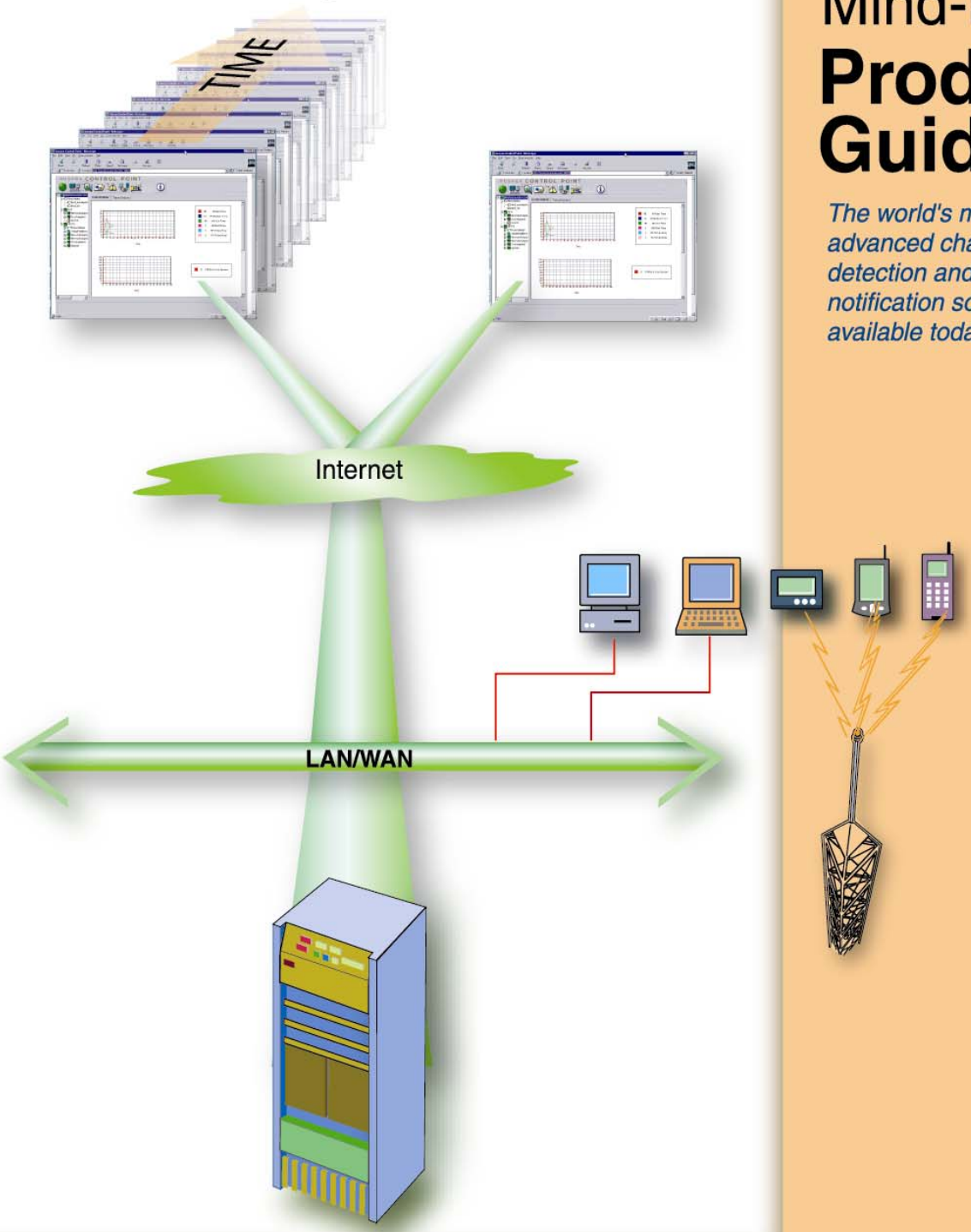
PUMATECH™

The Anywhere Internet.™

Mind-it™ Product Guide

The world's most advanced change detection and notification software available today!



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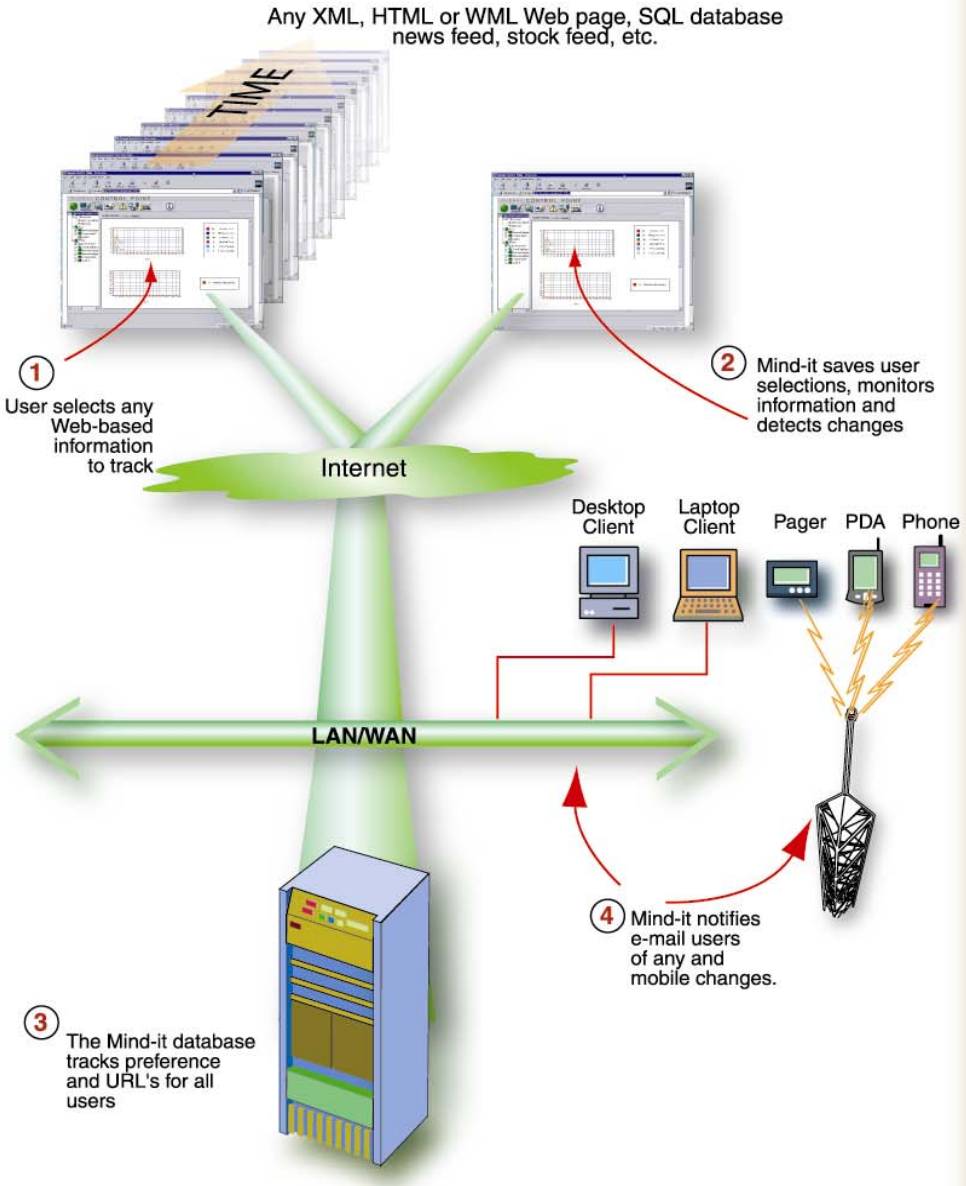

Mind-it is a key part of the Pumatech Mobile Application Platform (MAP)

Business benefits of an optimally designed change detection and notification system

Benefits of Key Mind-it features

Best of both worlds in database performance and availability

Simplicity of Mind-it Deployment

An open non-stop architecture

Consulting and Professional Services

The world's most advanced change detection and notification software available today!

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Chapter 1 - Introduction

The most advanced *change detection and notification* software available today

Pumatech's Mind-it application is a server based *change-detection and notification* software platform that includes modular server software, but without the need for a desktop client. Mind-it is based on state of the art, patented technology for intelligent change detection and email, Web and mobile device notification. Whereas other approaches, such as Microsoft Internet Explorer, rely heavily on server provided information to monitor changes, such as Last-Modified date, Mind-it takes into account actual page contents and previous page change characteristics. Mind-it also permits extremely fine-grained detection, e.g., regions of text, images and numeric expressions, whereas other approaches, such as search engines, are capable of minding only keywords or whole pages. Pumatech's proprietary technology includes expert rules derived from first-hand experience acquired from running the Mind-it service, currently in use by over 7 million users tracking many millions of Web pages. Pumatech has also developed personalization and database technology that both improves the user experience and enables more relevant information to be captured and analyzed. The Mind-it Architecture is shown in Figure 1.

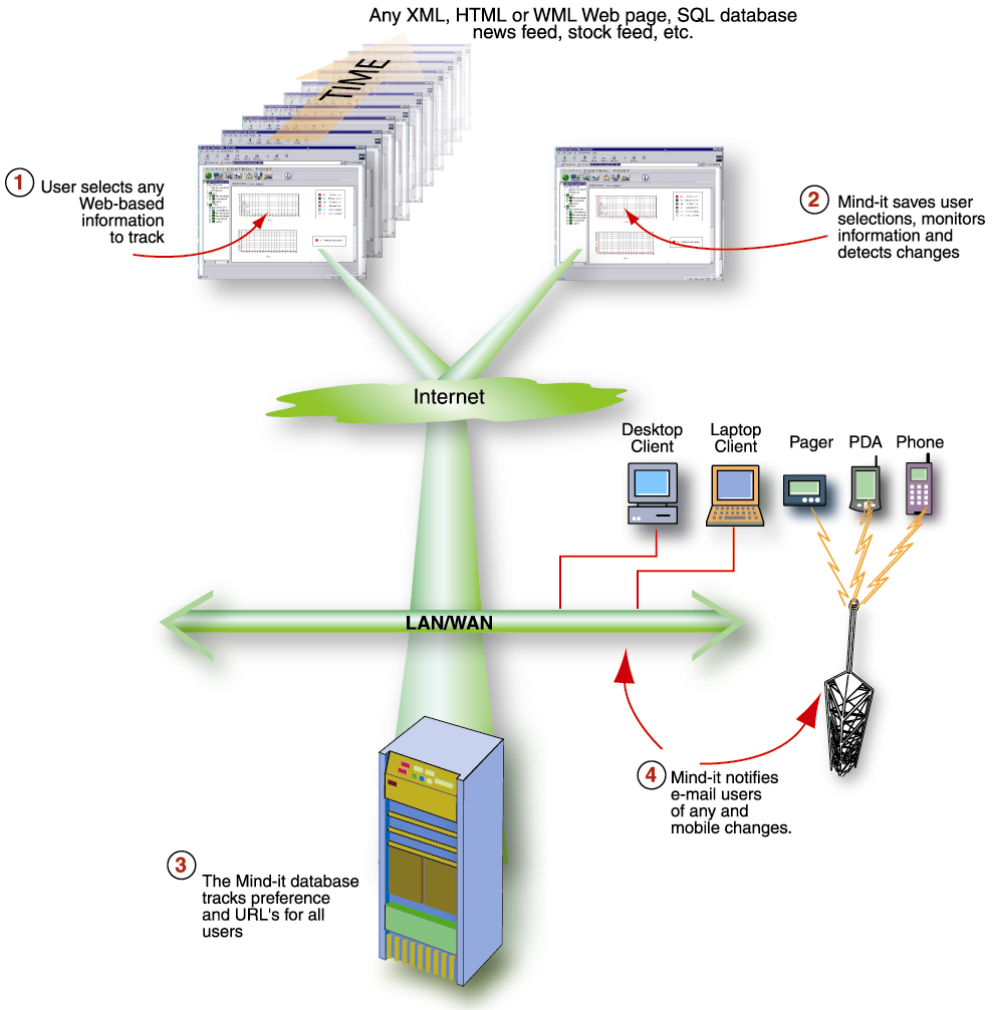

Figure 1 - The Mind-it Architecture tracks any information from any browser, anywhere.

The Mind-it product line

1. **Free Mind-it Service** - The Mind-it service is the world's largest Web-based information tracking system. This is the largest *change detection and notification* deployment known today in the world. It is a free service for people who want to track business and personal information on the Internet. Today it contains:
    - Greater than 7.0 million active registered users.
    - Greater than 11 million registered pages being tracked
    - Greater than 500,000 e-mail notifications per day.

2. **Mind-it Server** – Mind-it Server is the complete set of software modules licensed to an enterprise for deployment within their IT systems. Extensive implementation and training services are also offered to support this software platform.

3. **Mind-it ASP Service** Pumatech also provides Mind-it on a fully outsourced basis – as an ASP (Application Service Provider) service. This service is offered to customers desiring that the Mind-it *change detection and notification* software is completely managed by Pumatech on an outsourced contractual basis. Service Level Agreements (SLAs) are carefully designed and agreed with the customer in advance and serve as a pre-agreed basis for determining quality of Service (QoS) levels.

The role of Mind-it in Pumatech's Mobile Application Platform (MAP)

Pumatech's Mobile Application platform (MAP) is a server-based platform that pre-integrates various mobile technologies and provides the essential building blocks for creating custom mobile solutions.

Mind-it™ is a critical component of Pumatech's Mobile Application Platform (MAP). Mind-it provides MAP with state of the art change detection, notification and personalization software. A second component Browse-it™ provides a transformation engine to MAP that scales data from browsers to smaller wireless devices in the MAP mobile architecture. Finally Synch-it™ provides the MAP synch engine that keeps information updated across the wide range of devices supported by MAP.

In its current form, the Web contains a huge volume of publisher-centric and unqualified information that must inevitably be viewed from a large display. Given the inherent size and capacity limitations of mobile devices such as phones and pagers, it is simply impractical to rely on the general Web browsing model for these classes of devices and still achieve a reasonable degree of usability. Mobile devices are designed for selective access to content, and this is precisely the goal of MAP. The user explicitly chooses items of interest using the Mind-it change detection service, and receives only changes matching their personal criteria. There is no senseless browsing over slow wireless networks, and no spamming of irrelevant information. Mind-it puts the user in the driver's seat and lets them control precisely the changes and information they receive while mobile. This integrated approach of the three major announced elements of MAP [Mind-it™, Browse-it™and Synch-it™] is shown in Figure 2 and discussed further in Chapter 2.

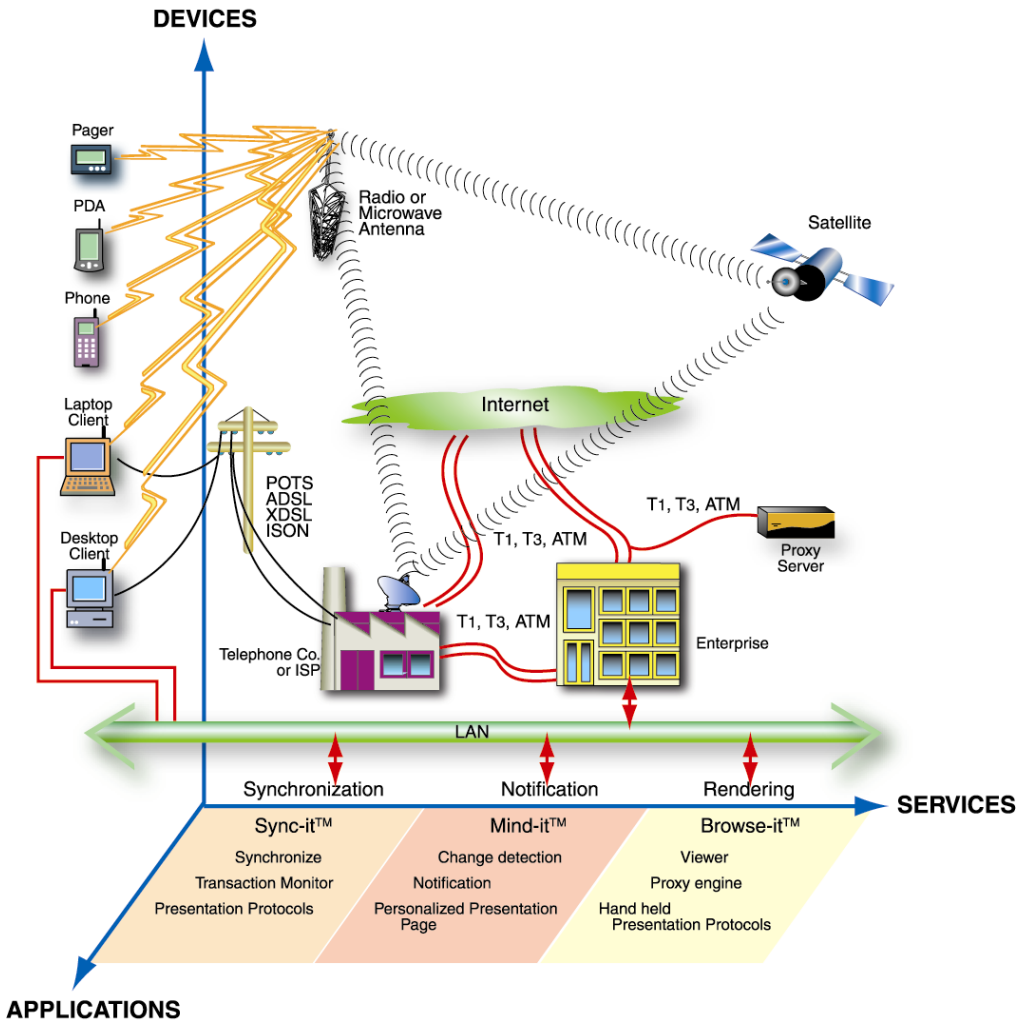

Figure 2 - MAP is a comprehensive integrated architecture

The unique advantages of Pumatech patents

Pumatech holds a variety of important patents in the field of intelligent change detection methods of computing. There are 19 core claims for the Pumatech server-side, signature-based change detection approach. These are discussed further in Appendix A.

Patents have been filed in four important areas, all critical to leading edge change detection software.

1. Information minding
2. E-Commerce minding - number minding (“price minding’) and related claims
3. Distributed *change detection and notification* (DCDN)
4. Adaptive minding that deals with highly dynamic content

These patents form the basis for the broad scale extensibility and flexibility of the Mind-it product line that covers document populations from very large to very small and user populations from very large to very small. This flexibility is shown in Figure 3.

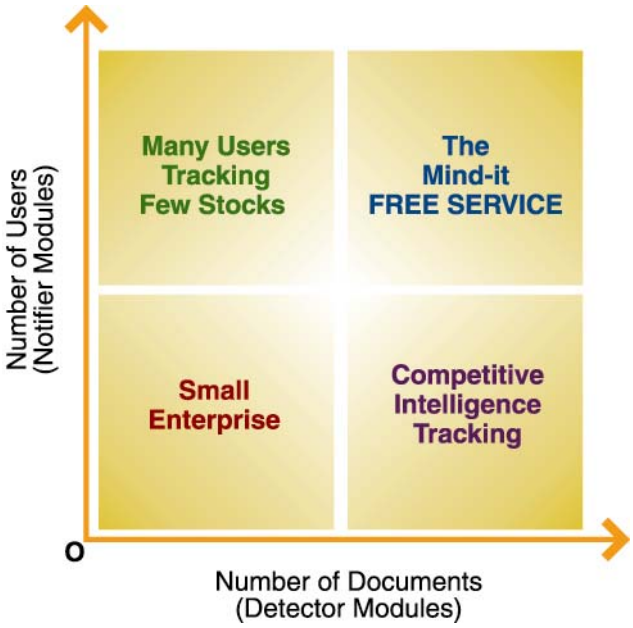

Figure 3 - Scalability of users and documents tracked is a key benefit of Mind-it

Other information sources available from Pumatech.

For additional information on the mobile applications systems market and an in-depth overview of MAP, please see the report titled ***Mobile Application Platform (MAP***) white paper that is available at http://www.pumatech.com/. This report contains thorough discussion of the many advantages of an integrated mobile applications suite. It also compares different architectural approaches available today. If further information is required, Pumatech representatives can provide further specialized presentations, reports and expert knowledge on the topics contained in this report.

Chapter 2 – Mind-it is a key part of the Pumatech Mobile Application Platform (MAP)

What is Mobile Computing

Wireless technology is not a new concept. Infra red transmission and Radio Frequency (RF) broadcasting has been available for quite some time. Cellular transmission technology is nothing more that another medium of transmission. Today the barriers of cost and availability are beginning to disappear. As more corporations implement the virtual workforce, with many of the workers dialing in via modem and cell phones, an increase in availability will emerge. As we see an increase in the demand for wireless service, the supply of these services will also increase and thus make this mode of communication more affordable. The wireless model will ultimately allow end users the ability to conduct business anytime without concern for a hard connection to the source.

With the emergence of the wireless market a new set of data storage and replication requirements will emerge. The world of Mobile Data Exchange will become as necessary to conduct business as the computer itself. Pumatech is the premier provider of Mobile Data Exchange Products and Technologies.

Strategic Analytics estimates that by 2002, 80% of mobile phones shipped in US will have a browser and the Yankee Group forecasts that one billion mobile Internet access devices will be in use around the world by 2003. Today about 50 million people worldwide are mobile computer users who spend at least 20 % of their time away from their desks. All this spells dramatic expected growth for Internet access via mobile devices. This growth is expected to come in three phases:

Phase I occurred in the late 1990s and was characterized by limited mobility, with access to the Internet characterized by offline access, where data was saved on a PC device, and synced to the mobile device locally and only intermittently. Phase I also included limited or no control of mobile devices or data by IT managers.

The second phase will occur in the period 2000-2002 and will see the rapid growth of many types of handheld devices e.g., Palm, mobile phones, and Windows CE. Sync will be local via Palm in cradle, PC to Palm only, using desktop synchronization software such as Intellisync. There will be enterprise versions of server synchronization, performed over the LAN for Palms and other mobile devices in the cradle.

Phase III will occur over the balance of the decade and mark the advent of true Mobile Computing with (Wireless Access Protocol) WAP phones (e.g., OmniSky with Palm), RIM pagers, Pocket PC, and Ricochet modems for laptops gaining prominence. In phase III there will be a greatly increasing number of diverse mobile enabled information sources such as Internet portals (Yahoo, AOL, eCal, Expedia, eBay etc), PIM data (Outlook on home computer, Exchange on work computer, Palm Pilot, WAP phone), and personal info (banking, auto bill payment).

MAP is an integrated set of mobile applications

MAP is designed with an integrated set of mobile applications. Each application can be licensed individually or collectively to create a personalized mobile solution. All applications share a consistent architecture including user interface, security model, and subscriber database. This integration results in a seamless service that enhances the mobile user experience, reduces cost, and improves time to market. Individual MAP applications can also leverage the services of other MAP applications to further enrich functionality. MAP initially includes the following announced components.

- **Sync-it™**. The Sync-it application brings a *sync engine* into the MAP infrastructure. Sync-it keeps information updated across a wide range of supported devices, applications, Internet services and mobile networks. This new sync engine was designed from the ground up with performance and

scalability in mind. Sync-it licensees can choose from a list of pre-existing “sync points”, and even add new ones using our available Software Development Kit (SDK).

- **Browse-it™**. Browse-it adds a *transformation engine* to MAP. It provides both online (real-time) and offline access to dynamic Web content. Since most Web sites are designed for large display devices, the content must undergo transformations before being sent over slow networks to small devices. Browse-it also allows users to store Web pages on their mobile device for offline viewing. Users can personalize the Browse-it client to mobilize their own content.

- **Mind-it™**. Mind-it includes a *change detection engine* and a *notification engine*. This combination enables users to build powerful applications that send intelligent alerts in response to dynamic changes in Web or database content. Mind-it efficiently sifts through volumes of publisher-centric content to detect changes and deliver succinct messages to devices like phones and pagers. Only items of explicit interest are sent, effectively giving mobile users complete control over the information they receive. Mind-it toolkits are available for licensees to support building custom alerts.

The role of Browse-it in Pumatech’s Mobile Application Platform (MAP)

Yet another key component of the mobile Internet is the need to access real-time Internet content. In recent years, mobile device standards such as WAP (Wireless Access Protocol) have been created to extend the reach of small wireless devices to Web content. Consistent with this objective, MAP includes the Browse-it service to facilitate both online (real-time) and offline access to dynamic Web content. The Browse-it service introduces the technology components needed to view the Web through a peephole (from devices having a small display).

Browse-it enables small devices to operate as full-fledge Internet clients by performing the necessary transformations on Web data before delivering the content to the device. Browse-it also allows users to store selected Web pages on their mobile device for offline viewing. In this way, the service balances the need for real-time access, while reducing slow connection times for users who opt to view selected Web pages offline.

The Browse-it service delivers Web content from a variety of markup languages including HTML and XML. A thin Browse-it *client* is currently available for Palm™ devices, supporting both efficient online and offline viewing of Web pages. The Browse-it software includes a *Web switch* and *front-end* (FE) that communicates with mobile devices using well-known encryption technology (DESX). *Distiller modules* are responsible for filtering and transforming the Web page elements for rendering on the given mobile device. A *cache* is used to improve overall service performance and reduce access frequency to the network. And advanced SSL encryption technology is used to access Web content from secure sites.

The role of Sync-it in Pumatech’s Mobile Application Platform (MAP)

The architecture of the Sync-it service facilitates any mobile device, PC or Internet content provider to synchronize its data. Published interfaces and sample source code are provided to empower independent parties to support the Sync-it service on their own. The service is implemented using a highly scalable architecture involving three distinct server tiers. The 1st tier involves Web servers that act as connection gateways for Sync-it clients. The 2nd tier involves the transaction servers that perform the actual sync steps. And the 3rd tier involves the database servers that provide access to synchronized data.

Key difference between content management and synchronization is that content management means a single, Web-based repository of information that must be accessed (typically from a PC) to extract information. It is not anytime, anywhere access. The key for synchronization is that to enable anytime anywhere data access, devices must contain data so that it is accessible continuously without having to access the limited bandwidth, limited speed, limited availability internet. This “contained” data must then be synchronized with the main server, passing only that minimal information that has been changed, either at the server or at the device.

Why Buy rather than Build

The mobile solutions of today are highly fragmented. This means that customers are forced to license *point* solutions from multiple vendors to address their complete needs. Pumatech created the Mobile Application Platform (MAP) expressly to address this problem. MAP is a high-performance and extensible platform that supports a broad range of mobile devices and services. Unlike the PC world, mobile devices vary dramatically in their physical size, memory capacity, processor speed, connectivity features and price. MAP effectively shields customers from these underlying differences, using Pumatech's advanced technologies to mobilize data across a wide range of mobile devices.

MAP is the common server platform on which Pumatech is building its new mobile solutions. MAP was designed for maximum scalability and performance, and empowers both Internet access and wireless access to mobile devices. This differs markedly from the PC-centric connectivity solutions that enable Internet access only while tethered to a PC. MAP provides ubiquitous access to mobile devices over both wired and wireless media, and does not require the PC to act as a gateway to the network. The platform is hosted in the public Internet space as *Intellisync.com*™, and will also be deployed inside the firewalls of major corporations. MAP is the only integrated approach to support data synchronization (Sync-it), personalized notification (Mind-it) and Web content rendering to mobile devices (Browse-it).

The unique advantages of MAP

MAP provides many of the benefits not possible with *point* solutions from different vendors. These include:

- Single source vendor
- Complete "Mobile Solution"
- One operating environment
- Modular architecture
- Easy to customize via APIs and SDKs
- Scaleable technology
- Platform Approach vs. *Point* Solution
- Flexible pricing model
- Professional Services

MAP and all layered services have been designed from the start with scalability in mind. The Sync-it, Mind-it and Browse-it services have all been implemented from the ground up to support millions of subscribers. Pumatech has applied its depth and expertise in synchronization to deliver a totally new sync paradigm and software solution.

Chapter 3 - Business benefits of an optimally designed *change detection and notification* system

Benefits for the Enterprise Intranet model

Intranets are networks based on TCP/IP protocols that belonging to an organization, usually a corporation, and are accessible only by the organization's members, employees, or others with authorization. An Intranet's Web Site looks and acts just like any other Web Site, but the *firewall* surrounding an Intranet fends off unauthorized access. Like the Internet itself, Intranets are used to share information among employees and affiliates. Secure Intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based on proprietary protocols.

A major benefit of corporate intranets is that they contain information critical to employee and corporate productivity such as project status, company policies, product information, sales numbers, engineering specs, and 401K performance. On the Internet there is also a lot of valuable business and technical information related to the competitive advantage of the firm such as competitor data, supplier data, market data, engineering standards, sales leads, human resource discussions, etc. Mind-it keeps employees up to date on both internally and externally published information that directly increases employee productivity and translates directly in the competitive advantage of the enterprise.

Benefits for the Business to Business (B2B) Extranet model

Extranet is a relatively new acronym that refers to an Intranet that is partially accessible to authorized outsiders. They are used to share information from a corporate database for example an MRP system, to process orders or check order status, or supply customer service. Whereas an Intranet resides behind a firewall and is accessible only to people whom are members of the same company or organization, an Extranet provides various levels of accessibility to outsiders. Extranets can be accesses only with a valid username and password, and a user’s identity determines which parts of the Extranet they can view. Extranets are becoming a very popular means for business partners to exchange information.

Similar to the Mind-it benefits for an Intranet discussed above, Extranets can make these advantages extensible to partners on a protected yet personalized basis. Deployment of Mind-it is particularly useful for resellers of a company’s products since both reseller and direct sales personnel can be easily included for certain types of competitive marketing and sales contact information by the parent organization.

Supply Chain Management (SCM) applications represent a major class of activities in the B2B model of today. As much as 25% of a corporate budget can be spent on supply chain management activities including inventory carry costs, materials acquisition, transportation, order management, supply chain financing and related IT expenditures. Collaboration with upstream and downstream business partners takes many forms including sharing forecasts, co-locating and managing inventory, and joint product development. The use of alerts based *change detection and notification* software such as Mind-it can have many business benefits in the SCM environment:

1. Sales Forecast Planning – An alert can be scheduled if a sales forecast received from field sales is a certain percentage off of what demand was expected from a prior forecast
2. Materials Management – An alert can be generated if material that is required for manufacturing operations is not at a work location before safety stock is exhausted
3. JIT inventory delivery monitoring. – Alerts are generated if a scheduled JIT inventory delivery exceeds the expected delivery window by a specified time interval.
4. Inventory management – Replenishment cycle reordering can be triggered by alerts tied to inventory and work in process (WIP) inventory cycles.

5. Work Order management – If the duration of an open work order slips, an alert can be generated to re-allocate or reschedule production resources of other jobs.
6. Process Control tolerances – When a quality control standard is not being met, QA, Maintenance or engineering management can be alerted to correct the problem.
7. Obsolete Inventory flags – When an individual product has remained in inventory past a certain time threshold, an alert can be generated to warn against possible product obsolescence.
8. Preventative maintenance alerts can indicate when planned PM has, or has not, occurred.

Benefits for the Business to Employee (B2E) model

Business to Employees, or B2E refers to the use of an Intranet, Extranet or Internet to communicate with employees or affiliates on an enterprise. Since employee productivity is a major determinant of corporate profitability, Mind-it has many advantages in communicating changes in the company information of all types to employees and affiliates in a timely and accurate manner. Examples of this would include press releases, policy changes, product releases, service problems, customer opportunities, proposal status etc.

Benefits for the Business to Consumer (B2C) Internet model

Mind-It provides many benefits to both consumers and to the ISP itself. Mind-it can monitor the price of almost anything that a consumer can buy over the Internet, like plane tickets, mortgage rates, stocks, or compact discs. Therefore consumers will return to an ISP that has implemented Mind-it. In addition to consumer benefits, Mind-it benefits an ISP directly by addressing common problems experienced in Internet marketing. Mind-it:

1. Reduces Bandwidth Costs - By Personalizing notifications Mind-it delivers small, user-specified, user-relevant data sets thereby minimizing increasing bandwidth costs.

2. Increases Traffic – Mind-it attracts new users by personalizing only relevant data they are interested in without repetition of unnecessary information.

3. Increases usage through mobile access – Mind-it's anytime, anywhere access reduces usage barriers and increases B2C usage.

4. Increases a site's stickiness by becoming a personalized and useful information source, with synchronization to a central point of data storage and increased usage due to access by mobile devices.

5. Reduces *churn* – Mind-it builds community branding and loyalty, resulting in users that are motivated to stay on the site for easy access to relevant data.

6. Mind-it will increase a site's Revenue due to the fact that many of Mind-it alerts are actionable and drive purchases behavior.

Other Business Benefits of Mind-it can apply to all business models

1. Reduced customer service costs - By allowing users to have access to Mind-it software, some business models can reduce the need for customer service calls and therefore reduce the staffing and infrastructure expense necessary for support.

2. Improved competitive advantage due to improved change detection - For many enterprise deployments of Mind-it, the major advantages are in the area of competitive advantage relating to improved notification of "time sensitive" information. These advantages span the entire spectrum of business from sales through production and customer service.

3. Simplified IT operations by using an integrated change detection architecture –the cost of integrating disparate *point* solutions from different vendors is much higher as discussed above in Chapter 2.

4. Accelerated deployment of new IT systems and applications - With an integrated Mobile Applications Platform such as Pumatech's MAP, upgrades to Mind-it applications can be easily supported by the mobile architecture without concern about integration problems. This is one of the major advantages of an integrated pre-tested approach instead of architecture made up of potentially non-integrated pieces.

5. Robust Centralized systems management - The Mind-it software provides easy and centralized systems and network management while the Mind-it Administrator's Web interface provides robust system management tools and ease of operation.

6. Inexpensive clustered servers reduce capital acquisition costs - The ability to cluster ensures that high performance levels can be achieved with multiple, inexpensive machines rather than fewer, expensive machines.

7. The Mind-it design leverages existing Web server investments - By operating at the Web layer, Mind-it enables customers to maximize their existing investment in Web infrastructure, i.e., Web servers, application servers, load balancing and fail-over hardware and software, etc. In contrast, database-oriented approaches typically require significant custom engineering and expensive hardware.

Examples of Mind-it deployments for business advantage include:

News minding: www.cnn.com/entertainment (bottom of page).

Persistent search: www.lycos.com ("Track this Search' feature).

Comparison-shopping: www.cnet.*NetMind*.com ('Price drop alert" feature)

Auctions: www.ebay.com ('Personal shopper" option)

Chapter 4 – Benefits of Key Mind-it features

Unsurpassed granularity of tracked information

Mind-it enables users to personalize tracked information with much finer levels of granularity than alternative technologies. Regions of text, images, numbers, and numeric expressions can be tracked instead of non-specific changes such as changes to a whole page or to keywords. For example, number minding can be used to track merchandise prices, inventory levels, stock trades, etc. By contrast, search engines only permit users to track keywords or whole pages.

Number Minding

Number Minding is a feature of Mind-it that allows the user to select any number from the page and be notified when it changes. It also gives the user the option to create an algebraic or logical expression with the number. Mind-it will monitor the number, evaluate the expression, and only send the user an email when the expression becomes true. An example would be automatic notification that a particular car model has been offered at a sale price while auto loan rates are particularly favorable.

Image Minding

Image Minding is a feature of Mind-it that watches for chosen images or graphics. Mind-it sends users an email when one of the chosen images arrives, changes, or disappears. This feature detects changes to the underlying image information, such as file name, rather than changes to the image itself.

Keyword Minding

Keyword Minding is a feature of Mind-it that watches for chosen keywords or phrases. Mind-it sends users an email when one of the chosen keywords arrives, changes, or disappears. Surrounding multiple words with quotation marks indicates a phrase. Otherwise, Mind-it will perform a search for multiple keywords. (Note: This is also important if a user is watching for simple words that may show up in a lot of ways. For example, watching for just the word "sun" will result in notification for the appearance of “sunny” and “Sun Microsystems”, while watching for "Sun Microsystems" or just "Sun", with the quotes and a space at the end of the word, will eliminate notification for the word, "sunny".

Text Minding

Text Minding is a feature of Mind-it that allows the user to copy and paste any section from a page and only be notified when that section changes. After selecting Mind-it, the user can use a mouse to select the text on the page and then use the copy/paste function in a browser to grab the text and paste it into the selection box.

Page Minding

Page minding is a feature of Mind-it that notifies users about any relevant change to the content that can be seen with a browser with the exception of images. The Page minding software ignores changes in HTML along with many of the common rotating ad banners.

The My Page control panel allows robust editing of tracked information

Mind-it provides an easy-to-use Web-based control panel called “My Page” from which users can view and organize information being minded and edit minding criteria and other preferences. My Page also shows users what specific information has changed on a Web page by serving up that Web page with highlighting of the differences. Highlighting enables users to quickly determine relevant changes in the information they are tracking.

Mind-it Wizard

The Mind-it Wizard allows users to use Mind-it to track almost anything in their browser. It can track:

- password-protected pages,
- pages that are dynamically generated based on a user's selections
- database-driven content
- Dynamic HTML

After clicking on the selection in the menu, simply type in any URL as a starting point. Alternatively, choose a search engine and perform a search. Either way, Mind-it places a small tool bar above the page and allows users to surf the Web as they normally would. When the user arrives at a page that contains something that he or she wants to track, Mind-it captures that page and then asks the user to select a method of tracking.

The Click Tracking wizard helps create strategies to increase purchases

Mind-it enables users to interact with dynamic Web pages through an easy-to-use wizard that tracks user clicks and form submissions by proxying requests. This enables Mind-it to capture all data necessary to track a dynamically generated page, i.e., GET data, POST data, cookies and credentials. For example, click tracking can be used to track items placed into a shopping cart that are never checked out and purchased, providing important feedback that can help the Web deployer create strategies to drive these shopping cart placements toward increased checkout rates.

Highly targeted Email notifications provides clear user profiles

Mind-it enables highly targeted messages to be included within the body of email notifications, based on demographic and psychographic data that Mind-it gathers on users, click tracking data, and other external information supplied to Mind-it. Messages are personalized based on the user data and other information, and can include third-party content such as that from advertisement engines.

Mind-it Smart Links capture only information that is specified

Mind-it Smart Links capture personalized, "actionable," one-click information, which can be invoked from email messages or the Web, in contrast with browser "dumb links" that simply direct a Web browser to a URL. For example, one SmartLink could capture and preview a computer configuration while another might enable a single-click purchase of the pre-configured computer.

Click-through Auditing reveals the buying process

Mind-it stores click-through information for links within email notifications and My Page and correlates such clicks with email messages and page views. In the case of, for example, an on-line auction, this can help the deploying company understand areas of concern in the continuum from email notification through to final purchase, and create strategies to drive up the purchase rate.

Robust reports provide actionable marketing information

Mind-it provides many built in reports via a Web-based interface and supports the ability to develop custom reports. These include detailed reports on number of users, number of pages minded per user, total number of minded pages, numbers of email notifications per user and per database, and click-through activity based on user, messaging campaigns, URLs, demographics, etc. An example of a customized report of business benefit is shown in Table 1 and a standardized daily report in Figure 2.

Enterprise Mind-it Customers	Buyers	Orders	Sales	Average Order Value	Average Spending per Customer
New	526	1,562	$269,444	$172	$512
Same	1,058	3,243	$577,125	$178	$545
Installed Base	2,787	23,613	$3,922,797	$166	$1,408
Customer Total:	**4,371**	**28,418**	**$4,769,367**	**$168**	**$1,091**

Table 1 - Analysis of Orders from Mind-it users[1]

USERS	
Total users:	12183
Total active users:	9321
Total users with persistent searches:	9299
Daily new users:	40
Daily new users with persistent searches:	36
REGISTRATIONS	
Total registrations:	13111
Total URLs:	66
Total persistent searches:	13033
Daily new registrations:	51
Daily new persistent searches:	51
NOTICES	
Total daily notices:	2116
Daily notices:	2111
CLICK-THROUGHS	
Total click-throughs:	37148
Total click-throughs:	23571
Daily click-throughs:	140

Table 2 – Example of a Mind-it daily report

[1] The Column headings in this report are:

Buyers – This is the number of users that signed up for Mind-it that were buyers
Orders –The number of orders placed by users that signed up for Mind-it)
Sales - Total sales revenue by NetMind users)
AOV - Average order volume
Avg spending per Customer - Total revenue divided by buyers

The rows headings in this report are :

New – This is the number of new users added to the client dbase on a date after they registered for the Mind-it service
Same – This is the number of users that signed up for the Mind-it service and registered for the client's service on the same day
Installed base – This is the number of users that were already in the client's dbase when they registered for the Mind-it service
Customer total -Total of all types of customers

Chapter 5 – Best of both worlds in database performance and availability

A powerful multi-threaded design

Mind-it is based on high-performance software architecture, designed for efficient multi-threading and memory management. This framework minimizes application memory requirements and maximizes performance. For example, the Responder module running in Web-server mode built upon this framework is approximately twice as fast as the Apache Web server is.

Mind-it supports multiple database formats for optimum flexibility

Mind-it offers two basic options for storing the database of information being tracked. The first is a database format known as pBase that is a custom designed database optimized specifically for the activity of efficient *change detection and notification*. This database uses a subset of SQL 92 commands.

The second is that the database can be stored in a form compatible with ODBC and / or Oracle databases. Some database administrators because of the built in compatibility with the robust reporting facilities of Oracle and other standard databases prefer this approach.

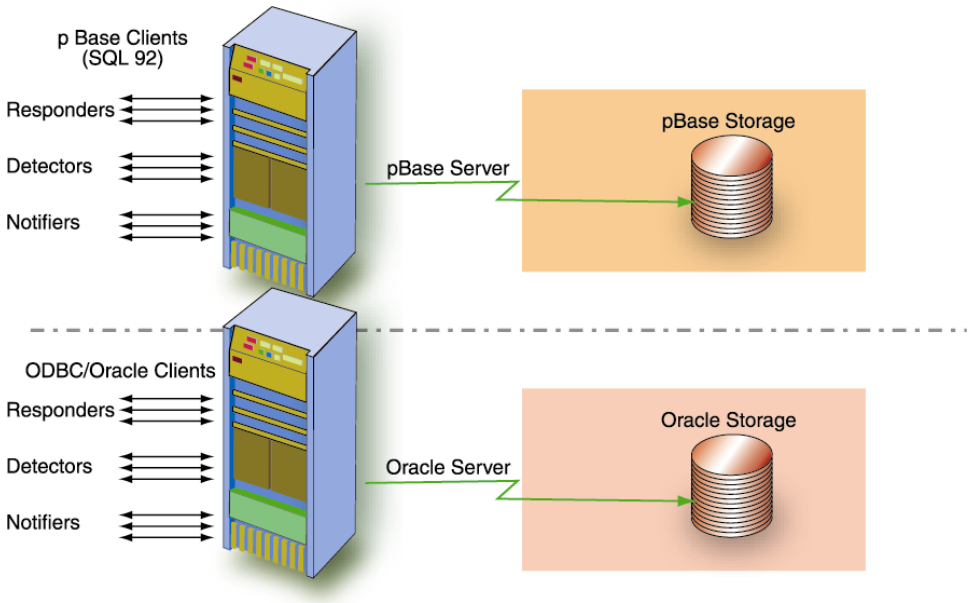

Figure 4 - Mind-it supports both pBase, ODBC and Oracle databases

Mind-it can analyze both unstructured and structured data

Mind-it analyzes the structure of existing Web content, whether unstructured HTML or structured XML, and does not require special tagging or publishing processes

The Mind-it pBase database is specifically designed for change detection

The Mind-it pBase database implements many advanced features for top performance including:

- Optimal, Order (1), hash-based database reads/writes.
- Non-blocking database reads.
- Bitmapped indices.
- Variable-length records.
- SQL-like query language (subset of SQL92 standard), including support for temporary tables and cursors.
- Ability to export into Oracle and other commercial databases.

Built-in Protocols reduce connection times to a minimum

Mind-it includes built-in implementations of common protocols, such as HTTP, SMTP and DNS, thereby eliminating performance-degrading dependencies on external software. Advanced TCP/IP connection management and efficient, flexible caching of DNS info, further improve performance by minimizing time to establish connections. The self-maintaining database of high-quality email addresses (fixes or purges bad addresses) reduces expensive email delivery failures.

Regular and Arithmetic Expression Engines optimize text and number tracking

Mind-it includes a high-performance regular expression engine used for text pattern matching and optimized for HTML. It is a DFA-based engine yielding Order (document size) performance versus inferior Order (document size x expression size) for common NFA engines, such as PERL. Mind-it also includes an arithmetic expression engine optimized for number minding.

Clustering Support provides high availability and performance

All Mind-it components, except the database engine, can be replicated and run on separate machines to satisfy any required level of performance. The number of threads assigned to each sub-system of each Mind-it component is configurable. For example, Mind-it may run more pager notification threads than regular email notification threads in applications demanding immediate notification, such as online auctions.

Mind-it can be extended to access Oracle and ODBC database information through adapters

Mind-it can be readily extended by including data from other sources of Web information, i.e., anything that a user can see from a Web browser. Similarly, Mind-it notifications can incorporate information from external sources. For even tighter integration, Mind-it can be extended to access non-Web information through adapters. For example, Pumatech offers an Oracle database adapter option to access data directly from Oracle databases. In the near future Mind-it will interface directly to Oracle databases. For more information, please contact Pumatech.

Chapter 6 - Simplicity of Mind-it Deployment

Full Internet standards compliance

Mind-it complies fully with the following Internet standards:

HTML, XHTML, HDML, WML email or plain-text email notification
Web browsers greater that version 3.X (JavaScript 1.2 or later)
SSL and NTLM security
Basic authentication, cookies, GET data, POST data
MIME, UniCode (UTF-8), Base 64
XML
SQL
Data export to Oracle and other databases

A true turnkey solution minimizes implementation costs

Mind-it works out of the box and can be installed within minutes using an installation wizard. No third-party database, Web server or other software is required. Mind-it is also readily customized to support applications requiring integration for purposes of look and feel or other special features. By including a Web server, email client, and database, no additional software is required to install and run Mind-it.

Templates facilitate rapid customization

Pumatech has developed a powerful, yet easy-to-use string substitution engine that enables customizable, template-based content. This facilitates rapid product customization and internationalization. Pumatech's *MailScript* language enables mail-merging from multiple, disparate data sources: database tables, flat files, and Web data.

Web layer integration avoids complex integration engineering

Mind-it integrates readily with existing e-applications by exploiting the availability and scalability of the top-tier of the application, namely the Web layer. Mind-it does not require integration at the middle- or bottom tiers, i.e., database layer, business logic layer, or middle-ware layer. Note that the latter typically requires more expensive integration engineering and imposes increased load demands on the database, which is often the system bottleneck.

A robust high-availability design

Mind-it is highly tolerant of non-compliant/faulty servers, invalid content, etc. Mind-it is designed for 7x24 availability. The free Mind-it service, available at http://www.netmind.com/ is an example of such full time availability and of Internet scalability.

Chapter 7- An open non-stop architecture

Overview of the Mind-it Architecture

Mind-it is a server-based *change detection and notification* software product that runs onSolaris. It is based on four software modules as shown in Figure 5, i.e., Responder, Detector, Notifier and Storer. Mind-it works with any Web browser and email program; no special client software is required. By default, Mind-it operates by polling pages for changes at a configurable frequency. Mind-it consolidates data being tracked to prevent duplication of notification to users and to maximize efficiency and performance. If 10,000 users are minding the same page, the page is retrieved only once for all users. This is in contrast with client-based approaches, such as Microsoft Internet Explorer, that would result in 10,000 hits to the same page! An additional benefit is that Mind-it continues to check on behalf of users even when they are off-line.

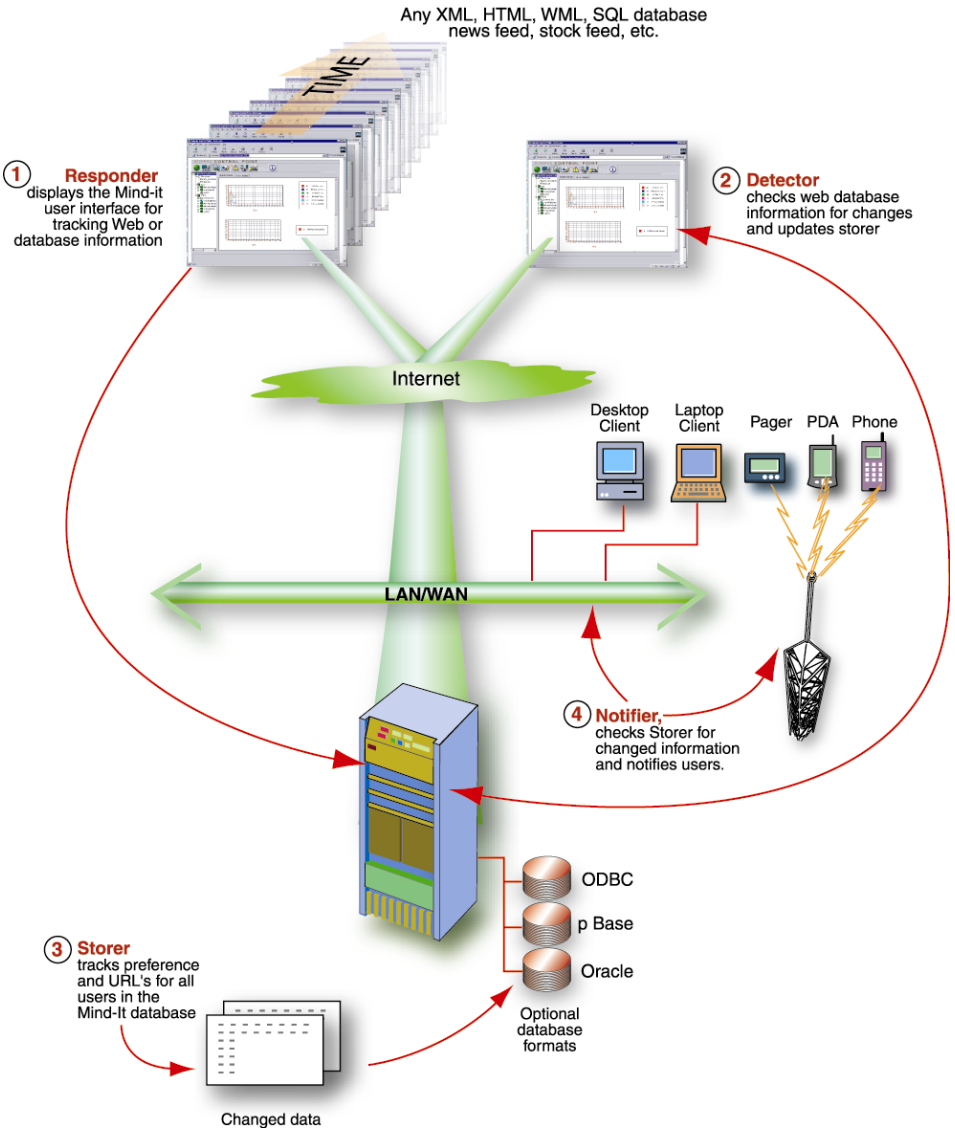

Figure 5 - The major software elements of the Mind-it architecture.

The four components of the Mind-it software architecture

The four components of the Mind-it software architecture are discussed below and shown in Figure 5.

Responder

The Responder module is responsible for processing user requests. Users interact with Responder using their Web browser in one of two ways: 1) Directly by talking to Responder's built-in Web server, and 2) Indirectly via a partner's Web server which sends Mind-it API requests to Responder.

Responder "instruments" the page, in both the Mind-it Service and Mind-it Server, and functions as an intermediary. Responder serves "My Page" views, either as complete pages, or raw data for embedding within another page and functions as a proxy server when click tracking.

Detector

The Detector Module is responsible for detecting and processing changes. There are two Modes of operation 1) The polling subsystem scans pages for changes at the configured poll period and 2) the event subsystem listens for change events that are generated by special-purpose adapters, such as the Oracle database adapter.

The Performance of Detector on a Netra T1 Server is 40,000 pages / hour since it is multithreaded. Detector also uses DNS caching and proprietary logic and heuristics for smart change detection. Factors that are taken into account include page contents and previous change behavior, in addition to server information such as Last-Modified date

A Proprietary arithmetic expression engine optimizes number minding and a proprietary regular expression engine optimizes HTML. An optional *tracking* feature in the Quick Add page allows a user to tell Enterprise Mind-it what changes it should look for in a particular page.

Notifier

The Notifier module is responsible for personalizing and sending email notifications. It includes three software subsystems:

1. The low-priority subsystem notifies users requesting notification to their regular email addresses.
2. The high-priority subsystem notifies users requesting notification to their email-enabled pager or other high-priority wireless devices.
3. The scheduling subsystem notifies users requesting that multiple changes be grouped into a single message and notified at a scheduled time.

Notifier also implements the following performance optimizations:

1. URL Checking.
2. High-performance email Notifier/Mailer.
3. Highly multi-threaded, built-in SMTP client and DNS resolution server.
4. Flexible DNS caching policy control: supports both TTL and configurable periods
5. Self-maintaining database of high-quality email addresses (fixes or purges bad addresses), "dead page" notices reduces expensive email delivery failures.

Storer

Storer is a uniquely designed database optimized for the Mind-it application. A proprietary database, (pBase), is designed specifically to meet Mind-it's performance requirements. The database includes many advanced database features:

1. Optimal, O(1), database reads/writes
2. Non-blocking database reads
3. Bitmapped indices
4. Variable-length records (blobs)
5. Fast indexing
6. SQL-like query language, including support for transient relations, variables, cursors and reporting
7. Data is exportable into Access, Oracle and other commercial databases

An integrated software structure both within Mind-it and within MAP

Not only are the four modules of Mind-it integrated within the product but they are also integrated within other components of the MAP architecture so that any upgrades to Mind-it or MAP will be thoroughly tested before release. This provides a huge advantage over the alternative of assembling *point* solutions as discussed in Chapter 3.

Chapter 8 – Consulting and Professional Services

Professional Services Overview

The Windward Group, a division of Pumatech, offers professional services for Mind-it. As new technologies gain acceptance, companies must decide on long-term plans and implementation schedules that cause the least disruption to business. The Pumatech professional services group excels at helping customers chart both the strategies and timelines necessary to remain productive and competitive. Since Mind-it can be highly customized, customers often choose to retain the Windward Group to provide accurate and timely customization services for optimal benefit. Pumatech offers similar services for the other major elements of MAP as described in Chapter 2.

There are four typical phases contained in a proposal for professional services:

Alert Content Definition—this phase identifies the content from the Customer's Website or other data sources, (such as a database) that is to be made available for alert monitoring ("alertable content")

HTML Interface Design—this phase describes the look & feel of the Alerts Set-up Page and specification of the required fields and variables on the "alerts" form

Message Template Specification—this phase describes the message templates to be applied to the Customer's alert content across multiple device classes, such as plain text, email, HTML email and SMS templates.

Report Requirements—finally a summary of the customer's reporting needs are defined

Detailed Proposals with Cost Estimates are provided

The Pumatech professional services staff provides clear and detailed proposals for all work to be completed. These Statement of Work (SOW) documents include a detailed scope of work section keyed to the four phases discussed in the prior section. They also include a deployment phase plan, a launch schedule, a milestones section and a spreadsheet-based cost estimate for each phase of work to be performed.

Chapter 9 – Summary

Mind-it benefits Intranets and B2B productivity

A major benefit of corporate intranets is that they contain information critical to employee and corporate productivity such as project status, company policies, product information, sales numbers, engineering specs, and 401K performance. Intranets are also growing exponentially among firms of all sizes. The growth is being driven by three areas: 1) Development of the necessary infrastructure, such as Web, email and directory servers; 2) Development of content, including Web authoring tools, content management tools and vertical applications; and 3) Productivity and personalization, such as information tracking, search, site mapping and knowledge sharing. Personalization via *change detection and notification* software, such as Mind-it, can enhance employee productivity and lead to competitive advantage in the many ways discussed in this paper.

Mind-it benefits Extranets and employee productivity

Companies are setting up Extranets to better service channel partners, suppliers, and customers. They continue to face challenges in managing security along with the diversity of computers and applications that a workable Extranet must support. Mind-It offers an approach to setting up an effective Extranet within a matter of a few days or weeks. If the content already exists on the Web in intranet format, Mind-it makes it possible for a company to securely extend that information to outside partners with little added effort. This will enhance partner productivity and lead to competitive advantage for the firm.

Mind-it benefits Internets and B2C productivity

Mind-it offers many advantages to B2C business in both reduced cost and increased revenue. E-commerce sites have many excellent opportunities for improved return on investment of their business model by attracting new and repeat customers back to their sites to see the latest products, promotions, and price offerings. Sites that have very specific customization and integration needs can optionally manage the database of registered users of Mind-it as well as the other products in Pumatech's integrated Mobile Applications Platform (MAP).

Only Pumatech offers completely integrated personalization software solutions

Pumatech offers unique personalized *change detection and notification* software solutions that support all of the above trends. Employees can increase productivity by tracking multiple Web sites [internal or external] without spending precious time on the Internet / Extranet / Intranet to find changes. They are notified of changes during the time they already spend daily on email. This allows employees to be better informed with less effort, keeping bandwidth and administration functions to a minimum for IT managers.

***Change detection and notification* software is the second major wave of Internet technology**

The Web is quickly moving to the mobile access devices of all types. According to International Data Corporation, sales of hand-held computers alone are expected to grow from 3 million units in 1997 to 13 million units by 2001. Companies like Sony, Sharp and Fujitsu are "Web-enabling" their products and offering customers email access through pagers, cellular phones, PDAs, and other wireless devices. Because Pumatech's MAP architecture supports a variety of protocols, it can deliver information via wireless devices to help employees and consumers track Web-based information from any server to any place.

If the first major Internet application is Search Engine technology, the second is *Change detection and notification* technology. Search technology allows both corporate and consumer users to find important information. Change detection software such as Mind-it allows these users to keep track of important information once found.

Appendix A: Pumatech Mind-it Patents

Pumatech's first patent is US patent 05898836, approved 04/27/1999, titled "Change-detection tool indicating degree and location of change of Internet documents by comparison of cyclic-redundancy-check (CRC) signatures"

This patent is revolutionary in that it (1) dramatically reduces the disk storage required for change detection since signatures are several orders of magnitude more compact than the documents themselves and (2) dramatically improves performance since signature comparison is orders of magnitude faster than string (text) comparison. Both advantages combine to make Mind-it extremely scalable.

Pumatech has three other patents pending in relation to its Mind-it technology.

Glossary of Terms

Alert An alert, in personalized *change detection and notification* software, refers to that software's ability to send a notification or "alert" to an individual or group of individuals if certain parameters of change detection are met.

Any device This term refers to one of the features of mobilization computing where access to data can occur from any network or wireless attachment of personal choice. e.g., Palm, WAP phone, pager, desktop, and laptop.

Any time This term refers to one of the features of mobilization computing where access to time-relevant data occurs without planning ahead

Anywhere This term refers to one of the features of mobilization computing where access to data can occur to any network or wireless connection anywhere in the world.

API An acronym for *Application Programmer Interface.* API refers to the software layer that interfaces application software modules to lower layers of networking and system software.

ASP *Application Service Providers* or ASPs are firms that provides individuals and companies with access to application software routines over networks for a monthly fee. The ASP provides a software package, username, passwords, access numbers and service and support.

B2B *Business to Business* refers to businesses involved in the sale of goods and services over the Internet rather than to an individual consumer as in *Business to Consumer* (B2C).

B2C *Business to Consumer* refers to the sale of goods and services over the Internet rather than to other businesses as in Business to Business (B2B). .

B2E *Business to Employees*, or B2E refers to the use of an Intranet, Extranet or Internet to communicate with employees or affiliates on an enterprise.

Browser Browser is short for Web browser, a software application used to locate and display Web pages. The two most popular browsers are Netscape Navigator and Microsoft Internet Explorer. Both of these are graphical browsers, which means that they can display graphics as well as text. In addition, most modern browsers can present multimedia information, including sound and video, though they require plug-ins for some formats.

Browse-It™. Browse-it refers to the *transformation engine* for MAP. It provides both online (real-time) and offline access to dynamic Web content. Since most Web sites are designed for large display devices, the content must undergo transformations before being sent over slow networks to small devices. Browse-it also allows users to store Web pages on their mobile device for offline viewing. Companies can personalize the Browse-it client to mobilize their own content.

Change Detection Server Software – Server software that tracks changes in specific information for end-users.

Click Through Refers to a user detecting a hyperlink within a notification of "Alert". By tracking "click through" it is possible for Mind-it to determine what percentage of notifications eventually lead to purchase.

Click Tracking By tracking "click through" it is possible for Mind-it to determine what percentage of notifications eventually lead to "interest" and of those interested what percentage eventually make a purchase. For example, click tracking can be used to track items placed into a shopping cart that are never checked out and purchased.

Cookie A cookie is a message given to a Web browser by a Web server. The browser stores the message in a text file called *cookie.txt*. The message is then sent back to the server each time the browser requests a page from the server. The name *cookie* derives from UNIX objects called *magic cookies*

CPM *Cost per Thousand* is a measurement in advertising whether in print media, television, cable or the Internet. It is calculated by dividing the cost of the advertisement by the reach of the advertisement in thousands of persons. For example, a CPM of $10 means it will cost an advertiser $10 per 1000 impressions of a banner ad display.

CPU *Central Processing Unit*. Can refer to either a processor chip such as Sun's SPARC or Intel's Pentium, or to a processor chip or chips and support circuitry on a CPU board.

E-mail E-mail is short for electronic mail, the transmission of messages over communications networks. The messages can be notes entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers, and computer networks have an e-mail system. Some electronic-mail systems are confined to a single computer system or network, but others have gateways to other computer systems, enabling users to send electronic mail anywhere in the world. Companies that are fully computerized make extensive use of e-mail because it is fast, flexible, and reliable.

Extranet Extranet is a relatively new acronym that refers to an Intranet that is partially accessible to authorized outsiders. They are used to share information from a corporate database for example an MRP system, to process orders or check order status, or supply customer service. Whereas an Intranet resides behind a firewall and is accessible only to people whom are members of the same company or organization, an Extranet provides various levels of accessibility to outsiders. A user can access an Extranet only if they have a valid username and password. Extranets are becoming a very popular means for business partners to exchange information.

Granular Information Mind-it enables users to personalize tracked information to fine levels of granularity in terms of regions of text, images, numbers, numeric expressions, etc. For example, number minding can be used to track merchandise prices, inventory levels, stock trades, etc. By contrast, search engines only permit users to track keywords or whole pages.

GUI An acronym referring to a *Graphical User Interface* that is the screen presented to a user in any computer application.

HDML *Handheld Device Markup Language* (HDML) is a proprietary markup language used to format content for Web-enabled mobile phones that is most popular in North America. HDML is a precursor to WML, which is the emerging standard for Europe and now for the US.

HTML Short for *HyperText Markup Language,* the authoring language used to create documents on the World Wide Web. HTML defines the structure and layout of a Web document by using a variety of tags and attributes.

HTTP HTTP is an abbreviation for *HyperText Transfer Protocol,* the underlying protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what action Web servers and browsers should take in response to various commands.

HTTPS HTTPS is an abbreviation for *HyperText Transfer Protocol using the SSL* or Secure Sockets Layer protocol developed by Netscape. Both Netscape Navigator and Internet Explorer support SSL, and many Web sites use the protocol to obtain confidential user information, such as credit card numbers. By convention, Web pages that require an SSL connection start with *https:* instead of *http.*

Internet Internet refers to a global network connecting millions of computers. As of 1999, the Internet has more than 200 million users worldwide, and that number is growing rapidly. More than 100 countries are linked into exchanges of data, news and opinions.

Intranet An Intranet is a network based on TCP/IP protocols (an Internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with password authorization. An Intranet's Web Sites look and act just like any other Web Sites, but the *firewall* surrounding an Intranet fends off unauthorized access. Like the Internet itself, Intranets are used to share information. Secure Intranets are now the fastest-growing segment of the Internet because they are much less expensive to build and manage than private networks based on proprietary protocols.

ISP An ISP or *Internet Service Provider* is a firm that provides individuals and companies with access to the Internet for a monthly fee. The ISP provides a software package, username, and password and access phone numbers.

Java Java is a high-level programming language developed by Sun Microsystems. Java was originally called OAK, and was designed for handheld devices and set-top boxes. Oak was unsuccessful so in 1995 Sun changed the name to Java and modified the language to take advantage of the burgeoning World Wide Web. Java is an object-oriented language similar to C++, but simplified to eliminate language features that cause common programming errors.

JIT This acronym refers to *Just In Time* Inventory planning in which the goal is to plan the exact time that inventory is to be delivered to the production line so that there is no work in process [WIP] inventory.

Keyword Minding *Keyword Minding* is a feature of Mind-it that watches for chosen keywords or phrases. Mind-it sends users an email when one of the chosen keywords arrives, changes, or disappears.

LAN *Local Area Networks* or LANs are networks of computers that are geographically close together; this usually means within the same building.

Link Minding *Link Minding* is a feature of Mind-it that allows the user to monitor changes in any of the hyperlinks that are part of a page. These are part of the HTML that is embedded in the page. This selection is useful for monitoring external links to a site. Unless a user selects this option, Mind-it ignores all changes to the HTML on a page, including changes to the hyperlinks themselves.

Magnetic This is an Internet marketing term that refers to bringing users to a site, e.g., Yahoo Instant Messaging.

MAP Pumatech's *Mobile Application Platform* (MAP) refers to the company architecture of integrated wireless applications such as Browse-it™, Mind-it™, and Synch-it™

Mind-it™ Mind-it is the product name for the product formerly known as Minder that was acquired from NetMind by Pumatech. Mind-it includes a *change detection engine* and a *notification engine*. This combination enables users to build powerful applications that send intelligent alerts in response to dynamic changes in Web or database content. Mind-it efficiently sifts through volumes of publisher-centric content to detect changes and deliver succinct messages to devices like phones and pagers. Only items of explicit interest are sent, effectively giving the user complete control over the information they receive while mobile. Mind-it tool kits are available for users to support building custom alerts applications.

Mind-it API The Mind-it API (*Application Programmer's Interface*) is a series of data/keyword value pairs sent to Responder as an http request. Several examples are:
1. Add – This operation adds a new URL to track
2. Delete – This operation deletes an existing registration
The result of these operations is either:

1 – An HTML response
2 – Raw data that is processed by some third party requestor
See also Mind-it API Guide (available from Pumatech) for a thorough description of the different operations and their required parameters.

Mind-it Server Mind-it Server is the product name for the product formerly known as Enterprise Minder that was acquired from NetMind by Pumatech. Mind-it Server is licensed to corporations for implementation by the corporation's IT department.

Mind Tags Tags or HTML tag modifiers that describe the relevant data on a Web page to track and define attributes such as whether content is SAVED, TRIGGERED, SAVED and TRIGGERED, and ignore.

Mind-it Wizard An intuitive HTML-based User Interface used on Mind-it's free service to allow users to track any content on any page.

Mobilization This term refers to the next wave on Internet technology that will allow users access to the Internet and personalized data any time, anywhere, and on any device

My Page Mind-it provides an easy-to-use Web-based control panel called *My Page* from which users can view and organize information being minded and edit minding criteria and other preferences. *My Page* also shows users what information has changed by highlighting the differences. Highlighting enables users to quickly determine relevant changes in the information they are tracking.

Netmind A company acquired by Pumatech that developed Minder, the product line now known as Mind-it.

Number Minding *Number Minding* is a feature of enterprise Mind-it that allows the user to select any number from the page and be notified when it changes. It also gives users the option to create an algebraic or logical expression with the number. Mind-it will monitor the number, evaluate the expression, and only send a user an email when the expression becomes true. An example would be automatic notification that a particular car model has been offered at a sale price while auto loan rates are particularly favorable

NTL *NetMind Template Language,* or NTL, is a substitution language used in Mind-it Web and email templates for personalization. Keyword/Data values are passed from the Mind-it database and substituted into the HTML template.

Online Services An online service such as Microsoft Network (MSN), America Online (AOL) or CompuServe is a business that provides its subscribers with a wide variety of data transmitted over telecommunications lines.

Page Minding *Page minding* is a feature of Mind-it that notifies a user about any relevant change to the content that a user can see with a browser (except images.) It ignores changes in HTML along with many of the common rotating ad banners

PDA PDA is an abbreviation for *Personal Digital Assistant,* a handheld device that combines computing, telephone/fax, and networking features. PDAs are also referred to as handheld computers, palmtops and pocket computers.

Personalization software Personalization software is a category of software that includes products such as Mind-it that provide users with individually determined (personalized) information.

PIE Script *Pattern Information Extraction* scripts are software-based rules that describe the relevant data on a Web page to track. The script identifies not only singular data but also recurring data

such as a column of numbers within a table. It has the same capabilities as “Mind Tags” yet requires no tags on the source page.

Polling Polling refers to the facility of Mind-it software to check a page on an internal basis as to whether it has been updated or not.

Proxy Responder, Mind-it’s Web server component, acts on behalf of a user requesting a Web page. The request is made through Responder, which in turn makes the request to the Web server. Responder then instruments the page (makes changes to the HTML) and returns the converted page to the user. Responder records any click through activity on the proxied page for reporting.

PQL PQL stands for *pBase Query Language* that is the query language used by the Mind-it database known as pBase.

QA *Quality Assurance* (QA) refers to the measurement of quality level of finished product. This is usually done by statistical sampling of production output.

QC *Quality Control* (QC) refers to the management of production processes so that a high level of uniformity in product quality can be achieved.

QoS An abbreviation for *Quality of Service*

Recursive Search A recursive search is where the desired information must be accessed through a series of interlocked URLs. With the exception of frames, Mind-it retrieves only one URL at a time. If a URL is linked to another URL that users want to keep track of, both URLs must be registered since Mind-it does not support recursive searches.

SCM *Supply Chain Management* or SCM refers to the sum total of business processes and accompanying IT support services, that are integrated with upstream and downstream business partners for the purpose of decreasing unit costs, increasing product quality and availability and optimizing inventory levels.

SLA *Service Level Agreements*, or SLAs are written agreements that define the service level to be achieved by a particular ASP service such as Mind-it from Pumatech. For example a SLA may define the period of time that on average will elapse between a given event being tracked by Mind-it change detection software and the time this event is notified via an alert. Polling frequency of the software and latencies for various notification methods are variables affecting a SLA.

Search Engine A program that searches documents for specified keywords and returns a list of the documents where the keywords were found. Although search engines are really a general class of programs, the term is often used to specifically describe systems like Alta Vista and Excite that enable users to search for documents on the World Wide Web.

SGML SGML is an abbreviation of *Standard Generalized Markup Language,* a system for organizing and tagging elements of a document. SGML was developed and standardized by the International Organization for Standards (ISO) in 1986. SGML itself does not specify any particular formatting; rather, it specifies the rules for tagging elements.

SMTP SMTP is an abbreviation for *Simple Mail Transfer Protocol,* a protocol for sending e-mail messages between servers. Most e-mail systems that send mail over the Internet use SMTP to send messages from one server to another The messages are then retrieved with an e-mail client using either POP or IMAP protocols.

SMS SMS is an abbreviation for *Short Messaging System* and is the method used in Europe and the US to send short text messages to mobile phones.

SS7 SS7 or *Signaling System 7* refers to the telecommunications protocol defined by the International Telecommunication Union (ITU) as a way to offload PSTN data traffic congestion onto a wireless digital broadband network.

Sticky: A term in Internet marketing that refers to a site's ability to keep individuals coming back to the site. B2C applications of Mind-it increase the stickiness of a site since users will return to the site to reference their "My page" information.

Sync-it™ The Sync-it application brings a *sync engine* into the MAP infrastructure. Sync-it keeps information updated across a wide range of supported devices, applications, Internet services and mobile networks. This new sync engine was designed from the ground up with performance and scalability in mind. Sync-it licensees can choose from a list of pre-existing "sync points", and even add new ones using Pumatech's available Software Development Kit (SDK).

Text minding *Text minding* is a feature of Mind-it that allows the user to copy and paste any section from a page and only be notified when that section changes.

Targeted Email Messaging Mind-it enables highly targeted messages to be included within the body of email notifications, based on demographic and psychographic data that Mind-it gathers on users, click tracking data, and other external information supplied to Mind-it. Messages are personalized based on the user data and other information, including 3rd-party content such as advertisement engines.

TCP/IP TCP/IP refers to the common set of network protocols used in the Internet today. It is comprised of TCP, or *Transmission Control Protocol* that serves as the transport layer component, and IP, or *Internet Protocol*, as the network layer component. IP provides reliable data delivery services over connection-oriented links. TCP uses IP to deliver information across a network and makes up for the deficiency of IP providing a guarantee of reliable delivery services that IP does not. TCP messages and data are encapsulated into IP datagrams and IP delivers them across the network.

URL URL is an abbreviation of *Uniform Resource Locator,* the global address of documents and other resources on the World Wide Web. The first part of the address indicates what protocol to use, and the second part specifies the IP address or the domain name where the resource is located.

Viral A term in Internet marketing that refers to when users tell each other about a cool site, as in "tell a friend."

Web Shortcuts Web Shortcuts are HTTP links that capture personalized, "action-able," one-click information, which can be invoked from email messages or the Web. Sometimes called SmartLinks these links contrast with browser based "dumb links" that simply direct a Web browser to a URL. For example, one SmartLink could capture and preview a computer configuration while another might enable a single-click purchase of the pre-configured computer.

WAP The *Wireless Application Protocol* is a specification that allows users to access information via handheld wireless devices such as mobile phones, pagers, two-way radios, smart phones and communicators. WAP is supported by all major operating systems specifically designed for handheld devices. It also supports most wireless network protocols including CDPD, CDMA, GSM, PDC, PHS, TDMA, FLEX, ReFLEX, iDEN, TETRA, DECT, DataTAC, and Mobitex.

Web A system of Internet servers that support specially formatted documents. The documents are formatted in a language called HTML (HyperText Markup Language) that supports links to other documents, as well as graphics, audio, and video files. This means a user can jump from one document to another simply by clicking on hot spots. Not all Internet servers are part of the World Wide Web. There are several applications called Web browsers that make it easy to access the World Wide Web. Two of the most popular being Netscape Navigator and Microsoft's Internet Explorer.

Windows CE Microsoft’s stripped down Windows operating system for mobile devices with lower capacities.

Widows NT Microsoft’s multi-user, multi-tasking operating system designed for network applications.

WIP *Work in Process* Inventory refers to material and labor that has been added to a product's subassemblies that are not yet in the form of a completed product.

WML *Wireless Markup Language* (WML) is an SML language used to format content for Web-enabled mobile phones that is most popular in Europe.

XHTML XHTML or *Extensible Hypertext Markup Language* is a hybrid between HTML and XML specifically designed for Net device displays. XHTML is a markup language written in XML, therefore, it is an XML application.

XML XML is an abbreviation for *Extensible Markup Language* - a pared-down version of SGML, designed especially for Web documents. XML allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations.