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ANSA Phase III

Enterprise Computing: ODP as an instrument of hegemony

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Abstract

This paper is an un-refereed position paper into the 'Advanced Informatics in Medicine' workshop of the September 1993 International Conference on Open Distributed Processing being held in Berlin.

The paper makes use of part of a case study carried out by the ORDIT project to illustrate the use of ODP concepts.

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Enterprise Computing: ODP as an instrument of hegemony

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Abstract

This position paper makes use of ODP enterprise language concepts in understanding the relationship between an information systems architecture and the politics of ownership for the system.

The focus is conflict resolution - between views occurring in the enterprise that are fundamentally opposed but which need to co-exist and to interact.

Resolution of conflict is not strictly the province of ODP. However, the nature of the support provided by an ODP infrastructure must allow the system to respond to any changes made in the organisational structure and policy.

The application of basic ODP concepts is illustrated by part of an example of tertiary medical care provided by the ORDIT project. This brief example raises a number of issues of how ODP concepts could be applied to a model of system development.

1 Enterprise Computing

1.1 Introduction

Work on a methodology for the development of open distributed processing systems is taking place in the UK Government-funded Enterprise Computing Project. Part of the work of the project is concerned with the development of a business case methodology for ODP systems.

1.2 Issues of complexity

In designing large, distributed, heterogeneous systems we need to deal with complexities as well as the issues of distribution. Complexities are of two kinds. The first is concerned with sheer size and the second with problems of understanding the sophistication of the system.

In order to deal with complexity due to size it may be convenient to partition problems into sets of concerns. One way of viewing the partition is in terms of solution methods and techniques. Solving conflicts using non-standard logics [DRUMS 93] and classical operations research methods of evaluating strategies [BUTLER92] are typical of such

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methods. An inappropriate partition, however, may well lead to aspects of the actual problem being ignored. A better approach is to adopt newer paradigms and abstractions which promise a more complete coverage of all aspects of the problem space.

1.3 Issues of distribution

Open Distributed Processing (ODP) [ISO92a] [ISO92b] is concerned with processing issues where the units of processing are not only distinct but are of differing kinds i.e. it is concerned with heterogeneity.

The ODP Reference Model dealing with these technical problems has been developed with separation of concerns in mind together with languages and models related to these concerns. ODP proposes a partitioning of concerns into five sets labelled enterprise, information, computation, engineering and technology.

There are two aspects to distribution. The first is that connectivity and configurability allow computer systems to be structured in a way that reflects the enterprise view of the world. In such systems there is less of the notion of technological imposition but rather a combined organisational/technological aspect which, together with notions of purpose, make up the enterprise view [SCARBROUGH92].

The second aspect of distribution is that assumptions of single processors generally made in system development are no longer valid and now have to be considered the special case. In the ANSA project this fundamental shift is referred to as the reversed assumptions [APM.1020.1 93]. This new approach to technology will only be acceptable if it is allied to a corresponding business benefit. This is the argument that the ECP project is pursuing.

1.4 The choice of architecture as a political statement

Architecture is commonly considered to be concerned with the choice of a set of components and rules for their composition. The provision of recipes and guidelines add notions of style to the architecture. The idea of style is also in part related to the choice of components and their boundaries. Such choices affect the degree of openness of the system and it is in this sense a political statement, i.e. an exercise of power, and is reflected in the way that ownership is recognised and claimed. A central notion of ODP is that of the interface. Ownership of an interface effectively provides control of access and therefore is the key to the political question. The ODP enterprise language, in particular, is designed to deal with issues of federation and with processes of negotiation and arbitration and the production of policies and contracts and with issues of ownership.

The choice of an architecture is central to the negotiation process concerning the kind of system to be built and underlies the political issues.

1.5 Elucidating the relations - the work of the Enterprise Computing Project

The ECP project is concerned with relating the processes of system building (and choice of architecture) with arguments that enable business choices to be made. The choices displayed by the business case extend beyond the usual notions of return and cost benefit to reflect wider organisational issues. The broad argument is that ODP systems provide capabilities for developing enterprise-wide systems and that ODP languages and models allow the requirements on the system which derive from the wants and needs of the enterprise as a whole to be more fully explored and understood.

2 A Hospital Example

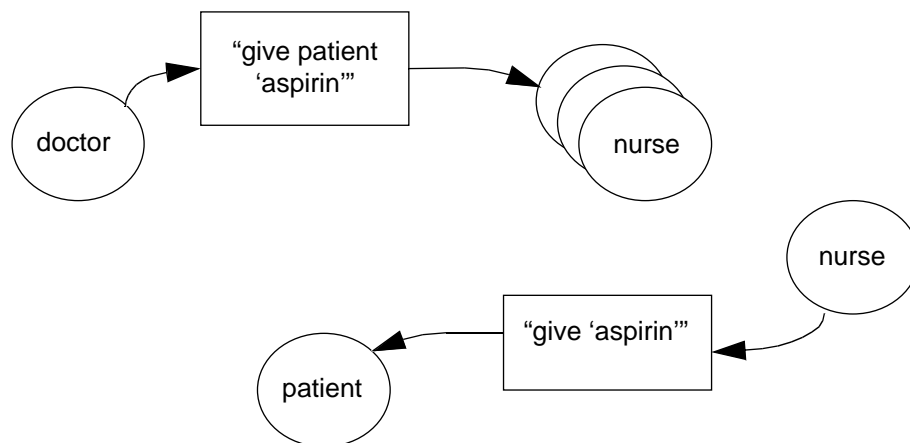
2.1 Background to the example

The example is abstracted from work done in support of and validating the ORDIT Methodology. This methodology was developed in an ESPRIT project¹. The ideas developed, especially those concerning enterprise models, have been introduced into the ODP community.

2.2 The example

The example illustrates a request by a doctor to provide a patient with medication by a nurse and the subsequent provision of the medication.

Figure 2.1: agents and activities



We have only two kinds of entities shown in the depiction of this scenario in figure 2.1 - agents and activities. Certain resources figure in the activities but in different ways. In the first is a reference to the resource ('aspirin') in the statement to the nurse(s). In speech act terms [LEVINSON83] this could be described as either a directive or commissive according to the organisational relationship between the two. In the second, subsequent, activity some actual consumption of the 'aspirin' is being referred to. This actual consumption has some administrative consequences over and above the 'medical act' which the doctor requested to be performed.

This particular activity can be viewed, therefore, in at least two ways. That of the doctor who wishes the least possible time between the request and performance of the 'medical act' and the administrative view which is that of efficient deployment of actual resources and services.

In terms of hospital politics, these two views are irreconcilable in the sense that to take one view exclusively is to deny the very possibility of expression of the other point of view. Indeed in discussion with clinicians, one reason for the very low uptake of clinical information systems by clinicians is often cited as the fact that the systems have been designed using concepts from the administrators' world-view not the clinicians'.

1. ESPRIT Project No 2301 Organisational Requirements Definition for Information Technology

2.3 Constituencies - irreconcilable views?

The ODP Reference Model has the notion of communities or constituencies. This gives some formal weight to the idea that different sets of people potentially have not only differing needs and concerns but also different ways and languages for expressing them. The process of designing and developing an information system for their common use must take account of these differences. In the Reference Model notions of contract and policy are introduced. A process model of system development needs to add negotiation and arbitration as well a development language to express the issues of obligation which also exist in the model. Such processes of system development coupled with flexibility provided by an infrastructure which conforms to ODP standards provides an environment that can better understand and deal with the apparently irreconcilable views.

2.4 Changing rôles

A by-product of the analysis provided by the use of ODP concepts is the re-examination of characterisations of the constituencies with the potential of evaluating the various rôles of the agents in the system. In the abbreviated example the issue is highlighted of the potential of doctors as resource managers. Our enterprise models should be capable of reasoning about the consequences of realising such organisational changes.

3 Conclusions

3.1 Using ODP to understand the issues

This brief example shows how ODP concepts can be used to illuminate organisational questions. It indicates that, at this level and for this particular example, the concepts are capable of identifying significant issues. In order to be completely sure, however, full-scale system development methodologies are needed to check that coverage is complete. Work on developing a methodology is in progress in the ECP project.

3.2 Using ODP to provide the technology

The Prescriptive Model of ODP [ISO92b] describes a set of components using five languages, including an enterprise language. The importance of this approach to prescription is that concepts capable of describing the components of an infrastructure are the same as those used to describe the organisational and political issues noted here. The particular importance is that the prescriptions at the organisational and system level have the potential to work in concert because of the common basis provided by ODP.

3.3 ODP as an instrument of hegemony

When a computer system is introduced into an organisation, it changes the balance of power through its redistribution of information. The main drivers of this change are the distribution model employed, the interfaces provided and the ownership of those interfaces, and the concepts and languages available to the users. ODP is capable of representing and implementing these changed drivers; the Enterprise Computing Project is working on ways of thinking about how to use them to reason about the power shifts that might, or at least are intended to, result.

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