Workshop on Goal Oriented Business Process Modeling (GBPM'02)

At HCI 2002, London, 2 September 2002

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Ilia Bider (IbisSoft, Stockholm) led the 3rd GBPM workshop, in memory of his late collaborator, friend, and co-founder of the workshop, Dr Maxim Khomyakov. The first workshop looked at OO and BPM; the second at practical issues of modelling business processes; and this one focused on Goals - what BPM is all about.

Ian Alexander (Independent Consultant) drew the short straw, speaking first straight after the holiday season. He spoke about **Modelling the Interplay of Conflicting Goals**. A scenario was a sequence of activities to achieve a functional goal desired by an organization, often modelled nowadays as a Use Case. Hostile agents could also have goals which may directly or indirectly threaten the organization's goals; these can be modelled as 'Misuse Cases'. Interactions between Use and Misuse Cases include MC threatens UC; a subsidiary UC mitigates MC; a UC unintentionally aggravates an MC (while perhaps mitigating another); two UCs directly conflict.

Depicting agents - possibly systems or parts of the environment (like the weather) as UML stickmen was a useful anthropomorphism; it enabled people to reason with their social brains about agent's goals and how to counter them. The approach led to a simple way of depicting and agreeing on goals, which was useful in specific areas such as design trade-offs and the identification of safety and security requirements.

Gil Regev (Ecole Polytechnique de Lausanne) spoke about **Regulation-based Linking of Strategic Goals and Business Processes**. The basic approach is attractively simple: businesses can be considered as control systems intending to maintain a target value, or as organisms with homeostatic goals (such as keeping body temperature constant), influenced negatively by the environment. To my mind it was surprising that neither control nor homeostasis were mentioned; instead, Wiener, Weinberg, Anton, and Checkland were referenced on aspects of systems. Perhaps different communities use different but isomorphic languages to describe goal-oriented behaviour.

Constancy or stability sound static, but can be interpreted dynamically (said Ilia Bider) by talking about constancy of growth (e.g. having a Strategic Goal to increase market share). You then get an Operational Goal (e.g. increase sales geographically) which is related to the strategic goal through a Belief that it will help to achieve it - through the operation of a business process (e.g. set up sales forces in new areas).

Ilia Bider said both these talks were about the **Environment** and our understanding of it - which might be true or not; and we could find out if it were true by modelling the environment and simply by trying out your model in the world and seeing if it works. Hence there is feedback to bring our understanding closer to real life, which is itself a higher-level (regulative, if you like Kant) process applied to lower-level business process interventions.

Erik Perjons (Stockholm University) (in a paper co-authored with **Ilia Bider** and **Paul Johanneson**) spoke about **Goal-Oriented Patterns for Business Processes**, focussing on goals rather than on activities. He described a state-oriented approach to

describe business process patterns. Quoting Fowler, a pattern is an idea useful in one context and hoped to be useful in others. Hammer & Champy define a BP as a partially-ordered set of activities to reach a goal. Different organisations may have different sequences, or somewhat different sets of activities, but shared goals and basically similar processes, so perhaps common patterns can be identified.

Approaches include input/output flow as in IDEF0, workflow sequences of activities as in UML Activity charts (flowcharts), agent-related workflow as in RAD, and state-flow looking at changes in the world caused by activities (a bit like IDEF3). This last is Perjons' favourite. Two BPs are similar if they have state spaces with the same topology, their goals are similar, and they have the same kind of valid movements in the state space. For instance, ordering increases the number of ordered goods (on the Y-axis); delivering increases the delivered goods (on the X-axis). To meet the goal that Ordered = Delivered, the final state must be on the line X=Y; and similarly for all other dimensions of the pattern. Goals thus become surfaces, not points, in the state space!

Ann Lindsay said that BPs were about what you know happens, but we need instead to learn to adapt, and BP modelling isn't helping people to adapt.

Ilia Bider said that to use patterns to synthesize processes, you needed to specialize them, adding procedures to move from one state to another, and adding constraints (e.g. you can't move back in time - you can return goods or deliver more, but not actually undeliver).

Dick Schaap (University of Groningen) spoke on defining a **Goal-Reached, Energy-Used Value pair as a Business Process Measure**. His aim is to describe rather more scientific ways of improving performance than the rather vague ideas in the literature such as 'eliminate, simplify, integrate, automate' (Peppard and Rowland).

His idea is to plot Goal Reached on the Y-axis, and Energy Used on the X-axis. If you have some uncertainty or variation in each, you'll get an elliptical GR/EU blob instead of a point for each activity. You can use a UML-like swimlanes chart to show the sequence of activities organized by actor, and then construct a table of goals reached (presumably one can tell if a goal is 100% reached, or less) and actor-time (a crude measure of energy) per activity. From a flowchart he ran some simulations to evaluate GR/EU results, getting a family of curves or lines. He admits that both Goal Reached and Energy Used can become complicated and unrealistic, so the challenge is to simplify them sufficiently. With multiple processes you also need to address issues of scheduling people and other resources to avoid conflicts. The ideal process clearly uses no energy and no time, i.e. is at the origin of the GR/EU chart.

Gil Regev said that in the 1950's, energy and information were seen to be different - an autopilot uses very little energy but can control a huge ship or plane. **Dick Schaap** said that the GR/EU chart makes visible what is happening in terms of resources applied and results obtained; you might have reasons (not visible on the chart) for going for goals quickly but at higher energy cost. **Ilia Bider** said that some goals have higher value, e.g. hitting the market first may be business-critical as **Ian Alexander** said was the case for developing new Jet Engines for specific aircraft types. And values might change; **Ann Lindsay** said the same was true in production - you might rush to meet a critical order for chocolates even if you wasted materials and labour. Value would have to be a third axis but **Dick Schaap** had not worked that out. **Ilia Bider** said that for some processes, like selling, it is important to have control over resources for each process instance; sales leads that require too much resource to complete the sale should be abandoned. Thus, limitation on resources should be included in the operational goals for such processes.

Ip-Shing Fan (Cranfield University) spoke about a **Process Model for Diverse Stakeholder Goals**. BPM projects were limited in various ways, but all aimed to abstract the organization of activities in an organization. Goals were driven by strategy, eg. quality, lead time, time to market, delivery reliability, design flexibility, volume flexibility, cost/price, innovation, and trustworthiness. These are extremely diverse competitive factors. Organizations differ in the factors they choose, and in their resulting success. It would be useful to understand the reasons for these variations.

Fan suggested that the largest cause of difference is people; the interaction of people with processes is complicated. Three perspectives on this are organization, people, and technology; these might be useful. But BPM's assumption that there is one single canonical process that everyone should follow is clearly false; so going from an As-Is model to a single new To-Be model - in classical BP modelling - is a limiting approach. People naturally desire variability in their work. Quality manuals indeed deliberately avoid (mechanism) details, sticking to (vague) business goals. Workflow is often too prescriptive. Instead, we need controlled diversity - not chaos but an allowed range of process variation. Fan is therefore working on ways of generating diverse models offering a choice of possible processes. TRIZ, the so-called theory of inventive problem solving, now available in 2 software forms (Invention Machine, and The Ideator), is being explored as a BPM tool. TRIZ was invented by Genrich Althsuller, a Russian who studied 200,000 patents to identify common features in the invention process; TRIZ is a huge conceptual system.

Ilia Bider said that half of the answer is in the question. Fan had put the wrong question by imposing Workflow; flexibility was needed in understanding the structure of the goals. Order is more or less fixed; varying all the orderings would give you too many answers. Fan said he agreed the that asking the right question is was important. The dominant types of systems being implemented now are packaged solutions, like ERP, PDM and even office accounting system. Flexibility is was certainly limited.

Denise Downs' talk on **Analysis and Design for Process Support Systems using Goal-Oriented BPM** was presented in her absence. She had argued that you should define clear goals, vision and values before creating a comprehensive BP model, and then trace each activity in the model to the software design objects that implemented it. Neither the OO approach - which tended to jump on isolated use cases - nor the structured approach - which tended to identify processes and dataflows without looking at sequence constraints or roles. She therefore creates a process flow model, which contains 2 kinds of item: triggers and activities. Triggers can be events or by time; every process flow starts with a trigger. Activities form a chain and identify the precise sequence required; i.e. the process model defines a canonical "best practice" process which is used by staff for guidance. This is clearly a simple case (unlike those raised by earlier speakers) but a perfectly valid one.

Steve Battle (HP Labs, Bristol) and **Deb Cooper** (Contact24 ltd) spoke on **Goal-Oriented Service Management**. We've done what the client asked us to do: why aren't they happy? We got really frustrated as it happened again and again. So we devised a practical approach for our outsourced situation. We want to be perceived as experts, and to learn from every implementation before we face our Board. So Lessons Learnt are important.

We worked with an organization providing outsourced call centre CRM support for the financial services industry. There is voice, as well as manual processes, and web interaction. There's been a big change since Sept. 11th - cutting costs, but also giving better quality not just quantity. In the USA they just have quantity; the UK

public is far more demanding and want their questions answered right first time. And clients tell us what they want, not what they need: 2 different things.

So, we first identify BPs and participants with use cases. E.g. queries arrive and are handled by advisors, who forward more specific queries to a well-trained bureau operator, and complex queries to a dedicated advisor. This analysis leads to the design of a massive knowledge base for each class of actor. Traceability is established between client corporate aims, more specific objectives, and then to detailed goals. However the goals depend on the BP model - if it changes, goals have to be revised. New goals can be handled temporarily in contingency by simple (often manual) procedures. If a client asks for anything that doesn't seem to trace back to a strategic goal, we can ask them why they want it, and maybe thus simplify the process model.

Ian Alexander remarked that it had been said 'all good patterns are obvious'. **Ilia Bider** said there was often too much abstraction in the wrong place (academically) but too little in other places (industrially). Ian replied that we all needed to connect research with practice and teaching.

Discussion

Ilia Bider led the discussion by asking us to work towards a common notion of Goal for BPM. Vision was too unquantifiable to be included. Objectives might also be unmeasurable but were important. Goals had to be measurable. But strategic objectives could said **Gil Regev** be qualitatively assessed. **Ilia Bider** asked us to seek the kinds of measures that goals should have. E.g. in a homeostatic system a key goal is to maintain a constant (or constantly growing) market share, etc. Goals could thus be fixed or dynamic (i.e. having a constant rate of change) with respect to an environment. Staying still was like walking up the down escalator: there was always 'friction' so you had to take action to stay still. To adapt to other environments you'd have to change the BP model.

Ilia said that (in a homeostatic or control system) having a goal means the current state is not the goal state, and a corrective (negative feedback) action should be applied. **Ian** replied that even when the current state was the desired one, the goal (Actual Value = Desired Value, $A = d$) remained, but no corrective action was momentarily needed. To follow a trajectory, you had a differential, i.e. $dA/dt = D$. This assumed a continuous environment, but (said **Ip-Shing**) the environment could suddenly jump.

Goals could be nested, just as processes (and systems) can. Goals change human behaviour by setting measures on our behaviour (said **Ip-Shing**). These concepts can be applied at all levels in an organization, raising issues of the different languages in the boardroom, in line management, in IT consultancy, and so on.

Every procedure must be measurable against a (functional) goal.

Other goals may not correspond to individual procedures but must be associated with a measure for the organization to follow, e.g. to conduct business ethically, to run the railway safely, etc.