product, translates it into a Petri net, and tells whether or not the net is a sound workflow net. Furthermore, using some standard Petri-net analysis techniques as well as those tailored to workflow nets, the tool provides diagnostic information about the net in case it is not a sound workflow net. Version 2.0 of *Woflan* has an import facility for *COSA*, *Staffware*, *METEOR*, and *Protos*. Figure 5.19 shows a screenshot of *Woflan*. A trial version of *Woflan* can be downloaded from <http://www.tm.tue.nl/it/woflan>.

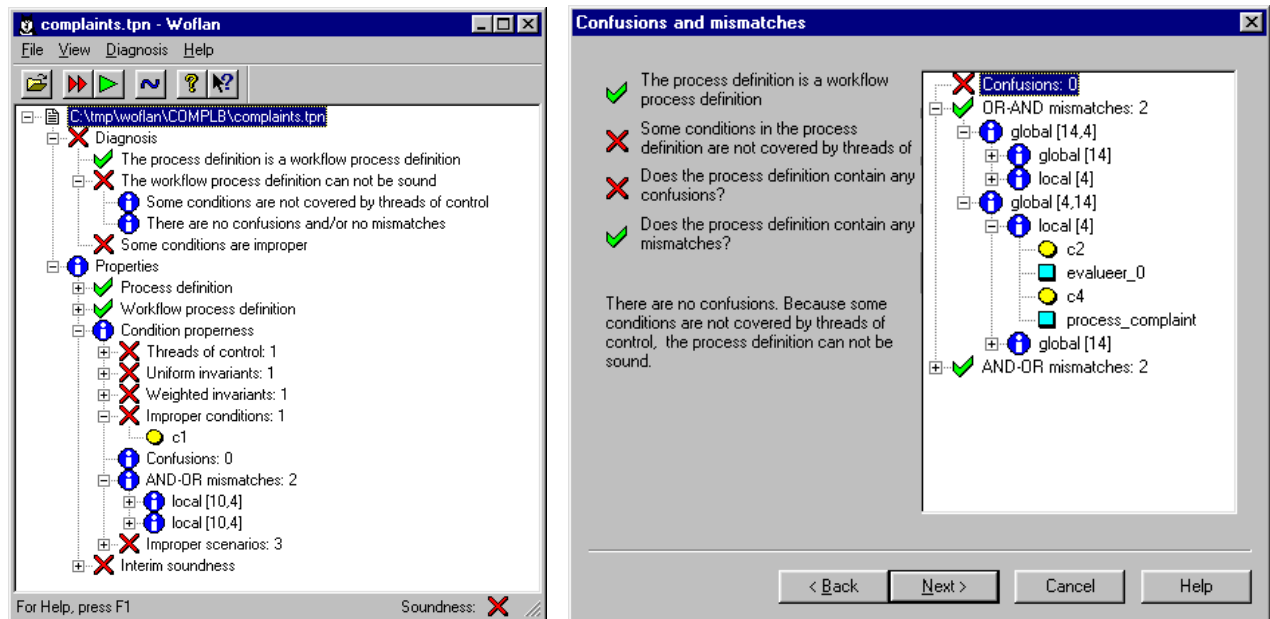


Figure 5.19: Woflan 2.0 analyzing an erroneous workflow process developed using COSA

ExSpect

ExSpect (Executable Simulation Tool) is a full-fledged simulation tool based on Petri nets. The development of *ExSpect* started in 1988 at Eindhoven Technical University as a research prototype. In the mid-nineties the development moved to the Dutch consultancy company Bakkenist. At the moment *ExSpect* is supported by Deloitte & Touche Bakkenist, The Netherlands. The application of *ExSpect* is not limited to workflow analysis. *ExSpect* can also be used to simulate production processes, transportation networks, software components, embedded systems, etc. In fact, *ExSpect* can be used to prototype simple systems and can interact with runtime systems via the Microsoft COM standard. However, for this book, the link between *ExSpect* and several workflow products is most relevant. *ExSpect* can download workflow processes from workflow management systems such as COSA and BPR tools such as Protos. Figure 5.20 shows a screenshot of *ExSpect*. The screenshot shows that *ExSpect* supports graphical animation of the workflow processes. In addition *ExSpect* calculates confidence intervals for all kinds of metrics (flow time, utilization, etc.). It is also possible to modify automatically created simulation models of the workflow to support management games. A trial version of *ExSpect* can be downloaded from <http://www.exspect.com>.

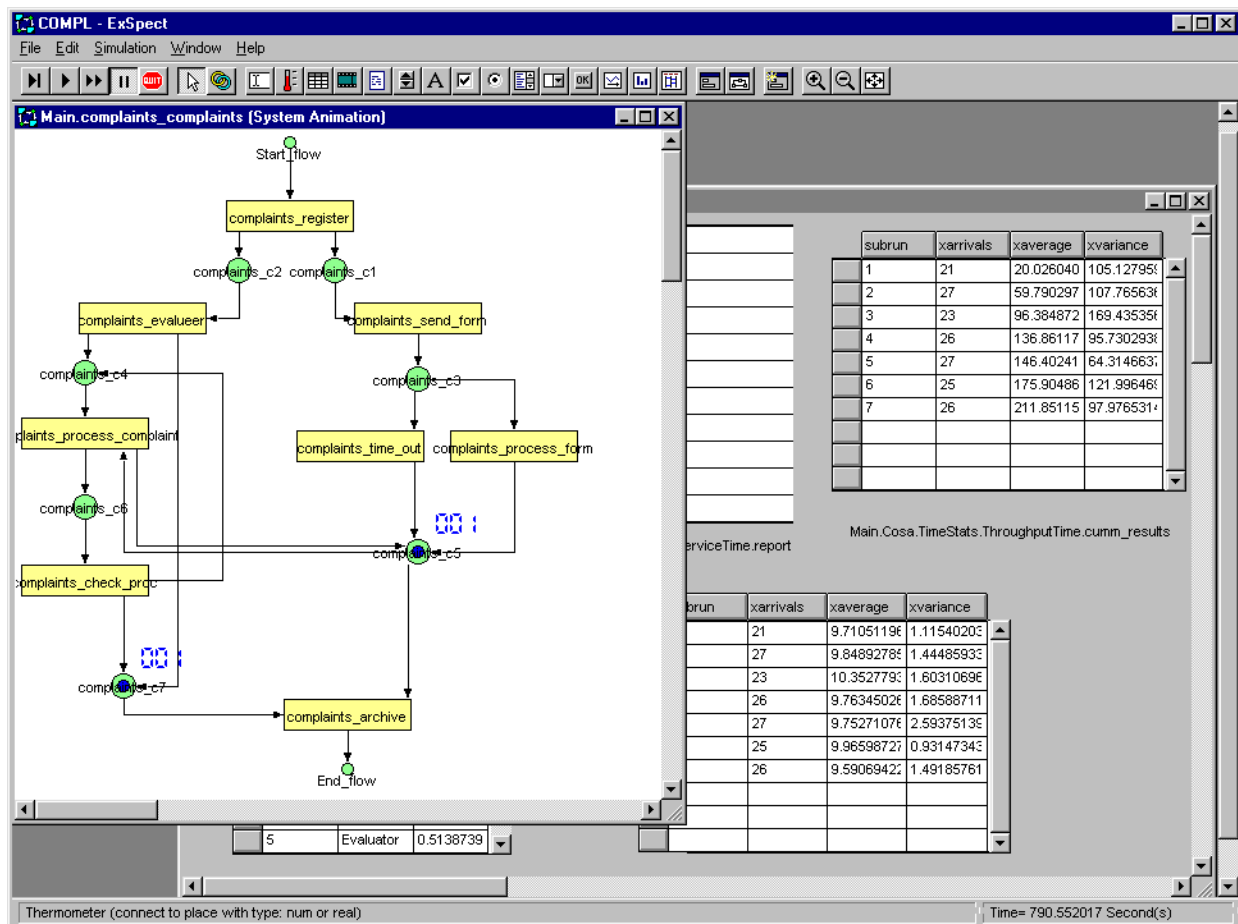


Figure 5.20: ExSpect simulating a workflow process developed using COSA

5.5.5 BPR tools

In Chapter 3 it was shown that there is a close relationship between Business Process Re-engineering (BPR) and workflow management. Therefore, there are also links between tools to support BPR efforts and workflow management systems. Some of the tools supporting BPR efforts focus exclusively on simulation. ExSpect is an example of such a tool. Other tools focus on the modeling of business processes without any real support for analysis. Examples of tools that focus exclusively on modeling are: Protos (Pallas Athena BV, Plasmolen, The Netherlands) and ARIS (IDS Scheer AG, Saarbrücken, Germany). Some tools offer both simulation and extensive modeling capabilities tailored towards business processes, e.g., BusinessSpecs (IvyTeam, Zug, Switzerland), Income (Promatis AG, Karlsbad, Germany), and Meta WorkflowAnalyzer (Meta Software, Cambridge, MA, USA). To illustrate the functionality of these tools we briefly introduce Protos.

Protos

Protos is a tool which can be used to model and document business processes. The tool is easy to use and is particularly useful for modeling workflow processes, i.e., case-driven processes. Although Protos is not based on Petri nets it can support the diagramming technique used in this book. Protos supports the graphical modeling of processes, documents, applications, roles, groups, and teams. The analysis capabilities of Protos are limited: Only very basic static dependencies can be analyzed (e.g., a role/route analysis comparable to the swim lanes in UML). Protos has excellent reporting facilities. It is possible to automatically generate rtf documents and html pages which hyperlinks. Protos supports an export facility to the simulation tool ExSpect. There are also interfaces with workflow management systems such as COSA (Ley GmbH), Corsica (BCT), and FLOWer (Pallas Athena). Figure 5.21 shows a screenshot of Protos. For more information we refer to <http://www.pallas-athena.com>.

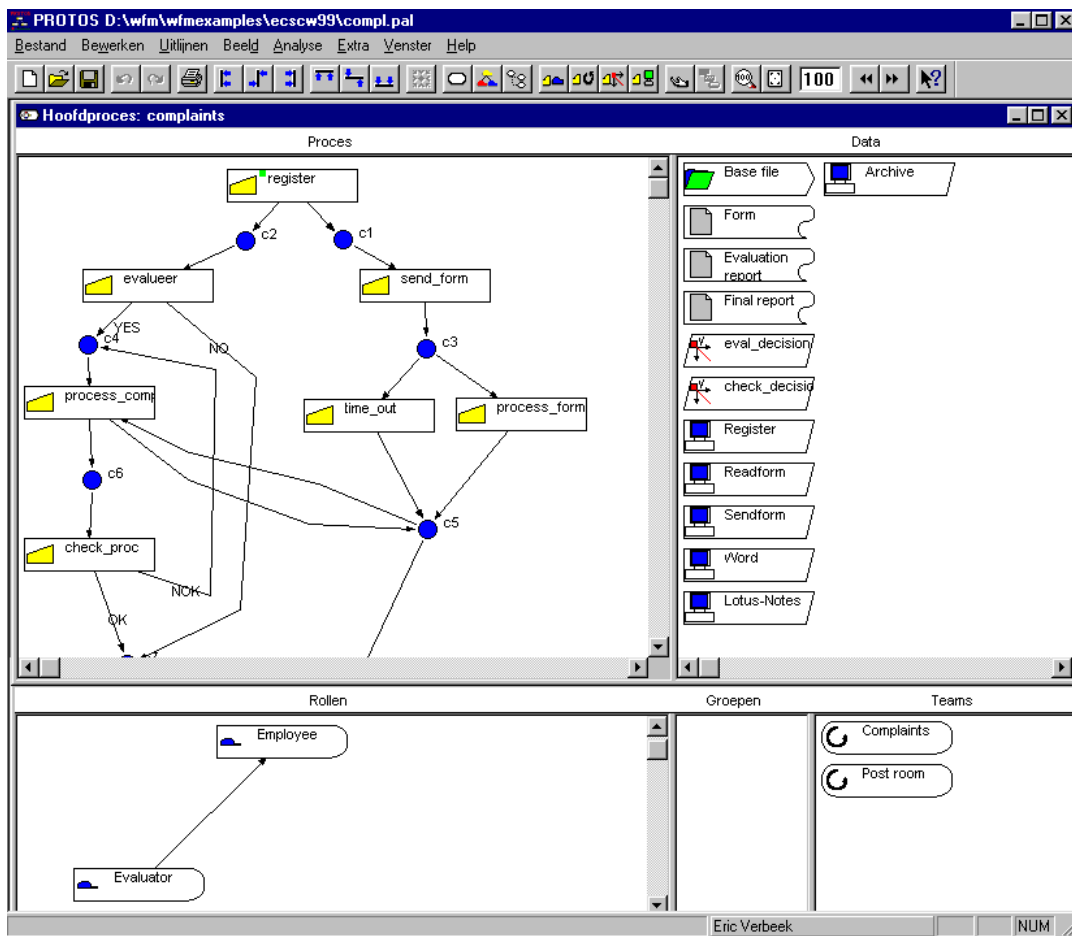


Figure 5.21: A Protos model of the complaints handling process

5.5.6 Selecting a workflow management system

Selecting a workflow management system is not an easy matter. There are many aspects which need to be borne in mind. The selection process begins with the listing of the requirements which the system must meet. Based upon these, a *shortlist* is then compiled. When doing so, consideration is given to characteristics which are easy to check, such as the reliability of the supplier and whether the desired operating system and database management system are supported. The shortlist should preferably contain about five systems.

Each package on the shortlist is then subjected to closer scrutiny. One way to quickly gain a good impression of a workflow management system is to work through a *sample process* chosen *in advance*. Most suppliers are prepared to co-operate with a potential purchaser in doing this. It is very important that the sample process is representative of the relevant business processes. For example, one should ensure that all the desired routing constructions are included. The sample process can be used to test both functional and performance requirements.

Figure 5.22 illustrates a possible sample process which, for the sake of convenience, we shall call *P*. Process *P* can be used to check functional requirements. All forms of routing are included, and a range of different triggers is used. The process is rather small for studying the performance of a workflow management system. However, if we produce a process in which *P* recurs four times as a subprocess, then we create something with far greater scope. By comparing the performance of the system when the four subprocesses run in parallel (linked by an AND-split and an AND-join) with that when there is selective routing between them (the four subprocesses are linked using an OR-split and an OR-join), one can gain a good insight into the speed of the workflow engine. In both cases the full process consists of 90 tasks. This is sufficient for most applications.

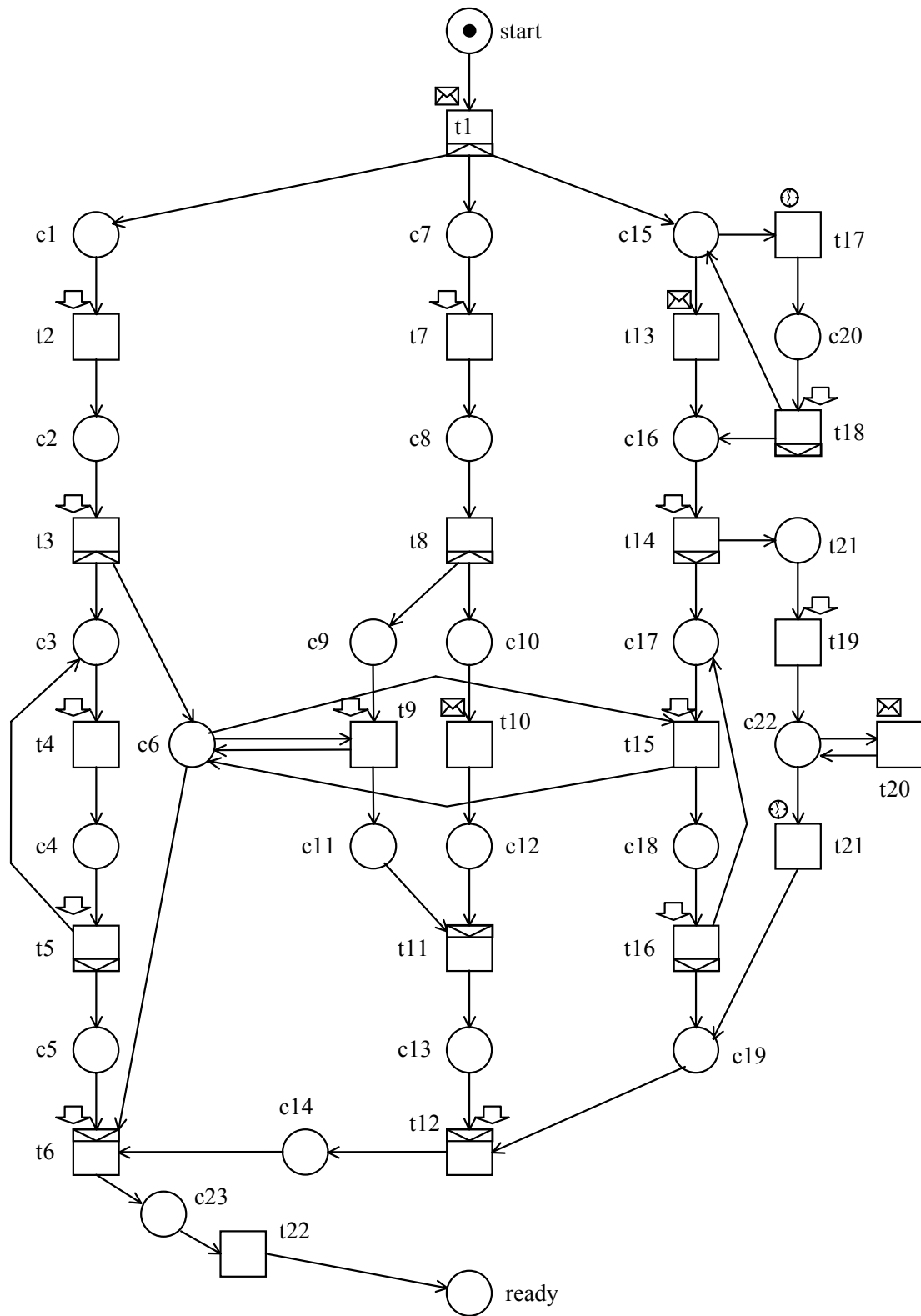


Figure 5.22: Sample process for evaluating a workflow management system

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Once the workflow management systems on the shortlist have been put on trial in this way, it usually becomes clear which package is the best choice.