Cypress Technology Solutions, Inc

White Paper

Requirements and Characteristics of Process Automation

Brad Mathews, Chief Technology Officer, Cypress Technology Solutions, Inc.

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Introduction

This paper is meant as a guideline to determining the success of process automation within an organization. I provide my definition of what process automation is and lay out the goals and objectives of a good process automation system.

The techniques and technologies employed in process automation are irrelevant. Whether you are using desktop applications communicating via COM or an HTML based user interface using J2EE or .NET is unimportant to this particular discussion. The technology that can produce the best results within the experience and budget of the organization is the best one to use.

What is Process Automation

Let us first define some terms[1]:

Process n. 1. A series of actions, changes, or functions bringing about a result. 2. A series of operations performed in the making or treatment of a product.

Automation n. 1. The automatic operation or control of equipment, a process or a system. 2. The techniques and equipment used to achieve automatic operation or control.

System n. 8. An organized and coordinated method; a procedure.

This paper concerns itself primarily with processes and systems as opposed to equipment or machinery where this term is most at home.

So here is my definition of process automation:

Automatic control of an organization's processes, policies, and communications using computer technology which brings about improved productivity and quality.

This is a good high-level definition. In order for process automation to be a positive factor it must *improve* the manual process or system it is replacing in certain key ways. That is not to say it should change the process or system. If a process is working and the associated policy is sound and gets the desired results, then basic principals and policies *should not* be changed. There are three key criteria that are used as guidelines in creating a good process automation system. These are explained below.

Whither Workflow?

Workflow applications and solutions are perfectly valid, but I consider them Process Automation "Lite". Workflow is used primarily to direct tasks from one person to the next according to the rules of the process. Process automation takes this concept to a whole new level, as you will see from reading this paper.

Three Keys to Process Automation

These three keys are:

1. Policy
2. Communications
3. Productivity

A successful process automation system will address these three issues above all others. If the system does not reinforce policy and improve communications and productivity it is a waste of time and money.

[1] All definitions from the American Heritage Dictionary, Third Edition

Let us take these one at a time.

Policy

First let us define this commonly misunderstood word.

Policy n. 2.a. A course of action, guiding principal, or procedure considered expedient, prudent, or advantageous.

We computer people also like to call this Business Rules. Examples of policy are: "All men must wear ties to project a professional image." "No product must ship until the invoice is paid and the payment registered in the accounting system." "Quality Control must be notified of any customer complaints by use of form 123k."

Good policy evolves within the organization by seeing what works and what doesn't and making fundamental rules to enforce what works and prevent what does not. Process automation should not seek to modify existing good policy. It should enforce it.

In a manual, paper process there is nothing preventing someone from failing to send form 123k to Quality Control except the training of the employees. Poor training is one primary causes of failure to follow policy. If someone does not know the correct policy he/she will make something up to fill in the void. This makes training extremely important. Unfortunately, very few organizations provide adequate amounts and quality of training.

Training Flaws

The prevalent form of training is verbal or "on the job" training. This leads to trainees misunderstanding instructions, trainers failing to impart complete information and no written record of what was taught. Employees need to be told what to do and how to do it multiple times and yet are still asking basic question months later.

Because the employee didn't fully understand the "training", the problem compounds itself when he/she attempts to train the next employee.

Remember the game you played in grade school where one person would whisper an instruction in one persons ear and her would whisper it into the next person and so on? By the time the instruction had passed a few people it had changed. By the time it has gone through the entire class, it has no resemblance to the original instruction. Think adults are any better at this game? This demonstrates a general inability to duplicate.

Until organizations realize how to train their employees fully and competently organizations need a way to enforce policies and procedures without the risk of someone changing them through ignorance or malice. (see http://www.trainingsuccess.com for an organization that can dramatically improve training within your organization.)

Process Automation to the Rescue

Process automation can greatly assist in preventing communication and training problems. By controlling the flow of a process, process automation can prevent incorrect policy and procedure. In our form 123k example above, as the customer service rep is taking notes from the call, an electronic form 123k is being filled out as well. Before she can submit her notes, the system requires that she fill out the remaining form 123k fields. This not only encourages correct policy with regard to form 123k but also forces the customer service rep to fill in *all* required fields in the form.

Here is another example. The shipping label system has a hook into the orders and accounting systems. The shipping label system simply will not let the user print a mailing label for an order if the accounting system does not show a payment.

Lets take this last example a few steps further. When the inventory system indicates a product is in stock and the accounting system says a payment has been made, a pick order is automatically printed in the warehouse and a mailing label is automatically printed out in the shipping department. In this scenario the policy is inherent in the system and cannot be violated.

Policy Rigidity and Process Automation

There is a special consideration to be aware of when assigning the computer to enforce policy. Depending on your philosophy this can be a godsend or a curse.

This special consideration is policy rigidity. You could consider perfect policy as that which does not need exceptions. It is firm, solid, and works every time. Unfortunately, humans seem incapable of creating perfect policy. One way of grading the quality of policy is to consider the number of exceptions required. The phrase 'The exception defines the rule" is simply a way of saying that the rule isn't perfect. Management often codifies exceptions into the policy. If a policy gets very complicated as a result of its list of exceptions and branches, it is bad a policy and will not be strictly followed. A new policy should be formed.

The computer is extremely stupid and literal. It will enforce the policy you teach it without evaluation or exception. If your policy is not perfect (most of the time) you will need to either improve it or codify the exceptions into the policy and teach them to the computer. If, at a later date, the policy fails to accommodate what you want to accomplish, the process automation system you have put in place will reject it.

There are a few options at this point. First, ask yourself "Is the policy exception I want to accommodate really what I want to do?" You have the policy in place for a reason and you should either follow it or decide that it is inadequate and change it. If you decide to change it, you need to teach the process automation system the new policy.

Here is a classic example. You have two different pricing models for your software product. First is per user licensing and second is megahertz licensing (your software costs more to run on a 700mhz processor than it would on a 500mhz processor). Your ordering, accounting, and packaging systems all recognize these models and strictly enforce them. Your top salesman has landed a major new account but the client wants per processor licensing as it expects to upgrade its computers in a year and does not want to pay a lot more.

Now, your ordering and accounting systems simply cannot handle this model. Do you modify the ordering and accounting systems to accommodate this one request? Add this model to your accepted pricing models and change the software? Deny the request? Or the most popular (and most dangerous) option, put false information into the system to trick it into accepting an order and creating an invoice along with copious verbal or written notes to make sure the order is handled per the exception?

Companies do not want to lose a big order, so this is a tricky decision and I cannot tell you the right answer. I will however try to dissuade you from picking the last option. As soon as you put information into the process automation system that does not match what it expects it becomes that much less valuable. Statistics will be wrong. It can cause unexpected results. And it sets a bad precedent. If you allow one policy violation, it will encourage others and you slide down that slippery slope. It does not look very steep from the top, but I speak from painful experience. It is.

So you need to have very well formulated policies and procedures before you even attempt to automate your processes. It is expensive to provide a lot of exceptions and very expensive to constantly change the system. Putting in a process automation system will force an organization to codify its policy and will very quickly point up bad policy.

Now it is possible to design a process automation system that minimally enforces policy. This may be the right decision for a new organization that simply does not yet know what policies and procedures will work. They can learn on this system and then create a better system later on. An organization with established policies and procedures should not do this. They lose 1/3 of the benefit of process automation right from the start.

Summary

Good policy enforced by a process automation system will provide consistently good results. But beware of garbage in, garbage out. The system will also enforce bad policy if that is what you feed it. You will find out very quickly just how bad your policies are.

Communications

This is the most precise and complete definition of communication that I have found:

Communication is the consideration and action of impelling an impulse or particle from source-point across a distance to receipt-point, with the intention of bringing into being at the receipt-point a duplication and understanding of that which emanated from the source-point[2].

An excellent working definition of an organization is: **Terminals[3] and communication lines sharing a common purpose.** That is all an organization is. And if that is all there is to an organization, you see the importance of communication. It is the blood and nervous system or an organization. And here is a another very important datum:

The faster and better the quality of an organization's communications, the more powerful the organization becomes. This is one of the most important areas that process automation can help an organization.

Good process automation does a number of things to communications within an organization:

1. Speeds communication.
2. Improves the quality and completeness of the messages.
3. Ensures accurate delivery.
4. Makes generating messages easier and faster.
5. Makes sure communication actually happens.

Speeding Communication

Before process automation used computers, communications were handled by passing forms, memos, reports, etc. from one terminal to the next until they arrived at the intended recipient. The medium used was paper and its manual nature made it expensive and slow. E-mail helped speed up the delivery of communications but in many cases the quality suffered.

Process automation can maintain the speed of e-mail and apply it to nearly all required communications within a process while still maintaining (and more often than not, improving) the quality of the message. All of those forms and reports are now routed automatically and electronically.

Improved Quality

Process automation improves the quality of the message by requiring certain data before the message can be sent. The orders system will not send an order to the shipping department without complete delivery instructions. The Purchase Order system will not forward a purchase order to purchasing without your supervisor's approval.

This eliminates an all too common problem with free form communications: Incomplete information. When a supervisor receives a report that is missing key data, he must send the report back to have the missing information included. This wastes his time and the time of the person preparing the report. This slows down the communication line and diminishes the organizations power.

[2] Reference: *Scientology 0-8 The Book of Basics*, L. Ron Hubbard
[3] We define terminal as a receipt point, destination point or relay point for communications.

Process automation cuts down on “Human error”. How many times has the wrong product been shipped because someone transcribed the wrong part number from an order onto the warehouses’ pick list sheet?

Accurate Delivery

The next point is ensuring accurate delivery. The process automation system routes the appropriate communications to the correct system or person according to the established policies and procedures. A new, untrained employee can be counted on to send the wrong communication to the wrong person. He does not yet know the organization and procedure. A good process automation system does not allow this.

Faster and Automated Message Delivery

Because we are dealing with an electronic database in the backend, the known information is automatically populated onto the electronic form. It does not need to be entered again. This also helps eliminate incorrect information from transcribing errors. Many communications do not need to be entered by a human at all. If all of the information is already known by the system, a completed message is automatically sent to the correct terminal.

Making Sure Communication Actually Happens

How many times have you discovered that important information was not given to you. Ever have an employee who was a “black-hole”, communications go to him but never leave. Process automation ensures that all communications that need to be delivered actually are.

Example

A very simple but powerful example of a process automation system improving communications is a Purchase Order system that I used in my last company. It could be significantly improved but it was a good start and easy to develop using Lotus Notes. An employee that needs a new computer fills out a PO form in Excel. He then uploads this to the Notes form along with priority, description, delivery info and approval structure information. The system e-mails his supervisor of the request. The supervisor approves the request and the next person in the line is automatically e-mailed and so on until the PO is approved at which point the purchasing department is e-mailed an order to purchase the item. If it is rejected at any point, it goes back down the line for amendment or circular filing. If a person on the route did not approve or deny the request within a certain time period, a reminder was sent out.

This saved 1 to 2 weeks over the old combination of fax, e-mail and intra-office courier. It also allowed the purchasing department and managers to see the progress of all PO requests at a glance.

This system did not enforce any policy more complicated than “POs must be approved by such and such people before purchasing”. What this did do was automate and follow up on all of the communications.

Summary

Communications is an extremely important factor in developing a process automation system. In fact if you are concentrating most of your energy into improving communications, much of your policy enforcement and improved productivity would come along for the ride.

Productivity

This all leads us to the Holy Grail of process automation: Dramatically improved productivity. This is really what it is all about. The purpose of policy is to enforce your company’s purpose which more often than not is to get your products made and into the hands of consumers. The role of communications is to facilitate the interaction between your people so that they can make products and get them into the hands of consumers.

Making your products faster, better, cheaper and selling them more efficiently is the ultimate goal of process automation. Enforcing good policy and improving communications is how you get there.

Making the Computer *Do Work*

But there is one more critical factor to consider. The computer itself can also *do work*. It can't replace all of your people and that is not the goal of automation. A computer cannot make a car. But it can manage the robots, people and assembly lines in the most efficient manner to get the car made.

Enforcing policy and improving communications are examples of the computer *doing work* and are probably the most important ones. But there are other areas where this can be done. A computer can compile reports, it can track statistics and make recommendations based on historical information. Look at your organization and ask "Of all of the functions that my organization is involved in, which of these can the computer do itself?" Your people are there to create products, come up with ideas, generate policy, invent, interface with your customers, investigate, evaluate, and manage systems and other people. They should not be doomed to entering the same old numbers into a spreadsheet cell or transcribing orders from form A to form B.

Most computers to date have been used to do nothing more than store information and allow retrieval of that information in various ways. This is a perfectly valid use of computers. But it is also a very limited use compared to their potential. Entire companies, governments and maybe even planets could be administered using computers.

Here is a great example of making the computer do work that I ran across many years ago. A custom project management application was built to facilitate the successful completion of the company's major projects. Projects were run from management's headquarters to offices around the world. The steps and details were entered into the system along with completion targets and who was responsible for their completion. Once the project was started, the system e-mailed all responsible parties their orders and when they were to be complete. When the steps were complete the responsible parties sent compliance reports to the project manager who logged them into the system. If a target date was approaching, a reminder was automatically sent. When a target date was passed, a nudge was sent with a CC to the person's boss. If the target date was way overdue, a report with a request for investigation was sent to the appropriate parties. Project timelines would be automatically adjusted based on non-compliance, unexpected circumstances.

An archive was kept of all of the projects, worldwide, along with compliance reports, progress reports, statistics and other important information. This allowed the project managers to effectively manage projects at great distances. They could track successful projects and evaluate unsuccessful projects. They could also track who did a good job and who did not along with detailed statistics.

The system enforced company policy on project management and project prosecution as well greatly facilitating communications.

The system had many effects on the company. First and foremost, project managers were able to get projects done faster. The success rate of projects improved dramatically. It pointed up successful projects managers and pointed out unsuccessful ones. It showed who habitually failed to get their targets done and who did a good job thus the company was able to promote and demote efficiently. The reporting capabilities of the system gave management an accurate, up-to-the-minute view of all ongoing projects. This allowed them to manage more effectively. The archives allowed management and project managers to learn from past successes and mistakes so they could continue to improve.

The company started expanding rapidly.

Additional Benefits

I have outlined the primary benefits of process automation in this paper. There are other tangible benefits I would like to address.

Lies, Damn Lies and Statistics

Statistics have gotten a bad rap from some circles. Many people have stopped believing in statistical reports after self-serving debacles such as the *Bell Curve* report which "proves" African-Americans are inherently less intelligent.

This dribble comes from incorrect data (or its seedier cousin, outright lies) and from the inability to evaluate the statistics correctly. For an organization (any organization whether a business or a government,) to manage its business, it needs accurate statistics relating to its own functions and their environment. Part of having accurate statistics is having the right statistics.

Stats can be hard to pin down if you do not plan them into your processes. When planning your process automation system decide on what stats need to be measured in order to accurately evaluate the health and productivity of the process. If these are known in advance then they can be accounted for in the process and the databases.

A manager will no longer need to ask for the weekly reports and wait 2 days for them to arrive, and how many want to bet that if he asked for the same report, for the same time period a week later, the numbers would be different. Instead, he can pop up a screen that lays all of the stats out for him. He can change from hourly to weekly to yearly data to see trends. A good managerial stats system will also allow him to enter information about changes in the system, personnel, policies and such. That way he can see any date-coincident factors that may have improved or degraded the stats. The system will allow the manager to view the information in many ways so he can reveal hidden associations.

You could consider this a sub-set or special case in our attempt to improve communications within the organization.

Paper Summary

There are three key elements to consider when designing such a system: Policy Enforcement, Communication and Productivity. Improving and speeding up communications beefs up an organization immeasurably and makes it faster and more powerful. Policy keeps an organization and all of its terminals and communication lines on track and moving towards its purpose. These elements lead to increased productivity and improved quality.

Process automation is a must for any company that wants to compete in this world. It is cheap compared to the alternative. And if you don't embrace it fully, your competition will.

Brad Mathews
Chief Technology Officer
Cypress Technology Solutions, Inc.
Brad@CypressSolutions.com