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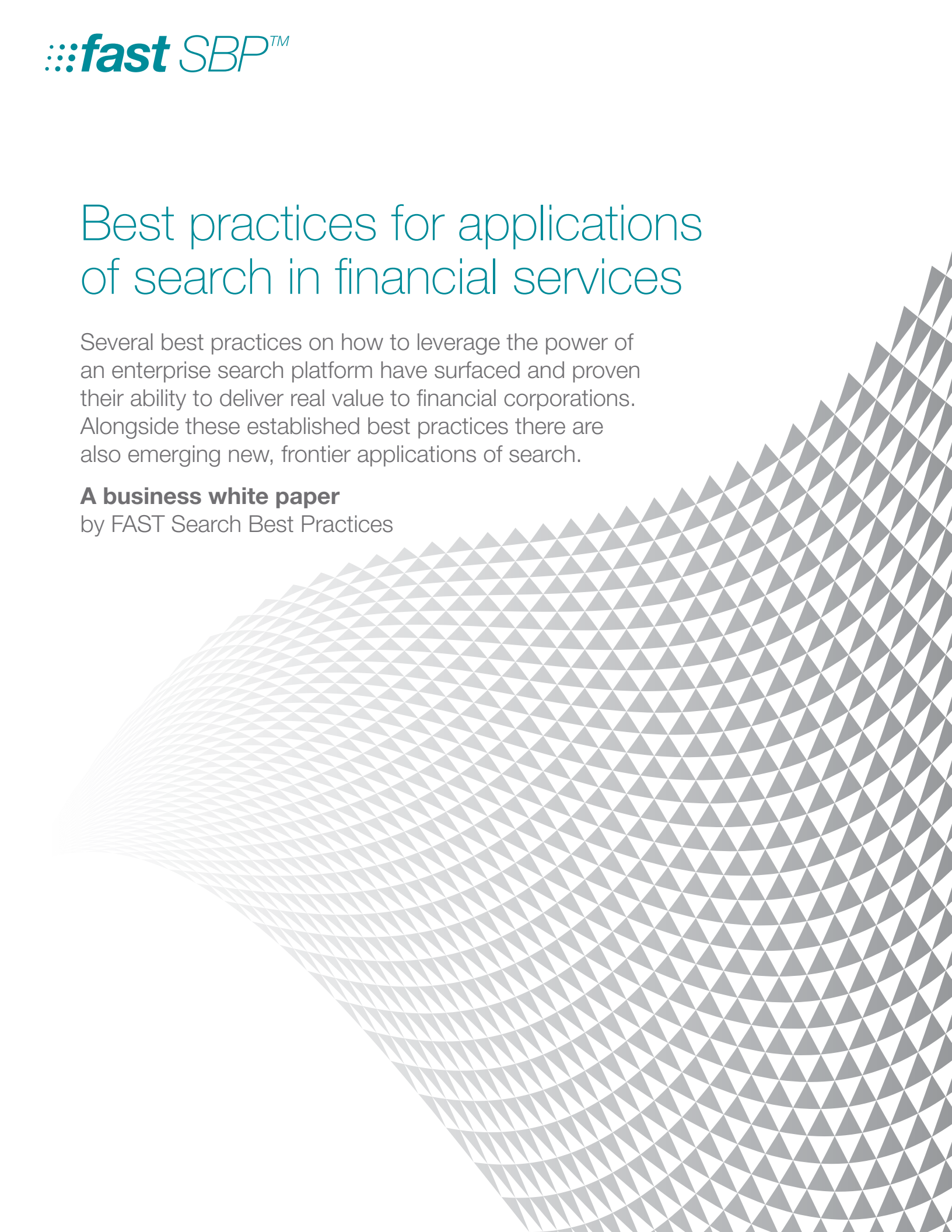
Best practices for applications of search in financial services

Several best practices on how to leverage the power of an enterprise search platform have surfaced and proven their ability to deliver real value to financial corporations. Alongside these established best practices there are also emerging new, frontier applications of search.

A business white paper

by FAST Search Best Practices



5 examples of how to leverage search in financial services

1. Build specialist portals—make maximal use of your whole document management and/or knowledge management corpus, and spend your valuable time on content analysis rather than content gathering.
2. Give your analysts the edge—search lets you cross-correlate your internally available information with external information sources.
3. Enhance KYC (Know Your Customer) initiatives by combining structured and unstructured content via best-in class search.
4. Avoid compliance penalties—search enables fast and comprehensive access to all data, enabling you to meet regulatory compliance demands.
5. Reduce the TCO (total cost of ownership) of your RDBMS and BI systems while simultaneously increasing their service levels and functionality.

Success in the financial services industry has been closely related to a simple axiom: the team with the fastest access to superior information will win. With massive data reservoirs, financial institutions should look to fully exploit the value of their information. Enterprise search platforms can play a catalytic role in taking the notion of "fast access to superior information" beyond the trading floor and into virtually every front-, middle- and back-office function of financial institutions.

Several best practices on how to leverage the power of an enterprise search platform have surfaced and proven their ability to deliver real value to corporations. These patterns include how search can support your business by powering your intranet and Internet sites; offloading your database systems; and providing market intelligence to accelerate the information gathering process of your analysts.

Alongside these established best practices there are also emerging new, frontier applications of search: using a search component to aid in automatic customer clearance and legal discovery solutions, for example. A best-in-class search system brings with it some amazing core capabilities which can be put to work in a number of exciting contexts.

Established Best Practices

In an information intensive environment—like the financial services industry—there are ample opportunities to exploit the full value of information through the use of an enterprise search platform's extensive capabilities to gather, process, identify and distribute information.

A high-end search solution can deliver value to financial services organizations in many ways, directly driving revenue generation, increasing efficiency and lowering TCO (total cost of ownership):

- Turn your intranet into a collaboration environment for information sharing and consumption.
- Power your online portal with a best-in-class search platform and drive the self-service model to new heights, as well as increase browser-to-buyer conversion rates.
- Simplify integration projects and promote significant time and cost savings.
- Spend more time on analysis instead of information gathering—and get better and timelier decisions.

Intranet

By introducing an enterprise search platform to power your intranet, you effectively create a single access point for your information. The search platform can effectively connect to your intranet, ECM/DMS (document management system) and file servers to provide users with a holistic view of available information—from a single, customizable interface. Users no longer have to search multiple sites or use different application interfaces to find the information they are looking for. As opposed to a DMS, a search system does not depend on "perfect metadata" to operate at its fullest capacity (for more information, refer to the white paper "Desperately Seeking Relevant Metadata").

Intranets are often used as a medium for internal publication and sharing of information. Various groups and department publish information on the intranet that they believe to be of interest and use to others. In addition, an enterprise content management (ECM) system might be deployed to facilitate knowledge management. However, as the amount of information grows it becomes increasingly difficult to identify where to actually find it; users have to go to several sites in order to find what they are looking for, and the discovery of new information becomes inherently more difficult. The result is that employees not only waste substantial time on information gathering, but also re-invent the wheel time and again.

A Finnish retail bank was posed with the challenge described earlier. They had a wealth of information published on their intranet and DMS, in a rich multilingual environment. The standard search functionality was unable to provide satisfactory results to queries, and the employees did not know where to go to find what they were looking for. To mitigate this situation, the bank deployed an enterprise search engine on top of their intranet and DMS. This effectively provided employees with a single point of access to information. The automatic advanced linguistic processing within the search engine provided these employees with the best answers to ambiguous or misspelled queries. Suddenly, finding information on this complex and international intranet was made easy enough for everyone.

They also leveraged the search platform's ability to automatically classify content: Available content was automatically analyzed, resulting in a suggested taxonomy (hierarchical category tree) for their documents. This taxonomy was then briefly manually refined, and the search system used it as a basis for automatic classification of the bank's documents. The categorized information was subsequently pushed to the DMS and incorporated to the source documents. Not only did this institution enjoy the benefits of easy access to their information, they also discovered that the enterprise search platform increased the value of their DMS by effectively introducing an automatic categorization schema.

Best-in-class use of search in an intranet setting often leverage the search engine's advanced linguistic analysis features. Also, tunable ranking profiles are useful to ensure that the end-users find what exactly they are looking for, by "soft coding" the business needs of the organization into the algorithmic ordering of returned results. Several rank (relevancy) profiles can be deployed to tailor the information retrieval experience for different user groups.

A Nordic financial institution discovered how this ranking functionality offers invaluable help in their every day operations: their brokers favor analyst's reports and corporate disclosures, and to support them a "broker rank profile" has been deployed in the search system and automatically employed when a broker issues queries. The search system further tracks which information the brokers find the most valuable and thus which information sources the institution should focus their attention towards.

Financial services organizations world-wide have experienced the benefits of employing an enterprise search system for their intranet. Employees get faster, more accurate answers to their questions—and they know where to go to get them. New employees experience reduced ramp-up time and key knowledge people are less interrupted by ad-hoc requests due to greater online self service.

Self Service Portals and Online Banking

Using the power of an enterprise search platform to serve your Internet site enables you to take your online service offering to the next level. Through popular public search engines on the web, users have become used to accessing information via a single search box as opposed to "surfing around" to find what they are looking for. A good search system enables your site users to start their journey through your site from the single search box. Accompanied by extreme relevance and navigational tools, users find the information they are looking for with the fewest number of clicks.

Online presence is becoming a must for financial institutions. With consumers constantly developing a higher degree of online literacy, they now expect a higher degree of online service from their vendors—including easy-to-find information and stock trading and banking facilities. An enterprise class search solution ensures sub-second response times to user requests, no matter the load on the site.

You can easily offer your customers a unified view on your services and information—even if they originate from different source systems—due to the search system's ability to act as a universal access layer. By also linking the search platform to your transactional system, you can create the next generation online banking experience: you can offer high net worth individuals (HNWIs) their very own personal banking portal where they will get a complete view of their business with you; the HNWIs complete portfolio, including stocks, loans, transactions, etc. will be available to them for easy consumption alongside any other relevant (cross/up-selling) information.

An increased online service offering will also drive self-service behavior from the user side. Search logs provide a wealth of information about customer behavior. Take customer support as an example. By publishing the most requested support information on your public site, and enabling the users to easily find the information they are

looking for, the need for call center support is lowered. This reduces the pressure on the basic customer service functions, allowing you to refocus resources to other value creating activities—such as attending to the needs of these high net worth individuals.

For a financial institution with large product portfolios, good search can help match users and products. The search engine will "guide" the users to the right product with a minimum number of clicks—making sure to keep their attention along the way and driving sales. Thus, the users' behavior on your site can be analyzed, allowing your company to gain an increased share of wallet (please refer to the later section on "know your customer" for more information).

Integration

Integrating two, or more, disparate IT systems can sometimes be a daunting task that just keeps on eating time and money from your budget. Different data models and formats need to be merged together into an overarching design that often has to support both of the previous roles of the original siloed systems, as well as the new integrated needs.

By leveraging an enterprise search platform in integration projects, significant time and cost savings may be realized compared to more traditional approaches. The search system can be used as an information retrieval layer on top of the systems subject to integration. As well as having the ability to connect to a multitude of source systems, a modern search engine will perform data normalization, cleansing and matching that can prove to be a substantial asset in providing unified access to your data.

A search platform approach to integration effectively reduces the need for costly, custom implementation of layers of middleware. This will save your organization both time and money; while traditional EAI (enterprise application integration) projects may take 12 – 18 months for a successful implementation, using a search platform, integration can be reduced to 2 – 4 months.

A major international financial institution faced a situation not uncommon to the industry: After a merger with another institution they basically had two sets of disparate IT systems that would not "talk to each other". This represents a common scenario for an integration exercise, but with one catch: regulatory policies required the merged institution to provide the appropriate authorities with regular reports on their most exposed risk, a list of their "top" customers in the merged system. Given the strict timeline enforced by these regulations, deploying an enterprise search system to ensure the integration was the only feasible solution. The search platform acted as an information retrieval layer on top of both IT systems. Together with an ETL tool, the search platform normalized, merged and cleansed the data from the underlying source systems to provide a unified view of all data. To the user, it looked like they were querying one coherent information system. Needless to say, with this solution at hand, producing the requested reports in a timely manner posed no challenge.

Financial Market Intelligence

Companies operating within the financial services industry handle enormous amounts of assets. In this regard, risk management becomes one of the prime concerns of the firm, and effective access to the right intelligence is imperative. Unfortunately, in most corporations the existence of many disparate, complex legacy systems is a hindrance to efficient information gathering. This multitude of systems is not easily accessed in a consistent, traceable manner.

A European financial services group wanted to improve their risk management and discover market-moving information "ahead of the curve" by getting more, better precise information—and getting it sooner. They turned their eyes on a search powered solution, much due to enterprise search technology's ability to interoperate with virtually any information repository: be it structured or unstructured, legacy or "streaming by". On top of the enterprise search platform they created an intelligence portal with support for personalization of information flow. The portal provided information from premium sources (e.g. Reuters), correlation of price movements with related news and analysis of news flows for market-moving potential. The users could configure the system to monitor information and alert them as soon as one or more specified conditions are met. This allowed the users to act quickly on new information and communicate and share the findings.

One can easily imagine taking the intelligence portal even a step further. The search system can be set up to also blend in internally available data (e.g. analysts' reports) for increased richness of information. Increased speed and quality of information gathering, processing and reporting are key features in the world of finance. A search powered intelligence portal can give your institution the tools to make better and timelier decisions. Less time is wasted on information gathering allowing more time to be dedicated to the analysis and decision making process.

The value of your market intelligence information will increase as it is produced quicker and with higher quality. This advantage can be utilized in several ways including:

- In a trading environment, the timing and quality of information is everything. A search powered intelligence portal provides the traders with a real-time information advantage, allowing for better trading decisions.
- The corporation might be providing customers with market information/analysts' reports as a product. In this case, the increased quality of the market intelligence information represents a potential differentiator for you.

Emerging Best Practices

Alongside the established best practices, there are several new and exciting uses of search technology emerging. Especially when the search platform works in tandem with other systems, substantial synergies are generated through their combined capabilities. In other words, an enterprise search platform will increase the ROI of solutions not traditionally associated with search:

- Avoid hefty penalties when presented with compliance requests.
- Increase your knowledge about your customers for increased cross-sell and fraud detection.
- Propel business intelligence and information discovery at less cost than traditional RDBM approaches.

Legal Discovery

Compliance regulations have increased in scope and importance (e.g. Sarbanes-Oxley and Basel II), and consequently increased the need for operational scrutiny and documentation for companies. In the case of the authorities making a legal request for documentation, the corporation needs to provide the requested materials in due time or risk being fined. One such case was faced by a Fortune 1000 company who received a request from the investigators of the SEC (Securities and Exchange Commission). The company responded by handing over one terabyte (!) of information to the authorities—an act which was looked upon as being non-compliant. In order to avoid a seven-figure fine, the company needed to filter out irrelevant information before handing it over to the SEC—and perform this exercise within the time limits imposed by the authorities.

Such time limits can range from 24-48hrs to a few weeks depending on the nature of the organization and the information request. For example, the monitoring of Swift transactions has 24-48hr window of opportunity to check the counterparty against name lists, whereas an insurance company may have a grace period of around 3 weeks before it formally responds to a compliance request.

The advantage that enterprise search brings to the table is in the precision of results—not in finding 1TB of information that happens to have a common keyword—but finding a few (or a few hundred) documents that are in the right context, relative to the original query. Furthermore, enterprise search solutions can determine, for example, who sent a particular email, to whom and the entire thread of the conversation. This can of course be performed by databases, but can take weeks of processing, especially if the information resides in multiple disparate repositories—and requires significant human interaction to eliminate the false positives—something that search solutions can do automatically.

There are many compliance solutions offered in the marketplace, but most of them are challenged when it comes to serving requests as described above, with timely execution being of outmost importance. By using search technology to address the information retrieval tasks, these shortcomings can be severely mitigated.

By coupling the information retrieval capabilities of an enterprise search engine with the workflow and process functionality of a compliance management solution, it enables "intelligent" compliance. The search system ensures that all related documents to a legal request are retrieved, from all of the company's information repositories—in real-time; no matter if the information in question is located in your ECM system; in presentations scattered throughout your file servers or intranet; in emails; or in other sources. In this scenario, search becomes an integral part of your corporate governance strategy.

Introducing search technology to your compliance solution will effectively let you meet compliance requirements on time with minimum financial impact. Appropriate documentation is produced upon request, with minimal manual effort.

Know Your Customer and AML: Fraud Detection

The data aggregation capabilities of an enterprise search platform allow financial services organizations to get a more complete view of customer relationships, quickly and cost-effectively—know your customer (KYC). For example, in a retail call center environment, a customer's credit card data could be aggregated with information about banking and investment accounts held at the same financial institution—in real-time, without costly database integration or middleware. The customer service representative would be presented with a complete picture of the customer's relationship with the bank, facilitating excellent service and optimal cross selling.

Powerful search engines can thus be used in a management setting with three areas of particular interest: KYC, anti money laundering (AML) and internet patrolling.

The KYC concept can be extended to include linking up to PEP (publicly exposed persons) lists and matching prospective customers to these lists. By employing advanced linguistic analysis, the search system is able to disambiguate names and effectively perform correct matching even if personal data is (intentionally) misspelled or there exists alternative name spellings. For example, there are a number of alternative spellings for the name "Gaddafi". A high-end search platform is able to recognize these alternative spellings and take this into account when processing them. This information is made available on-the-fly, helping your corporation reduce risk and provide appropriate customer service.

By connecting a search system to transaction information sources, it can scan daily transactions for counter-parties and new customers for exceptions to banks' policies and regulations. It provides a central data access and storage layer which together with secure access makes transaction data instantly available to authorized personnel. Coupling of data sources along with sophisticated data analysis lead to a reduced number of false-positive alerts. Together with easy access to transaction data, manual labor related to transaction monitoring is minimized.

A government agency uses enterprise search technology to monitor cross border transactions over $500 for fraudulent patterns. Within the first six months of operations this system handled 1.5 terabytes of data, and the data volume is expected to grow to 10 terabytes within three years. The search system's linear scalability ensures that these volumes are handled without strain. The system employs fuzzy name matching to secure completeness of information when serving the different constituencies: The national statistics agency receives automatic BOP (balance of payments) reports; the police can more easily act on warrants; and the tax and customs authorities are can fully mine the system for information (please refer to the later section "User Driven Business Intelligence" for more information).

An enterprise search platform is able to perform directed crawls of web sites. Through this mechanism it can effectively monitor on-line marketplaces and peer-to-peer networks to uncover the trading of stolen credit card details and suspect transactions as they happen. The "state" of these marketplaces can be stored for future references. As an example, an insurance company monitors on-line automotive marketplaces and keeps a six month history of offerings found on these sites. Then, when a potential customer asks for a quote on car insurance, he is asked if he has tried to sell his vehicle within the past six months.

The potential customer's answer to this question is compared with the findings of the search system and in the case of contradictory information an alert is raised.

User Driven Business Intelligence

Data warehousing sales in 2004 for environments greater than half a terabyte reached $2 billion and 97 percent of them were used purely for information retrieval. The cost of maintaining systems such as these grows exponentially as data volume increases, and data volume is increasing at a rapid rate—estimated at 200% per year. As well, enterprises are demanding greater consolidation of information to better understand their internal and external environments. This creates a greater demand for integrating non-traditional (for the database community) content, such as email, documents, and rich media (video, sound, images) into the corporate warehouse. Add to this a push for lowering overall operational costs, including hardware, training, and maintenance, and we have a market that is in need of a different and innovative approach to solving the problem.

An enterprise search platform provides the extreme scalability, power, and support for all types of content that can manage the largest warehouses for a fraction of the cost of the RDBMS environment. Firstly, a search platform may outperform an RDBMS with two orders of magnitude when it comes to information retrieval. Thus, less hardware resources is needed to reach a specific level of service compared to an RDBMS. Secondly, the amount of manual labor related to administration and maintenance of the system is greatly reduced by taking the search approach.

A leading online automotive marketplace exemplifies this: they deployed an enterprise search system to offload their RDBMS of information retrieval tasks and experienced a nearly 50% reduction in cost related to the system. A 32 CPU system was replaced with 20 CPUs, and 10 FTEs (full time equivalents) was replaced with one half FTE.

Add to this the ability to handle real-time requirements, natural language style searching, contextual navigation and intelligent relevancy models, and integration of analytical data and text mining—search based approaches will not only have a positive impact on your TCO (total cost of ownership), they can also significantly expand the service level offered by the total system; end-users can query the system from a Google-like interface (if that is desired) and get navigational aid to help them get the facts they are looking for. The cross-correlation of information from multiple sources, both structured and unstructured, propels the discovery of new facts, relationships and trends—all this being made easily available to the end-user.

A trend is emerging in this market: we expect the power of the search platform to greatly lessen the need for traditional, expensive database environments as the analysis and extraction of structured data consolidates with that of the already search-dominated unstructured world.

Enabling Technologies

The foundation of the more effective usage areas of enterprise search solutions lies in the many cutting-edge technologies employed by such a solution. A search platform represents a potent toolbox from which the user can choose. Earlier we have discussed how a search based approach can support and expand the financial institution's business activities; let us take a closer look at some of the cornerstone technologies of a best-in-class enterprise search platform:

- Contextual Search. Contextual search enables extreme result precision and query freedom for users, and schema flexibility for content aggregators.
- Linguistic Data Cleansing. Advanced data cleansing methods helps perform proper matching and duplicates removal despite spelling variations and errors.

Contextual Search

Typically when searching, documents that contain occurrences of the specified keyword are given—with the top hits having the keyword in the title, or 'appearing' in the document a significant number of times to be deemed relevant, in addition to using other statistical methods. However, the granularity of these results is not usually sufficient in financial services organizations where brokers, analysts, etc. need to find precise nuggets of information that relate to specific companies, people, dates and "events", such as financial releases or irregular share trading activities. Imagine a search application that is able to do exactly this—return relevant results that mention company and people names, locations, dates or events that are all interconnected, say within the same chapter, paragraph or sentence of a document. This is not science fiction, but contextual search.

Here, contextual search brings true contextual awareness to the search engine. It gives unprecedented freedom to both front-end providers and end-users. All data relations built into the source data is preserved—enabling query time content mining without having a priori knowledge of the underlying data model. Precision of results and the associated navigators are drastically improved, through awareness of context and scopes contained in the original information.

As an example of improvement in precision offered by contextual search is shown below, with two test queries against the online encyclopedia Wikipedia. Results on the left are from the query: Persons that appear in documents that contain the word "soccer" and on the right from the query: Persons that appear in paragraphs that contain the word "soccer". The improvement in result quality is striking, yet the first list of results corresponds to a Web search result that we accept as standard! This can be extended to the financial environment, where such a query may take the form: Persons that appear in sentences that contain "Company Names" and the word "scandal".

Persons that appear in documents that contains the word "soccer"	Persons that appear in paragraphs that contains the word "soccer"
Jack Nicklaus (~10.0%)	Diego Maradona (~4.0%)
Fred Davis (~10.0%)	David Beckham (~4.0%)
Billie Jean King (~8.0%)	Alan Shearer (~3.0%)
Richard Nixon (~7.0%)	Michelle Akers (~3.0%)
John Wayne (~7.0%)	Mai Hamm (~3.0%)
Margaret Smith (~7.0%)	Eric Wynalda (~3.0%)
Joe Frazier (~7.0%)	Freddy Adu (~3.0%)
Irina Rodnina (~7.0%)	Michel Platini (~2.0%)
Mao Zedong (~6.0%)	Stanley Matthews (~2.0%)
Gordie Howe (~6.0%)	Olivier Neuville (~2.0%)
Richard M. Nixon (~6.0%)	Bobby Moore (~2.0%)

Linguistic Data Cleansing

Larger organizations have to cope with several information silos, most of them containing their private view or version of the truth, for example customer records. In general, no universal unique identifier is available to bring these records together to form a unified customer view. Search engines have been "cleansing" data from the beginning and employ numerous techniques to enable disparate sources to be joined, and missing relationships discovered.

The basic workflow starts with feeding the "raw" data through an ETL tool where data model transformations are configured. The ETL tool calls to indexed master lists in the search system, and the search systems performs the fundamental matching job and returns lists with ordered results. Ambiguous data is set aside for manual inspection and cleansed data is sent to the desired storage location. What really sets this approach aside is using the search system to do the matching; this is among a search system's core capabilities and ensures unmatched automatic identification of data.

Firstly, a search engine can perform character normalization to solve the challenge posed by diacritical characters (á, à, ä, å, etc.). Diacritical characters are often typed wrong or omitted. The grave (à) and acute (á) accents are commonly mixed both in source documents and queries, for example. By performing character normalization, all diacritical characters are mapped to one normalized form on both query and content side, ensuring that one can get exact matches despite any differences in the use of diacritics.

Secondly, dictionaries are used to cope with spelling errors and variations. Known variants of names are used by the search engine to ensure matching when a name has many alternative spellings. For example, the name "Mohammed" has 53(!) correct spelling variations. The data cleansing technology of a high-end search engine will take this into account when performing matching. In addition to spelling variations, spelling errors might occur in source data/documents and/or user queries. These are handled by the spelling correction mechanism to ensure correct matching, even despite typos.

Thirdly, in case the character normalization and dictionary approaches do not give us 100% recall, fuzzy and phonetic matching is used. Fuzzy matching will match occurrences which are orthographically close to each other while phonetic matching will detect words/names that "sound similar" although spelled differently (e.g. "Phillips" and "Billups").

Now, these matching mechanisms can be employed across multiple fields for a more secure identification. This can be used to help decide if two similar looking customer records are the same person/company, for example: let us say that the first names are identical and the last names close (White vs. Whyte), then matching the address-field might help determine if the two records are in fact the same person/company.

All these techniques, together with duplicates identification and removal, allows for an amazingly powerful data cleansing scheme with plentiful application areas—the integration, and user driven business intelligence being two of them.

Mini case study

A knowledge sharing solution yields substantial results for financial institution

Who
One of the world's largest financial services companies.

Challenge
After a flurry of mergers and acquisitions, this corporation ended up with inconsistent processes and no high-level use of standard. They needed to improve their ability to monitor the performance of IT projects, communicate processes and standards, track projects, and manage assets..

Solution
An internal performance monitoring and asset management web portal (e.g. project, budget status) used by IT staff and their business partners. This search powered system accesses over 700,000 documents and has resulted in more consistent enforcement of IT governance policies. On-time delivery has been improved by 15% while project loads have increased by nearly 50%.

Summary

Established Best Practices

- Turn your intranet into a mechanism for information sharing and consumption.
- Power your online portal with a best-in-class search platform and drive the self-service model to new heights, as well as increase browser-to-buyer conversion rates.
- Simplify integration projects and promote significant time and cost savings.
- Spend more time on analysis instead of information gathering—and get better and timelier decisions.

Emerging Best Practices:

- Avoid compliance penalties—search enables fast and comprehensive access to all data, enabling you to meet regulatory compliance demands.
- Increase your knowledge about your customers for increased cross-sell and fraud detection.
- Propel business intelligence and information discovery at less cost than traditional RDBM approaches.

About FAST SBP™ (Search Best Practices)

SBP consulting is a highly focused transfer of search knowledge and experience from FAST to its prospects and customers. SBP workshops aim to help enterprises realize the full potential of search, by creating optimal strategic, functional and technical roadmaps, delivered in the form of business model, solution and architecture designs.

For any feedback or questions related to this paper, please contact us at sbp@fastsearch.com.

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