

# The Business Value of Enterprise Search <sup>2009</sup>

A review of cost effective solutions for managers

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July 2009

Business Value Series – No. 1

This Business Value report discusses the business and organizational issues a technology raises. We avoid buzzwords and unintelligible jargon wherever possible, and favour a straightforward discussion of costs, benefits and risks. If you would like to be notified of future reports in this series please go to our web site and register.

## Enterprise Search - Introduction

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Only ten or fifteen years ago the task of searching for information was a fairly straightforward matter. Most information was held in transactional databases and various query languages could be used to search for pertinent records. A typical search might involve extracting details of all customers with particular demographics, or with a history of problematical payments. Most of the other information in the organization was stored in filing cabinets - contracts, memos, product descriptions and any other information that was needed for the organization to function correctly. Today most of this information is stored electronically and the problem of information search has grown with the diversity of information sources. The proliferation of email use has in itself created problems. Various regulatory requirements typically mean that emails must be archived and made available for interrogation. Word processing documents may contain anything from details of new product developments through to contracts with customers. Sensitive documents could be stored away under lock and key - today they typically sit on a disk drive allowing anyone to view them that has the relevant permissions.

From a purely economic point of view information search is becoming a more costly exercise, with plenty of scope for inefficiencies, security breaches, high maintenance overheads and unmanageable complexity. It is for these reasons that we stay focused on the basic economics of information search and avoid the three letter acronyms and unintelligible jargon that affects most IT markets. The goal of information search is simple enough - to be able to access information in a timely and efficient manner without incurring crippling costs. This is not as easy as it sounds, although if we maintain our focus on the central task before us we can avoid the unproductive detours that technology in itself might introduce.

In an ideal world information search would be justified using a simple cost/benefit approach. The costs will be relatively easy to estimate, whereas the benefits are much more difficult to assess. Technology simply gives us the tools to do the job, it is people who determine whether information search is a productive activity or an unmanaged free-for-all.

The key to successful enterprise search for many organizations will be simplicity. There are of course areas of every business where complexity cannot be avoided, but it is worth remembering that the people who use search technology simply want a button they can click in the applications they use, and for a meaningful search to be executed.

Estimation of the benefits to be gained from information search is a prerequisite for clear, unambiguous search activity. Some information is so important that lengthy, expensive searches are justified. Other information may have so little value that failure to find it during an initial search may signal the end of the exercise. It is the skill of the people involved that determines whether the benefits obtained from search exceed the costs. This is a management issue that is often overlooked, but as information sources proliferate the need for a managed approach becomes more important.

Some of the problems associated with information search are well illustrated by a typical Google search on the Internet. Most searches will produce tens of thousands of resulting references. The search term we use may have multiple meanings, and only after an initial search will we have the

context to refine the search further. Even so the new search may result in thousands of links, and determining which ones are most relevant becomes a long gruelling task. What we do after this depends on how valuable the information is to us (or our organization). The problem of search costs has been well understood by economists for decades. The classical problem of searching for the lowest cost supplier of an item essentially boils down to not spending more on the search than the savings that would be made as a result of the search. It's a tricky problem that calls for judgement and experience.

Some of us hope that the technology will become sufficiently sophisticated that it can accommodate nuances, ambiguity and significance. This hope is obviously encouraged by the Enterprise Search technology suppliers, but we should be cautious. Getting search technologies to do the donkey work is fine - expecting these same technologies to determine meaning and relevance is folly, and will result greater costs in the long run (as we make erroneous decisions and supply various authorities with flawed information). We cannot, and should not, exclude the people costs involved in information search, since these will typically be the major costs. Information sources have to be managed and maintained. Additional information costs are incurred through the need to establish high levels of security and add additional information that describes the information we are interrogating (metadata creation). The results of information search have to be manually processed and formatted in a way that is presentable to others both within and outside the organization. And to cap it all the people that carry out these tasks are usually highly skilled and expensive.

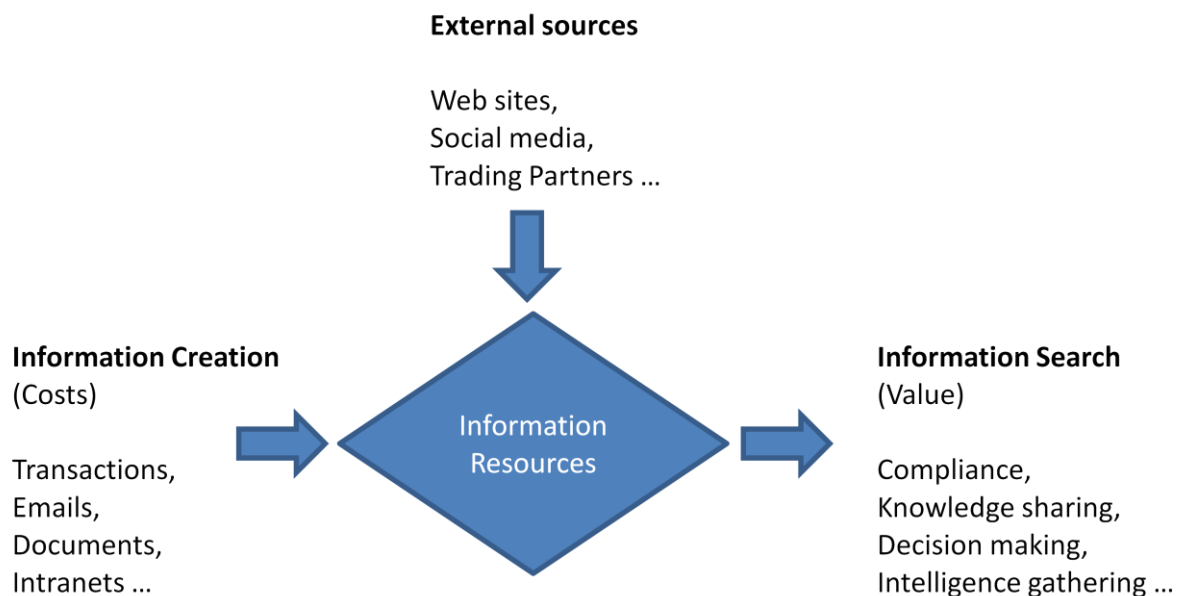
Unlike information creation, which usually occurs in a highly structured environment (data entry and document creation for example), the information search environment is highly unstructured and desperately in need of supporting tools to help professionals determine the efficacy of their search activities. One of the major predictions we make at MBR is the emergence of tools to help information professionals manage their working environments more effectively - they are sadly lacking at the moment.

The economics of information search will become a more pressing issue as information sources proliferate. Internal information sources include transactional databases, email, instant messaging, documents, scanned documents, intranets and even some multimedia files such as voice and graphics. It is however the external sources that are proliferating most rapidly. Organizations may wish to interrogate subsets of each others' information sources - when collaborating with suppliers and customers for example. Outside of this we have web sites and the new social media phenomena such as Facebook and Twitter. Some organizations are already interrogating Facebook as an additional resource in their recruitment process.

We should not expect this proliferation of information sources to cease any time soon. What we need is a sound approach to the costs and benefits associated with using these information resources. There are already signs that the sheer volume of information sources is causing serious inefficiencies to occur in the way we manage our time and resources. Information can be more of a distraction than a useful resource - technology alone will probably just compound the problem.

## Why Search?

When we look at the way organizations use information it is easy to see that information search is easily more than half the picture. While information creation (through data entry, document creation, writing emails etc.) is an unavoidable cost, information search is the primary mechanism for creating value from information. The fact that search has only recently become important demonstrates how little attention it has been given. As information sources proliferate so search will take on much greater importance.



Information search is a much larger part of the way we use information than many of us appreciate. At its simplest we may simply want to retrieve details of a customer given the name and post code. We take this level of search for granted, but even here there are efficiencies that can be realized, particularly when the action is repeated hundreds of times a day. More pertinent to contemporary needs however is text search. For many organizations this will account for eighty per cent or more of the searches they wish to perform. Text is held in documents, emails and databases - bringing these together under one seamless search interface is what most people want. The applications of search technology are as varied as the organizations that use it.

Pharmaceutical companies may wish to search documents, emails and databases to track performance of a drug. Financial services companies may wish to perform searches across multiple financial products for customers. Security agencies use search extensively to home in on suspect communications. Other users may not only want to interrogate internal information sources, but combine these with external sources such as web sites and the information resources of trading partners. This level of search is not easily achieved, and is more a dream than a reality for most organizations.

Individuals may need to search enterprise information resources on an ongoing basis, and if the organization depends upon the skills of knowledge workers, information search capability may be as necessary as a telephone system.

One of the major drivers of search technology has been the need to meet various regulatory requirements. This typically means that a complete, lengthy audit trail needs to be in place so that officials can gain access to information should they need it. The financial services industry has been particularly hard hit by regulatory requirements, and search technologies are widely used.

## The Search Cost Spiral

As with most things in life eighty per cent of the benefits typically derive from twenty per cent of the functionality. This is certainly true of enterprise search technologies, and organizations would be wise to consider the cost spiral that can manifest as greater sophistication is required. The basic trade off is this - greater sophistication should make the search process more efficient, but the sophistication should not cost more than the benefits it delivers. To understand this point we have to use some of the terminology associated with search technology.

An ontology is essentially a dictionary that conveys the meanings of terms used within an organization. The word 'track' will have a different meaning if you are in the music industry than it will if you are a sports equipment company. Creating and maintaining an ontology is a labour intensive process - and it is always incomplete. Taxonomies are also used widely by search technologies, and these are structures for classifying information. A variety of names used in most organizations will refer to products, and in the organizational taxonomy these names would appear under the 'product' classification. Once again this is a labour intensive process that is ongoing and never completed. We should also consider the cost of tagging information. For effective document search we might need to create keywords, or abstracts.

Multi-media files are often interrogated on the associated tagging and not by interrogating the file itself (which is unintelligible to most search technology). Once again someone has to do this. The process of adding meaning to information can be considered a process of adding semantic content.

We should also consider security as one of the major cost overheads associated with search technology. Every document, email, item of data in a database, and all other information instances should have permissions set up. The classic test to see if this has been done in your organization is to execute a search on the term 'confidential' - but we didn't tell you to do that.

All these costs are real and significant, and will dwarf the actual cost of the technology. It is for management to decide how much value they expect the availability of sophisticated search to deliver and then determine the costs they are prepared to bear.

For most organizations the best efficiencies will be realized through a fairly 'crude' use of the technology. This will entail greater manual post processing of search results, but will avoid costly diversions into realms such as semantic meaning. The security issue always needs addressing, but the most efficient way to implement security is simply to make sensitive documents unavailable, and a resource that must be specifically requested.

## The Mediocre Search

Search results can be broadly categorized as failed, successful and borderline. We should have no problem with the first two. If a search fails we can try a new strategy or simply abandon the task. A successful search is what we all aim for and is a conclusive positive outcome. The mediocre search outcome is quite easily the most problematical. This would be characterized by just enough search results to indicate value in the search process, but insufficient results to compile the necessary report or reach a firm decision. The problem with this type of outcome is that it does not warrant abandonment of the process or a new strategy, but neither does it lead us to a conclusion. It is here that costs can escalate well beyond the value that might be derived from a search.

The mediocre search should be acknowledged for what it is with an extra keen focus on weighing the ongoing costs against the possible value. Of course the natural tendency is just to keep going, in the hope that we find some new thread that takes us to where we want to be. Mediocre searches tend to remain just that, and only exceptionally will they deliver the results that are needed. Once again this is a matter for human judgment and experience - no amount of technology will tell you that a mediocre search is unlikely to lead anywhere.

## What does the Technology Do?

We've all used Google search and are familiar with the interface. Enterprise search technologies typically provide a similar interface where phrases can be entered and the search executed. The results are often presented in a similar manner to Google - a list of references ordered by relevance. But that is where the similarity ends. Users of enterprise search technologies may be disappointed by the results a search delivers. Google has access to billions of web pages, whereas a search within the confines of the enterprise may offer a relatively small number of references. We should also remember that the information sources we access through enterprise search are not linked in the same way that web pages are - it's a wholly different environment. Where one search on Google may suffice, we may have to conduct several searches within the enterprise to get what we want.

Despite all the hype and complex terminology, what we would all ideally want is an enterprise Google. Enter a search and browse a rich set of references. Enterprise search emulates this model, but it is still early days for the technology, and because of the diverse nature of the information we need to search, the results are less reliable.

## Sharing Knowledge

The term Knowledge Management is not as widely used today as it was a few years ago. The basic idea was that individuals would freely share their knowledge via some repository, and the organization as a whole would benefit. This 'managed' approach never really worked, people are much more protective of their knowledge and experience than we often assume. Enterprise search on the other hand does allow knowledge workers to dig around for available information and share knowledge in a more informal way. This will be a significant benefit for some organizations and may become the single most important benefit, particularly where knowledge and information sharing is crucial to the welfare of the organization.

It is worth pointing out that knowledge sharing 'by schedule' has been shown to be particularly inefficient. Opportunity costs and the cost of setting up a more formal environment are often greater than the benefits derived. Where knowledge sharing and collaboration happen on an 'as needed' basis the benefits easily outstrip the costs.

## Confidence

A common flaw in the use of information search technologies is overconfidence in the results. There is, unfortunately, no substitute for understanding and experience. Executing a search on a topic that is unfamiliar will inevitably generate results that are at best misleading and may be simply inaccurate. An experienced eye would spot the mistakes, but blind faith in the content referenced by a search will result in erroneous conclusions. It is best to have the attitude that the search technology can automate the process of sifting through vast electronic 'filing cabinets', but that the results need to be checked by someone with domain experience.

## Summary

Information search is a generic function in all organizations that is worthy of planned implementation and managed usage. As information sources proliferate, so the need to present a single search interface will become more important. While the search function has often been treated as an afterthought, it is deserving of at least as much attention as information creation processes (data entry, document creation etc.) and is the primary mechanism for creating value from an organization's information resources.

We expect information search to become a major issue in all organizations as the need to reduce information costs becomes a more pressing issue. Only careful analysis of search needs will result in a level of investment in the semantics of the information an organization possesses that is appropriate. Some information may need very little preparation, while other information may be central to the way the organization works and require lengthy processing (creation of tags, taxonomies, ontology, abstracts etc.)

The guiding principle is to always ensure that the benefits derived from information search exceed the costs associated with the search. This may seem obvious, but it is quite common for information workers to spend inappropriate amounts of time searching for information that has little real value. Recent research on the benefits of knowledge sharing reveal that costs can quickly exceed benefits.

Expect information search to become a much larger component in your organization's IT armoury, and with it will come a need for constant awareness of cost and value.

# Industry Perspective Section

# Memex - Enterprise Search Explained

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## More than a search for information

Enterprise Search is much more than just a search for information. Of course the search is about finding information known to be recorded, but in addition, we search for information we hope is recorded, often discovering along the way information we didn't know was there, but which is useful. Enterprise Search is also, importantly, concerned with what we do with the information once we have found it i.e. presenting the information in a timely and accessible manner, to those authorised to receive it. Underpinning these functions has to be a powerful Enterprise Search technology, allowing intelligent questions to be asked and the results delivered in a fast and accessible manner, providing powerful intelligence for effective decision making.

## More than a white bar and list of results

When we think of Search, we inevitably think of Google. Search technologies such as Google, however, whilst excellent for the job they are designed to do, are typically designed to enable large numbers of users to conduct simple, "fuzzy" searches, with the results being returned in such a way as to maximise commercial gain for sellers. With Memex however, both the target market and objective are different: The search is designed for fewer users, and the objective is to provide important information on which organisational decisions are made. And because these decisions are often mission-critical, search results need to be 100% live, not up to days old, as is the case with Google. With Memex, user search activity also needs to be tracked and recorded, to comply with legislation and/or to provide evidence of how and why decisions are made. This is important for all organisations, and even more so for Memex clients, where Enterprise Search, is a "mission critical" component in their armoury.

## More than one database

The NIM (National Intelligence Model) which guides UK police forces dictates that in order to make decisions effectively, searches should be made across the "widest pool of information" available, which is why it is essential to search across all business systems, and even those relevant but outside of the organisation i.e. open source information, partner information as well as subscription-based and national databases.

## More timely than yesterday

Enterprise Search is optimal when searches are set up to run automatically in the background and distribute automatic notifications to relevant people immediately when new information is found. In this case, Enterprise Search is about using the technology to help people get exactly the information they need, when they need it, in the face of rapidly changing and burgeoning market information.

## More intelligent than we expect

One example of a mission-critical Enterprise Search system is the use of a Memex system for vetting and character checks run against a central criminal database. Applicant data is searched against various data sources and across several business systems at once. Depending on the results returned, the query is automatically tightened or expanded. This capability has been refined over

the years in tandem with risk reduction strategies, and was the Memex response to its customers becoming inundated with data initially on searching across a number of different business systems.

## THE CHALLENGES OF ENTERPRISE SEARCH

### Information is unstructured

Within the enterprise, information is often unstructured, and stored in many different formats and locations across different channels. And even when stored in a common format, location and channel, information is very often stored for compliance purposes, rather than with retrieval in mind. Memex enables users to search both structured and unstructured information which is essential so that nothing is missed.

### Information Quality

Information Quality has a number of important dimensions, including reliability, relevance, accessibility and timeliness. And for organisations, there are costs associated with poor Information quality: making decisions based on the wrong information; losing competitive position due to not finding good market intelligence; and for a police organisation - not finding the intelligence which will prevent threats and save lives, or indeed finding the wrong intelligence, with equally drastic effects. Organisations need to know if they can rely on information (known as intelligence in the law enforcement field), because they so often have to make mission-critical decisions. An Enterprise Search system, then, needs a way to measure Information Quality. In law enforcement and Memex systems the intelligence is graded using a 5 x 5 x 5 model which judges the credibility of the information, the reliability of its source and the notional sensitivity.

### Information Access, Control and Security

Within an organisation, you have any number of different users, each with different information requirements, according to their role and responsibility. At the same time, within any organisation, access to information needs to be controlled and restricted according to role and responsibility. Whether it is a commercial, government or law enforcement organisation, security of, and control of access rights to, information is mission critical. This is the single most important factor which distinguishes the search requirements of the enterprise to those of individual consumers. With this in mind, the implementation of any Enterprise Search solution has substantial implications for risk management and mitigation. Within an organisation, every person is different, but whoever you might be, you should be able to access the information you need. And just because you needed information in one format one day, it doesn't mean that you will need the same thing the next day i.e. search needs change constantly.

### Each industry sector is different

Organisations differ according to the industry sector in which they operate. Every industry sector will have its own information access requirements, varying information types, business processes, and its own compliance pressures related to information storage. Domain expertise, therefore, is vital for an Enterprise Search provider.

### Each organisation is different

And within each industry sector, every organisation is different, with its own information access requirements and processes. An Enterprise Search system needs to be flexible, to take this into account, thus process expertise is similarly required by the Enterprise Search provider.

## THE DRIVERS OF ENTERPRISE SEARCH

### Information overload

As technology continues to evolve and dominate our working lives, the volume of information we have to work with is growing exponentially. Organisations and the people within them are undoubtedly suffering from information overload, and whether you are a commercial enterprise, or law enforcement or government agency, the challenge is the same: How can you retrieve, analyse and communicate relevant information quickly, in order to solve problems, reduce risks and make critical decisions? How can you turn information held within the enterprise into the intelligence required to achieve competitive advantage?

### Compliance

Organisations are required to access information for legislative purposes, providing a full audit trail of activity required for compliance.

## MEMEX IN THE ENTERPRISE SEARCH FIELD

Many of Memex's Enterprise Search systems are operational within law enforcement and government organisations, where requirements as regards Information Quality, Access and Control, Compliance etc. are more demanding and stringent than within most private industry, due to the public safety, defence and security elements of their roles. Indeed private organisations may even be able to learn from the Enterprises Search processes adopted by law enforcement organisations e.g. law enforcement agencies use their Enterprise Search systems to access partner organisations' data, thus widening the pool of information or intelligence available and enhancing decision making. This sharing of information between organisations became a recommendation for law enforcement agencies following the 9/11 terrorist attacks, the Soham murders, and the July 07 bombings both in the UK and the US.

With years of expertise in the law enforcement field, then, it is no surprise that Memex has found it easier to extend its reach into the private sector from its law enforcement roots than if it had started out in private industry and then moved into law enforcement. And with an Enterprise Search technology (the Memex Intelligence Engine) which is more than capable of satisfying law enforcement and government search requirements, Memex is well positioned for the private industry Enterprise Search challenge. Memex also offers invaluable expertise in the area of process management, having helped its clients to integrate and streamline their systems along the way, saving time and money and making better use of limited resources. This knowledge of processes and the way they constantly change for any organisation has also led Memex to offer an entirely flexible solution able to be customised by clients without reference to Memex, keeping system lifetime costs minimal.

## ORGANISATIONAL BENEFITS OF GOOD ENTERPRISE SEARCH

So what can be gained by organisations, regardless of industry sector, by implementing an Enterprise Search system?

**Enterprise Search as an aid to decision making** –The number one key driver of information searching is to make decisions. Effective decision-making within the law enforcement environment enables better allocation of scarce resources as well as improving officer and public safety.

**Enterprise Search as a resource lever** - Enterprise Search enables operational decision making to allocate scarce resources. This is a driver for all organisations, regardless of industry sector.

**Enterprise Search as a money saver** – Time and cost is incurred by having to access information via different systems. With Enterprise Search, both are saved by integrating systems and searching across all systems just once. Furthermore, the cost saved by not chasing the wrong information, or by not duplicating work which already existed but was lost in a database somewhere, is substantial. There may also be an unexpected Return on Investment in the form of improvement in the way an organisation operates.

**Enterprise Search for competitive advantage** - Getting the right information at exactly the right time may even help deliver competitive advantage, or in the case of law enforcement, foil a crime or terrorist threat.

**Enterprise Search as an enterprise extender** – When Enterprise Search is done correctly, it extends an enterprise through information sharing across partner organisations. For both criminals and customers of private organisations, business is global, and search needs to follow suit. There are also great advantages to be gained by accessing a wider pool of intelligence than you would usually, and law enforcement organisations lead the way in this.

**Enterprise search as an aid to compliance** – The Data Protection Act and various other industry specific standards dictate that organisations keep their data for a specific time period. Any Enterprise Search system, then, needs to be able to address the retention, review and disposal of documents, and not only aid compliance but also drive business improvement, rather than making it an administration burden.

**Enterprise Search as a change agent** - Most organisations have data in silos, and agreeing on standards, processes, and the interface and how it will interface with other tools etc., often creates a problem. Suddenly people from different departments who wouldn't normally be required to work together have to do so, creating an extremely positive lever for change.

## THE COST OF NOT HAVING AN ENTERPRISE SYSTEM

Assuming there are 15 million knowledge workers in the UK, and that each one of them spends 25 per cent of his or her time a year searching for information, at an estimated at £10k per worker, the cost to the UK economy is a massive £150 billion. Food for thought!

## MEMEX TECHNOLOGY - PROFILE

Memex is a privately-owned, multi-national organisation headquartered in Glasgow, Scotland and Virginia, USA. Established in 1979, Memex provides cutting edge Enterprise Search solutions in the arenas of law enforcement, national security, government and business. Memex solutions are deployed globally by organisations needing to search the enterprise, and beyond the enterprise, for information which will enable decision making to predict, prevent and respond to market threats.

Memex originally developed an intelligence search technology for US military organisations which was significantly more advanced than anything available at the time. The Memex technology was then further developed to address the needs of the law enforcement community, with sales made to pioneering law enforcement agencies in the UK and the US.

Memex search systems underpin national and critical systems across the globe, and Memex adds domain and business process expertise to its advanced search technology.

### Memex markets

Global demand for Memex solutions has opened up markets for Memex in Central and South-East Asia, the Middle East, Europe and South America. Memex has a number of partners with direct presence including UAE, Mexico, Spain, Bulgaria, Poland and South Africa.

### Memex clients

Key Memex clients include:

Georgia Bureau of Investigation; British Transport Police; Nottingham Police, Pennsylvania State Police, Iraqi Ministry of the Interior; National Insurance Crime Bureau; British Horseracing Authority; Environment Agency; Trading Standards Authority, Belize Police Department, Gambling Commission.

### Key system features:

1. **Scalability** - The Memex solution is highly scalable and can support enterprise wide implementations as well as small scale clients for departmental use. The largest Memex installation (The UK's largest police force) currently holds 11 million intelligence reports, increasing at 1 million records per year.
2. **Ease of use** - The Memex solution is highly intuitive and easy to use. The majority of customers require only minimal training to be able to competently use Memex. And as Memex is enterprise-wide, the same solution is used by a variety of different users in differing roles ranging from basic level users with input access only, up to complex analytic functions.
3. **Real time information entry** - All information held in the Memex solution is stored in real-time. This ensures information is searchable as soon as an entry is made, vital when having access to the latest information affects public safety.
4. **Total Content Access searching** - Users can search over every word held in the system, critical when identifying emerging trends. Memex can find information even if a name was entered incorrectly, through its query building capabilities.
5. **Smart search** – Memex harnesses the expertise and experience within the client organisation to build a number of searches into a single “Smart Search”. This ensures consistency of practice among different types of users.
6. **Attachments** - Memex allows the storage of all electronic files within the system allowing large amounts of data to be added quickly and made searchable immediately. This is especially important in multi agency working where large files are passed between agencies

7. **Speed of search** – Users can execute vast numbers of searches without affecting overall system performance.
8. **Configurability** – The client organisation can configure the system itself without referring back to Memex, allowing a cost-effective and fast response to any changing business requirement, or emerging legislation.
9. **Role-based access** – Memex is an entirely flexible security system which allows each customer to decide who can see what information according to their individual role and responsibility.
10. **Index and search of other data** - With Memex clients can index data regardless of format, and search this quickly and easily. They can also continuously index and on-demand index (search federation) meaning information is much more up-to-date.
11. **Augmentation of data** – Memex retains linkages to other records and dynamically creates linkages across sets. It also allows users to annotate data and securely share annotations
12. **Audit log** - Every action within the system is audited and retrievable ensuring professional and ethical use of data.

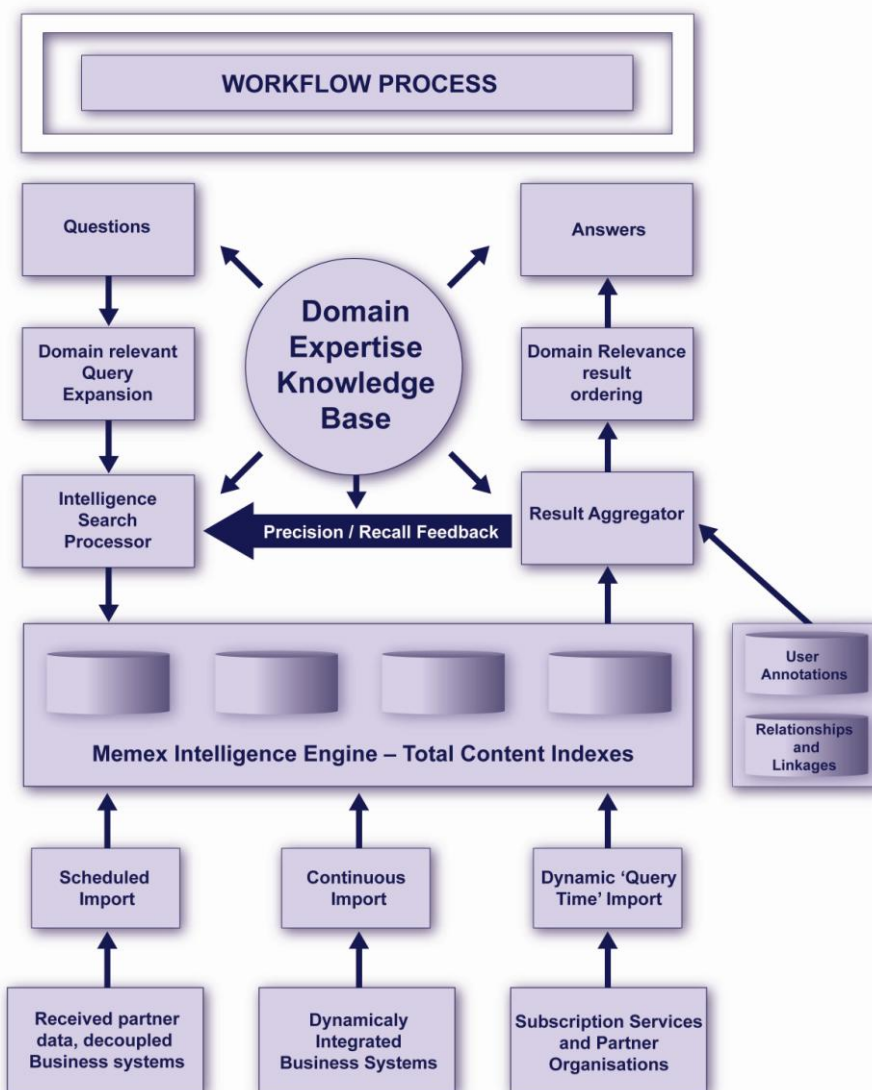


Image 1 Memex Enterprise Search Architecture

### Key system benefits:

1. **Designed to enable mission critical decisions** – where users need timely and accurate information to make critical decisions, often where lives are at stake, the order of search results is controlled by the searcher and best practice.
2. **Designed for making powerful intelligent searches** - within organisations, decision makers often think carefully before asking an initial question, studying more, if not all of the matching results before acting on them. All results are equally as relevant and the most up-to-date information needs to be presented to the user at the top of any list. The users automatically re-order results themselves based on relevancy.
3. **Provides a small, accurate set of relevant search results** – the user is encouraged to ‘ask a better question’ and to rapidly narrow down results for detailed analysis.
4. **Provides real-time search results** – Decisions taken based on information that is even a few hours old can make the difference between success or failure, or even life or death.
5. **Embeds security restrictions in data itself.** This means information may be partially presented to a user – they can see results but sections have been removed. They may also, if desired, be able to search and find information but not view it. A secondary action can be taken where a user was not shown information simply due to security, and if that may have influenced their decision so another user can be notified.
6. **Reduces data storage requirements.** This speeds up searching and avoids expensive data storage space. The Memex system actively shrinks data through conversion to a total-content-index, resulting in enterprise storage requirements one tenth of those other engines require and saving tens or hundreds of thousands of pounds or dollars.
7. **Allows searching to be intelligent, and designed by users.** The Memex system understands that every organisation is different, and the difference between most skilled searchers in an organisation and the average user is enormous. With Memex you can capture the knowledge and ‘tricks’ used by experienced users, allowing every user to benefit from their skills and knowledge of the domain.
8. **Records and tracks Enterprise Search activity,** user by user. Exceptionally detailed information is kept regarding actions taken by each user took i.e. what information was accessed and how, ensuring compliance with legislation and defence of decisions made based on the information found.

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