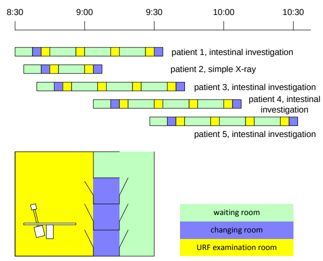
The application view

-



Gerrit Muller
University of South-Eastern Norway-NISE
Hasbergsvei 36 P.O. Box 235, NO-3603 Kongsberg Norway
gaudisite@gmail.com

Abstract

The purpose of the application view is described. A number of methods or models is given to use in this view: stakeholder and concerns, context diagram, static entity relationship models and dynamic flow models.

version: 0.2 status: preliminary draft June 21, 2020

1 Introduction

The application view is used to understand how the customer is achieving his objectives. The methods and models used in the application view should discuss the customer's world. Figure 1 shows an overview of the methods discussed here.

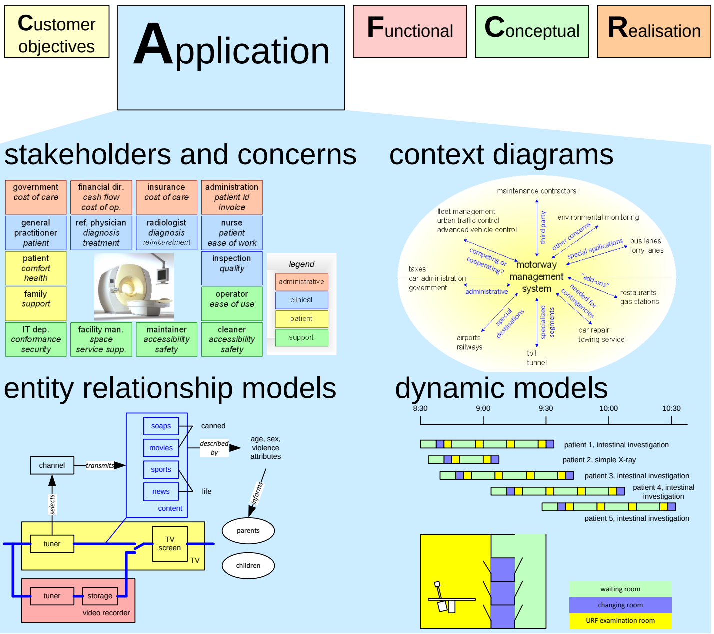


Figure 1: Overview of methods and models that can be used in the application view

The customer is a gross generalization, which can be made more specific by identifying the customer stakeholders and their concerns, see section 2.

The customer is operating in a wider world, which he only partially controls. A context diagram shows the context of the customer, see section 3. Note that part of this context may interface actively with the product, while most of this context simply exists as neighboring entities. The fact that no interface exists is no reason not to take these entities into account, for instance to prevent unwanted duplication of functionality.

The customer domain can be modelled in static and dynamic models. Entity relationship models (section 4) show a static view on the domain, which can be complemented by dynamic models (section 5).

2 Customer stakeholders and concerns

In the daily use of the system many human and organizational entities are involved, all of them with their own interests. Of course many of these stakeholders will also appear in the static entity relationship models. However human and organizations are very complex entities, with psychological, social and cultural characteristics, all of them influencing the way the customer is working. These stakeholders have multiple concerns, which determine their needs and behavior. Figure 2 shows stakeholders and concerns for an MRI scanner.

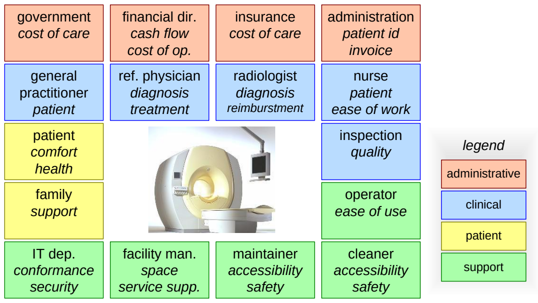


Figure 2: Stakeholders and concerns of an MRI scanner

The IEEE 1471 standard about architectural descriptions uses stakeholders and concerns as the starting point for an architectural description.

Identification and articulation of the stakeholders and concerns is a first step in understanding the application domain. The next step can be to gain insight in the *informal* relationships. In many cases the formal relationships, such as organization charts and process descriptions are solely used for this view, which is a horrible mistake. Many organizations function thanks to the unwritten information flows of the social system. Insight in the informal side is required to prevent a solution which does only work in theory.

3 Context diagram

The system is operating in the customer domain in the context of the customer. In the customer context many systems have some relationship with the system, quite often without having a direct interface.

Figure 3 shows a simple context diagram of a motorway management system. Tunnels and toll stations often have their own local management systems, although they are part of the same motorway. The motorway is connecting destinations, such as urban areas. Urban areas have many traffic systems, such as traffic management (traffic lights) and parking systems. For every system in the context questions can be asked, such as:

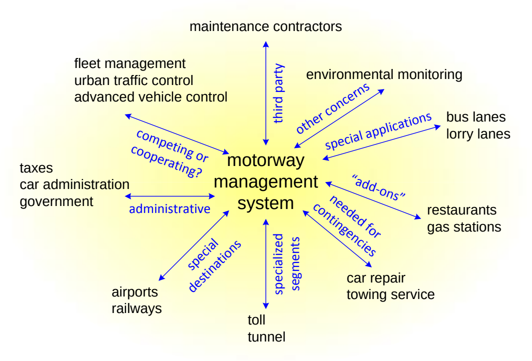


Figure 3: Systems in the context of a motorway management system

- is there a need to interface directly (e.g. show parking information to people still on the highway)
- is duplication of functionality required (measuring traffic density and sending it to a central traffic control center)

4 Entity relationship model

The OO (Object Oriented software) world is quite used to entity relationship diagrams. These diagrams model the outside world in such a way that the system can interact with the outside world. These models belong in the "CAFCR" thinking in the conceptual view. The entity relationship models advocated here model the customers world in terms of entities in this world and relations between them. Additionally also the activities performed on the entities can be modelled. The main purpose of this modelling is to gain insight in how the customer is achieving his objectives.

One of the major problems of understanding the customers world is its infinite size and complexity. The art of making an useful entity relationship model is to very carefully select what to include in the model and therefore also what **not** to include. Models in the application view, especially this entity relationship model, are by definition far from complete.

Figure 4 shows an example of an entity relationship model for a simple TV. Part of the model shows the well recognizable flow of video content (the bottom part of the diagram), while the top part shows a few essential facts about the contents. The layout and semantics of the blocks are not strict, these form-factors are secondary to expressing the essence of the application.

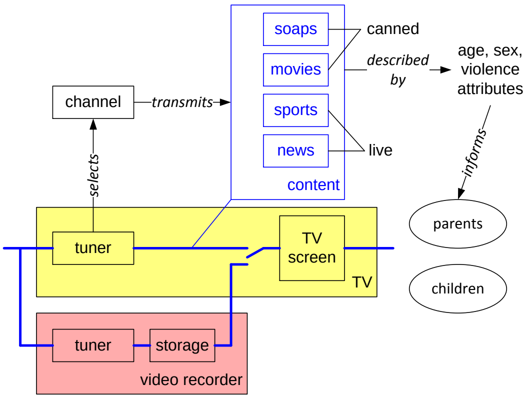


Figure 4: Diagram with entities and relationship for a simple TV appliance

5 Dynamic models

Many models, such as entity relationship models, make the static relationships explicit, but don't address the dynamics of the system. Many different models can be used to model the dynamics, or in other words to model the behavior in time. Examples are of dynamic models are shown in figure 5

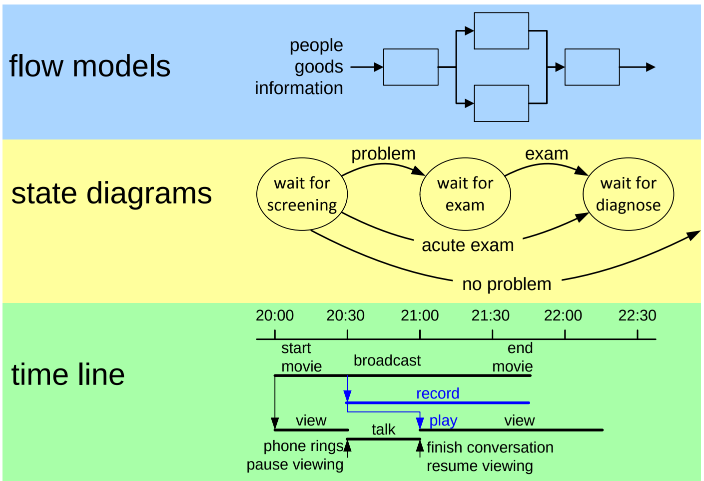


Figure 5: Examples of dynamic models

Productivity and Cost of ownership models are internally based on dynamic models, although the result is often a more simplified parameterized model, see figure 6.

Figure 7 shows an example of a time-line model for an URF examination room.

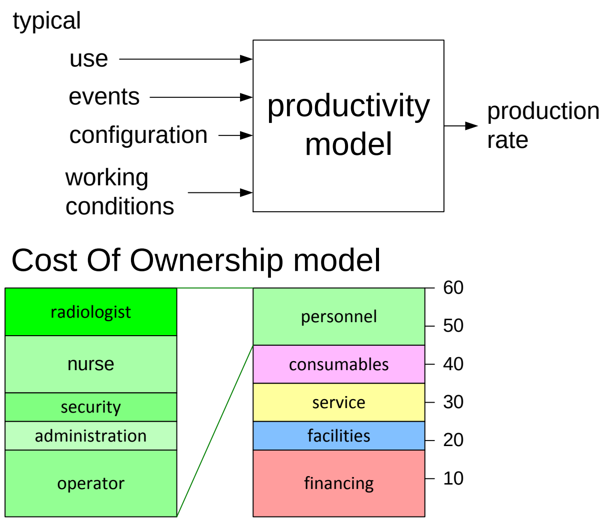


Figure 6: Productivity and cost models

The involved rooms play an important role in this model, therefore an example geographical layout is shown to explain the essence of the time-line model.

The patient must have been fasting for an intestine investigation. In the beginning of the examination the patient gets a barium meal, which slowly moves through the intestines. About every quarter of an hour a few X-ray images-images are made of the intestines filled with barium. This type of examination is interleaving multiple patients to efficiently use the expensive equipment and clinical personnel operating it.

References

[1] Gerrit Muller. The system architecture homepage. `http://www.gaudisite.nl/index.html`, 1999.

History

Version: 0.2, date: November 14, 2012 changed by: Gerrit Muller

- changed stakeholder text

Version: 0.1, date: July 4, 2002 changed by: Gerrit Muller

- replaced list of dynamic models by figure
- added figure cost and productivity models

Version: 0, date: March 28, 2002 changed by: Gerrit Muller

- Created, no changelog yet

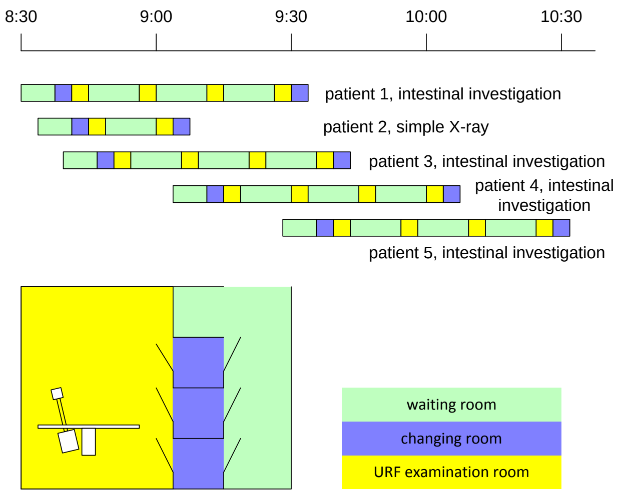


Figure 7: Dynamics of an URF examination room