Modeling Human Interactions: Part 2

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*Human Interaction Management (HIM)* is a radical new business theory describing *how we really work*, and *how we can be helped to work better*. HIM sets the stage for a step change in business practice, by applying process principles to revolutionize the management of collaborative work.

These principles require a new approach to process description, management, support and analysis. However well suited current techniques are to dealing with mechanistic and repetitive activities, they are very poorly suited to the dynamic, innovative, interactive behavior typical of humans. People are not programs, and their behavior cannot be properly described, controlled or facilitated using techniques such as BPEL, BPMN or the UML.

HIM is the theory required to deal with humanistic processes. It permits dramatic cost savings to be achieved across the board, in any organization no matter its type, by providing a new approach to such everyday activities as work assignment, project management and meeting organization.

In the first part of this article we looked at the fundamental building block of process modeling in HIM—the Role concept. In this second part we introduce a key technique in HIM—an enhanced version of the long-established graphical notation known as *Role Activity Diagramming (RAD)*. We show why Role Activity Diagrams are appropriate for the description of human activity, and how they can be used in seamless conjunction with conventional process modeling via techniques such as the UML to complete the process picture in the enterprise.

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*I kept thinking there’s bound to be something else. I could hear it sometimes, but I couldn’t play it.* —Charlie Parker

HIM as a whole is a multi-layered theory, describing process patterns that can be used to understand human working activity, providing modeling tools with which to capture them, techniques with which to manage them, and technology with which to support them. However, at the heart of Human Interaction Management (HIM) there is always the Role concept—the recognition that a Role is not simply a label applied to a group of activities, but a rich, multi-layered representation of a process participant including goals, responsibilities, varied private information resources and so on. All the principles and methods of HIM depend on a rich Role concept as the fundamental means of process description.

Unfortunately, however, conventional process modeling techniques universally deal with Roles in a very limited way—simply as a way to group activities. Not only is this insufficient for our purposes when modeling human interactions, but it falls down completely as a basis for the management of the continual process change that is a feature of human collaboration. A large part of what humans do when they work together is agree on *what to do next*—hence we need a process modeling technique that can be brought into play as a means of facilitating and implementing such agreements. We need a process modeling technique that:

- Places Roles center stage, and gives them a rich semantics
Is simple and intuitive enough for non-technical people to use
Has a natural graphical representation.

The representation we seek is **Role Activity Diagramming (RAD)**. A sample Role Activity Diagram is shown in Figure 1.

**Figure 1: Example Role Activity Diagram (fragment of an Engineering Design process)**

This figure represents a dummy process in the engineering design domain. It depicts a manager constructing a design concept and brief, assigning some designers to the work, passing each one the same brief, receiving back the completed designs, then approving/rejecting each design for further processing. The diagram omits any interactions between designers, as well as the actions to be taken on approval/rejection. However, it includes the main notational elements we need, of which there are only a few, and includes a legend naming the elements of the notation.

Role Activity Diagramming is a long-established, if niche, notational technique. However, in order to support the principles of HIM, it is necessary to make several changes to the traditional use of the notation, as well as to the way in which it is interpreted (the *semantics* underlying it). In fact, these changes are also necessary if we are to provide computerized support in the form of a process engine—the difficulty of implementing the standard semantics for Role Activity Diagrams is partly why no commercial process engine supporting the notation has been available until recently.

In essence, the notation is reinvented as follows. We retain the six standard object types:

- **Roles** that users play within processes
- **Resources** private to Roles—information and other items required to participate in the process
- **Activities** carried out by Roles to manipulate resources
- **Users**—the humans, organizations or machines that take on Roles
States of a process, defined in terms of logical conditions that control the execution and validation of activities.

Interactions between Roles to transfer resources and synchronize behavior.

However, we remove the basis in traditional Petri nets (although HIM does use Petri nets at a higher level, for the analysis of process management), and alter the interpretation of many standard symbols. In particular:

- Process participation. To model human-driven processes effectively enough to support improvement, we need to understand better the nature of people, organizations, and machines as process participants. In particular, we must be able to characterize the Roles in a process, and the Users that play them, by adding various attributes not found in the standard notation. We also require a better technique for modeling relationships—both on a personal basis as Users, and within a process context as Roles. This understanding must support such typical human behaviors as learning, adaptation and conflict resolution, and such typical process features as goals, responsibilities and delegation of authority.

- Process management under process control. You must be able to use a Role to define, start, stop, monitor, and generally manage processes and their associated users. This requires that we support the definition of process objects of all forms as information resources within Roles, and allow them to be passed from one Role to another via interactions.

- Activity enablement and validation. Humans typically jump from one activity to another, repeating and interleaving activities as they see fit. If we are to facilitate people’s work rather than constrain it unnaturally—and if we expect to gain acceptance for any process support system we attempt to implement—we must support this behavior, while simultaneously permitting appropriate controls to be placed on the process. This leads us toward an approach to process definition based on the use of logical conditions that enable and validate both activities and Roles—and this leads us away from process modeling based on sequencing of tasks (as is usual).

- Tasks. Activities are not atomic, but composed of multiple lower-level tasks. It is a modeling issue whether or not to expose a particular task on a Role Activity Diagram as a fully-fledged activity, but there are some simple principles that can be applied. For example, tasks are often unpredictably repeated and interleaved, to the point where it would be hard to find a typical order to draw them in if shown separately. Unless some logical and standardized dependencies can be found for the tasks, they may as well be simply grouped together inside a single activity.

- Interactions are not generally synchronous. A closer match to real life is to view them as formed of multiple channels for sending and receiving resources, where each channel has a sender and one or more recipients. A sender may donate an item into a channel when they are ready—and recipients may then take it out in their own time. This approach to modeling interaction leads to some specific conclusions. For instance, when it comes to computerized process support, the recipient may be the one to signal that something has been given, not the senders themselves.

The Role Activity Diagram building blocks, under this revised interpretation, form a robust foundation for a process modeling framework aimed at capturing human collaborative activity. Role Activity Diagramming is a fundamental technique in HIM, and underpins any supporting software system, or Human Interaction Management System (HIMS).

Finally, how are we to integrate the methods and techniques of HIM, and software support via a HIMS, with existing approaches to process modeling and automation?

This new category of enterprise system—the HIMS—is a player that sits alongside transactional
process support systems to complete the business process picture. Human Interaction Management *overarches* enterprise technologies to support human-driven processes, just as conventional process support tools and techniques *underarch* enterprise technologies to support machine-driven processes. In the book that spearheaded the Business Process Management movement, Smith and Fingar define a business process as:

> the complete and dynamically coordinated set of collaborative and transactional activities that deliver value to customers

Current process modeling techniques and tools are geared toward activities that are *transactional*. HIM and the HIMS deal with activities that are *collaborative*. The two approaches to process support cooperate naturally with each other and with all other forms of enterprise software to realize the vision of the process management pioneers—to make processes the foundation of the enterprise IT architecture.

Hence, any enterprise process architecture must include both forms of process—as shown in Figure 2 on the following page..

How are the two approaches to be integrated in practice? A number of means are available, varying in formality. We give two examples.

An informal technique, suitable for general use, is to rely on *service contracts*—guaranteed interfaces (for example, Web services) provided by the application systems that embody machine-centered processes. Human-centered processes then make use of these services as appropriate for their needs. In this case, human-centered and machine-centered processes may be defined in different ways, within different systems, using different modeling techniques. They interoperate as permitted by the service contracts.

A more formal technique, that can be used in conjunction with the above if desired, is to reduce all processes to a common format—such as the Unified Modeling Language (UML), for example. Any Role Activity Diagram can be expressed in the UML, although this means sacrificing:

- The specialized usability features available in a dedicated Role Activity Diagram tool
- A natural correspondence with the concepts of Human Interaction Management.

However, human-centered processes based on Roles can be:

- Depicted via Role Activity Diagrams for the purposes of Human Interaction Management
- Integrated with more general data, function and business modeling via transformation to UML format.

This brings advantages such as vendor independence, since such models can be exported in the standard XML dialect for UML model interchange (XMI).

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ii A detailed explanation of how to convert Role Activity Diagrams to the UML is provided in [http://www.rolemodellers.com/abstracts/RADs_and_the_UML_1_0.pdf](http://www.rolemodellers.com/abstracts/RADs_and_the_UML_1_0.pdf)
Whether one or both of these approaches is used, or a different approach entirely, no modern enterprise that seeks process orientation can ignore Human Interaction Management. In the real-time age, the process-managed enterprise will dominate by implementing radically new means of support for human interactions. Winning companies will deploy innovative information technology tools to manage Roles and Users, capture information deeply personal to Roles, and help process participants to use this information both individually and collaboratively. A new breed of software, the Human Interaction Management System, will provide the freedom that interaction workers need so that they are helped, and not hindered, by the system. With Human Interaction Management, smart companies will be able to optimize the human-driven processes that are, in the end, their people’s jobs—and the next source of competitive advantage.

Human Interaction Management permits suppliers to establish a fundamental integration with the needs of their customers, by engaging directly with the human-centered processes for which their products will be used. In the twenty-first century, where customers are bewildered by choice and seek understanding from a supplier as well as low price and efficient delivery, such integration may be a necessity. Customers will find a supplier that they trust, engage with them, and stick with them. Anyone can compete in this heady new world; but to keep the customers you gain, you need Human Interaction Management—the future of process support.