2. The Overall Architecture of a Forest Information System

Following the introduction on the state-of-the-art of a European forest information system it seems appropriate to start with a generic view on the architecture of such a system. This chapter will introduce such an architecture, taking into account a set of examples of existing reporting processes and data flows which exist at a European level. These examples or “use cases” were seen as complementary information in order to design the overall system architecture. Chapter 2 is divided into four parts: 2.1 “The Unified Modelling Language; 2.2 The user view – overview of European forest information processes and their principal actors; 2.3 “Commonality between use cases – the Big Picture ” (a study of existing use cases); and 2.4 “NEFIS architecture”. These were set out as tasks in the NEFIS project.

2.1 The Unified Modelling Language (UML)

The Unified Modelling Language (UML) has been adopted by the NEFIS project as a means of structuring discussion and formulating the information systems requirements and software specification for development of a system that might satisfy pan-EU needs for an integrated European forest information system (EC, 1997; Päivinen and Köhl, 2005).

UML has been developed and maintained by the OMG (The Object Modelling Group) a not-for-profit consortium of virtually every large company in the computer industry plus hundreds of smaller ones whose aim is to maintain computer industry specifications for interoperable enterprise applications. It became the software engineering de-facto gold standard as an extensible graphical language for visualizing, specifying, constructing and documenting the artefacts of a software-intensive system. As a language it has a rich syntax and formal semantics which include mechanisms for extending the vocabulary and grammar to encompass and express specific needs of any application domain of interest. UML is now an accepted ISO specification (ISO/IEC 19501). It is employed not only for writing the systems blueprints, application structure, behaviour, and concrete architecture things such as programming language statements, database schemas, and reusable software components, but also for describing and modelling conceptual aspects such as business processes and system functions (OMG, 2005b).

It has been recognized that the real value of the UML to NEFIS is to support the elicitation and analysis of requirements and the identification and modelling of the information system architectural framework. Further UML was seen as a vehicle for system developers and forestry domain experts to establish a common framework of understanding on an overall architectural design. This was done by transcribing textual use cases provided by forest experts into UML design.
2.2 The user view – overview of European forest information processes and their principal actors

2.2.1 Introduction

Information systems are perceived by different actors (stakeholders) in radically different ways. System users may have little idea of the way in which a system functions behind the user interface, nor should they care – so long as the system delivers their requirements in a correct, meaningful and consistent manner. As we saw in the introduction it is the user’s requirements that govern the system’s functions, in turn the system’s functions determine how it is implemented. It is therefore fundamental to understand the user’s perspective, or Use Case View, in order to specify a system that can satisfy the user’s requirements. Figure 6 in section 2.3.3 illustrates the way in which the User View is overarching in relation to the Design, Process, Implementation and Deployment perspectives.

The ways in which forest information is measured, collected, utilized and presented at the European and international levels are multiple and various. There are many actors, stakeholders and users of the information throughout the forest and related sectors. The various international conventions and agreements that are concerned, to a greater or lesser extent, with forests each have their own objectives and reporting requirements, although efforts to standardize reporting are ongoing. Furthermore, the nation states that make up the European Union each have their own forest sector with its own historical and political contexts. The picture of forest information at the European level is therefore a complex one, and one in which there are many overlapping interests and requirements. Furthermore, these various forest information paradigms operate at multiple levels – global, EU, national, sub-national and local – further complicating things.

The approach within the NEFIS project has been to compile a core set of characteristic European forest use cases. These use cases have been developed as brief, textual descriptions of selected information processes. Where appropriate UML use case diagrams were produced for each of the information processes. The purpose of the use case diagrams is to provide a better understanding of how a European forest information system could benefit the forest community by fulfilling specific information communication and processing tasks in addition to identifying information resources. The following use cases were prepared within the NEFIS project.

- UN-ECE/FAO Global Forest Resource Assessment (FRA) and Temperate and Boreal Forest Resource Assessment (TBFRA) 2000 (Regional FRA)
- MCPFE Criteria & Indicators for Sustainable Forest Management
- Forest Products Production and Trade Flows
- Land Use and Land Cover Change for UNFCCC

In developing these use cases it became clear that some of these information processes are very complex and their full development was beyond the scope and mandate of the NEFIS project. The UML exercise carried out within the project