

From "conveyor belt" logistics to "construction site" logistics:  
**Do not move information** to a person doing the next operation  
**Move a person** to information when he or she is needed

## ***New Logistics for Administrative/Business Processes***

*White Paper by Dr Ilia Bider of IbisSoft ([www.ibissoft.se](http://www.ibissoft.se))*

**Abstract.** Manually controlled administrative/business processes always used a "conveyor belt" logistics, i.e. "move information to a person doing the next operation". Modern computers made it possible to automate administrative/business processes, at least to some extent. Current trends in administrative/business process automation continue to exploit the conveyor belt logistics, we still send and receive documents, though we do it electronically (e.g., email). Modern technology allows exploiting other options to organize logistics. In particular, it allows employing a "construction site" logistics that can increase both the productivity and quality of administrative work.

### **Introduction**

A computer became a commonly used tool in the administrative work in all spheres of life, private enterprise, governmental office, or non-for-profit organization. Do we get all help the computers can give to lessen our administrative burden? Have we minimized routine, repetitive and boring work, so that we can concentrate on the most important task of decision making that cannot and should not be left to machines? Not really, we utilize very little of the ever increasing power of modern technology in our administrative work.

Why is it so? We take with us our habits when going from manual to computer-supported work. A typical example of this situation is presented on Fig. 1, where disorder on the desk is translated into "disorder" on the computer desktop. The seemingly better order on the computer desktop is attributed to "Auto arrange" feature of the Microsoft screen desktop. As far as the information on the computer desktop is concerned, it has no more degree of orderliness than on the desk on the left side of Fig.1.

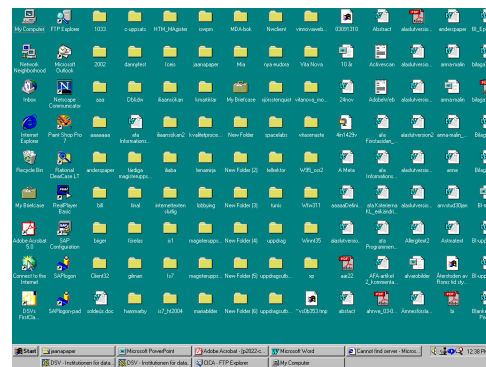


Figure 1. We take with us our habits ... (a real life example!)

One of our old “habits” is sending information (documents) across the organization as a way of arranging the information logistics in administrative/business processes, such as decision making, insurance claim processing, reclamation processing, selling, purchasing, hiring and firing people, etc. The only difference is that nowadays, we do it electronically, not in the paper form. The modern technology gives us a possibility to prepare and send documents quicker than before, which in its turn results in us sending more documents to more people, e.g., as a CC. The latter creates information noise, which shows itself in the form of clogged email boxes. This noise consumes a lot of time for clearing, and it may result in some important information being lost. The productivity of the logistics itself grows, while the productivity and quality of the administrative processes may remain the same or even decrease.

In this paper, we explain how modern computers can help to change the information logistics in administrative/business processes. We can stop moving information between the people, and start moving people to information when there is a need for them to acquire or process it. We will discuss what advantages the new logistics gives and what kind of computer support is needed for employing the new logistics. We will also discuss what kind of reengineering of administrative/business processes is needed to pave the way for new logistics.

## Two Types of Process Logistics

Roughly speaking, there are two types of logistics that are used in industrial processes. The first one can be referred to as “conveyor belt” logistics, see Fig. 2, the second one can be referred to as “construction site” logistics, see Fig. 3.

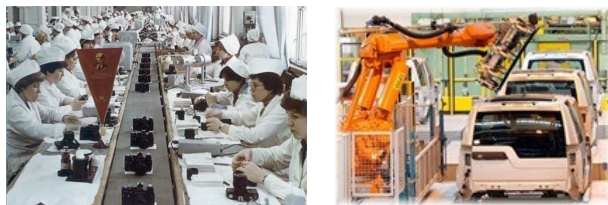


Figure 2. Conveyor belt logistics



Figure 3. Construction site logistics

The essence of the conveyor belt logistics consists of agents that do operations, people (see Fig. 2, left) or/and machines (see Fig.2, right), stay at the same place while physical objects on which the operations are performed are being moved between the agents.

The essence of the construction site logistics consists of physical objects on which the operations are performed stay at the same place, while agents, people (see Fig. 3, left) or/and machines, (see Fig.3, right), are being moved between these objects.

Two independent factors determine which logistics type is the most appropriate for a particular process:

1. Relative costs of movement of agents on one side, and objects on which operations are performed on the other side. Costs can be direct and indirect, for example, working time lost while an agent is moved from one place to another.
2. Length and complexity of operations. As simple, we consider repeatable operations on objects that are identical to each other. As complex, we consider operations that are performed on objects that while belonging to the same kind, have unique features that require special consideration when completing an operation.

In cases, when moving the objects costs less than moving the agents, and at the same time, operations are relatively short and simple, the conveyor belt logistics is preferable. In cases, when moving the objects costs more than moving the agents and at the same time operations are complex and/or lengthy, the “construction site” logistic is preferable. In cases, when costs are comparable and/or operations are simple but lengthy or complex (not repeatable) and short, it is more difficult to choose the logistic. In these cases, both kinds may be equally appropriate.

### **Information Logistics in Administrative/Business processes**

Both “conveyor belt” and “construction site” logistics are possible in administrative work, see Fig. 4, and Fig. 5., respectively. Though the objects on which people work in administrative process are not physical but virtual (information objects), they always have some physical representations, such as written texts, pictures, films, etc. Thus, these objects can be transferred between people (Fig. 4), or people can be transferred between the objects (Fig. 5).

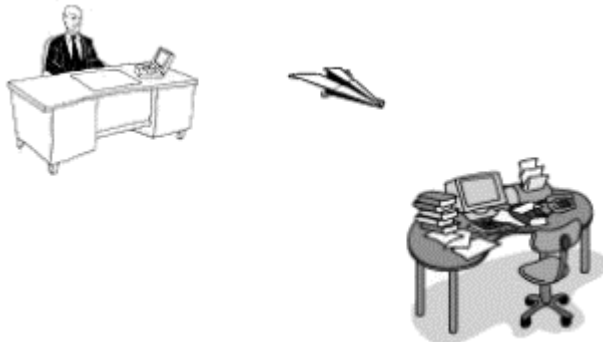


Figure 4. Conveyor belt information logistics



Figure 5. Construction site information logistics

Note that in a physical world of Fig. 5, the construction site information logistics looks awful and impossible to implement. This is why it was not used in practice. However, in a virtual world of modern computers, implementation of this alternative is completely possible, which will be discussed a bit later.

Sending your colleague a document with a (polite) request to read and comment on it constitute an example of the conveyor belt information logistics. Asking your colleague to come to your desk, and read and comment on a document already placed on your desktop, constitutes an example of the construction site information logistics. On the surface, there is no difference between what will be done in both cases. However, the result can be different. In the first case, your colleague sees only the document you have sent. In the second case, he/she can also see other documents and papers on your desk. They can help him/her to better understand his/her task, for example, by looking through other documents that concern the case on which you are working. This, of course, is true only if your desk is arranged properly, i.e. it contains nothing that does not concern the current case (not as in Fig. 1). Otherwise, sitting behind your desk will be only misleading.



In the pre-computers era, the cost of moving people was much greater than the cost of moving information objects. Thus, the conveyor belt logistics prevailed despite that the operations on the information objects could be both lengthy and complex. In the modern time, the costs of moving information to people and people to information are the same. For example, there is no difference to send a e-mail with an attached document as in Fig. 6., or send a message where you ask somebody to “go” to a WEB site and read the document placed there as in Fig 7.

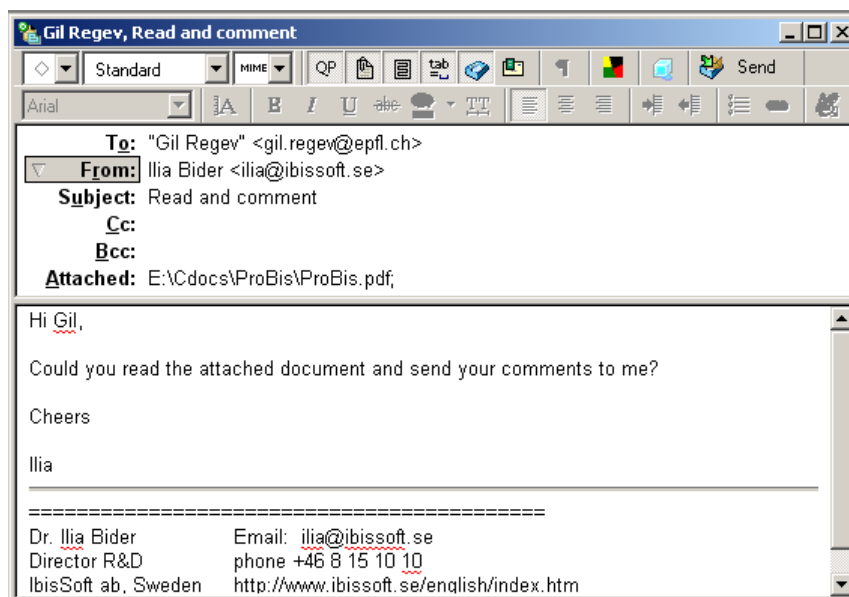


Figure 6. Sending a document to another person.

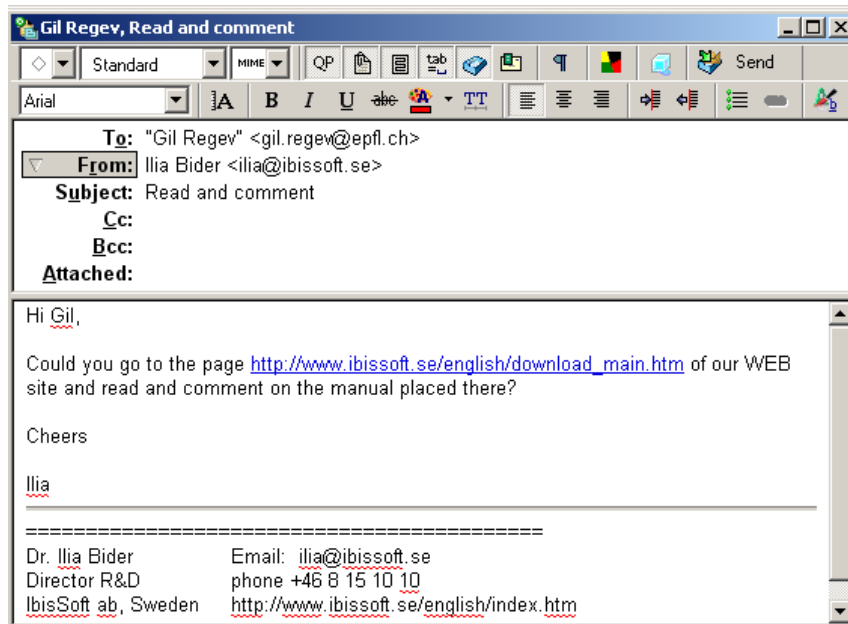


Figure 7. Sending a person to a site which contains the document

The costs of movement in both cases are the same, but not the effect. In the first case, the addressee will only get a document. In the second case, the addressee will go to the site where he can not only read the document, but also see other things associated with the document, see Fig. 8. For example, the document that is referred in Fig. 6, 7 is a manual for a software, evaluation version of which can be downloaded and tested from the WEB site on Fig. 8. If the person reading the manual wishes to see whether he understood it, he/she can download the software and test it without communicating with the originator of the email.

Though the costs of moving information and people are the same, we continue to use the conveyor belt information logistics in administrative/business process just because we are used to it. Taking into consideration that operations in administrative/business processes can be both lengthy and complex, the construction site logistics is much more appropriate for this type of processes, and it is high time we switched to using it.

### Advantages of Construction Site Information Logistics

Administrative/business processes that belong to the same process type can substantially differ from each other. For example, no two insurance claims are the same. This results in different amount of information needed for seemingly the same operation in the frame of different processes. The biggest disadvantage of the conveyor belt logistics in this circumstances is that we need to decide on how much information to send each time we ask the next person in the chain to do the next operation. Still each time we run a risk we send too little or too much information.

If we send too little information, for example, only a manual as in Fig. 6, two things can happen:

1. The operation will not be performed properly, as some important information is missing, and the performer of the operation may even not know about its existence. For example, software that the manual concerns, the history of the document, who wrote it, etc.
2. The person who performs the operation understands that he/she got too little information and starts asking for it. This will result in lengthy communications, which can end up with this person arranging his desktop exactly in the same way as your own desktop.

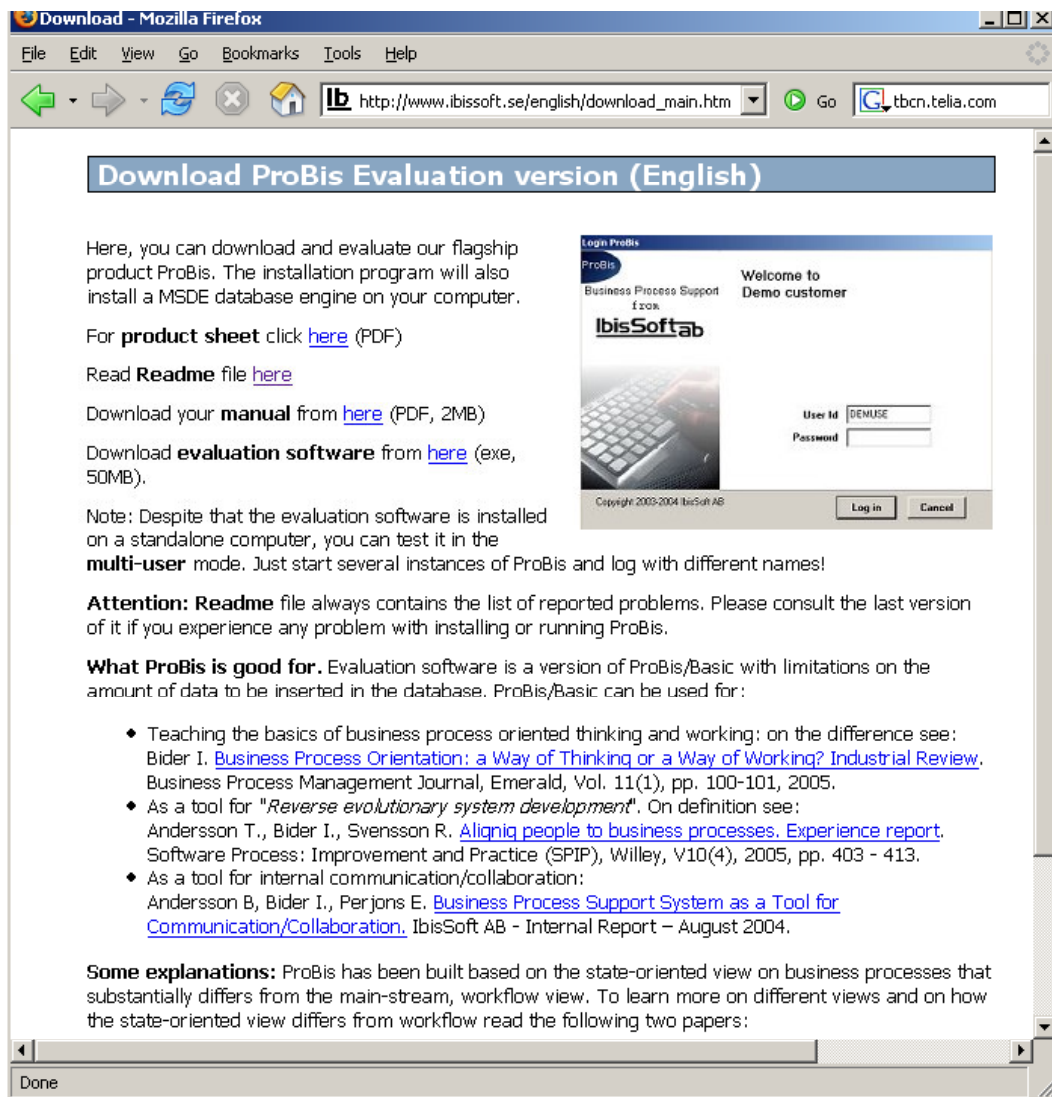


Fig 8. The site to which Fig. 7 refers

Thus, too little information may result in bad quality or productivity of the operation or both.

On the other hand, sending too much information is no better, even if it costs nothing. A typical example is forwarding a email conversation with many replies included in it. Who will care to read all the messages included, and if somebody cares, will it be easy to understand?

If a large package of information is not properly structured, the performer of the next operation will be drowned in the information, not knowing what is important, and what is not. To avoid this situation each piece of information needs to be annotated, and its connection to the task needs to be thoroughly explained. Therefore, sending too much information can degrade quality (when nothing is explained) and/or productivity (too much explanation is given each time).

When the construction site logistics is in use, we do not need to decide on what information to send or not to send, we ask a person to “go to” the right “desk” and point out what document(s) on this desk he/she needs to process. If more information is required, he/she can find it on the same desk. If something is still missing, he/she can find it somewhere else, for example, in the library, on the WEB (through Google), and put it on the desk, so that the next person completing the operation can see it.

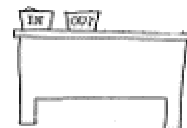
### What is Needed for Construction Site Logistics to Work in Practice?

1. Firstly, we need a multi-desk, multi-workers environment. In such an environment, people can easily move between multiple desks, each of which represents the state of affairs in a particular administrative/business process, e.g., an insurance claim case, a reclamation case, etc., see Fig. 9.



Figure 9. Multi-desk-multi-people environment

2. Secondly, we need to agree on how a desk should be organized for a particular process type. When a person is assigned a task in the frame of a particular process and he/she comes to this process’s desk, the person should know exactly where to find materials he/she needs. The proper organization can be done through various organizing tools, e.g. folders.



3. Thirdly, we need a system that shows each person which desk to attend at each particular point of time, and what to do when behind this desk. Something like a red button for a flight attendant that shows which passenger needs help.



4. Fourthly, execution of some tasks may require information on the history of the process. Historical information consists of two components:

- Who did what when and why?
- How the desk that belongs to a particular process looked at a particular point of time

The first component requires that each worker who completes an assignment at a particular desk records his/her doings in the process log. The second component requires a kind of time machine (Fig. 10).

5. Fifthly, we need a To-do list on each desk with task assignments for this process. Then, everybody can see what has already been assigned to others, and nobody will attempt to complete a task assigned to somebody else (Fig. 10).



Figure 10. Additional components: Log Book, Time Machine, and To-do List.

Surely, the five features listed above cannot be effectively realized in the physical world. However, there are no particular reasons why they cannot be realized in the virtual world of modern computers. What is more, most of us are already accustomed to moving in the virtual world. For example, instead of going shopping to the Barnes&Nobel local bookshop, we can virtually go shopping to the Barnes&Nobel WEB bookshop (see Fig. 11).

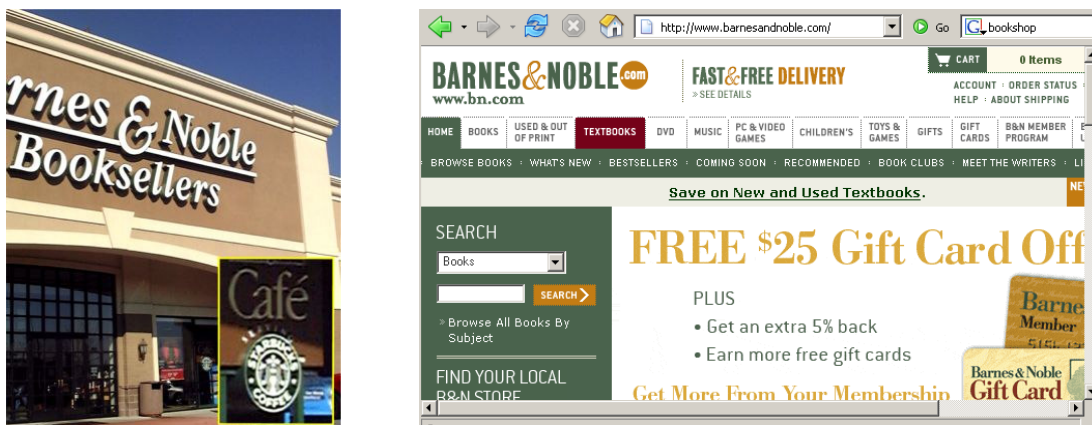


Fig. 11. Bookshops: left – real; right - virtual

We tried to realize Fig. 9 in a virtual world and succeeded. Our business process support system ProBis provides all 5 features listed above and many more. Fig. 12 is a snapshot of a ProBis screen. It shows how a person (IliBid) reports a completed task

assigned to him by another person in the frame of a process. There is a document attached to the task-reporting window that should be read. Behind the task-reporting window, the process's "desk" can be seen. It contains To-do list, Done list (process log book), and other related information, e.g., other documents on the desk. Task reporting was initiated by dragging a planned task from the To-do list to Done list.

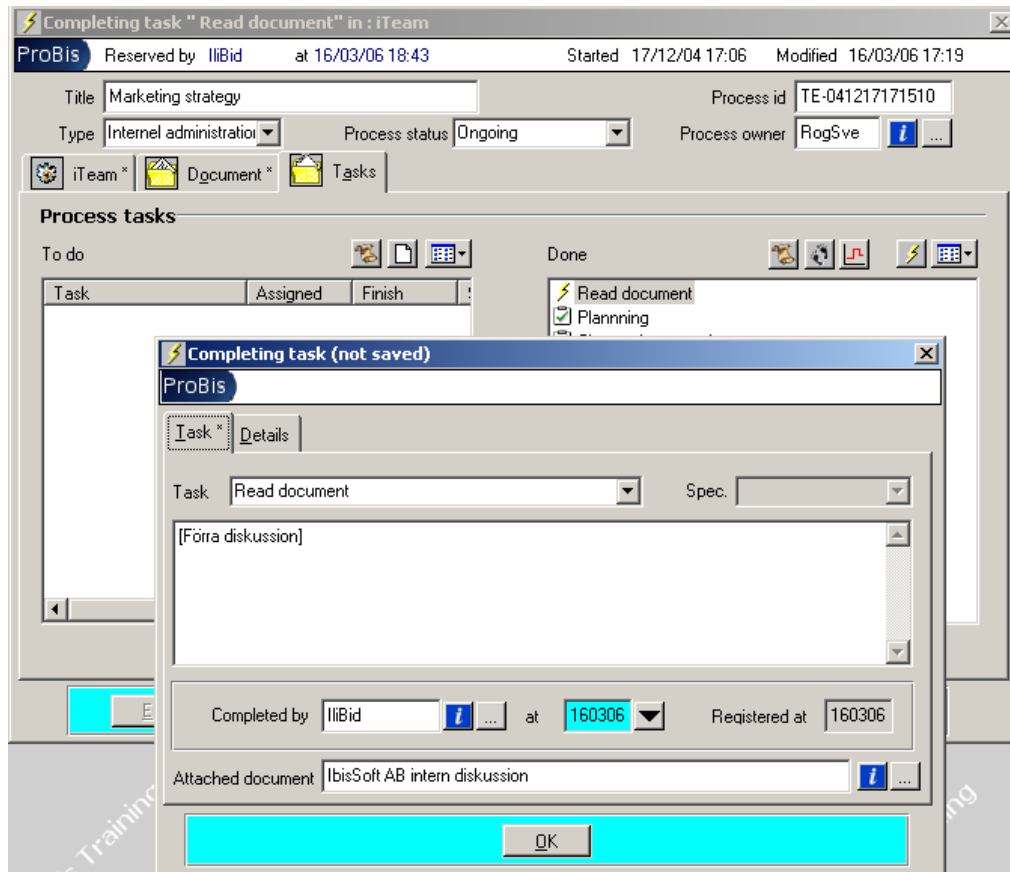


Figure 12. Screen capture from ProBis

A summary of ProBis features is presented in Appendix A. Other materials, including the evaluation copy of software can be found at:  
[http://www.ibissoft.se/english/download\\_main.htm](http://www.ibissoft.se/english/download_main.htm).

### Administrative/Business Process Automation

Henry Ford started automation revolution by introducing a conveyor belt into his assembly line (Fig. 13 left). Introduction of robots to substitute people completing simple operations (Fig 13 right) lead to fully automated lines.

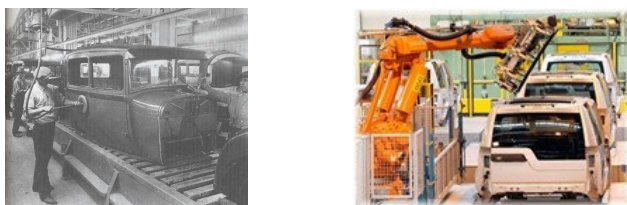


Figure 13. Automation of industrial processes: left - people completing operations; right – robots completing operations

Full substitution of people in administrative/business processes by machines is neither possible with today's technology, nor desirable. The most important operations in the administrative/business processes are intellectual and they concern decision-making. By handing decision-making to the computers we run a risk to become slaves of the machines. Automation of administrative/business processes should start with automating the logistics, i.e. introducing something like a conveyor belt for moving people to processes.

Creating a "conveyor belt" for the construction site information logistics is not a simple matter. In the Henry's Ford conveyor, each object was processed by each worker only once, and the operation length was always the same. Neither is true for administrative/business processes, the same person may need to attend a particular process many times, and the length of any particular operation may considerably differ from one process to another. Therefore, we cannot put people on a "conveyor belt" that will move them from one process's desk to another after given period of time. A more complicated scheme for automated logistics is required.

Automation of the construction site information logistics requires implementation of three JiT- principles, where JiT stays for just-in-time:

1. JiT-planning: where and when some person is needed
2. JiT-resource management: whom to move to this place
3. JiT-knowledge management: with which tool to complete the task

JiT-planning is a mechanism that determines whether a process needs to be attended by somebody and when. This mechanism should take into consideration how much has been achieved in the frame of the process, and decide on what should be done next based on the general rules, sometimes taking into account this process's history. We call this mechanism Just-in-Time planning because planning of the next steps is done based on the current situation, which depends not only on what people do inside the organization, but also what happens outside it. For example, before a customer confirms his/her order, no delivery can be planned.

JiT-resources is a mechanism to find a right person to assign to a task requested by JiT-planning. Several factors should be taken into consideration here: suitability of the person to the task, his/her availability at the time assigned to the task completion, his/her previous engagement in the process. Suitability requires matching qualifications of the person to the complexity of the task. Assigning an underqualified person will degrade the quality, while assigning an overqualified person will increase costs. Availability requires to see other tasks already assigned to the person, so that no double booking occur. Previous engagement in the processes may be required or forbidden. For example, a person who wrote a document is suited better to correct it after a review. However, a person who wrote a document cannot be assigned to review the same document.

JiT-knowledge is a mechanism that provides a person completing an operation with instructions, rules, laws, experiences that concern a situation in a case he currently works with. Metaphorically speaking, as soon as a person sits behind a desk to complete a task all manuals, and instruction books should flow to his desk.



Moreover they will automatically open on the page relevant to the task and the process at hand.

Automation of industrial processes based on conveyor belt resulted in

1. High productivity
2. Effective quality control
3. Performance measurement for improvement
4. Better traceability and accounting

There are no hinders to achieving the same effects in the non-manufacturing part of an enterprise through automating administrative/business processes based on the construction site information logistics. The first two effects (productivity and quality) are achieved by:










- Moving the right people to the right sites at the right time, i.e., ensuring the right qualification of people doing the job, and equal load for all workers.
- Supplying these people with right information on the state of affairs in the processes, as well as the processes histories (without any lengthy communications with their colleagues who worked on these processes before them).
- Supplying these people with right knowledge to process this information.

The second two effects (performance measurement and better traceability and accounting) are achieved due to having a logbook for each process.

## Business Process Reengineering

Henry Ford revolutionized the industry by introducing the “conveyor belt” logistics. To do that he needed to reengineer all factory processes so that all operations were completed on the conveyor belt. Introduction of the construction site logistics in the non-manufacturing sector also requires process reengineering. Business Process Reengineering (BPR) is old-hat about how to optimize business processes by excluding unnecessary operation, using best practices, etc. We give a new meaning to BPR – reengineer business processes to exploit the construction site logistics supported by a software system.

The difference between the new BPR and the traditional one is summarized in the table below, and explained in the text that follows the table.

	Traditional BPR		New BPR
Essence	Radical change	Process optimization	Change in logistics
Benefits	Large 	Small 	Large 
Risks	High 	Low 	Low 
Automation	Optional 	Optional 	Mandatory 

Roughly speaking, there are two types of traditional BPR, which can be referred to as radical change, and process optimization.

Radical change means that a company or organization completely changes their business processes, for example, from having a shop where people come to buy goods to become a mail-order company. Such radical change may or may not be complemented by some sort of computerized support of new processes, for example, by introducing a shopping WEB-site. The benefits of radical change can be large, but the risks are high, because the organization has no experience of the new ways of doing business. Even when radical change is based on somebody else's best practice, it does not automatically mean that it will work for you.

Process optimization consists of revision of an existing process in order to remove non-value added operations, automate some operations, etc. The nature of the process does not change, thus the risks that the reengineered process won't work are low. However, the benefits of partial optimization may be low in relation to the costs of change.

When information logistics is being changed, the company, or organization does not change what they are doing, but only how the things are being done. For example, if they had a shop they continue to have it. In addition, there is no need to change the tools used for completing operations. For example, if all documents in the company are prepared with the help of Microsoft Word, they can continue to be done so even after changing the logistics.

The absence of radical change in what is being done constitutes one reason why we consider the risks of the new BPR as low. The second reason is that a company or organization does not need to go over to the new logistics for all administrative/business processes at once. When production is being automated, there is no demand to introduce automated lines for all products manufactured by the company simultaneously. The lines can be introduced one by one. The same approach can be applied to non-manufacturing activities. Only after the organization has acquired experience of new logistics in the frame of one administrative/business process type, should it start introducing the new logistics in other processes.

We consider the benefits of the new BPR as large, because in the end, the improvement concerns all operations in all processes, and the use of human resources on the whole is optimized. Here, we are not limited to partial optimization as in the second type of the traditional BPR. As new logistics is impossible to arrange in the physical world, a computer system is always required. Therefore some level of automation becomes mandatory in the new BPR.

Note that the new BPR does not exclude using the traditional BPR after the transition to the construction site logistics has been completed. Moreover, this transition may help in conducting the traditional business process reengineering. For example, log of all activities in all processes introduced by the new logistics can serve as an information base for finding bottlenecks and other pitfalls in the existing processes. And when the organization decides on a radical change, the already established efficient logistical infrastructure may ease the pain of radical change and lower the risks of failure.

## Aligning People to Business Processes

Reengineering business processes to arrange them according to the logic of construction site logistics is not a trivial matter. This work is to be done by business process engineers based on the information received from people engaged in business processes under reconstruction. Thus, this is a matter for professionals to solve.

Once the processes have been reengineered they need to be introduced into operational practice. This means that all people participating in the processes should start using a new computer system. What is more, they will use a system that supports a way of working that they are not used to. This creates a problem, solution of which requires careful planning of the introduction phase. Our experience shows that despite the difficulties, transition to the new logistics is both possible and gives expected results.



## Conclusion

This paper started with the motto:

From "conveyor belt" logistics to "construction site" logistics:  
**Do not move information** to a person doing the next operation  
**Move a person** to information when he or she is needed

In the previous sections we tried to explain what this motto mean, how it can be implemented and why it is worthwhile to be engaged in such a project. If we convinced you that it might be interesting to know more, please visit our WEB site [www.ibissoft.se/english](http://www.ibissoft.se/english) and contact us (all contact details can be found on our WEB site).

Dr. Iliia Bider  
Director R&D IbisSoft  
September 2006

## Appendix A. ProBis Summary

### Why ProBis?

- Supports process-oriented way of working that results in genuine cooperation between all process's participants independently of which department they belong to, and whether a particular process instance follows the standard pattern, or deviates from it.
- Ensures that *document- information- and knowledge-management* is fully integrated into your business processes.
- Especially designed to support soft administrative processes.

- As standard, includes three generic process types that are suitable for supporting such processes as sales, purchases, CRM, help-desk, information spreading, decision making, administration of projects, and many more.
- Allows customization through modification of code tables and through adding new, specialized process types.

**ProBis for process participants:**

- View the tasks waiting for you, with full supporting details, including full history of relevant events for each task, and the documents concerned.
- Plan tasks for each other.
- Access any document by its purpose and usage – no need to know its name or location.
- Have documents automatically versioned when editing is completed.
- Retrieve any earlier document version.

**ProBis for line managers:**

- Immediate display of the current status of work in any project or department.
- Easy access to the history of tasks on any job.
- Instant analysis of workload of staff by project or function, ideal for scheduling and conflict resolution.

**ProBis for senior management:**

- Rapid access to reliable information on the progress of projects and the efficiency of departmental work.
- Simple, up-to-date statistics to support strategic planning and decision-making.

-----  
 For more information on *ProBis* and our other products and services, please contact IbisSoft at [info@ibissoft.se](mailto:info@ibissoft.se).

**Short information about the company:** IbisSoft ([www.ibissoft.se](http://www.ibissoft.se)) is a consulting company based in Stockholm, Sweden. It specializes in the borderland between Management and IT, the main focus being on organization of operative work in non-manufacturing business processes.

**Short bio of the author:** Dr. Ilia Bider ([ilia@ibissoft.se](mailto:ilia@ibissoft.se)) is a cofounder and Director R&D of



IbisSoft. He has MS in Electronic Engineering and PhD in Computer and System Sciences, and combined experience of 30 years of research (in the fields of business modeling, computational linguistics, databases), and practical work (business analysis, and software design, coding, sales, and marketing) in five countries (Norway, Russia, Sweden, United Kingdom, and United States). Dr. Bider has published over 30 research papers as well as a number of articles for practitioners. His main specialty is finding research topics in his business practice, and testing research results in the business practice. Dr. Bider is an inventor of the state-oriented approach to business process modeling that is based on the application of the conceptual ideas of the Mathematical system theory to the realm of business processes. This approach has been successfully tested in business analysis and application development practice of IbisSoft and its partners. Dr. Bider puts a lot of effort in bridging the gap between the academics and practitioners. He co-founded a series of international workshops on business process modeling where both academics and practitioners meet for fruitful discussions. He holds tutorials at international conferences to highlight the needs of practitioners for academic public. He sits on the editorial board of the Business Process Management Journal as a representative for practitioners.