

# Intellix



## Automating Expertise

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**For further information, please contact:**

Mr. Thomas Stryger Olsen  
Intellix Denmark  
Nikolaj Plads 32,2  
DK-1067 Copenhagen K  
Tel: +45 33148100  
Fax: +45 33148130  
Email: [tho@intellix.com](mailto:tho@intellix.com)

## **A Birds Eye View of Intellix**

*What began as an artificial intelligence learning solution launched in the mid 1990's has expanded today into the **Intellix Designer** and **Intellix Knowledge Server**: forming a unique decision support tool improving excellence in business operations through the automation of expert advice. The Intellix product suite combines human experience and breakthrough learning systems in a straightforward, easily understandable manner allowing customers to create effective and meaningful knowledge solutions.*

## **The Knowledge Management market**

Intellix participates in the multi-billion dollar knowledge management market, one of the few sectors of the IT market that showed any signs of growth in 2002. According to the independent research body Ovum, "The overall Knowledge Market as a whole was estimated to be worth some \$16 billion dollars at the end of 2002, and will continue to be the fastest growing segment of the software market over the next five years, totalling more than \$21 billion by the end of 2006."

The reasons for this buoyancy are plain: knowledge and information management remains a key driver of cost reduction and success for businesses today. Against this backdrop, many companies also face labour shortages and skill deficiencies – not to mention an aging workforce. These trends are causing some concern as the loss of key personnel requires expensive rebuilding of organizational expertise.

## **Task automation**

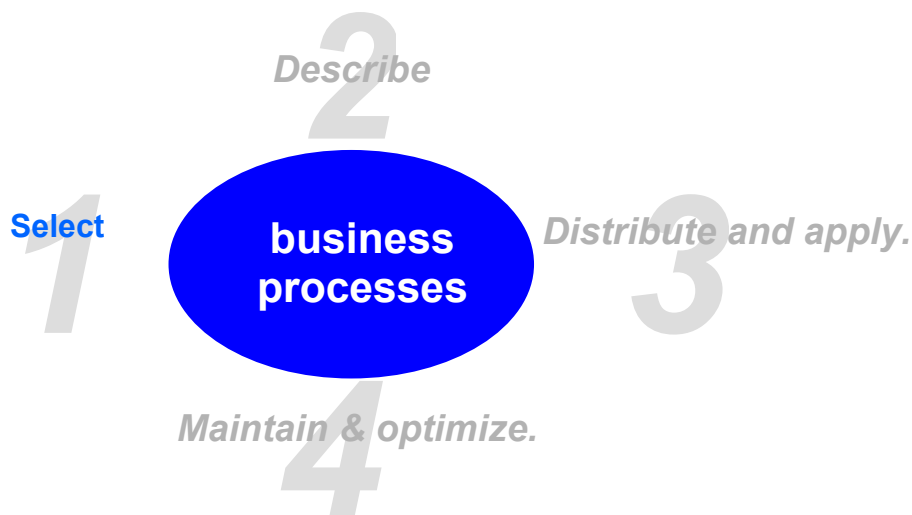
Intellix knows that human experts are rare, and where possible, human resources should be used for tasks that are complex and of a high-value added nature. Intellix could theoretically help any industry with their approach, from florists to farmers, though the current product range targets two key industries: the process industry and the financial services sector. Within these industries, repetitive tasks have tended to be automated, but complex, infrequent ones have not. As the frequency of a task increases, it often becomes cost-effective to automate it. However, many tasks are performed infrequently, or change often enough to make it seemingly not worthwhile to automate. Intellix significantly lowers the cost for companies to automate tasks by allowing the experts themselves to automate their own expertise, and therefore opens up a number of possibilities for companies to improve operational excellence.

## **Intellix -- unique in the market**

Intellix develops software that helps companies automate decision processes to improve consistency, lower costs and promote innovation. Intellix' focus is on 'Business to Employee' or 'Expert to Employee' applications, where the knowledge of a company's experts is distributed throughout the organization. An Intellix project is easy to roll out, and an XML framework ensures

easy integration to back-end systems and databases – so there is no need for large-scale IT involvement. The experts themselves are able to build, deploy and maintain knowledge solutions. Minimal training is needed and no programming skills are required to build basic solutions.

Intellix products are applicable in many different areas. Solutions range from troubleshooting wizards for a few employees deployed within a week, to highly integrated enterprise-wide solutions used by hundreds of concurrent users. Solutions support employees as they interact with their (internal or external) customers, or to optimize/troubleshoot processes. Experts are enthusiastic because the routine enquiries are handled automatically by the system and staff are freed up to concentrate on exception situations and other processes that challenge their expertise in the organisation -- and to put more creativity into their work.



### **How Intellix works**

The core product suite is based on the premise that a company's experts have knowledge and experience that can be used to improve a business processes. These areas of expertise, once **selected**, can be **described** and structured using the **Intellix Designer**. The **Intellix Knowledge Server** is then used to **distribute** the captured expertise so that it can be **applied** and business process performance improved. Experts play a vital role in both the capture and the **maintenance** of the expertise.

### **The Intellix Designer**

Intellix Designer is a unique product that helps experts model and automate human expertise and overall decision processes. The **Intellix Designer** provides a structured method for a non-programmer to build a knowledge model. Business Experts lay the foundation for the model by providing examples of known situations or business cases. The Intellix Designer applies the neural network to generate the actual knowledge model. If necessary, the Intellix Designer poses questions to the business expert in order to make the model more robust. All modelling steps are completed without the need for programming skills.

By taking full advantage of the flexibility and versatility of the **Intellix Designer**, customers can separate business logic from more technical matters in knowledge management solutions. This allows business experts to maintain best practice models themselves without involving their IT department or consultants.

And, in the era of empowerment, Intellix software is centred on a concept of giving solution ownership to the business expert who uses the **Intellix Designer**, much like a spreadsheet, to register best practices, solve known problems and provide options for unknown problems based on recording past experience.

When a knowledge model has been created, it is then deployed using the **Intellix Knowledge Server** so that anyone can quickly tap into the knowledge of experts. The model is easy to maintain and develop by further input and users can 'feed back' information or exceptions directly to the expert. After it has been created the model can be distributed via a web interface simply and effectively to any channel using the **Intellix Knowledge Server**.

### **The Intellix Knowledge Server**

The **Intellix Knowledge Server** is a highly robust and scalable server-based product that enables users to deploy knowledge solutions built with the **Intellix Designer**. Knowledge solutions can be accessed using a standard web browser. They can be tailored to the differing needs of customers, employees, and business partners.

The Intellix Knowledge Server provides enterprises with a tool for deployment of decision support using advanced knowledge solutions. It is easily customised to support transaction logging (via the Intellix tool called "Session Store") -- a requirement of the financial services community.

Naturally, integration is the cornerstone as Intellix' product suite can be linked to external databases and legacy applications by use of XML, the glue that is used to connect systems, (**eXtensible Mark-up Language** that is akin to a smart HTML and defines types of information).

The **Intellix Knowledge Server** makes it possible to distribute models of specific business processes built with the Intellix Designer. These models usually contain a mix of best practice knowledge, business rules, and company policies. By making such a knowledge-based business process model available in-house you obtain several substantial advantages:

- ✓ The knowledge held by company experts is made available throughout the organisation
- ✓ Business processes and best practice knowledge is documented efficiently
- ✓ The experts spend less time dealing with routine tasks, and the core competencies of the organisation are made available where they have maximum impact.
- ✓ Business policy changes can be implemented rapidly

### **For large, medium and small applications**

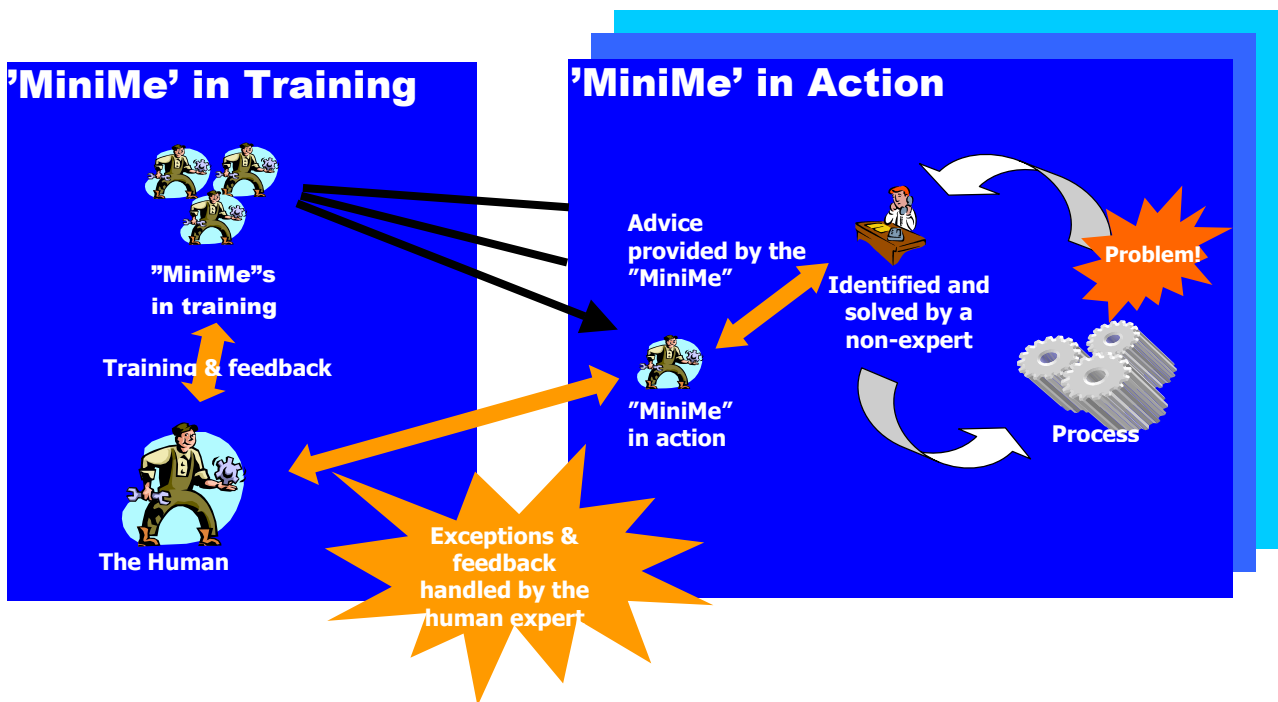
Scalability is a main feature of the Intellix Knowledge Server. It allows companies to distribute expert knowledge to large numbers of users - Intellix has installations where several hundred employees utilize a knowledge solution simultaneously.

### **The Intellix Entry-level ease**

Intellix market research confirmed that companies are generally not willing to dedicate major capital to new systems, before they are actually able to try the application in-house. That is why Intellix makes its entry-level package very affordable. The start-up kit provides customers a full working solution including training, the software and many of the necessary add-ons.

### Introducing the concept of a "MiniMe"

Once expert users have entered in the necessary parameters by describing situations (cases), they have in fact replicated their knowledge. Intellix calls this a "MiniMe." These "MiniMe's" can be deployed wherever the automated process is run, thus distributing expertise 24/7, improving operational performance and freeing up the expert's time allowing them to concentrate on more meaningful, forward-looking issues.



Intellix envisions a world of 'MiniMe's acting like intelligent software agents trained by business experts to provide services, mostly in the form of advice, on the experts' behalf. 'MiniMe's allow businesses to profitably address problems where it previously was not cost-effective to deploy an expert.

## Case Study: Solving Problems in the Process Industry

*The need for continuous improvement as well as innovation in increasingly congested markets are all part of the challenges driving this \$USD 6 trillion per year business, of which the chemical industry accounts for some \$1.4 trillion. Intellix is a new and active player in the process industry helping customers automate and distribute their expertise to improve operational excellence and promote innovation. Intellix' reference customer in this industry is Eastman Chemical, one of the top 10 global suppliers of custom-manufactured fine chemicals for pharmaceuticals, agricultural chemicals and other markets.*

### **Intellix: Meeting customer needs**

Chemical companies support vast numbers of processes -- ranging from complex and continuous to simple and infrequent batches. The needs with each process are different, but almost all require expert support in some form. With continuous processes the ability to quickly detect and resolve process bottlenecks as soon as they occur is critical. With batch processes, it may be troubleshooting of set-up that is the factor limiting the process efficiency.

Because of the wide range of issues that can arise in such an environment, IT solutions to improve the efficiency of processes can be complex and are often not cost-effective to develop. Consequently, humans are often still the first line when it comes to problem solving – especially for complex, high value and infrequently run processes. Given the scarcity of experts, this can be a limiting factor in improving efficiency and lowering costs.

Intellix provides a solution to improve productivity by allowing process experts themselves to 'replicate' and automate their expertise. This has a number of benefits:

- Improved efficiency on the processes, lowering costs
- Expert quality advice is available 24/7
- Experts are freed up to spend more time on more productive tasks
- New employees can quickly access and apply the expert knowledge
- Consistent advice offered

As an industry innovator in the application of IT technologies to the chemical industry Eastman immediately saw the fit of Intellix products to their company. Their decision to deploy Intellix enterprise-wide came after a six-month evaluation by Eastman in their Kingsport, Tennessee (USA) facility during which time pilot systems were built for a range of applications.

*"We chose Intellix because of the ease-of-use of their Designer software and the diversity of applications that can be built with it. The Intellix Designer gives the business experts the capability to build, and more importantly maintain their own knowledge-based systems. This allows the true experts to capture their knowledge in a system and to make that knowledge*

*available to a wide range of individuals without relying heavily on IT resources. By using the Intellix suite of applications, we captured knowledge that might have otherwise been lost through retirements or reorganizations – leading to a more efficient company."*

*Mike Pearce, Eastman Chemical*

## **Case Study: Serving the financial service industry**

*Operating in increasingly competitive financial markets, Intellix has a proven record of accomplishment serving this industry dating back to the foundation of the company. Today Intellix serves both insurance companies and banks with **expertise automation** systems that enable them to offer their customers the best total value across their broad range of products.*

### **Intellix helps advise banking customers**

For bankers, investment advice is a complicated area, notably in today's choppy markets. Many factors influence the choice of an investment strategy, since this requires investment knowledge and the ability to understand and match a strategy to a customer's situation. Such expertise exists centrally in most banks, but the challenge lies in distributing that expertise to a bank's customer advisors in all its branches.

To address and solve some of those issues, an Intellix solution was pivotal in rolling out an Online Investment Advisor product to major Danish financial institution, Jyske Bank (2002: some 3000 employees, gross income of DKK3B and ranked 125<sup>th</sup> of Nordic top 200 companies). The Online Investment Advisor has consequently been able to provide investment advice support to all investment advisors in Jyske Bank - allowing a consistent approach in assessing the needs of customer and recommending an investment portfolio based on this.

### **Question and Answer: a step-by-step approach**

Customer needs are determined through a series of questions asked by the system. The Intellix Online Advisor uses patented neural network technology so that based on the answers initially given, and the direction the questioning takes, an individual process results that leads to the establishment of the "ideal investment strategy" for the customer. Besides finding the optimal solution, the Intellix system also provides valuable documentation of the entire process.

### **The Expert learning process at work**

The Intellix Online Advisor was originally 'trained' using examples of daily advice sessions where customers had received investment counselling from the most experienced and knowledgeable experts in the bank. Using those cases as a base, sufficient expertise was gained for the Online Advisor to act independently and today the system is able to recommend an expert solution for nearly any situation.

### **Online Access for all**

All Jyske Bank's investment advisors have access to the system; a plus for branch offices located throughout Denmark or even in outlying Danish islands. Investment strategies and portfolio recommendations are updated on a daily basis from a central location.

Not only does the Online Advisor meet Danish legislation on broker ethics, it is also provides the bank a strong legal-compliance tool as it references the original criteria for the advice given in case of disagreement.

### **Intellix removes bottlenecks**

By automating investment case evaluation, the time needed for an advisor is reduced. Therefore the advisor is free to spend more time on the more complicated issues, and of course on interpersonal relationships, vital in the banking industry. Additionally, investment advisors are able to rise to the challenge of the more sophisticated cases.

**"As a customer counsellor and dealer, I am certainly not an IT expert. Despite this, I am able to train the Intellix system, and am living proof how easy the system is to use. That was a key issue when choosing Intellix. Some of the profiling questions we asked in the past may not have carried the value we needed.**

**So, turning things upside down and formalizing our practices has been a valuable lesson to us. Expertise has not only been gained by the Intellix system but also by the human experts driving it. Our overall level of service and ability is much higher now"**

***Ejnar Frederiksen, Jyske Bank***

## **Company history and the Intellix® story**

The founder of the company engineer Christian Liisberg laid the foundation for the Intellix back in the 1980's while employed at the Risoe Danish National research centre where a group of scientists were studying a neural network called **Self Optimising Universal Learners** (SOUL) targeted at image recognition. Liisberg developed a decision support system called **ZEUS** in 1990 whose aim was to permit users to access expert knowledge. Although the system only enjoyed limited take-up, it was the incubator to transform ZEUS into a product called **Case Agent** (whose aim was to make informed and consistent decisions for local governments).

Liisberg soon recognized the vast potential of neural networks and started his own company Chr. Liisberg A/S in 1992. The neural networks of the mid-1990's were no doubt akin to a "technology in search of a solution," they were the forerunner of today's applications. The beauty of the technology was incremental learning and unlearning meaning the ability to "learn" and "unlearn" in real time, without having to re-teach it every time.

In 1997, the company name changed to Intellix A/S -- the mission was "delivering software to gather, store and communicate knowledge" – tenants still true today. The name comes from "**Intell**-igence" and "**ix**", borrowed partially from a near Latin root meaning you see, you do see, you are seeing. The brief name research indicated no overall negative international meanings associated with the word "Intellix" and today it has grown into an interactive situational based learning platform suitable for any type of learning application branded as the **Intellix Designer** and **Intellix Knowledge Server**.

In 1998, the concept of *knowledge domains* was born and Intellix released its first decision support system called the Knowman Designer. Consequently, the SOUL Analyser became the Knowman Advisor. Intellix then introduced the Knowman Knowledge Server to make knowledge domains accessible through the Internet. This product portfolio laid the foundations for the development of today's Intellix' product suite.

What has characterized **Intellix** as genuinely unique is the fact that the products were designed and built 'bottom up' and decisions about the look-and-feel of the product were made on a 'need to' basis. In fact, when the development team embarked on the software creation itself, they had no pre-conceived notions regarding the final product, liberated from the traditional development constraints; they thought "out of the box." The basic and overriding goal was to create a

knowledge delivery tool where anybody with minor computing training could store knowledge for later use and improve on decision-making.

In 1997, a major Swiss insurer adopted Intellix' solution to report claims over the Internet. A Danish financial institution adopted an Intellix solution for its help desk in 1998, and in 1999, research on a server prototype began, targeting integration to back-end open IT frameworks. From 2000 to 2001, Intellix matured and deployed that framework allowing them to fulfil key customer requirements. Mr. Allan Hansen joined the company and introduced a new development processes, thus strengthening overall R&D. Intellix also won "Reader's Choice PC World Product", further evidence of the product's applicability.

Intellix is a Microsoft Certified Partner, marking the company's clear focus to support and develop for the Microsoft Platform. Intellix is now aligned with the Microsoft ".NET" roadmap. Intellix has also developed components for J2EE (Java 2, Enterprise Edition) facilitating integration to these environments.

### **Intellix today and tomorrow**

Realising the specific strengths of the Intellix product suite the company transitioned from being a consulting-focussed company to become a product company. Today Intellix targets the needs of the process and financial industries – two disparate industries but strikingly similar in their need for Intellix' knowledge based solutions. By the end of 2003, Intellix plans to expand its operations in these two selected industries with dedicated sales and marketing activities supporting customers in niche markets in the USA and Europe. Intellix is currently in discussions with several large industrial groups throughout Europe regarding further product trials.

The company is located in Copenhagen, Denmark and has a dedicated team of 15 talented researchers, developers, software testers and managers.

## **Artificial Intelligence and Intellix**

*Intellix capitalises on **artificial neural networks** – a term that was initially inspired from the functions of the human brain. "AI" is a term that is often misunderstood and conjures up many kinds of thoughts. What are neural networks? Why is understanding them capstone to grasping the services provided to Intellix' customers?*

### **The backbone of artificial intelligence**

One of the basic units of artificial intelligence is the "neural network." Originally these simulated the basic thinking functions of the brain. The process of designing a neural network is an iterative process and today, Intellix has created a working neural network system. The system is straightforward and users never know they are using neural networks whereas previously one had to tweak many parameters. By eliminating that level, today's approach is very user-friendly.

### **Learning: *the brain and Intellix***

Much as the brain learns from experience, Intellix' neural networks learn by practical examples provided by users. The system *learns* new knowledge by adjusting a set of given parameters making up the learning model. The learning ability of a neural network is determined by its architecture and by the algorithmic method chosen for training.

### **Neural Networks: *helping to make decisions***

Neural networks perform successfully where other methods do not, recognizing and matching complicated, vague, or incomplete patterns and can solve a wide variety of problems such as collecting knowledge to support decision-making. Neural networks are the backbone of knowledge acquisition for expert systems in stock market forecasting with astonishingly accurate results and are useful for bankruptcy prediction for credit card institutions. Today, Intellix helps financial institutions provide investment advice.

Although neural network systems can interpret, predict, diagnose, plan, monitor, debug, repair, instruct, and control, some of the most successful applications of neural networks are in categorization and pattern recognition. Systems classify objects under investigation (e.g., a pattern, a chemical compound, the financial profile of a customer) as one of numerous possible categories that, in return, may trigger the recommendation of an action such as a solution path or a financial plan. Traditionally the term 'expert systems' was applied to rigid rule-based decision systems, and today the term is used generically to describe "advisors" or "decision support systems."