
UNIQUE IMPROVEMENTS TO BUSINESS PROCESS MANAGEMENT

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A WHITE PAPER FROM ERUDINE

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EXECUTIVE SUMMARY

The Erudine Behaviour Engine is an innovative technology for the generation and management of complex business rules. This paper examines how the unique benefits the

Erudine Behaviour Engine can bring to projects requiring business data workflow management, and specifically Business Process Management (BPM) and Business Process Automation (BPA) systems.

An Erudine based data workflow management system offers:

- Fast and accurate capture of business rules
- Quick ROI as system quickly automates common tasks
- Rules creation and changing with the confidence
- Built in rules testing to maintain system integrity
- High performance rules execution
- Additional advantages featured below

In short using the Erudine Behaviour Engine means that you can develop complex systems faster than you work now.

The Erudine Behaviour Engine is not in itself a BPM system, but can be used as the core behaviour processing engine within such a system or project bringing with it all the above advantages.

The BPM market is a large and fast-growing one, valued at \$362 million for the year 2002 and predicted to be over \$1.1 billion by 2008. An Erudine based product would offer significant advantages over competitors in this sector.

This white paper is one of a suite available from Erudine (www.erudine.com) that describe the functionality and advantages of the Erudine Behaviour Engine , as well as its application to many business areas.

INTRODUCTION

The Business Process Management (BPM) market was estimated at \$362 million in the year 2002 and it is predicted, very conservatively, to become \$1.1 billion by the year 2008. This is a massive increase in just over six years and one that is well reported by WinterGreen Research in *Market Opportunities, Strategies and Forecasts, 2003 to 2008*. They considered also that the markets for process workflow were at \$213.6 million in 2002 and expected to reach \$582.5 million by 2008.

PROBLEMS AND MARKET ISSUES

Data workflow systems have been proven to provide improved cost and time savings to many companies. However, many such projects still have problems that are inherent in the continual need to access the tacit knowledge of the individual – or indeed the inherent tacit knowledge of a whole organisation. An example – and not an uncommon one – is a well reported problematical project of the London Ambulance Service Computer Aided Despatch System (LASCADS). This was for the automated dispatch of ambulances but unfortunately it was reported to have had some serious flaws and difficulties. These were in the areas of:

- testing
- confidence in the system
- performance
- robust underlying code
- development time
- costs.

The unique technology in the Erudine Behaviour Engine can and will have a massive impact on BPM and the issues detailed above.

ERUDINE PROVIDING THE SOLUTION

WHAT IS ERUDINE?

The Erudine Behaviour Engine is a software development toolkit for the generation and management of complex business behaviour. A full description can be found at www.erudine.com. Workflow within Erudine follows an innovative Conclusion and Justification methodology that excels at quickly and painlessly capturing knowledge from domain experts. Erudine's core technology is a general purpose high performance behaviour generation and processing engine that has application in a wide range of rules dependant systems. The unique capabilities of the Erudine Behaviour Engine Erudine make it perfect to drive business data workflow systems.

THE CONCLUSION AND JUSTIFICATION PHILOSOPHY

At the heart of the Erudine Behaviour Engine is the observation that, in the area of knowledge acquisition, a user can always justify their conclusions when presented with a situation, even if they cannot list in advance all the rules that they use. Many systems available on the market require the business rules to be known in advance, which can often result in significant omissions and oversights.

An Erudine based application often starts out with no rules at all. As the expert who understands the task to be automated (probably not an IT developer) performs a given task (i.e. makes a conclusion) the software asks them to justify what they have done.

The Erudine Behaviour Engine automates the task of turning conclusions and justifications into behaviour. As the Erudine Behaviour Engine is taught about the task, it starts to make suggestions that the expert can accept or reject. A rejection implies that the system requires extra rules, thus the user is asked for the correct conclusion and to justify their reasoning.

The beauty of this process is that the expert simply continues to work within their knowledge arena, on their usual tasks, responding to the queries made by the software. Erudine learns their tacit knowledge the same way in which people learn: by doing the task. This key area is dealt with in great detail in the Erudine white paper Unlocking Tacit Knowledge by Conclusion and Justification.

A critically important issue in the development of software systems is to capture the requirements of the user clearly and concisely. However in many BPM or BPA systems there is a need to fully understand and capture the business logic knowledge of key individuals. This logic is more often than not the preserve of the business managers and not the IT engineers. The Erudine Conclusion and Justification process is particularly well suited to extracting knowledge from non-IT professionals.

A BPM SYSTEM

Generally a BPM system will consist of a number of nodes and data packets. The packets are passed between these nodes and at each node an action will be performed based upon the data in the packet and other external information.

In a BPA system, an Erudine based engine will be placed at each processing node in the data flow network. At each node the initial Erudine engine contains no rules. The expert then starts to perform his or her job as usual: as each data packet reaches the node, the expert reaches a conclusion about this packet.

The conclusion will usually be in the form of a new node to pass the packet to, a change to be made to the packet, or some other external process that needs to be performed. The Erudine Behaviour Engine takes note of this conclusion and prompts the expert for a justification of the conclusion reached. The system ensures that the justification is a consistent one, i.e. that it does not conflict with any previous cases.

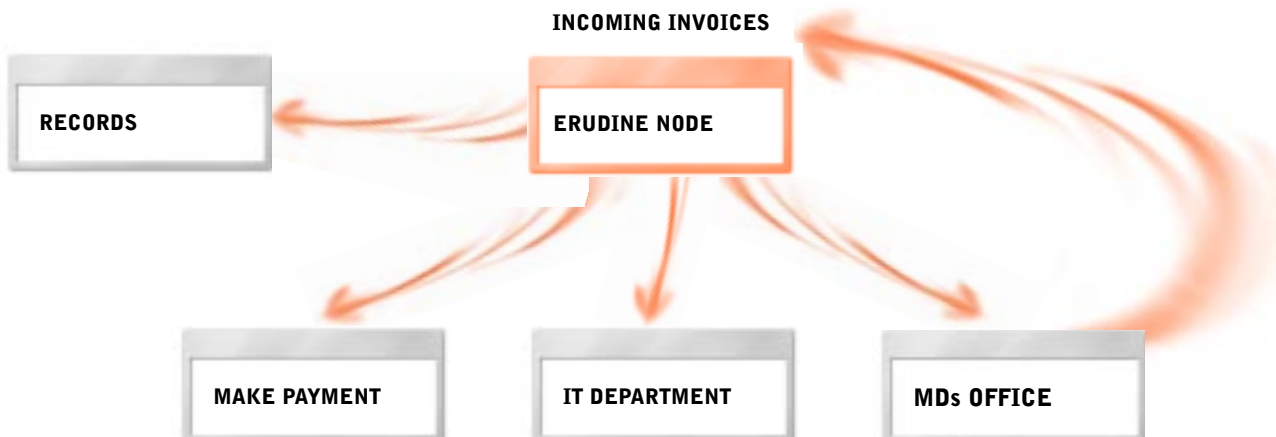
As each new packet is processed at the node, the Erudine Behaviour Engine presents its conclusion based upon its current rule set. If the conclusion (the action to be taken on the packet) is correct, the expert allows the system to proceed; the user only needs to intervene when the system makes an incorrect conclusion due to its incomplete rule set. As the user continues to perform their job the rule set quickly builds up and the system is soon able to process all the commonly occurring packet scenarios correctly, requiring the user to only confirm its conclusions.

The system's performance can be measured (i.e. what fraction of the packets it correctly deals with) and once it reaches a required threshold (which may or may not be 100%) it may be allowed to proceed completely autonomously, or the user can remain an overseer, in an exception management role (although the system will learn how to manage each exception in turn and will thus handle them correctly in future).

Extremely unusual occurrences can be explicitly catered for, or detected, using relevance analysis that determines if the data packets parameters fall well outside of its previous experience. This rules acquisition process is illustrated in the following simplified example.

ERUDINE INVOICE PROCESSING EXAMPLE

This example examines how an Erudine Behaviour Engine built system could be used to process incoming invoices. Within this example company it is the role of the accountancy technician to handle incoming invoices. The possible route that invoices take when they reach the company is shown below. In this case the user who will be training Erudine is the accountancy technician as s/he fulfils his or her day-to-day job.



Incoming invoices

Let us consider what happens when the first invoice that will be processed using the new Erudine Behaviour Engine is received.

ID	INVOICE DATA	ACTION PERFORMED	JUSTIFICATION
1	\$45.00 - Stationery - - Office Supplies - - - We Clip It Inc.	Make Payment Record - Attach Paid	Incoming Invoice

This is a simple case and the expert decides to simply pay and send the invoice to Records with an additional 'Paid' flag attached to it. The Erudine Behaviour Engine requires a simple justification for this decision, and the expert justifies his or her actions by the fact that the item was an invoice. Several more simple invoices follow and Erudine prompts 'Make Payment', 'Records - Attach Paid' and the expert concurs, allowing the engine to automate the task.

ID	INVOICE DATA	ACTION PERFORMED	JUSTIFICATION
6	\$150.00 - Monitor - - Computers - - - Big Chip Inc.	IT Department Record	Invoice for computers

For Invoice 6, Erudine again prompts 'Make Payment', 'Records'. However the expert overrules the system and sends the invoice to the IT Department and Records, because they handle their own accounts. It requires a justification for this change in conclusion, as logically there must be some difference between Invoices 1 and 6 to justify the change in workflow and the expert provides a satisfactory justification, this item was an Invoice for items categorised as Computers.

ID	INVOICE DATA	ACTION PERFORMED	JUSTIFICATION
12	\$100.00 - Mice - - Computers - - - Bad Debts Inc.	Email invoice to Bad Debts Inc. requesting payment Record - Attach Unpaid	The invoicing company owes has an unsettled debt

After a few more correctly processed invoices, No.12 arrives. Our expert notices that ‘Bad Debts Inc.’ still has an outstanding account with the company and that company policy is not to pay such invoices. The Erudine Behaviour Engine prompts ‘IT Department’, ‘Records’, however the expert instead sends an email requesting the payment of previous debts before their money is released and, records Unpaid. He uses the justification ‘The invoicing company has an unsettled debt’. Thus any invoices from a company with bad debts to this company in future will generate an e-mail requesting payment.

Note that this justification requires knowledge external to the incoming packet, the concept of being ‘in debt’. The Erudine Behaviour Engine can make decisions based upon any supplementary knowledge to which it is given access. After the system has been operating correctly for some time, management decides to switch over to an autonomous mode where the prompted action is performed automatically without confirmation. The system processes many invoices correctly; however the following invoice then arrives.

ID	INVOICE DATA	ACTION PERFORMED	JUSTIFICATION
345	\$500,000.00 - 54 East Parade - - Property - - - Real Estate Inc.	MD’s Office	Invoicing > \$5000

The system is operating in autonomous mode, but fortunately relevance analysis is enabled. The Erudine Behaviour Engine recognises that the invoice value is well outside the range of anything it has processed before. It thus alerts the expert and asks for a manual confirmation of its conclusion ‘Make Payment’, ‘Records - Attach Paid’. The expert immediately recognises that any invoice over \$5000 must be sent to the MD’s Office for payment and makes the following conclusion. The invoice soon comes back from the MD.

ID	INVOICE DATA	ACTION PERFORMED	JUSTIFICATION
146	\$500,000.00 - 54 East Parade - - Property - - - Real Estate Inc.	Make Payment Record - Attach Paid	MD approved

Erudine Prompts in this case ‘MD’s Office’. The expert, expecting this prompt, corrects the system and pays the invoice. The justification being that MD Approved invoices are always paid.

The above example is a simple one, but illustrates the Conclusion and Justification model in use. It should also be noted that each packet upon which a new rule was made becomes a test case. The system can just ensure that no new rule breaks the way in which any of these confirmed test cases would have been handled.

Whilst known business policies can of course be explicitly entered into this engine, this example shows how easily the actual behaviour can be put to use, and tacit knowledge about the invoicing process can be quickly captured. It also illustrates how the full rule-set is not required to be stated up-front, but is captured through use.

FURTHER APPLICATION

DATA MINING AND RE-ENGINEERING THE BUSINESS BEHAVIOUR

Automating a workflow process produces not only an efficient autonomous or semi-autonomous process, but also a behaviour-set that represents the organisation's business process.

This information is very useful as data mining behaviour can provide useful insights into the processes actually being used. Inefficiencies can be found, new working methods planned, and 'what if' scenarios tested. An Erudine based business process automation system is particularly well suited to these tasks as it can very accurately extract the business behaviour actually in use, rather than the 'official' process or the employees' believed model of the process. The ease and confidence with which business behaviour can be added, or changed, also facilitates 'what if' exercises.

Because of Erudine's built in test cases, process re-engineering (and thus business behaviour editing) can be undertaken with confidence, as the impacts on these test cases can be automatically calculated and any problems highlighted for examination.

INTERFACING WITH EXISTING/EXTERNAL SYSTEMS

Being able to seamlessly import and export data to existing internal or external systems is vitally important to an efficient data workflow system. The Erudine Behaviour Engine Erudine can create and maintain data translation and transformation rules. The same techniques and rules-based approach allows data cleansing to be performed with ease.

THE ERUDINE BEHAVIOUR ENGINE AS A GENERIC DATA PACKET SWITCH/PROCESSOR

Whilst this paper has examined the use of the Erudine Behaviour Engine in the context of business process automation, it is also well suited for use in fully autonomous high performance data processing/switching applications. The Erudine Behaviour Engine brings its inherent robustness, rule execution performance and interfacing capabilities to these problems.

Within this white paper we have presented the Erudine Behaviour Engine as a behaviour process module within a business data workflow application. It has been clearly shown how the Erudine Behaviour Engine can deliver a number of key benefits that are specific to the Erudine Behaviour Engine and not attainable by other processes and systems. In summary:

- The behaviour captured is the workflow actually performed as opposed to what it is believed to be.
- Behaviour capture becomes a relatively painless issue as behaviour is acquired through the normal performance of the expert's job.
- ROI is extremely fast as the system quickly learns to handle the most commonly occurring cases, quickly removing 'the burden of the trivial'.
- Unlike other competing conventional systems, behaviour capture can be performed by personnel with few IT skills.
- It provides a high level of confidence. Because the system quickly handles the common cases correctly, users can very soon see correct results being produced and so confidence in the system quickly builds.
- Changes and new rules can be added with confidence, as any new rules are automatically cross-referenced with every preceding rule.
- The Erudine Behaviour Engine's unique rules execution technology enables vast numbers of rules to be efficiently run on huge numbers of incoming data packets.
- The Erudine Behaviour Engine provides seamless integration with both standardised and proprietary data interfaces.
- There is a strong audit trail, as each behaviour is made it is tracked to the packet and user who made it.

The Erudine Behaviour Engine could be used as a plug-in module for an existing BPM system or as the basis for a new system. Erudine can also be used in a wide variety of other rule-based data processing systems. A visit to www.erudine.com will provide further information and technical white papers explaining the underlying technology as well as applications to other business areas.

REFERENCES

Rice, P. S. and Bamber, F. W. Unlocking Tacit Knowledge by Conclusion and Justification, (2004). Erudine, www.erudine.com

Sucharov, T. Innovations in Code Maintenance, Erudine (2004), www.erudine.com

WinterGreen Research, Market Opportunities, Strategies and Forecasts, 2003 to 2008.

Gonzales, A. Business process automation, Tech Web News (2004).

Byron, D. Business Process Automation and Deployment Software Research 2003.

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