

# **TRAPEZO PARTNER FUSION PLATFORM™**

## **Technology White Paper**

Release v. 1.6



## **Contents**

<b>1. Introduction</b>	<b>3</b>
<b>2. Platform Overview</b>	<b>4</b>
<b>3. partnerApp Server</b>	<b>7</b>
<b>4. Display Case Server</b>	<b>10</b>
<b>5. Reactor Server</b>	<b>12</b>
<b>6. Oracle Database</b>	<b>17</b>
<b>7. Questions and Answers</b>	<b>18</b>
<b>8. Forthcoming Changes for Release 2.0</b>	<b>21</b>

# TRAPEZO PARTNER FUSION PLATFORM™

## Technology White Paper

### Release v. 1.6

## 1. Introduction

The Trapezo Partner Fusion Platform Release v. 1.6 allows a Trapezo partner to control all relationships through one central Trapezo Web site. There is no hardware or software installation required on any partner server or client.

In some cases, an optional Server Side Object in JavaScript is used in conjunction with a servlet that can be installed on certain partner Web servers. Trapezo handles the installation, which can take from one to eight hours. This option is discussed in detail in section 7, *Questions and Answers*.

This white paper is written for IT Managers and others concerned with the lower-level technical details of the Trapezo platform. For a higher-level view, see the *Trapezo Partner Fusion Technology Platform Product Overview*.

The one area of possible concern to a partner's IT department is the catalog acquisition process when a partner's catalog items do not have unique identifiers (such as Item Numbers or SKUs). For more information on this topic, see the subhead "Catalog Acquisition" under section 3, *partnerApp Server*.

For this white paper, the following definitions apply:

- *Partner*: Any business or individual that signs on with Trapezo to take advantage of the Trapezo Partner Fusion Platform.
- *User*: Anyone designated by a *Partner* to access and configure Trapezo's partnerApp application.
- *Visitor*: Any individual or consumer accessing a *Partner* Web site containing Trapezo "Display Cases."
- *Distributor*: A *Partner* or *User* whose primary role is supplying content (catalog items, service items, or other content) to other partners who take on the role of *Publisher*.
- *Publisher*: A *Partner* or *User* whose primary role is creating Trapezo "Display Cases" that provide the content of one or more *Distributors* to *Visitors*.

## 2. Platform Overview

The Trapezo Partner Fusion Platform Release v. 1.6 consists of three application servers and one database:

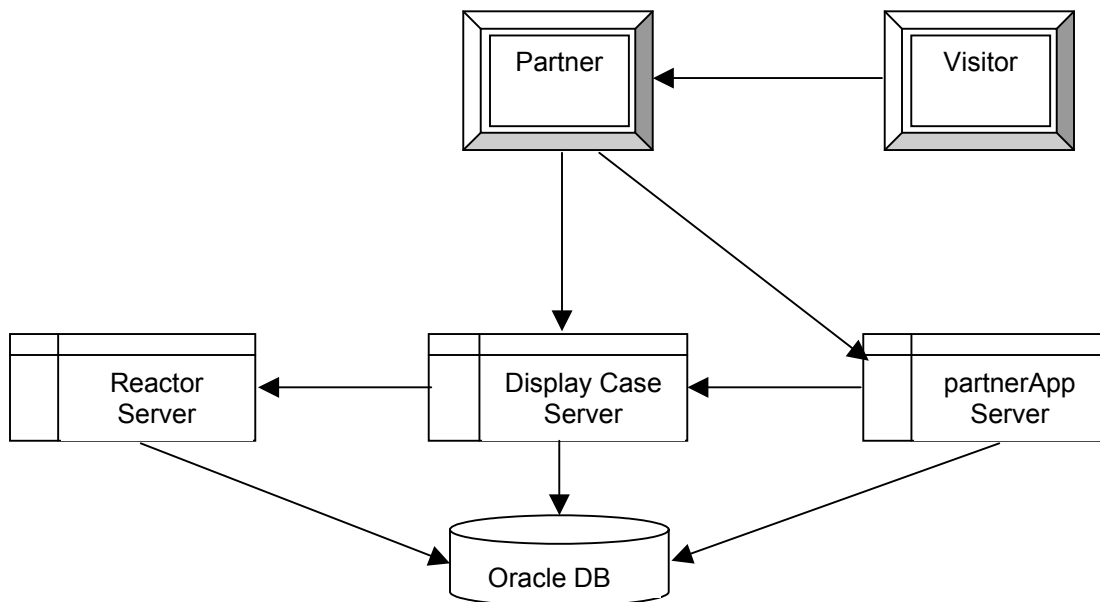
- partnerApp Server
- Display Case Server
- Reactor Server
- Oracle Database

### Application Servers

- partnerApp Server
  - WL Server 4.5.1sp7
  - JVM 1.2.2\_05
  - JReport 2.2437
  - JMail 1.1.3
  - JMS (Server) 1.02a
  - JAF 1.01
  - X Windows R6.4
  - SSH 1.2.27
  - Oracle JDBC 1.2
  - FTP
  - Send Mail 8.10.2
- Display Case Server
  - JVM
  - JDBC
  - JMS (Client)
  - WL Server
  - SSH
- Reactor Server
  - JVM
  - JDBC
  - JMS (Client)
  - WL Server
  - SSH

### Database

- Oracle 8.5.1 STD SSH



## **Partner's Client Requirements**

There are no special client requirements other than standard requirements to effectively view and run the Partner Application:

- Internet Explorer 5.0. (The user interface will also work on Netscape 4.x.)
- 128 MB RAM
- JVM or Microsoft Virtual Machine installed in the browser. The client should also have the most recent update from Microsoft located at:  
[http://www.microsoft.com/java/vm/dl\\_vm32.htm?FinishURL=%2Fdownloads%2Frelease%2Easp%3FReleaseID%3D20516%26redirect%3Dno](http://www.microsoft.com/java/vm/dl_vm32.htm?FinishURL=%2Fdownloads%2Frelease%2Easp%3FReleaseID%3D20516%26redirect%3Dno)
- Java Console enabled. This function assist Trapezo's technical services in troubleshooting any user interface issues.

## **Performance and Reliability**

In order to achieve real-time 24/7 service delivery with maximum performance and reliability, Trapezo co-locates its Partner Fusion Platform at AboveNet's facility in San Jose, California, and at Intira's facility in New York City. The system has load balancing across all critical components with no single points of failure. Both sites run in parallel. The operating system is Solaris 2.7.

Proven industrial-strength components are used throughout the system:

- Cisco Routers
- Foundry Load Balancers
- Sun Enterprise class servers
- Oracle 8i databases
- Sun Photon RAID drives

Trapezo's QA department conducts regular internal benchmark and stress tests to ensure that the IT infrastructure can perform at and beyond customer expectations. Trapezo maintains a minimum of 50% excess capacity to accommodate these requests.

In addition, regular Keynote ([www.keynote.com](http://www.keynote.com)) tests are scheduled to measure performance across the network from multiple US locations. These tests constantly check for consistent accessibility through every important Internet backbone, ISP, and region. Trapezo has been achieving consistently excellent ratings from Keynote on both performance and availability. This data is available through Trapezo's Technical Services Group.

Loren Berthelsen  
Director, Technical Services  
loren@trapezo.com  
415.216.1922

## **Security**

A strong emphasis is placed on all aspects of system security. Measures include:

- Partner Application access via secure HTTP connection.
- Redundant firewalls.
- Intrusion detection software.
- Encrypted VPN between Trapezo's development and collocation facilities.
- Secure data center environment with access limited to data center personnel.
- Automated vulnerability scans on all Internet facing devices.

## **Systems Monitoring**

All systems are monitored for degradation issues, hardware/software failure, and bottleneck identification on a 24/7 basis. Performance analysis tools are used to isolate the problem source and generate corrective recommendations.

System, traffic and network reports are then generated, including:

- Server Performance
- Global CPU Utilization
- System Usage
- CPU Priority Utilization
- Global Physical I/O Rate
- Global Disk Performance
- Global Memory Utilization
- Global Paging Rates
- Global Network IO Rates
- Global Network Errors
- Global Process Counts
- Maximum Mbps
- Average Mbps
- ATM-Metered (Total Cells)
- Availability Report
- Latency Report
- Backbone Trunk Sustained Usage Report
- Private Peering Point Sustained Usage Report
- Backup reports

### **3. partnerApp Server**

The partnerApp server contains the Partner Application that a user accesses to configure and control their unique portion of the Trapezo Partner Fusion Platform. The Partner Application is the primary control interface for all user activities, whether the user is a distributor or a publisher.

#### **Distributors**

Distributors use the Partner Application to:

1. Create a Distributor Profile (based on topical categories and demographics) and upload content (item catalog, service catalog, or other content). The profile and the content are stored in the Oracle Database.
2. Arrange and configure partnerships with other partners who are Publishers.
3. Create business rules for each partner.
4. Edit content.
5. Generate Category Reports, Summary Reports, and Sales Reports.

#### **Catalog Acquisition**

Catalogs are defined as files that contain data pertaining to the items sold by a retailer (vendor catalog), to the services offered by a service provider (service provider catalog), or to the content offered by a content provider (content provider catalog). Trapezo can obtain partner catalogs through the Partner Application in the following ways:

- *XML File*: Trapezo can map from any DTD into ours – the partner does not need to adhere to our standard DTD.
- *Flat File*: Trapezo can map any file in a delimited format (tab, comma, etc.).
- *Manual Entry*: The partner can manually enter data using the “bulk import” or “manual import” features in the Trapezo Partner Application.
- *Site Scraping*: With no effort on the partner’s end, Trapezo can automatically source their catalog for a fee.

The catalog data should contain the following fields for each item:

#### ***Vendor Catalog:***

- Redirect URL
- Item Name
- Item Description
- Item Category
- Item Identifier or SKU Number
- Item Price (Optional)
- Item Image URL (Optional)

*Service Provider Catalog:*

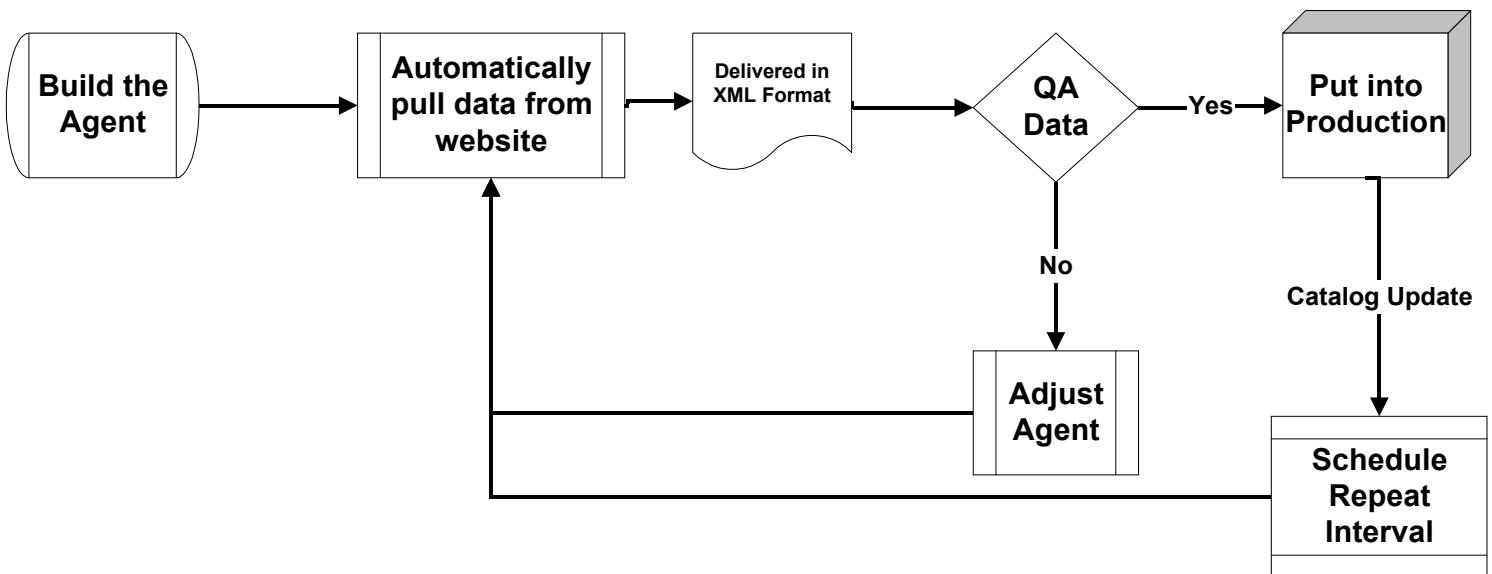
- Redirect URL
- Service Name
- Service Description
- Service Category
- Service Identifier or SKU Number
- Service Price (Optional)
- Service Image URL (Optional)

*Content Provider Catalog:*

- Redirect URL
- Article Name
- Article Synopsis
- Article Classification or Category
- Article Source (Optional)
- Image URL (Optional)

The entire catalog sourcing process takes a total maximum time of two business days.

*IMPORTANT NOTE: If catalog items or services do not have some kind of unique identifier or SKU Number, which allows Trapezo to monitor updates, then the partner must create these unique identifiers. Otherwise, Trapezo will have no means to maintain accurate update information for each item.*





## **Publishers**

Publishers use the Partner Application to:

1. Create a Publisher Profile (based on topical categories and demographics). The profile is stored in the Oracle Database.
2. Arrange and configure partnerships with other partners who are Distributors.
3. Establish display case and slot assignments for each partner.
4. Create and design display cases. Display cases are stored on the Display Case Server.
5. Generate Category Reports, Summary Reports, Sales Reports, and Vendor Reports.

The Display Case Server, the Reactor Server, and the Oracle Database are all accessed through the partnerApp Server via the Partnership Application, except in cases where a distributor's client may access the Reactor Server directly to supply purchase information in the event of a financial transaction.

## **Software Running on the partnerApp Server**

- WL Server 4.5.1sp7
- JVM 1.2.2\_05
- JReport 2.2437
- JMail 1.1.3
- JMS (Server) 1.02a
- JAF 1.01
- X Windows R6.4
- SSH 1.2.27
- Oracle JDBC 1.2
- FTP
- Send Mail 8.10.2

## **4. Display Case Server**

Partners add Trapezo-created HTML tags to their Web sites to deliver the display cases that partners have created using the Partner Application. Display cases may have one or more slots. For example, a publisher may create a single display case with three slots that can display three catalog items acquired from a single distributor.

The Display Case Server works closely with the Reactor Server to deliver display cases, and to deliver accurate updates. In fact, both can reside on a single server.

### **Display Case Delivery**

When a visitor pulls up a partner page with a Trapezo tag embedded in its HTML, Trapezo's Display Case Server populates the tag with items from the appropriate pack. Simultaneously, an anonymous cookie is added to the user's cookie file for subsequent behavioral tracking. Whenever a user clicks through on a given link, Trapezo redirects the user to the URL corresponding to the item.

Display case request tags need to be integrated within a publisher's pages in order to generate display case requests. This is a one-time integration process – future modifications to partnerships, business rules, or visual appearance do not need re-integration of the tag.

This integration is possible in several ways:

- JavaScript
- Server side includes (Needs SSI enabled on the publisher's Web servers)
- Server side objects (for guaranteed availability to safeguard against network or hardware delays)

### **Pack Cooking**

The Display Case Server generates display cases through a process called "Pack Cooking," which takes place in real-time. When items or display rules are changed, the Display Case Server instantly refreshes them.

Pack cooking is defined as the selection of items from all sources that are used to populate a given slot within a specific display case. The partnerships, category associations, and business rules (such as slot assignment) that the publisher has defined determine the selection of each pack's items. The pack cooking process also applies the visual design template of the display case to each item.

The Display Case Server caches presets by members in the member application of templates, business rules and items. The order in which the Display Case Server pulls display cases and their content is:

- The display template (the look and feel)
- The business rules (in the order of slot assignment)
- The item weighting
- The keywords
- Then randomly pulling from the remaining filtered pool of items.

All impressions, click-throughs and completed sales are logged by the display case server and stored in the Oracle Database for reporting purposes.

Each catalog item also receives a weight during pack cooking that is unique to that specific display case. This weight indicates the frequency with which that specific item will show up in the display case.

### **Software Running on the Display Case Server**

- JVM
- JDBC
- JMS (Client)
- WL Server
- SSH

## 5. Reactor Server

The Reactor Server performs four main functions:

1. *Optimization*: The nightly recalculation of popularity weights.
2. *Keyword Filtering*: Providing keyword search capabilities for display case delivery.
3. *Content Updates*: Real-time listening for any and all content updates.
4. *Report Generation*: Serving up all kinds of organized contextual data in the form of customized reports.

### Optimization

Trapezo uses weighting to determine the frequency of display for a particular display case item. The different criteria used in the weighting systems are:

- *Relevancy*: This measures the relevancy of a publisher's profile and categories relative to their partners' profiles and categories. This rating helps jump-start the weighting process for new partners, categories, and items in the system.
- *Popularity*: This measures explicit visitor actions such as click-through and completed transactions to gauge the popularity of a certain item in a particular display case. This rating is modified regularly and has an aging component to it. The aging ensures that items that were previously popular do not dominate the display case, and that items that were previously unpopular have an opportunity to regain lost ground.

The theory behind Popularity ranking (which we call item weighting) is that the ratio of click-throughs to the number of times impressions increases, the more likely the item will be selected or purchased by the web site visitor, thus improving the performance of the display case, therefore it should be shown more often.

### Normalized Ranking

Normalized ranking is used the performance of the item, based on the total number of impressions for the item, the number of click-throughs, and the number of purchases. Different user actions generate different weights, as follows:

Click-through	1 point
Completed transaction	10 points ( <i>NOTE: Only available for release 2.0</i> )

The normalized daily popularity ranking,  $P_n$ , is then calculated as follows:

$$P_n = \frac{p_n * 100}{\max(p_n)}$$

where  $\max(p_n)$  is the highest calculated value of  $p_n$  for all items that day.

*NOTE: Since completed transactions will not be tracked for individual items until release 2.0, the weighting algorithm for release 1.6 is based purely on the ratio of click-throughs to impressions.*

### Un-normalized Ranking

Un-normalized ranking is applied to any new item introduced into the system for equal footing with normalized items. It is given a generic weight number. The un-normalized daily popularity ranking for a given day  $n$ ,  $p_n$ , is calculated for each item as follows:

Let  $i$  := number of impressions for the item  
Let  $c$  := number of click-throughs for the item  
Let  $b$  := number of purchases for the item

$$p_n = \frac{c + (b \times 10)}{i}$$

### Cumulative Popularity Ranking (S)

Cumulative Popularity Ranking is used to track empirical behavior about item success. The value is based on a normalized scale, with a maximum value of 100 and a minimum value of 0.

The ranking is calculated once a day, using the following algorithm:

1. The initial value is set to the Initial Relevancy Value:

$$S_0 = R$$

2. For each subsequent day  $n$ , the Cumulative Popularity Ranking,  $S_n$ , is calculated as follows:

$$S_n = (u \times S_{n-1}) + (v \times P_n)$$

where  $u$  and  $v$  are the aging factors, such that  $u + v = 1$ . For version 1.6, these will be fixed values:

$$u = 0.7$$

v = 0.3

*NOTE: For version 2.0, the aging factors will be linked to the item type (e.g. product, news, auction, and information).*

### **Keyword Filtering**

Keyword filtering falls under the business rules umbrella. It is triggered when there is a request for a display case and the Reactor Server dynamically looks at all the possible items that can be displayed in the display case for that page. The order of filtering is:

- Look and feel
- Slot assignment
- Popularity weighting
- Keyword filters

If there is no keyword filter, the Reactor Server chooses items randomly after applying all the above stated rules. If there are keywords, the reactor looks at the available list and if any words match, it pulls those items first.

There are two parts to keyword filters. Building Keyword Tables and the publisher's call to the Display Case Server for a specific display case's keywords call.

### **Keyword Tables**

Only the distributor has control over an item's keywords. The keyword table is the area of a catalog that contains keywords with relation to a particular item. There are keyword tables delivered by the distributor in the form of a file, or they are automatically generated by the name descriptor when Trapezo sources a catalog. They can be edited at any time by the distributor in the "Item Edit" sub-section of the "Import" section under "Profile" or "Content" of the Partner Application.

There are three ways to build a keyword table depending on how the catalog is entered into the Partner Application.

- With the "Bulk Import" sub-section of the Partner Application. If the catalog already has a keyword field, that field should be mapped to the keyword field in the Partner Application. Keywords will appear per item under the "Edit SKU" sub-section under the "Import" section under "Profile" or "Content."
- With the "Manual Import" sub-section of the Partner Application. Keywords are entered manually. The distributor can also specify additional keywords within the UI in the "Catalog Edit" sub-section under "Content. "

- With automatic catalog sourcing, done by Trapezo. There is a Parsing Name Description agent that generates keywords and places them into the keyword field in the Partner Application.

If no keywords are available in the catalog (or if a catalog is generated from parsing a Web site directly), the Name Description field will be parsed to generate a keyword table. If the item's name is Blue PalmVII Case Cover, for example, the keywords automatically generated by Trapezo will be "Blue" "PalmVII" "Case" "Cover".

Currently all keywords are controlled only by the distributor for individual items keywords. The publisher can only control what keywords are called for in each slot or display case.

### *Publisher's Keyword Call*

Only a publisher has control over what keywords are called for each display case at the slot level. The publisher needs to deliver a request to the Display Case Server for specific keywords per display case. This is done by appending a search string to the individual display case tags, whether it is appended dynamically or hard-coded; *i.e.*:

[http://stage.trapezo.com:7001/displaycase?affiliate\\_id=1244&pack\\_id=3529\\_1&search=foo%20bar](http://stage.trapezo.com:7001/displaycase?affiliate_id=1244&pack_id=3529_1&search=foo%20bar) where &search=foo%20bar is the keyword.

### **Content Updates**

**[Need information for this section]**

### **Report Generation**

The Reactor Server has access to a large amount of contextual data. This data is used to generate extensive reports in multiple data types. The data gathering occurs at various stages:

- *Display Case Serving*: Since Trapezo dynamically serves up individual display cases, the system can log various parameters, such as "item displayed," "item category," and "item distributor." These logs generate a large variety of reports that can be used to identify successful (and unsuccessful) partnerships, popular categories, and specific items that may be in demand over specific time periods.
- *Click-through*: Items clicked on are re-directed to the specific item URL via the Trapezo servers. This information is logged automatically and is available in various reports. The click-through also causes a cookie to be placed on the visitor's system for tracking purposes.

- *Completed transaction:* A distributor can also opt to have completed transactions tracked through Trapezo to enable business terms, such as shared commissions. Trapezo supports different levels of transaction tracking based on specific partner needs:
  - At the simplest level the distributor integrates an HTML image reference call (using a 1x1 transparent GIF) to Trapezo on their designated point for completed transactions. This call checks for a Trapezo redirect cookie on the visitor's system, and returns the cookie information with the request for the image. If the click-through was referred via Trapezo, the information is logged as a completed transaction for that specific visitor. However no details are provided regarding the specific items or their price (if applicable).
  - For more specific information, the distributor needs to modify their checkout process to feed the requisite information to the Trapezo HTML tag. Typical parameters transmitted are item identifiers, item prices and complete order price. The cookie mechanism remains the same as above.

The data aggregated is used to produce a variety of reports. Partners can select from pre-specified report formats or customize their own. Reports can be viewed in tabular or graphical formats, with static graphics or interactive Java applets.

Additionally, members can download report data in a variety of formats for further analysis. Some data types supported in reports include HTML, PDF, and CDF (comma delimited format).

### **Software running on the Reactor Server**

- JVM
- JDBC
- JMS (Client)
- WL Server
- SSH



## 6. Oracle Database

The Oracle Database runs Oracle 8.5.1 STD SSH. It stores the following data:

- Partner profiles
- Catalogs and other content
- Business rules established by the partner
- Report data

**[More content?]**

## 7. Questions and Answers

### **How does Trapezo verify site-scraped content?**

At this time, catalog content is sourced directly from the partner's Web pages. When the agent is built and begins sourcing, the process is carefully monitored to ensure it is working correctly. There are threshold-warning indicators that are triggered if the aggregate data falls outside of certain specified parameters (e.g., when the item description field lengths increase by more than 20% on average). If the sourcing agent is not running correctly, it is pulled, reconfigured, and applied again until it works properly. Once the XML catalog file is delivered, a random sample is checked for content integrity.

### **Does Trapezo have filters that keep it from bringing in certain types of content?**

There are no pre-configured filters for "appropriate" content. All catalogs sourced by Trapezo are specifically requested by the partners and all content displayed by the partner is strictly controlled by the publisher.

### **What is the reliability of Trapezo's delivery system?**

Trapezo offers 99.95% uptime guarantees with a Server Side Object installed. We have engineered for geographic diversity and fail-over.

### **What happens if Trapezo's system goes down? What is displayed on a Publisher's site?**

Trapezo provides a solution to protect uptime in the event of high network latency or a Trapezo's system outage—a Server Side Object.

The Server Side Object is JavaScript used in conjunction with a servlet. This option requires the integration of a servlet on the publisher's Web servers. The servlet will have the following functionality:

- Time-Out mechanism—This provides control over the dependency on Trapezo display case deliver times.
- Caching—In event of time-outs, the servlet is configured to serve up the most recently served Display Cases.

Installation of the Server Side Object typically takes from one to eight hours.

### **What happens if one of our partner sites goes down?**

Trapezo does not monitor partner sites for uptime. *Trapezo hosts the partner's content so the display cases will be served uninterrupted.* However, if visitor clicks on a link to an unavailable partner site, the link will lead to the unavailable page. The impression and click-through are still recorded for reporting purposes.

### What sort of hardware or systems set-up does a partner need to interface with Trapezo?

- The basic user for the Web-based partner application views it through a Web browser. The Partner must use a Java enabled browser window such as Internet Explorer version 4x and higher and Netscape version 4.5 and higher.
- With the default option, a partner simply cuts and pastes a JavaScript tag into their desired pages. The script tag has a SRC attribute that loads a file such as .js on-the-fly from Trapezo servers. This file such as .js uses the *document.write* method to actually write the display case.
- Server Side Object for 99.95% uptime guarantees.

### How often can we make changes to the settings on a piece of real estate? (design, type of content, matching, etc.)

As often as desired, twenty-four hours a day, seven days a week. Changes occur immediately after the Submit button is clicked.

### Does Trapezo cache the partner's html files? graphics?

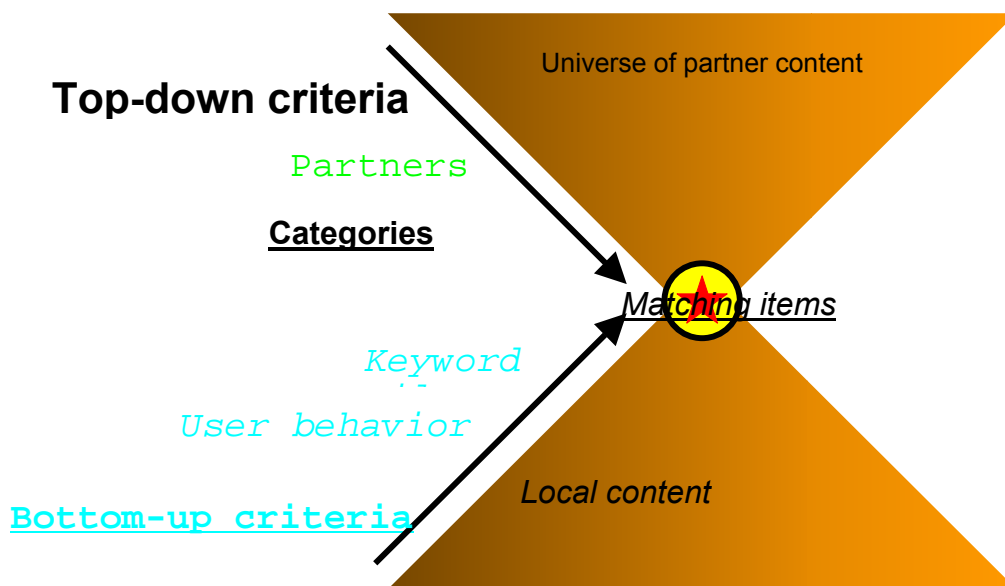
No. Trapezo does not currently store images on its servers; however it does support images hosted by the publisher or distributor.

### How do we manage the inventories we are selling (by keywords? pages?)?

Several methods are supplied for managing inventory:

- by category
- by page
- by time period (i.e. week or month)
- by keyword

### How does partner content matching work?



Keyword matching involves two processes, building keyword tables and passing keywords to the Display Case Server.

- Building keyword tables
  - Bulk import (additional keyword field in file is specified)
  - Flat files (additional keyword field in file is specified )
  - Automated keyword generator (sourced catalogs name fields are filtered into keywords field)
- Publisher Keyword Matching
  - Manually by appending the display case tag within the member's static page with keywords
  - Dynamically when a visitor types in a query keywords are generated through the publisher's content management technology and dynamically appended to the display case tag.  
(example) `<SCRIPT LANGUAGE="Javascript"  
SRC="http://stage.trapezo.com:7001/dc?affiliate_id=1252&pack_id=59_2& search=<%=searchString %>" </SCRIPT>`

## 8. Forthcoming Changes for Release 2.0

Release 2.0 is slated for Aug/Sept 2000.

- Catalog Acquisition will be transferred from the partnerApp Server to a more powerful and efficient application acquired from Cohera ([www.cohera.com](http://www.cohera.com)).
- Real-time feeds for catalog and content updates will be established directly to the Oracle Database using an agent to be determined.
- All application servers (partnerApp, Display Case, and Reactor) will have their own databases that will communicate updates directly to each other, thereby enhancing significantly the speed of platform performance.
- Inventory can be managed by additional display rules based on the precise number of impressions and by date and time.
- Completed transactions will be figured into Normalized Rankings as part of the Item Weighting process for display cases. (See section 4, *Display Case Server*.)
- Aging factors will be linked to the item type (e.g. product, news, auction, information) for Cumulative Popularity Ranking as part of the Item Weighting process for display cases. (See section 4, *Display Case Server*.)