_____

**Technical Overview
A Gizmoz White Paper**
March 2001

Introduction

Why Gizmoz?

Today's World Wide Web represents a cacophony of technologies thrown together: a base level network system connected by the Internet's protocol-TCP/IP, the WWW and its statically positioned Web sites, the Simple Mail Transfer Protocol (SMTP), network, news servers, proprietary Instant Messaging Systems, chat rooms and more. Moreover, these technologies are also integrated with cellular networks and various devices ranging from cell phones to PDAs and PCs. The problem is that all of these technologies are not interweaved for the rigorous demands of today's consumer. Even more problematic is that fact that some of these technologies are considered entirely stand-alone models. Thus the concept of Gizmoz^{TM} -- a mobile container of content that can utilize the existing Internet technology infrastructure and generate the necessary tools for utilizing varying technologies together.

The Gizmoz technology generates a layer on top of incompatible technologies to provide content distribution, user retention, dynamic updates, instant notification and tracking. A Gizmo is a dynamic mini-site that can be transferred and collected between and by end-users, integrated into existing sites and tracked by a back-end system. To support the concept of Gizmoz, the entire Gizmoz Platform was developed to combine a developer suite of tools needed to generate content and wrap it with the Gizmoz Player, account management tools and a robust Internet Server Farm.

So, What Are Gizmoz?

Gizmoz are visual "smart envelopes" that that can contain audio and video, 2D & 3D animation, text and any other kind of media available on the Web, including Real Audio, Real Video, Windows Media, HTML, DHTML, MP3, Shockwave, Flash, QuickTime and Java. Each Gizmo allows users to "Collect" the Gizmo to their desktop; "Send" the Gizmo to anyone with an email address; and "Copy" the Gizmo to a personally maintained Web site. Users distribute Gizmoz to other individuals based upon shared interest, thus generating networks of users who are interested in receiving new content within their Gizmoz. A fully updateable platform, Gizmoz allow instant messaging to occur between businesses and their consumers.

Gizmoz can be distributed via email to lists of people who have opted in to receive more information about a certain Web site, company or topic. After the initial email is received, users can opt to *Collect* the Gizmo to their desktop, which will allow them to continually receive updates from the owner of the Gizmo. This offers a non-intrusive way for companies to conduct an ongoing relationship with customers. Users can also *Send* the Gizmo to friends and colleagues whom they think will be interested in having it, and *Copy* it to Web sites that they themselves maintain and chat rooms they visit. All of the Gizmoz across the Internet, on desktops, Web sites, in email boxes form the Client Company's Gizmoz Network. These Gizmoz in turn,

provide a real-time, fully interactive connection between a network of selected users and the Client Company. Gizmoz are fully updateable and allow the Client Company to refresh them with new content whenever they choose. The entire Gizmoz Network will receive the updates simultaneously. Moreover, Gizmoz are trackable and provide information on the number of end-users collecting them, passing them on to colleagues and copying them to Web sites. In a nutshell, Gizmoz help to expand the Client Company's user base, and are particularly effective when used for customer retention and acquisition, brand-building, content distribution or to increase traffic to an on- or offline property.

Gizmoz can also be used as an application service for e-commerce sites seeking to improve their bottom line by communicating retention messages more effectively. In fact, Gizmoz are the most effective, trackable customer retention tool available. Gizmoz provide the ability to test the effectiveness of marketing campaigns in real time and the ability to utilize affinity and relationship marketing.

The content of the Gizmoz resides in a central server, which provides dynamic updates of content information. The Gizmoz HTML container provides the unique services of its network platform, viral distribution, and detailed reports and statistics pertaining to Gizmoz usage. The Gizmoz portfolio of products is supported by a scaleable and robust web-server architecture that is able to manage and track Gizmoz across the Internet.

Network and Server Farm

The term *Server Farm* is used to refer to Gizmoz's server infrastructure. Gizmoz are run from a server farm - a robust, scalable infrastructure that assures maximum reliability. A Gizmo is actually a single set of data positioned on the server farm's back-end, while users hold an http link to that data from a browser. Thus Gizmoz are linked to the central server, and copies of all Gizmoz remain even in the central server even if a specific one is taken off of a site. However, a Gizmo can visually reside on any web page on the Internet while still remaining a simple link to the Gizmoz viewing farm. The server farm also tracks the propagation of Gizmoz from user to user.

Gizmoz's architecture supports standard XML-based content exchange formats such as Internet Content Exchange (ICE) for Gizmoz data transmission and standard rich-media content formats such as Java, Real Video, Real Audio, Windows Media, Flash, Shockwave, HTML, DHTML or MP3 as presentation formats. This ensures maximum media flexibility, compatibility and adaptability to system demands. All Gizmoz reside in a central database connected to the Internet over a logical viral network. This network tracks user views and click throughs, locates all copies of Gizmoz across the Web, and broadcasts content updates to all copies of specific Gizmoz.

Gizmoz Features

- Gizmoz enable rich media to be experienced without a plug-in or download.

- Gizmoz viewing requires only an Internet connection.

- Gizmoz can be used on narrow, mid and broad bandwidths and any will eventually run on wireless devices.

- Gizmoz are mobile and easily manipulated web entities: they can be sent by email, placed on desktops or copied to Web sites and chat rooms.

- Gizmoz reside in a central database and are connected over a smart viral network.

- Gizmoz use the "permission marketing" approach to deliver content to specific and targeted groups and to broadcast updated content.

- Gizmoz inform the user when there is new content waiting for them via visual and audio cues.

- Gizmoz are dynamically updated. To view changes, the user need only click on their Gizmo to open it.

- Gizmoz can integrate with back-end databases.

- Gizmoz hosting and network services provide the delivery of Gizmoz, load balancing between servers and reliable access through a network of established Internet backbone service providers within a 24/7 network monitoring.

- Gizmoz offers full tracking and reporting services on marketing effectiveness. Gizmoz provides comprehensive data and detailed statistics of Gizmoz views, clickthroughs and viral distribution in a password-protected environment. The data is updated in real time as part of the Gizmoz Account Management Center.

- Gizmoz's micro editing capabilities and The Gizmoz Maker provide for seamless content production and content modification with an automatically generated HTML interface.

Platform Structural Principles

Robustness

Robustness is the ability of a system to handle varying situations without failure and successfully function under problematic circumstances. The Gizmoz platform's redundant-node configuration and fail-over mechanism ensure no single point of failure. Each mission-critical node in the Gizmoz platform is inherently fault tolerant, by means of either hot or cold backup, ensuring the quality and continuity of service. In the event that a component fails, a backup component or procedure is immediately triggered. Internal hardware components such as hard disks, processors and power supplies are redundant and swappable. Machines that are node units are clustered, mirrored, or grouped in farms, providing immediate backup in case of failure. Cold backup is provided at disk storage in which critical data is routinely backed up to remote storage. This enables fast recovery in case of data corruption or loss.

Scalability

Scalability is the ability of a system to expand in order to meet expected traffic growth. The Gizmoz platform is fully scalable. Gizmoz employs Akamai technology to handle peak traffic loads and divert heavy traffic pressure to the network infrastructure. Gizmoz Network uses Akamai servers to stream and cache Gizmoz files and enhance the Gizmoz viewing speed. The Akamai server network provides speed and reliability by eliminating as many hits as possible from the servers.

Server Modularity

The Gizmoz platform is designed around the concept of server clusters. Each cluster has its own domain name and IP address. Each server in a cluster is a stand-alone unit that performs all the services that cluster provides. Thus, one functioning server is sufficient to have the platform work properly. Moreover, adding more servers to the same cluster allows the platform to serve more requests simultaneously. The fact that there are separate clusters for separate operations enables a flexible division of resources. Additional servers can only be added to the clusters that lack resources.

Load Balancing

As requests are routed to the least response-occupied Gizmoz server, load balancing is achieved with redundant Gizmoz servers. In the event of a server failure, the Gizmoz platform substitutes backup servers. Every hit on the Gizmoz Web site first reaches the load-balancing server, a UNIX machine that runs F5 BIG-IP software products. BIG-IP is stationed between the network and server array and optimizes server availability and performance. Each cluster of servers is load balanced separately and provides ease of switching between application and viewing. The system continuously monitors each server for service and routes incoming queries to the most available server. In addition, BIG-IP allows network managers to use a variety of sophisticated load-balancing algorithms to fine-tune performance and availability.

Viewing Reliability

Users can manipulate a browser to view Gizmoz, as they require no additional plug-ins and can support even low end-user machines. The viewing process is simplified to serving files to the appropriate requests. This makes the viewing mechanism efficient, robust, and independent of the database. The entire Gizmoz viewing system is platform independent.

Monitoring

The Gizmoz platform performs various internal tests to ensure proper functioning. The load-balancing servers continuously test the editing and viewing servers, network connectivity, web-server functionality and server response mechanisms. The Sanity Checker, run from the Site Administration server, monitors the site performance and provides alerts on malfunctions. The Sanity Checker is a Java application with custom tests written for the Gizmoz platform and is completely configurable.

External tests are performed by other systems on the Gizmoz platform. BIG-IP load balancing software automatically detects server failures and directs incoming traffic to functioning servers and applications. An additional Sanity Checker application executes at the Tel-Aviv Research & Development Office to monitor the operation of the Site Administration server and the main Sanity Checker application.

In addition, errors can be immediately handled through home computers of key employees. These computers contain all the necessary software for remote problem solving. The off-hours emergency kit includes a dedicated mobile phone and laptop which has regular and cellular modems and all the software necessary for system recovery. Moreover, system administration in New York and Global Center Network engineers can supply immediate support if required.

Security Issues

Because Gizmoz are not executable files, they are virus protected. All Gizmoz accounts are protected by login name and password. In addition, a hypertext transfer protocol secure (HTTPS) for the Gizmoz account server is currently under development. The Gizmoz Online Editor is protected by login name and password and maintains a system of security checks. The viewing servers have no editing access. For network security, the BIG-IP software is used as a firewall.

A Security Center is maintained by electronic surveillance, security consoles for firewall-driven alerts, and alarms that are followed up by Security Center staff intervention.

Akamai Streaming and Caching

The Akamai Server Network enhances Gizmoz's file speed and reliability. Gizmoz Network uses Akamai servers to stream and cache Gizmoz files.

Gizmoz Network integration with Akamai is almost completely automatic. Akamai uses its "free flow" algorithm to distribute the media to all its servers worldwide. This distribution is a background process and does not significantly affect the speed of serving files. Akamai servers supply two important functions to enhance the system's scalability:

- Caching
  Caching is a sophisticated form of buffering, in which a large amount of memory is set aside to hold data so that it can be accessed quickly. Akamai servers are spread around the world and cache frequently accessed Gizmoz files. This removes the load from the Gizmoz Network's servers and provides short access times to Gizmoz files.

- Streaming
  Akamai servers are used to stream large multimedia files that are loaded to Gizmoz Network's Platform and support streaming Windows Media Player, Real Audio, Real Video or QuickTime formats.

Platform Architecture

Gizmoz Network platform contains more than 10 web servers that run on Windows NT machines. These servers are divided into several layers and groups.

I.   Web Interface Layer:
The Web layer is the interface to the Internet and ensures the platform's redundancy and efficient capacity utilization. The web interface layer consists of the following web server farms:

- Viewing Farm
  Purpose: To serve viewing requests.

- Collector Farm
  Purpose: To support the client collectors install base (a client side front-end layer) which handles Gizmoz notification and management.

- Account Management Farm
  Purpose: To manage every phase in the Gizmo life cycle from deployment, modification and monitoring.

- Viral Distribution Farm
  Purpose: To send Gizmoz as personalized email between users.

II.   Application Back-End Layer:
This redundant and fail safe layer holds the back-end applications and supports actions executed in the interface layer. Its applications are:

- Statistics Accumulation (Database Service (DBService))
  Purpose: To collect hit event information from the interface layer and store to a reports database. This application has several caching and fail-over mechanisms, and will continue to store incoming events even if the DBService application is not functioning.

- Online Editor
  Purpose: As the primary Gizmoz generation application, the Online Editor generates Gizmoz based on descriptive and quantitative data, and supplies a simple HTML interface for data updates.

- Deployment Engine
  Purpose: To upload Gizmoz, copy files onto the appropriate multiple servers, update the DBService and generate Gizmoz via the Online Editor.

- Live Data
  Purpose: The data fetching scheduler that retrieves data from the client databases and repositories and updates the Gizmo to reflect the new content via the Online Editor.

- Sanity Checker
  Purpose: The system watch dog.

III. Data Layer:
This layer supplies the data handling infrastructure and consists of a combination of two clusters:

- Files System Cluster
  Holds the majority of Gizmoz data. Consists of two replicated servers in a cluster with EMC Symmetrix device as the data storage device.

- Database Cluster
  Consists of two replicated servers running Oracle database with fail over.

The Gizmoz Network system business logic is run by two applications that reside on the platform's servers:

- The Gizmoz Online Editor allows the client to update a Gizmo using a password-protected account that is available from any computer with an Internet connection. Once the Online Editor is activated, it displays the Gizmo Graphical User Interface (GUI) which is implemented in HTML. Through GUI, the client can change the values of the Gizmo's placeholders. Gizmoz are file-based entities, and once edits are implemented, the Online Editor re-publishes the Gizmo and updates the new data in the files on the file server. Once a Gizmo has been distributed, it can be further edited through the client's account. All the editing process is done on a copy of the live Gizmo. All changes made are reflected in all the Gizmoz within the Gizmoz Network across the entire Internet.

- DBService is an application that accepts Gizmoz view and clickthrough information and stores it in a reports database. The database stores three main groups of information:
    o Gizmoz Descriptive Data
    o Client Account Data
    o Gizmoz View and Clickthrough Statistics

The front-end layer consists of the Gizmoz Collector. The Gizmoz Collector is a desktop application that stores and organizes an unlimited number of Gizmoz. By means of visual and audio cues, the Collector alerts Gizmoz users of updates and new online content. The Collector maintains the Gizmoz on each user's desktop and will allow the end-user to collect additional Gizmoz that are of interest. The key advantages of the Collector are its quick installation and the ability to notify the end-user that any of the Gizmoz it contains has been updated. The Gizmoz Collector can also be branded to increase a Client Company's presence, should they choose this option. Each collection of Gizmoz is saved in Gizmoz Network database, and the Collector is automatically updated when a new version becomes available.

Once a Gizmoz Account is opened, the client is assigned to an account manager. The Gizmoz Account Management Center handles content management and administration. The secure, Web-based center allows the client to manage every aspect of Gizmoz campaigns in real time. Employing a point and click interface, the Gizmoz Account Management Center contains a suite of Web-based applications that update content and track performance.

Platform Building Blocks
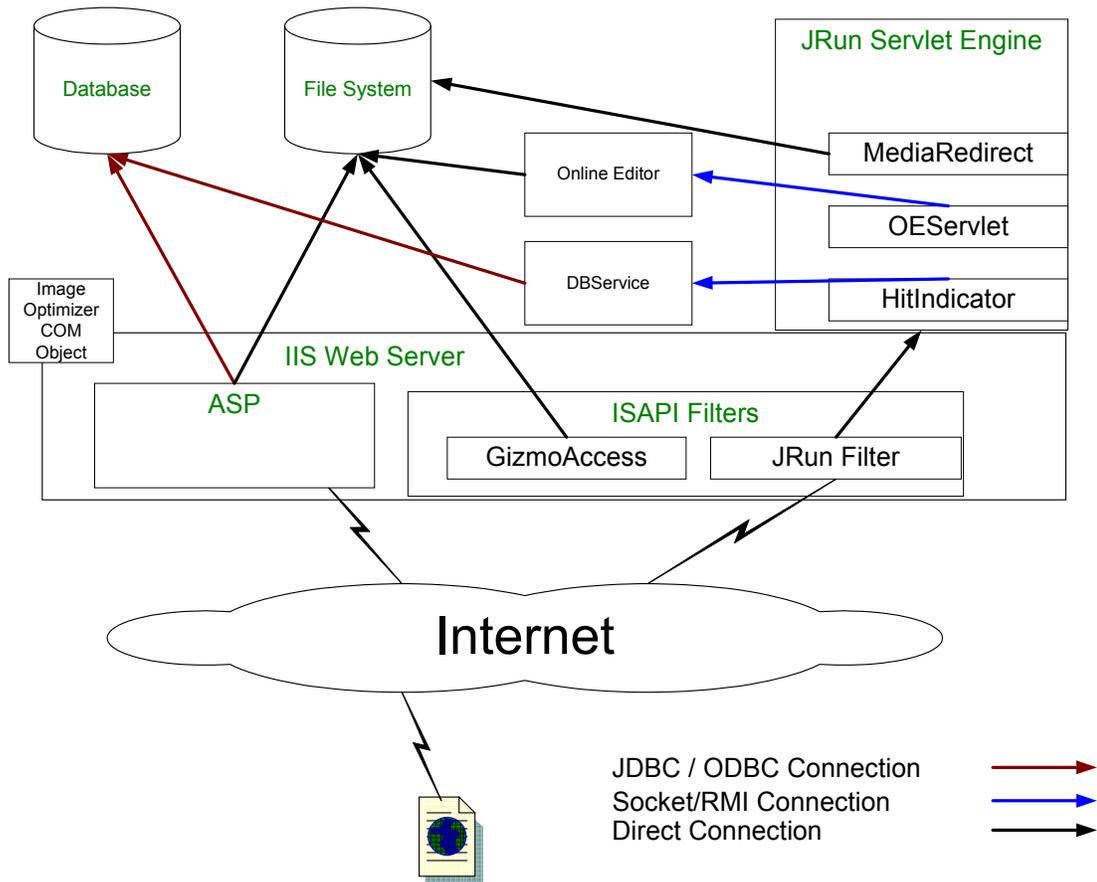
The Gizmoz Access filter converts visible Gizmoz URLs to actual Gizmoz files.

- Gizmoz editing requests are directed by the OEServlet and performed in the Gizmoz Online Editor.

- Gizmoz files are located by MediaRedirect servlet in the file-system hierarchy.

- Gizmoz views and clickthrough statistics are directed by the HitIndicator servlet to the DBService application that stores them in a database.

The platform uses a variety of third party and proprietary components to extend its functionality. Image Optimizer wraps third party packages for handling, optimizing, resizing and converting images that may be uploaded to the site for use inside a Gizmo.

Gizmoz Platform Capabilities

Creating Gizmoz

Gizmoz are created as a proprietary development. Java-based Gizmoz are created using the Gizmo Maker.   The Gizmoz Maker is a powerful authoring environment for generating dynamic, interactive and multimedia Gizmoz. In a user-friendly WYSIWYG environment, the Gizmoz Maker is a desktop tool that enables Gizmoz creation and the importing of animation, graphics, text, hyperlinks and multi-scene experiences.

Java-based Gizmoz are created as a sequence of separate scenes. Each scene can contain a different background and media items. Editing one scene will not affect any others. Scenes are linked by time-triggered or user-triggered events. Every scene is compressed separately to allow streaming of the scenes while downloading the Gizmoz for viewing. Media elements such as images or sounds can be imported from an external file.

The Java-based visual implementation of a Gizmo is a rich-multimedia entity that is lightweight and can incorporate many types of multimedia content. Because these Gizmoz are applets, which allow the content to stream in regardless of bandwidth constraints, plug-ins are not required. In addition, since the applets are created as a series of separate scenes, loading time is minimized.

A Note on Java

Unlike client/server technologies, Java-based applications enable the Web to act as a platform in which the client (or web browser) can handle portions of the workload. Java web programs, referred to as applets, are compiled to byte code, which is referenced in an HTML document. Java applets run equally well under Windows, OS/2, Macintosh, RISC computers, workstations or any other type of computer that sports a Java-enabled web browser. When an HTML document references a Java applet, the applet's bytecode downloads to the browser and runs through a bytecode interpreter. The advantage of the bytecode interpreter is that it is machine-independent: any computer that has a Java-enabled web browser can run Java bytecode.

To create HTML-based external formatted Gizmoz, multimedia files can be placed into one of several predefined templates. External media Gizmoz support the following formats:

- Macromedia Flash
- Windows Media Player
- Microsoft Digital Video
- MPEG
- Microsoft NetShow
- Wave Audio
- MPEG Layer 3
- Macromedia Shockwave
- QuickTime
- Real Audio
- Real Video

Gizmo Metadata File Creation

Metadata is data about data. As information in Gizmoz platform is reused and shared, it must be catalogued in a consistent manner. Gizmoz metadata is information that is not part of Gizmoz content. Gizmoz metadata is a file that contains additional data on Gizmoz such as format and attributes. It also contains all necessary information for Gizmoz editing and a list of all editable items inside the Gizmoz. This list is referred to as a placeholder. Other information includes: Gizmoz General Properties such as width, height, copyright notice, downgrade page and help URL, Gizmoz GUI and implementation information, Gizmoz format data, and device information. The metadata file is an XML format and is referred to as the Gizmoz XML.

Ease of creating a metadata file depends on the format of the Gizmoz. For HTML Gizmoz there is currently no technology in place for automatic metadata creation. Thus the file and placeholders need to be created manually. External formatted Gizmoz that do not have micro editing options use predefined Gizmoz metadata. There is no way to define custom placeholders for these Gizmoz. For Java-based Gizmoz, editable items are defined inside the Gizmoz Maker application using Visual GUI, and the metadata file is created automatically.

Live Data Support

Live Data analyzes new content and stores it in a standard XML format. The Live Data mechanism integrates content that is stored in the client's site into the Gizmoz and updates it dynamically when content is changed. The Live-Data mechanism involves a timed test of the content update and activation of an update process. The Live Data mechanism has maximum flexibility for handling various types of content as well as the complexity of the content mapping. A much more sophisticated Live Data mechanism is currently under development.

Graphical User Interface (GUI) Creation

The GUI for the Online Editor is generated from the Gizmoz metadata. An automatic batch process is activated during deployment to create a set of Active Server Pages (ASP) that serve as the Gizmoz editing pages in the Online Editor. Upon editing, a GUI is created instantly from the Gizmoz metadata and a GUI template. While the resulting GUI created in such a way is somewhat simplified, it saves the need to QA the GUI for each Gizmo separately.

JavaScript Extensibility

Gizmoz are HTML-based entities and can be reprogrammed for JavaScript. Clickthroughs, for example, are wrapped in JavaScript functions to enable collection of statistics.

Gizmoz Format

Gizmoz formats are either external, Java-based or HTML. For external formats, Gizmoz encapsulate content in Flash movies, Shockwave and video. These Gizmoz are easy to create while taking advantage of existing content. Java-based Gizmoz are created using the Gizmoz Maker authoring tool. This is a Java applet and requires no plug-in. HTML Gizmoz are based entirely on HTML.

Gizmoz Content

Once a format is selected, the Gizmo visual representation is designed. Macromedia Flash, Director, Real Audio or Real Video are tools used to create content for external formatted Gizmoz. HTML editing tools are used for HTML Gizmoz and the Gizmoz Maker application is used for Java-based Gizmoz. If the Gizmo is designed to update automatically from content in the client's servers, then it is linked to the client's database. The Gizmoz metadata file handles the linking of back-end content integration to Gizmoz automatically.

Update Gizmoz

There are several ways to update Gizmoz. Macro editing involves replacing the entire Gizmoz content. This is supported for external formatted Gizmoz. Micro editing entails replacing only specific text or images which reside inside a Gizmo. This is supported for Java-based Gizmoz. After Gizmoz are put on Gizmoz Network's servers, Gizmoz editing is performed online through the Online Editor. Live Data mechanism brings content from the customer's database directly to Gizmoz through an XML file-based interface.
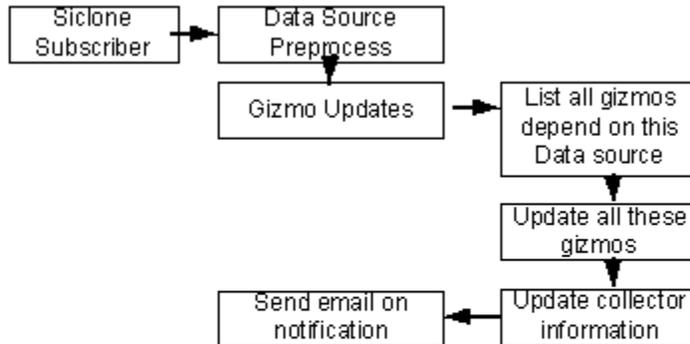
Distribute the Gizmoz

- Gizmoz are distributed by email to mailing lists, by placing the Gizmo on various Web sites where it can be viewed or via the Gizmoz's inherent viral functionality. Each Gizmo has three buttons on it that are used to maximize its viral functions.

    - "Send" which allows users to send the Gizmo to anyone with an email address.

    - "Collect" which prompts the user to install the Gizmoz Collector (if they don't have it) or places the Gizmo inside their existing Gizmoz Collector.

    - "Copy" which allows users to place the Gizmo on a Web site they maintain, such as an affiliate marketing or fan site.

The Gizmo Network

Another feature of the Gizmoz platform is the creation of a personal network on the Web and the ability to broadcast content to a self-selected audience. These are end-users who have chosen to receive the Client Company's content and can view it whenever they wish.

Viewing Gizmoz

Gizmoz are web-based entities and therefore Gizmo views are executed on-line. The Gizmoz interface is through a URL. The smart HTML container provides the reporting and viral distribution services of the Gizmoz Network platform. The content wrapped by a Gizmo is displayed by either the Gizmoz Transceivers or Java Player.

The Gizmoz Java Player

Java Player is an engine that runs a dynamic and interactive applet according to the parameter files that are passed to it. The Gizmoz Maker creates these parameter files. The Java Player can display Gizmoz items and create their time-dependent behavior. The Java Player can interact with the outside world by sending and receiving information. Java Player streams the applet information by downloading each scene separately. The Gizmo plays once the first scene finishes downloading.

External format Gizmoz rely on the end-user's viewing machine plug-in installation. If the required plug-in does not exist, Gizmoz will show an HTML-based downgraded version. External plug-ins are an embedded object in the HTML file. External plug-ins with JavaScript control are Flash and Shockwave.

Viral Distribution and Retention

Viral propagation refers to Gizmoz's ability to quickly spread across the Internet. Gizmoz users send Gizmoz via email, copying them to their own Web sites or from client Web sites.

Gizmo Viral Strip

The Gizmo viral strip is implemented in HTML. The viral strip has flexibility and may include one or more of the viral options. It is also possible to change the strip completely according to the client's needs by adding custom URLs, texts and images, or placing the strip above Gizmoz. The viral strip width resizes automatically.

Deploying Gizmoz
Once Gizmoz content is created, it is deployed to Gizmoz Network servers. Professional services teams in New York have been set up to handle this function.

Manual Deployment
The deployment process requires:

- File system operations which upload Gizmoz files to Gizmoz Network servers and generate editing GUI.

- Database updates which include inserting Gizmoz into the database, opening a client account for new Gizmoz, attaching Gizmoz to the client account, and triggering the Gizmoz report mechanism to capture view and clickthrough data.

Deployment Tools
The following deployment tools are currently in use:

- Gizmo Maker Java Built-in Deployment
  For Java-based Gizmoz, deployment is built into the Gizmoz Maker Java tool. In one click, the application uploads Gizmoz files to Gizmoz Network servers, making all necessary database updates. This tool is currently in the development stages.

- Account Management Tools
  Account management tools are a set of web mini-applications for the use by the professional services team. These tools allow for querying and database modifications.

- Deployment Manager
  Deployment Manager is a client server application that automates the manual deployment process.

You can find out more about Gizmoz and Gizmoz development by emailing: sales@Gizmoz.com or by calling Gizmoz for information at (212) 983-3200. You call also access the Web site at www.Gizmoz.com.