Human Processes

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Ruling Unruly Rules

The next major step in enterprise IT may well be a shift in emphasis, from server-side application automation to client-side human interaction. For example, here is a quote from a November 2007 blog post, "Democracy: AKA Collaborative BPM" by Jim Sinur, ex-Gartner Research VP and now Chief Strategy Officer of BPM vendor Global 360:

> *Many people think that BPM enables straight-through processing (little or no human interaction) and is the servant of Service Oriented Architecture (SOA)/composite applications for orchestration/sequencing needs.*
>
> *While these are proven and productive tributaries to BPM, they are not exclusive approaches to BPM. In some cases, it is so bad that some myopic IT professionals and vendors view these paths as the only viable approach to BPM.*
>
> *This view equates human activity as a necessary evil to handle the few exceptions that might occur when there is missing information. Some power vendors are even using the SOA approach for platform and client control.*
>
> *The reality of the situation is that there are more exceptions than these folks imagine (over 50%) and the age of collaborative BPM is dawning to deal with this reality. In addition, BPM, equipped for collaboration, will be serving the knowledge worker in new ways.*
>
> http://www.global360.com/blog/index.php/2007/11/28/democracy-aka-collaborative-bpm

The search for increased efficiency in handling these "exceptions" (which, at over 50% of all cases, are actually more like the rule for many organizations) will inevitably lead to a new form of software aimed directly at the desktops of knowledge workers – or as I prefer to call them, **interaction workers**. My term more closely reflects the degree to which collaboration is inherent in what most people call "knowledge work". The analyst firm McKinsey go even further in this direction, and refer to such work simply as **tacit interactions**:

> *In today's developed economies, the significant nuances in employment concern interactions: the searching, monitoring, and coordinating required to manage the exchange of goods and services. Since 1997, extensive McKinsey research on jobs in many industries has revealed that globalization, specialization, and new technologies are making interactions far more pervasive in developed economies. Currently, jobs that involve participating in interactions rather than extracting raw materials or making finished goods account for more than 80 percent of all employment in the United States. And jobs involving the most complex type of interactions--those requiring employees to analyze information, grapple with ambiguity, and solve problems--make up the fastest-growing segment.*
>
> *This shift toward more complex interactions has dramatic implications for how companies organize and operate.*
>
> *...*
>
> *The article that follows, "The next revolution in interactions," shows that the shift from transactional to tacit interactions requires companies to think differently about how to improve performance--and about their technology investments. Moreover, the rise of tacit occupations opens up the possibility that companies can again create capabilities and advantages that rivals can't easily duplicate.*
>
> "The next revolution in interactions", The McKinsey Quarterly
> http://www.mckinseyquarterly.com/article_page.aspx?ar=1690&L2=18&L3=30

This new focus on collaboration means that **dominating the desktop** is going to mean something quite different in the 21st century. Whether or not Microsoft remains the leading operating system and office application supplier, the current trend towards commoditization of such products will eventually render Microsoft's presence more akin to that of a company like Cisco. Most people with an interest in IT know roughly what Cisco does, but most ordinary mortals don't think of themselves as Cisco customers.

So who or what *will* dominate the desktop in the 21st century? The increasing competitive pressure on knowledge worker productivity means that we are all coming to expect more from workplace software applications. In particular, we don't need cleverer low-level tools -- office applications for document and spreadsheet creation, for example, have provided more than enough for most of us for a long time now. What we need is a way to *join up* the work we do using such low-level tools – join up our work with that of colleagues both inside and outside our own organization.

The knowledge bus

In a conversation with Jim Sinur, he referred to this new layer of technology as the **knowledge bus**, which I think is an excellent term. It certainly describes very well what I have been trying to achieve with the free HumanEdj software [see humanedj.com]. In its simplest usage, a Human Interaction Management System like HumanEdj helps you structure your email communications with colleagues, and more generally enables peer-to-peer collaboration in knowledge work processes.

The term **bus** is a technical one, but the idea is simply that of a common means of transport – an integration mechanism, in this case for human work. However you use such software, the ultimate purpose is to find better ways to deal with a work environment that is high complexity, high pressure, high volume, and high speed. Individuals need a knowledge bus for productivity, and organizations need a knowledge bus for all sorts of reasons – management efficiency, retrospective accountability, strategic alignment, and more.

Here are some key characteristics of a bus:

- **A bus is a mechanism for crossing boundaries.** This is why a knowledge bus is fundamentally desktop technology rather than server technology. Server-side business applications are typically intended for use within a related set of organizations, since *someone must own the servers on which they run*. Knowledge work is not like this, however. More often than not, interactions between knowledge workers span organizational boundaries -- typically since both customers and suppliers are involved, but more generally due to the trend towards outsourcing and other forms of collaborative partnership that has come with globalization and the rise of the Internet.

- **A bus carries a payload.** Knowledge work can be viewed as the process by which information is turned into knowledge and decisions, so its essential precursor and enabler is transmission of information. This information can be structured (think Business Intelligence), unstructured (think emails), or semi-structured (think documents). A knowledge bus must be able to handle all these and more.

- **A bus provides an infrastructure in which routing decisions can be made.** Here things get really interesting. How are routing decisions made in knowledge work? By humans, yes, but to support them and increase their efficiency the bus should allow the use of Business Rules in combination with human decision-making. This is vital for several reasons, not least because use of business rules is increasing anyway, and *without* human mediation it carries a high risk of business disaster. Most cases of this kind are kept quiet, but a very public case is what happened in the stock markets on **Black Monday** (19 October 1987)

The Black Monday crash was the largest one-day percentage decline in stock market history. Here is what Wikipedia has to say about its most probable cause:

> *The most popular explanation for the 1987 crash was selling by program traders. U.S. Congressman Edward J. Markey, who had been warning about the possibility of a crash, stated that "Program trading was the principal cause." In program trading, computers perform rapid stock executions based on external inputs, such as the price of related securities. Common strategies implemented by program trading involve an attempt to engage in arbitrage and portfolio insurance strategies. The trader Paul Tudor Jones predicted and profited from the crash, attributing it to portfolio insurance derivatives which were "an accident waiting to happen" and that the "crash was something that was imminently forecastable". Once the market started going down, the writers of the derivatives were "forced to sell on every down-tick" so the "selling would actually cascade instead of dry up".*

> *As computer technology became more available, the use of program trading grew dramatically within Wall Street firms. After the crash, many blamed program trading strategies for blindly selling stocks as markets fell,exacerbating the decline. Some economists theorized the speculative boom leading up to October was caused by program trading, while others argued that the crash was a return to normalcy. Either way, program trading ended up taking the majority of the blame in the public eye for the 1987 stock market crash.*
>
> http://en.wikipedia.org/wiki/Black_Monday_(1987)#Causes

Have the stock markets learned their lesson? A June 2007 article in New Scientist (*"Where have all the traders gone?"*) reported that one-third of all trading decisions in US markets are now made by machines, a figure predicted to rise to more than half by 2010, and new forms of algorithm are emerging for "algo-trading" – genetic algorithms whose behavior cannot be predicted by their original creators. So, apparently not.

Where the money leads, the rest of us follow. In particular, globalization is driving more and more organizations to look for ways of automating their interactions with both customers and suppliers-- not just transactional interactions but also tacit interactions (to use McKinsey's terminology). This automation is not just for B2B trading -- demands from consumers for self-service interaction with their suppliers are ever on the rise. People expect ever more sophisticated options from Web sites, and the ubiquity of mobile devices means that even organizations whose customers are located mainly in a single time zone must provide 24*7 service availability for B2C interaction.

For cost reasons alone, these B2B and B2C interactions cannot include people at every step, so at least partial automation of them is critical. This drives the need for *business rules* to enable decision-making via business applications. However, the increasing use of rules engines to drive business decisions means that organizations of all kinds need to watch out for their own Black Mondays. But how?

The answer lies in Jim Sinur's statement that "exceptional" cases are actually more than half of all cases. In other words, for many organizations, the bulk of business interactions are of the complex kind whose resolution *cannot be predicted in advance*. By definition, business rules alone will never be enough to handle such cases. Something else is required in order to support partial automation of business interactions, and that something is what geeks call **wetware** – in other words, us.

Human rules management

Human engagement with business rules is essential to the third aspect of a knowledge bus discussed above – i.e., routing. Organizations that wish to avoid their own personal Black Mondays by placing controls on usage of rule engines need **human mediation of business rules**. In other words, organizations need to integrate their Business Rule Management with their knowledge work. This is not about administrators using a Web form to update your rules engine periodically – it is about your operational staff getting right in there with the rules on a daily basis, and *becoming part of the business processes by which the rules are applied*.

Further, the maintenance of business rule definitions is just as much a candidate for human control as mediation in their operational usage. Increasing competitive demands are forcing new levels of complexity in rule engine support for business operations -- but without ongoing safeguards on the implementation of this support, we will only see more disasters like Black Monday. This means placing proper controls on the administrative business processes by which rules are created, updated and deleted. Even *viewing* business rules needs to be closely managed, since rules are key intellectual capital of an organization, and their confidentiality may be a main source of competitive advantage.

So managing human intervention in the maintenance and usage of business rules properly means *managing collaborative business processes that include both humans and rules engines*. This is not as simple as it seems. It doesn't take much thought to see that these business processes are not of the conventional, "mechanistic" kind dealt with by BPMN/XPDL/et al and corresponding mainstream BPM software – the kind of processes that your IT departments defines once and the organization then runs ad infinitum with only limited variations each time.

By definition, each exceptional case requires unique treatment. Hence the business processes that handle such cases need process design techniques and process support technologies suited to work that is carried out differently on each occasion.

Such process techniques and technologies do not set out to constrain work precisely. Rather, they:

- Provide standard process templates as a starting point;
- Ensure that general over-riding controls are in place;
- Allow the work to be integrated with management practices; and
- Automatically record and distribute audit trails for the work.

What the process engine does *not* do is determine the actions actually carried out in practice. Rather, the actions are determined by the individuals responsible for handling each case, on a case-by-case basis. In effect, the process participants collaborate to shape the evolution of each process, as part of the work itself.

The theory of **Human Interaction Management** [see http://human-interaction-management.info] terms such collaborative, adaptive processes as "human-driven". In the reference implementation of a **Human Interaction Management System**, HumanEdj, human-driven processes are termed **Stories**. A precursor to safe use of Business Rules in an enterprise environment is the implementation of techniques for defining human-driven processes, and technologies appropriate to support of Stories.

Case study: energy demand management

Here is an example Story to illustrate a typical situation where business rules are vital, but their safe use requires controlled human intervention.

I was contacted recently by a software vendor that provides solutions for energy demand management. In particular, their software both

- Meters energy usage by individual facilities; and
- Tracks the current price of energy from various sources.

This enables organizations to proactively optimize their sources of energy supply on an ongoing basis. Since at times of peak demand some energy suppliers actually offer cash rebates to customers who reduce or suspend usage, energy supply can even be turned into a source of revenue by responding quickly to energy market changes.

Smart, but what was even smarter was the recognition by this software vendor that *using their products is effectively a collaborative business process* – so the best approach to implementing their products is to integrate them with software support for human-driven processes.

What I will show here is not the Stories used in production, but an initial outline Story drawn up simply in order to illustrate the principles. Here is an overview diagram:

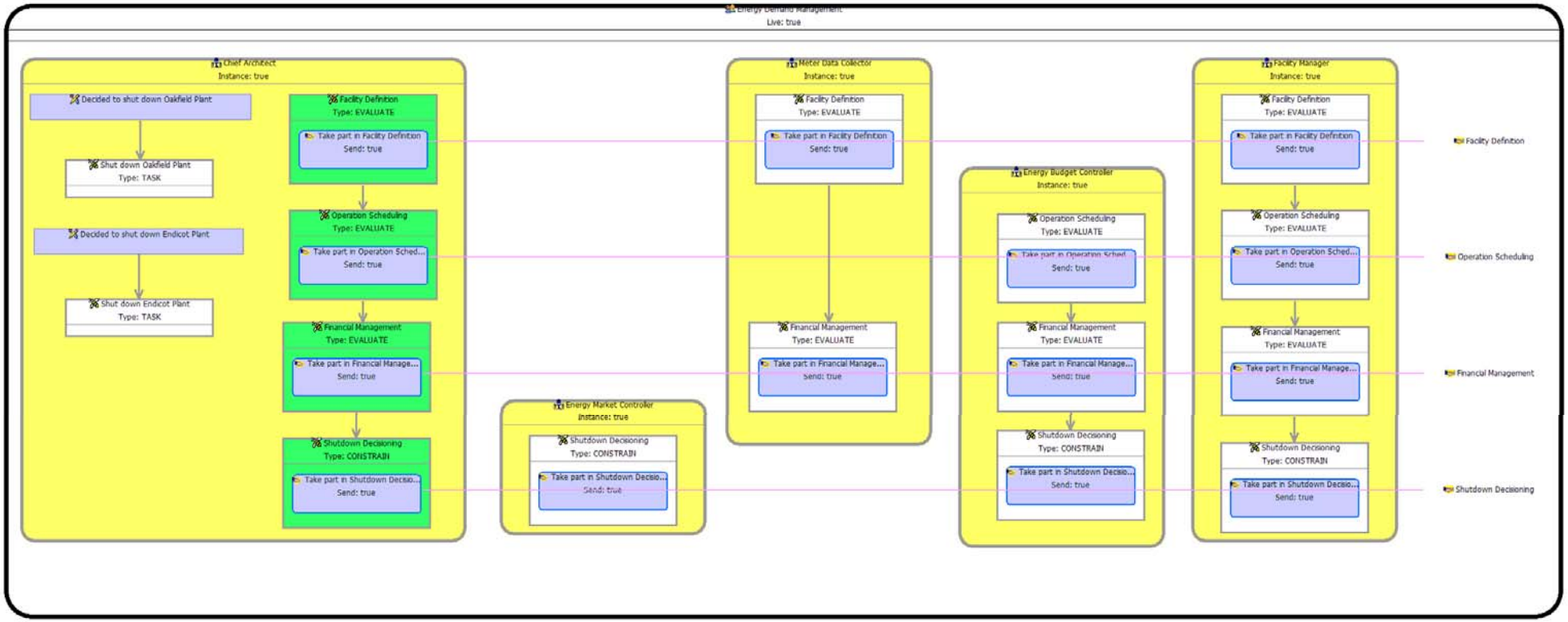

Figure 1: Overview of an outline Story for energy demand management

The diagram shows the **Roles** involved in the Story:

- Chief Architect
- Energy Market Controller
- Meter Data Collector
- Energy Budget Controller
- Facility Manager

together with the **Interactions** via which the players communicate:

1. **Facility Definition** - What facilities have we got? Who is responsible for production from each facility?
2. **Operation Scheduling** – What are the demand patterns? When can each facility possibly be shut off?
3. **Financial Management** - What are the costs of each facility? What is our energy budget?
4. **Shutdown Decisioning** - in which the Energy Market Controller can warn of rising costs, offering to pay consumers if they switch stuff off, and the Energy Budget Controller can make suggestions about switching source of supply

Note that each Interaction includes different Roles. However, the Chief Architect, as the driving force behind the work, participates in all of them.

This is simplified from a real-world Story, in which the work would be divided into a number of separate stages. Each stage is what the theory of Human Interaction Management terms a **collaborative transaction**:

- Started by an Interaction that defines the work to be carried out;
- Executed via different actions in each participating Role, to handle things like document creation/exchange as well as integration with server systems of various kinds; and
- Concluded by another Interaction that assesses status and agrees on deliverables.

The Story shown here is simplified so that most stages of the Story consist simply of a single Interaction. The exception is the final stage, in which the Chief Architect is able to initiate shutdown of energy demand from specific facilities, an action enabled by business rules within the Story.

However, note that a Human Interaction Management System makes it easy to add new activities on the fly. You can add activities to your own Role explicitly, or it will be done automatically when (for example) you open a new document as part of your work in the process. If you wish to add activities to other Roles, you can then share the new Story definition with some or all of the other process participants, and make a collaborative decision as to whether or not you wish to start using the new version.

The work done by process participants – whether to carry out activities or define new activities – is done *on the desktop*, with communications between Roles typically being via email. This makes it possible for the Story to proceed without everyone involved needing access to the same server applications, and without a single organization needing to own the entire process.

However, key activities in certain Roles are tightly integrated with a server-side, rules-driven system for Energy Demand Management (EDM). The EDM system itself integrates with both:

- The operational systems in each plant that monitor and control energy usage; and
- Third party applications providing business intelligence on the energy market.

The EDM system uses sophisticated business rules to supply the human Story participants with the information they need in order to make decisions, and helps them effect the decisions that they make.

Here are some screenshots illustrating human usage of the example Story.

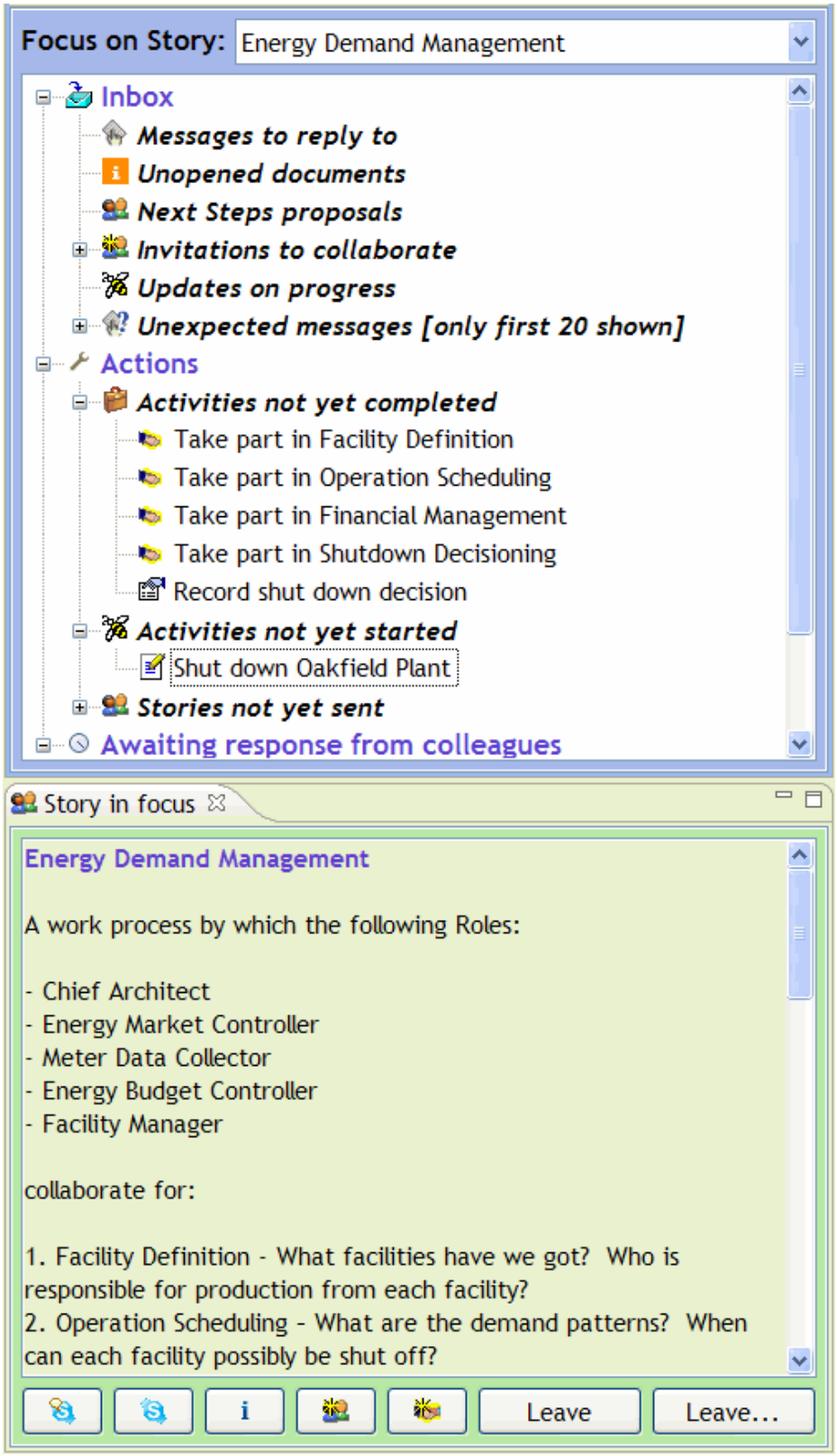

Figure 2: The Chief Architect's view of the example Story

Shown above is part of the desktop available to the Chief Architect, illustrating their options for participating in the process. In particular, they have various actions available. In this simplified Story, most actions are simply to participate in an Interaction.

Here are some screenshots showing the Chief Architect participating in Interactions:

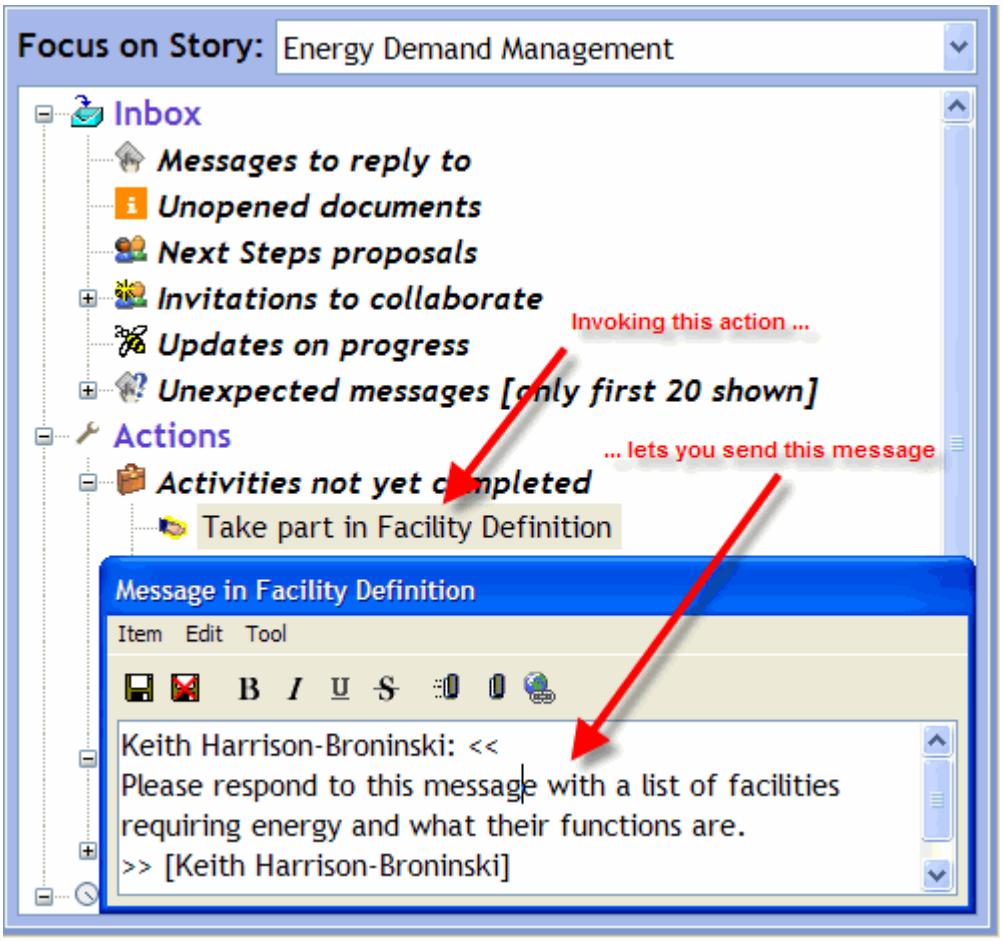

Figure 3: Chief Architect participating in the Facility Definition Interaction

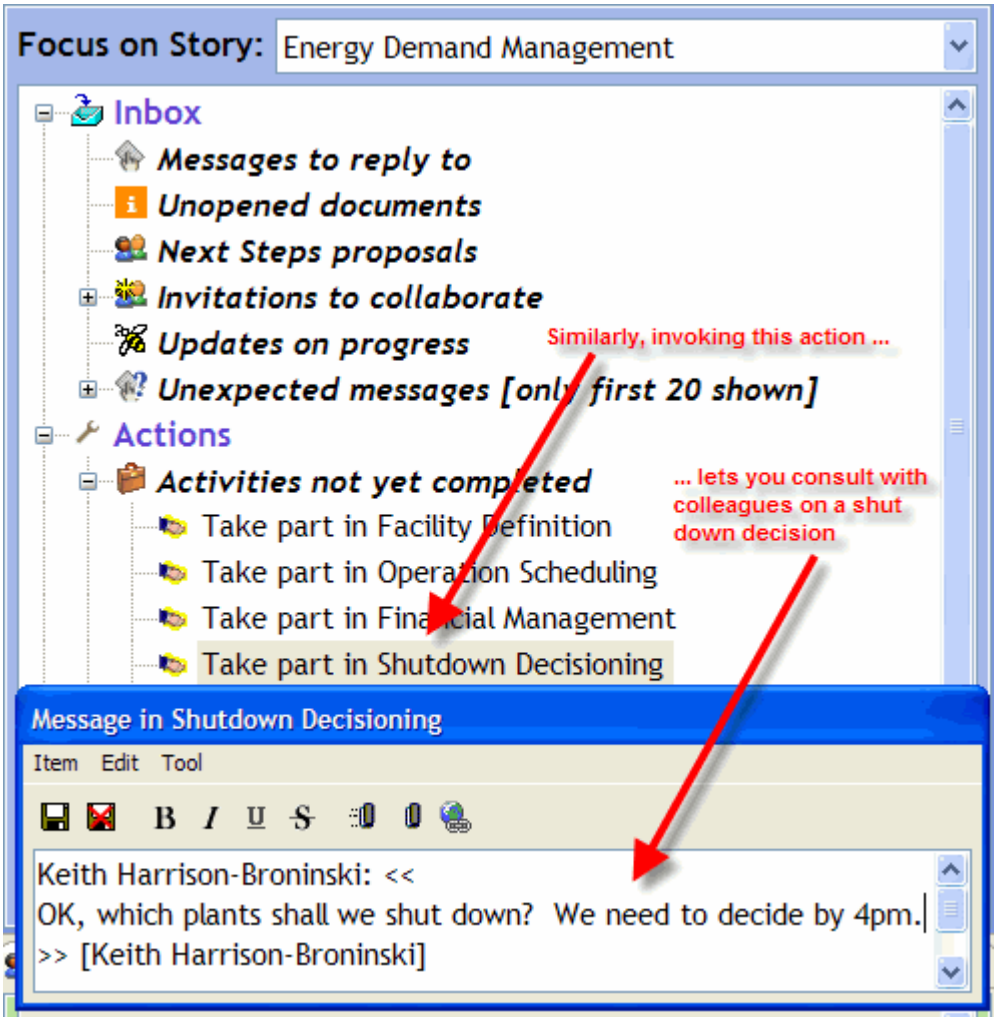

Figure 4: Chief Architect participating in the Shutdown Decisioning Interaction

The messages may be sent by the Human Interaction Management System using a variety of means. In general, email is used since this is the lingua franca in every workplace.

Further, use of email means that participants in the Story do not *need* to use the Human Interaction Management System to interact with their colleagues – they can reply to a message using a standard email program. Their response will form a natural part of the business process, with both message body and any attachments visible to all players involved in the Interaction. Similarly, Interaction conversations can be initiated using a standard email program.

There are some disadvantages to using a standard email program for process participation rather than using the process desktop. In particular, some of the fine version control over attached documents may be temporarily lost – and, of course, only messaging actions can be carried out via a standard email program (and these actions will not be controlled by business rules defined within the Story). However, participation from outside the process engine is a must for a modern working environment in which people:

- Interact with colleagues who work for different organizations; and

- Expect to be able to work using a handheld device in the airport lounge, without needing to load any special software onto this device.

Returning to the Story, as shown in **Figure 4: Chief Architect participating in the Shutdown Decisioning** Interaction, a key purpose is to enable collaborative decision making on energy demand management. Let's suppose that a decision has been arrived at by all concerned, to shut down one plant and not the other. The Chief Architect can then "make it so". The first step is to record the collaborative decision:

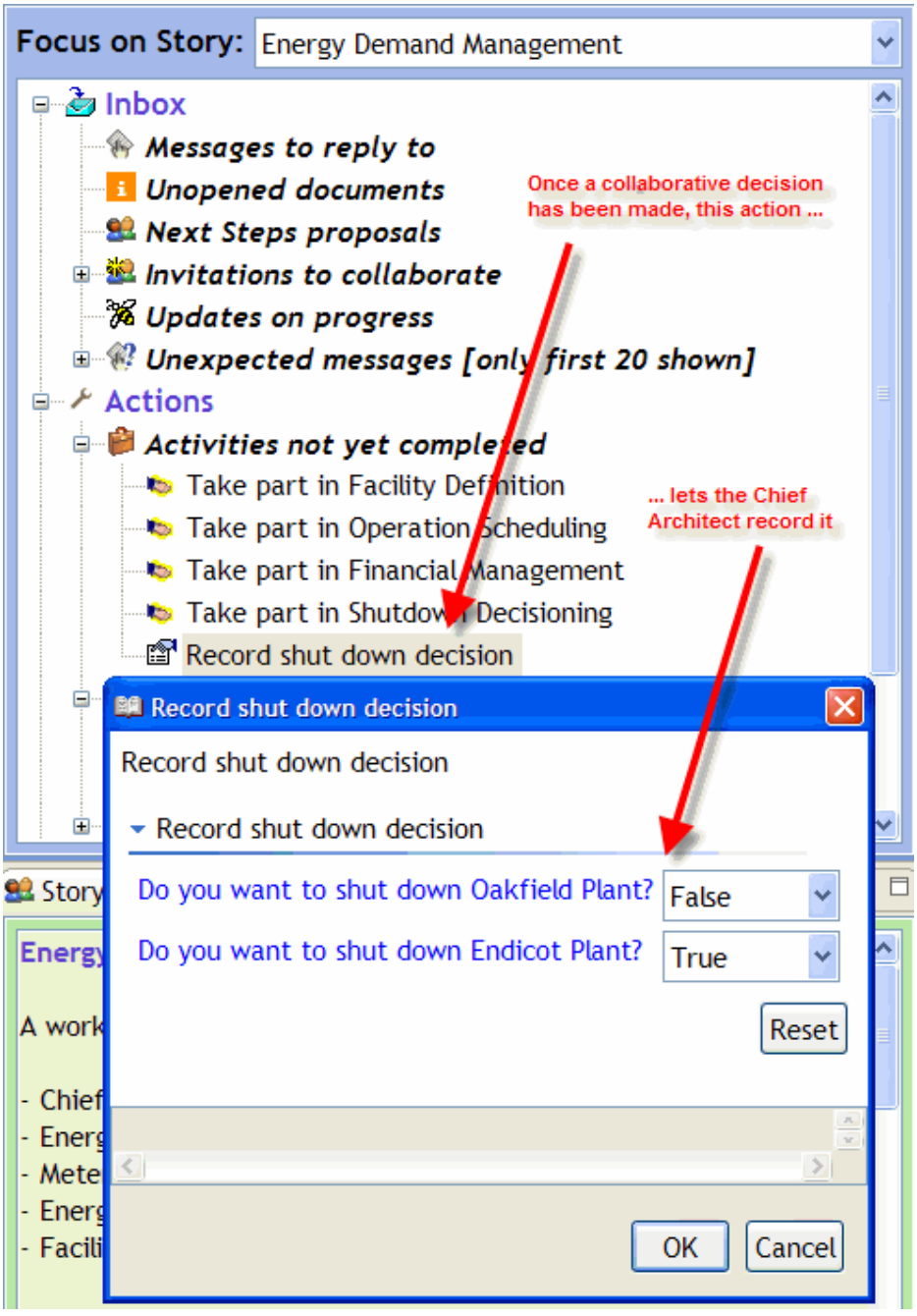

Figure 5: The Chief Architect records a collaborative shutdown decision

This triggers a business rule in the Story which makes available a particular action to the Chief Architect. This action integrates with the operational control systems to effect the shutdown:

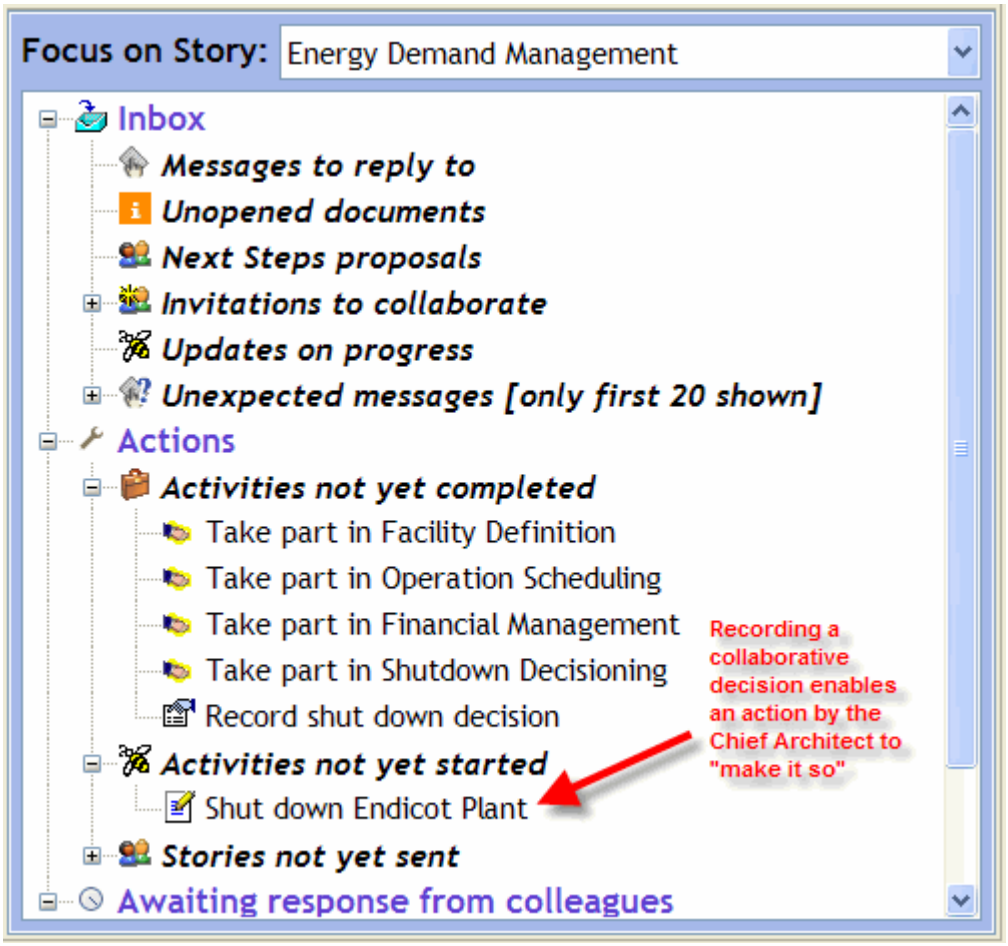

Figure 6: Chief Architect "makes it so"

Summarizing the case study, the use of a Human Interaction Management System has implemented seamless integration between:

1. Energy market information sources
2. Operational facility metering and control systems
3. Business rule engines that integrate the above to recommend operational changes; and
4. The collaborative knowledge work (interaction work) required to ensure that energy usage is optimized without causing business disruption.

Smart energy management is made both smarter and safer by integrating it with process support for interaction work.

TAKE AWAY: Ruling Unruly Rules

In the next few years, competitive pressures mean that operational improvement for organizations of all kinds will be driven by support for human interactions, especially what McKinsey call “tacit interactions” -- the knowledge worker interactions that support B2B and B2C collaboration. Server-side computing will not decline in importance – if anything, there will be more of it, due partly to the increasing use of rule engines to drive business operations. However, the **focus of attention** by CIOs needs to change, due to what Jim Sinur describes as the more than 50% of cases that are in some sense "exceptions".

As server-side automation of business interactions is extended, controls need to be enforced, and these controls must take full account of the majority of cases being special cases - i.e., not having a fully predictable resolution. Rules can get very unruly in such complex situations. *Without very careful management control both of their implementation and of their use, business rules actually represent an extremely serious business risk*. Hence a business environment that attempts to provide computer support for human interactions depends fundamentally on human mediation of the underpinning business rules.

Such human mediation is collaborative and requires structure to be efficient -- in other words, business rule mediation depends on process support suitable for "human-driven" work. Such process support may utilize server-side applications – data repositories, transactional systems, shared documents, audit trails, and so on - but it is fundamentally a client-side technology that crosses organizational boundaries. Interaction workers need a new form of desktop software for personal productivity. Organizations need to make sure their interaction workers have it in order to ensure manageability, accountability and strategic alignment.

20th century technology is not going to go away - if there is one lesson that the IT world should have learned by now, it is the extraordinary longevity of legacy systems. However, it is certainly not going to be enough to meet the demands of the 21st century. The missing piece is the client-side, desktop-based infrastructure that allows organizations to leverage - *safely* - the enterprise backbone into which they have already invested so much money and effort. Thinking of this new infrastructure as forming the **knowledge bus** may be an illuminating way to make sense of what is coming.

Author

Keith Harrison-Broninski is a consultant, writer, researcher, and software developer working at the forefront of the IT and business worlds. He is author of the landmark book **"Human Interactions: The Heart And Soul Of Business Process Management"** (Meghan-Kiffer Press, 2005, www.mkpress.com/hi), described by a BPTrends review as *"the overarching framework for 21st century business technology,"* and by the BPM Group as *"a must read for Process Professionals and Systems Analysts alike."* Keith is also a contributing “thought leader” to the BPM Group book "In Search Of BPM Excellence" (Meghan-Kiffer Press, 2005, www.mkpress.com/bpmg.html).

Along with his research and consulting work, Keith is the CTO of Role Modellers Ltd, whose company mission is to develop understanding and support of collaborative human work processes across industry, a field that Keith has pioneered with his work on Human Interaction Management (see http://human-interaction-management.info). Role Modellers' free software, HumanEdj, is the reference implementation of a Human Interaction Management System.

Find out more about Keith and his work at http://keith.harrison-broninski.info.