Impact of the Supported Coordination Levels on Process Modelling Techniques

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1 Introduction

From the very beginning of the ESF project (Eureka Software Factory), the problem of improving development environments has been associated with the problem of improving coordination among people, among tools and between people and tools. A separation between the different coordination issues was already taken into account by distinguishing the work on integration technology which is concerned with the interaction of tools, from the work on process technology which is concerned with the coordination problems involving human agents.

However, if one of the major concerns of process technology is to support co-ordination, this word doesn’t have the same meaning if we are talking about the coordination of several teams, within a team, or at an individual level. The characteristics of these different levels of coordination are quite different and it is not just a problem of scale. Identifying these characteristics will help to specify the adapted process modelling and support approaches for the different levels.

2 Factory Level

A factory is composed of several entities (project, teams, managers,...). It can be seen as a set of almost independent or at least loosely coupled groups, and the problem is to insure the global coherence and cohesion of this set.

Work dependencies between the different groups are very limited (e.g. problems of software reuse). What we are facing is a global management and organisation problem (e.g. resource management). Providing a common driving force to all factory members is a very ambitious and maybe unrealistic goal. However, what should be provided is a framework to help and enable these groups to work concurrently, without perturbing and conflicting with one another. This, at least, should improve the company efficiency. In order to make a comparison with a simpler domain, imagine if our company was made up of all the car drivers, with the sole objective of insuring good traffic conditions: apart from very special occasions like holidays departures, or road repair, no strategy is imposed on the drivers to reach their destination, but imagine what driving would be like without the highway code!

The goal is thus to normalise and standardise working practices. The chosen practise may appear arbitrary at times, as no rational reason can be given to justify them apart from improving company efficiency. (It doesn’t make any difference whether we are driving on the left or on the right hand side, but we have to agree on it!)
Therefore, we believe these are the basic requirements for the factory level: good structuring rules to insure the implicit coordination between groups having their own motivation and objectives to achieve, working within the same environment or context, but without having explicitly to interact given the scope of their activities.

To be effective, the rules have to be respected. Enforcement is thus an important characteristic of how the process models should be applied.

The presentation issue is also crucial here: to be well accepted and followed, the methods have to be well understood and known. Training support should be available as well as continual guidelines and references in daily work. These methods and procedures must be made part of the culture and tradition of the company, a completely integrated element and behaviour within the working process.

3 Team Level

This level is the one where the type of coordination corresponds to its most natural definition: working together to achieve a common goal. It supposes some intensive interactions between the involved agents, that need to be coordinated.

In contrast to the previous level, where a one-way dependency is in place with the company enforcing constraints on the behaviour of its composing parts, here we have a two-way dependency. There is no one part of the group prevailing on the other: all have specific requirements and functioning constraints to be respected, and an agreement on how to cope respectively with every one constraints is to be found. The execution principle is not enforcement but constant dialogue and cooperation. Cooperation procedures, agreement or communication protocols can be defined in advance within the limits of the already known constraints, but they have to be flexible enough to integrate new constraints dynamically.

All team members contribute to solve a common technical problem. But, in order to be solved, it has been broken down into many smaller sub-problems. All of them have a piece of the solution and they have to put them together, just like making a puzzle interactively: everyone has to find out who he is related to.

Two aspects have to be supported. First, we have to insure that all the pieces of the puzzle will be created: the support system should help not to forget some part of the work. The system should manage a global description of the tasks or products and check its execution coverage. Then, we have to insure that all the pieces will fit together. This is where agreement protocol and constraint management procedures are needed.

Presentation issue: more than the process itself, it is the interdependencies that must be made explicit, as well as the dynamical parameters representing the global process status (what has been done, how we can proceed from now on, who is responsible for what,...)

Since many unforeseen constraints can appear during process performance, the process support system must be made to resolve these dynamical constraints (data access control, delay on object productions,...) while preserving the consistency and correctness of the whole process.