



## **Catavault Technical White Paper**

**Revised - January 2002**

This document provides a technical overview of Catavault including its features, functionality, user experience, operations, backend implementation, and future offerings.

## Catavault Technical White Paper All Access Pass to the Internet

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# Catavault Technical White Paper

## All Access Pass to the Internet

### Table of Contents

<b>Preface .....</b>	<b>5</b>
<b>Catavault Overview .....</b>	<b>7</b>
Catavault's Privacy & Security Pledge .....	8
Catavault's Operational Units .....	8
Figure 1: Catavault's Operational Units & Services.....	9
Catavault's Intellectual Property.....	9
Figure 2: Catavault's Operational Flow Chart.....	10
<b>How Catavault Works.....</b>	<b>11</b>
Overview.....	11
Catavault's Solutions Transcend Tomorrow's Federated Goals.....	11
The Catavault Technology Platform.....	12
Catavault Architecture.....	12
Catavault Registration & User Profile.....	12
Figure 3: User Profile & Authentication Credentials Matrix.....	13
Figure 4: Catavault's User Profile Management Tool.....	14
Registration Confirmation.....	14
Adding Third Party Sites to One's Vault.....	15
Auto-Registration for Third Party Sites.....	15
Figure 5: Catavault's Auto-Registration Flow Chart.....	16
Linking & Logging onto a Third Party Site from Catavault.....	17
Figure 6: Catavault's One-Click Login to Third Party Sites.....	17
My Life Functionality.....	17
<b>Catavault Private Label Partners .....</b>	<b>18</b>
Case Study: Time Warner Communications' Road Runner.....	18
Figure 7: Private Label All Access Pass to the Internet, Powered by Catavault.....	18
Embedded Private Label Login.....	19
Figure 8: Embedded Private Label Login & My Vault Functionality.....	19
<b>Catavault Auto-Login Button &amp; Auto-Checkout Button .....</b>	<b>20</b>
Placement & Functionality.....	20
Figure 9: Catavault Auto-Login Button & Auto-Checkout Button.....	20
Redirecting from a Third Party Site to Catavault and Back to the Site.....	20
Figure 10: How Catavault's Auto-Login Button & Auto-Checkout Button Work.....	21
Figure 11: Co-branded Login with Catavault's Auto-Login/Auto-Checkout Button(s).....	21
Auto-Checkout Functionality.....	23
<b>Netscape 6 My Sidebar Functionality.....</b>	<b>24</b>
Figure 12: Netscape 6 - My Sidebar Functionality.....	25
<b>Catavault Mobile .....</b>	<b>26</b>
Mobile Phone & PDA Microbrowser Functionality.....	26
Figure 13: Mobile Phone & PDA Microbrowser Functionality – Flow Chart.....	26
PDA Synchronization Functionality with the AvantGo Service.....	27
Figure 14: PDA Synchronization Functionality with AvantGo – Flow Chart.....	27

# Catavault Technical White Paper

## All Access Pass to the Internet

<b>Catavault Technology Overview .....</b>	<b>28</b>
Scalability .....	28
Rapid Application Development & Implementation .....	28
High Availability .....	28
Manageability .....	28
Platform Independence .....	29
Disaster Recovery Plans .....	29
Uptime Performance .....	29
Technology Audits.....	29
<b>Security &amp; Privacy .....</b>	<b>30</b>
Background .....	30
Processes .....	31
Password Recovery .....	32
Session Time-out .....	32
Privacy .....	33
Independent Privacy Certification.....	33
Information Collection & Disclosure.....	33
Cookies .....	34
Account Management.....	34
<b>Market Research .....</b>	<b>35</b>
<b>Catavault Benefits.....</b>	<b>36</b>
For Consumer End Users .....	36
For Businesses.....	36
<b>Case Study: Federated Authentication with eBay.....</b>	<b>37</b>
Figure 15: eBay Login Page Example.....	37
<b>Future Offerings .....</b>	<b>38</b>
Catavault Personal Assistant - Client-Side Form Filler.....	38
Linking a User from One Third Party Site to Another Site in a Federated manner .....	38
Electronic Change of Address – Global & Local.....	38
Two-Factor Authentication.....	38
Strong Credential Sign-in.....	39
<b>Appendices .....</b>	<b>41</b>
Appendix 1: Glossary of Terms .....	41
Appendix 2: Catavault Privacy Policy .....	43
Appendix 3: Catavault User Agreement .....	48
<b>ENDNOTES.....</b>	<b>54</b>

# Catavault Technical White Paper

## All Access Pass to the Internet

### Preface

*Boston Globe* columnist John Powers articulated the problem of disconnected silos of content, commerce and application Sites that are “walled gardens” protected by different login data requirements:

**“I am the Man of 1,000 Passwords, and I'll be damned if I can remember more than three of them. Actually, I can remember more than three. I just can't remember which goes with what. Is \*\*\*\* the password for my Fidelity account or my Marriott Rewards account or my United Airlines Mileage Plus account? And I won't even talk about personal identification numbers.”<sup>1</sup>**

### Introduction

The need for common online identification and authentication services arose from the open, democratic nature of the Web. Many third party Web sites, services and applications (collectively referred to as “Sites” hereafter) require that users register to use part of the site and/or pay for their purchase through unique user names, user IDs, account numbers, PINs (personal identification numbers) and passwords (collectively referred to as “Authentication Credentials” hereafter). In the absence of a standard process, technology, and/or specification supporting a common authentication procedure across a wide array of Sites, Sites independently created their own access requirements. Technology, and not common sense, provided most of the rules for formatting; thus causing some Sites to use minimum and maximum character length, some Sites to use case sensitive parameters and/or some Sites to require a combination of letters and numbers.

*The New York Times*, for example, requires a Member ID of five to fifteen characters, and a password that is a minimum of five characters in length.<sup>2</sup> For American Express, the rules are more stringent for its User ID:

- Must be greater than 5 characters in length.
- Must contain at least one letter.
- Must not contain spaces.

And that's just for the User ID. The password for American Express:

- Must be between six and eight characters in length.
- Must contain at least one letter and one number.
- Must not contain spaces or special characters.<sup>3</sup>

Due to the magnitude of Sites that people use every day, each with its own distinct identity and authentication requirements, active Internet users have reached password overload, struggling to manage as many as 15 or more Authentication Credentials in a typical day.<sup>4</sup>

Additionally, online consumer end users are required to create and maintain personal profiles at virtually every site that they visit whether it is for a single transaction, or a site that they visit on a frequent basis. Remembering where those personal accounts exist, and how to access them has become an overly burdensome task and has created the need for software solutions that enable simple and secure access to the multitude of personal accounts and online services that users want to access online.

## **Catavault Technical White Paper All Access Pass to the Internet**

With thousands of Sites, each one demanding a different format, there was a clear need for Catavault's solution that has created an "open sesame" for the Web. Various approaches and terminology have been used in the online identification and authentication sector to describe different businesses including: aggregators; all access passes; e-wallets; form fillers; redirect providers; single sign-on services; etc. Catavault's single sign-on solution serves as a master key or "all access pass" that unlocks all of the "virtual doors" that people are enabled to access on a daily basis. Specifically, Catavault's single sign-on software provides the following: aggregated login information, wallet functionality, form filling, online identity and authentication management and "redirects" from third party Sites, among other services. The bottom line is that Catavault frees users and businesses from the cumbersome task of managing and using Authentication Credentials each time that users visit various Sites.

# Catavault Technical White Paper

## All Access Pass to the Internet

### Catavault Overview

Catavault's patent pending online identity and authentication technology powers the "All Access Pass to the Internet," a single sign-on service that allows users to securely access any of the 3,500+ Web sites ranging from Amazon.com to ZDNet within the Catavault Network with just one user name and password. Catavault can:

- Securely store Authentication Credentials (user names, user IDs, account numbers, passwords, PINs, etc.) for third party Sites
- Link and log users onto third party Sites with just one-click
- Register users automatically for third party Sites if the user opts-in

Catavault creates authenticated links, enabled over a network that can log a user onto a third party Web site in a number of different ways including:

- Linking a user from the Catavault service to a third party site;
- Redirecting a user from a third party site to the Catavault service and back to the site; and/or
- Linking a user from one third party site to another, establishing site-to-site authenticated linking and peering in a federated-like manner.<sup>5</sup>

Catavault's online identity and authentication technology is enabled for PCs, PDAs, Mobile Phones and Set-top Boxes so that users can access their information anywhere, anytime and from any device.

Catavault can store users' Authentication Credentials for third party Sites, link users to third party Sites, log users onto third party Sites and facilitate users' sessions and transactions with ease. In addition, Catavault's patent pending auto-registration process enables Catavault users to opt-in for various third party Sites, have Catavault auto-register the user for the site(s) selected, and then Catavault subsequently links and logs the user onto those site(s) when the user chooses.

Essentially, Catavault is in the "transportation" and "authentication" business. Catavault's safely transports Authentication Credentials to third party Sites and authenticates users accordingly at the those Sites. Catavault's branding was conceived as a compound contraction brand name from the words, "catapult" and "vault." Catapult illustrates the motion or transportation of its users' Authentication Credentials, and "vault" has the double entendre of a safe and of motion. Moreover, Catavault's logo of cascading asterisks connotes Authentication Credentials being encrypted and transported through the Internet to third party Sites where Catavault's users are then identified and authenticated.

Sites that are accessible through Catavault are not required to integrate Catavault's technology to authenticate users. Catavault operates as an "overlay" technology providing a single sign-on solution for individual Sites and services that maintain their own proprietary authentication systems or outsource those systems to third parties.

With respect to Catavault's single sign-on solution, Catavault works with both affiliated Sites, like .Net Passport's model, as well as non-affiliated Sites, unlike .Net Passport's model. The open model of working with both affiliated and non-affiliated Sites has been arguably very important in terms of providing maximum utility to users; this utility has helped drive adoption and usage of services such as Catavault's which embrace this inclusive approach.

## Catavault Technical White Paper All Access Pass to the Internet

Catavault users can also safely store personal information about themselves in their profile on Catavault's servers. As discussed regarding auto-registration, Catavault can securely transmit this information from the user's personal profile to a selected third party site, and create a new personal account for the user at that site automatically. The specific information stored in a the User Profile is driven by a dynamic database system that is intelligent and "learns by doing" so that users do not have to continually retype their name, address and other personal information again and again.

Catavault views Internet privacy as a paramount tenet in its operations. The success of the business depends upon Catavault's ability to maintain the trust of its users. As such, Catavault has worked vehemently to ensure that the data that is entrusted to Catavault is safe, secure, confidential and private.

### Catavault's Privacy & Security Pledge

On many pages throughout the Catavault service, Catavault displays its privacy and security pledge that is personally made by the company's CEO:

"We are absolutely committed to protecting the privacy, security, and confidentiality of your personal information. We promise not to share, sell or exchange any of your personal information to a third party without your explicit permission."

Moreover, Catavault is a proud licensee of the privacy audit certification seals from TRUSTe and BBBOnLine. Catavault's "plain-English" Privacy Policy has influenced many Sites and their users since TRUSTe uses Catavault as a "model-citizen" to numerous Sites that want to create and implement their own privacy policy using Catavault's framework.

### Catavault's Operational Units

Catavault has three primary business units, which are all supported through Catavault's Authentication Credentials Mapping Database:

- **[www.catavault.com/privatelabel](http://www.catavault.com/privatelabel) - Catavault's private label offering**, whereby the technology is licensed to third parties such as Time Warner's Road Runner High Speed Online. This service functions in the exact same manner as the direct to the consumer offering described below, but it has a different look and feel.
- **[www.catavault.com](http://www.catavault.com) - Catavault's direct to the consumer end user offering** which functions in the exact same manner as the private label offering described above, but it has a different look and feel.
- **[www.catavault.com/autologin](http://www.catavault.com/autologin) - Catavault's Auto-Login Buttons and Auto-Checkout Buttons** are integrated by third party Sites that participate in the Catavault "All Access Alliance," and offer a single sign-on solution to their users. This application functions with both the private label and direct to the consumer offerings described above.

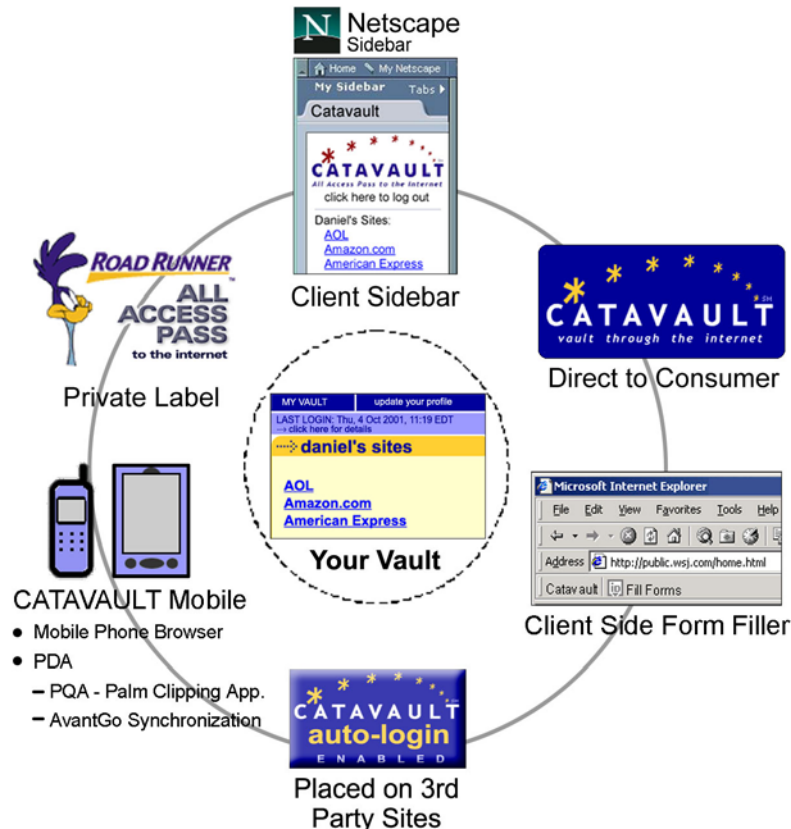
Catavault's **Authentication Credentials Mapping Database** effectively monitors dynamically changing elements of login requirements from a host of organized and unorganized suppliers (i.e., third party Sites which are affiliated with Catavault in some business fashion and third party Sites which are not affiliated in some business relationship). Figure 1 shows a graphical



## Catavault Technical White Paper All Access Pass to the Internet

representation of Catavault's various operational units and services. Figure 2 illustrates the operational flow chart of the basic functionality offered by the Catavault service.

**Figure 1: Catavault's Operational Units & Services**  
([www.catavault.com/company](http://www.catavault.com/company))



### Catavault's Intellectual Property

Title of Application - "METHOD AND SYSTEM FOR SECURE REGISTRATION, STORAGE, MANAGEMENT & LINKAGE OF PERSONAL AUTHENTICATION CREDENTIALS ENABLED OVER A NETWORK."

Morgan, Lewis & Bockius filed Catavault's pending patent applications with the United States Patent and Trademark Office and the Patent Cooperation Treaty.

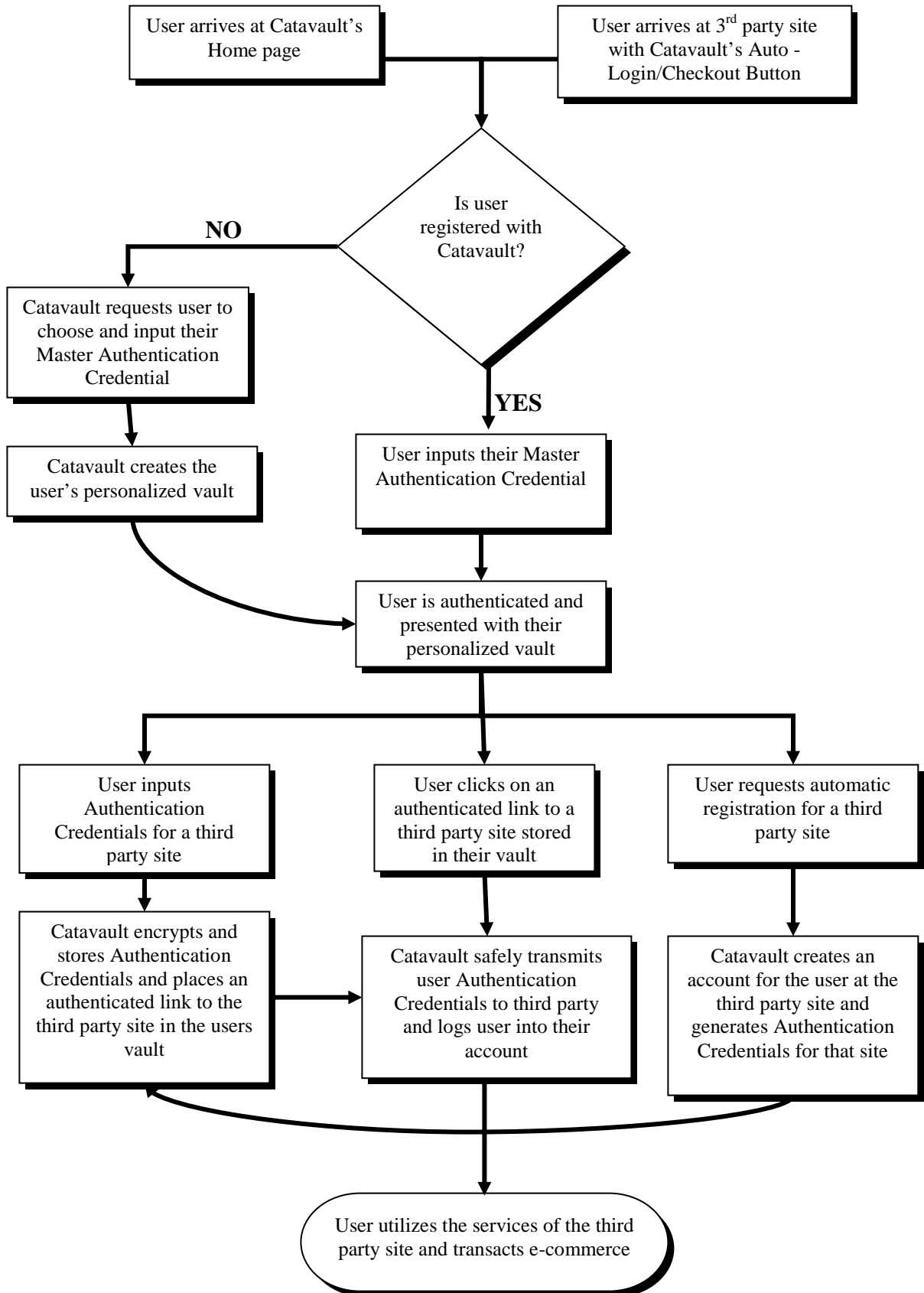
Morgan, Lewis & Bockius and Catavault believe that Catavault's Intellectual Property includes claims that cover methods and systems described as part of Microsoft's .Net My Services initiative (formerly called "HailStorm") and currently in use with Microsoft .Net Passport.

PINvault.com Inc. doing business as Catavault, a Delaware corporation, is the exclusive owner of all Intellectual Property rights with respect to Catavault's online identity and authentication service.

# Catavault Technical White Paper

## All Access Pass to the Internet

Figure 2: Catavault's Operational Flow Chart



# Catavault Technical White Paper

## All Access Pass to the Internet

### How Catavault Works

#### Overview

Third party Sites implement a wide range of different methods and standards to authenticate their users and allow them access to their accounts. This lack of standardization has become an impediment to consumers who use the Internet, requiring them to register for and remember different Authentication Credentials for each individual site or service. Additionally, online security is compromised when users are forced to apply non-secure methods of password management such as writing their information on “Post-it” notes stuck to their computer monitors or storing the data in other non-encrypted, and unsecure formats.

Catavault solves these problems by:

- Providing a secure method of storing and managing Authentication Credentials for multiple Sites; and
- Providing a single, easy to remember, easy to manage, master authentication credential (“Master Authentication Credential”) to access user information and user accounts at third party Sites.

#### Catavault’s Solutions Transcend Tomorrow’s Federated Goals

Today, the dominant online identification and authentication processes that have arisen entail various methods and systems of **authenticated links enabled over a network** including:

- **Authentication service (i.e., Catavault) to a third party site** – For example, when a user wants to visit Yahoo! Mail, he/she can request that his/her corresponding Authentication Credentials which are encrypted and stored within Catavault’s master database are then sent to Yahoo! Mail in order to log the user onto that site.
- **Third party site to an authentication service (i.e., Catavault), back to the third party site** - For example, when a user visits BabyAge.com and wants to purchase baby supplies online, the user is identified and authenticated through Catavault’s Auto-Login Button or Auto-Checkout Button and “redirected” from Catavault’s master database and sent back to BabyAge.com.

Tomorrow, in a federated framework, the processes above transcend various methods and systems of **site-to-site authenticated linking and peering enabled over a network** including:

- **Authentication service (i.e., Catavault) to third party site, and to other third party site(s)** - For example, when a user wants to visit Yahoo! Mail, he/she can request that his/her corresponding Authentication Credentials which are encrypted and stored within Catavault’s master database are securely sent to Yahoo! Mail in order to log him/her onto that site. Then, in theory, the user would be able to go to Hotmail and log into Hotmail using the corresponding identity ticket from Yahoo! Mail and the Catavault authentication service and/or federation such as the Liberty Alliance initiated by Sun or Microsoft’s Internet Trust Network. Given the competitive nature among Hotmail and Yahoo! Mail, it is easy to see how a federated framework will be challenged in terms of successful implementation.
- **Third party site to authentication service (i.e., Catavault) back to third party site, and to other third party site(s)** - For example, when a user visits the Drexel University site and wants to check the status of their Co-op interviews, he/she is identified and authenticated through Catavault’s Auto-Login Button and “redirected” back to Drexel University’s site.

## Catavault Technical White Paper All Access Pass to the Internet

Then the user would be able to go to Yahoo! Mail in theory and log into Yahoo! Mail using the corresponding identity ticket which started with Drexel University. The user could then go from Yahoo! Mail to Hotmail and be logged in based on the original identity ticket from Drexel University. Given the competitive nature among Hotmail and Yahoo! Mail, it is easy to see how a federated framework will be challenged in terms of successful implementation.

Note that these federated frameworks are in their very nascent stage. While Catavault's intellectual property covers these areas, and Catavault looks to take a lead in this emerging sector, this is not the focal point of Catavault's current business operations since it is going to take a long time for these federated frameworks to be developed, adopted and implemented in order to provide for interoperability across a plurality of third party Sites. For more information on Catavault's views on federated frameworks, please read the *Open Sesame White Paper* available at [www.catavault.com/opensesame](http://www.catavault.com/opensesame).

### The Catavault Technology Platform

The Catavault technology platform is modeled on a CORBA-based distributed application framework, combined with software tools that ensure security, scalability, availability, reliability and manageability, on which transaction intensive applications can be delivered over the Internet or over other distributed data environments.

### Catavault Architecture

Catavault supports identification and authentication across multiple Sites by:

- Hosting, maintaining and updating a secure database **containing third party site structure and data requirements for registration, identification and authentication.**
- Hosting, maintaining and updating a secure central database **containing users' Authentication Credentials and profile information for third party Sites;**
- Creating authenticated links, enabled over a network, which securely "transport" and authenticate or register and authenticate a user at a third party site.

Catavault creates authenticated links in a number of different ways including:

- Linking a user from the Catavault service to a third party site;
- "Redirecting" a user from a third party site to the Catavault service and back to the site; and/or
- Linking a user from one third party site to another, establishing site-to-site authenticated peering and linking in a federated like manner.

### Catavault Registration & User Profile

Users create their Catavault User Profile and personal "vault" of Sites when they register for Catavault, which can be done in several ways:

- By registering at Catavault's direct to the consumer service - **[www.catavault.com](http://www.catavault.com)**
- By registering at one of Catavault's private label partners - **[www.catavault.com/privatelabel](http://www.catavault.com/privatelabel)**
- By registering at Sites that have joined Catavault's All Access Alliance by placing Catavault's Auto-Login Button and/or Auto-Checkout Button on their site. The Auto-Login Button automatically redirects users to a co-branded, centrally hosted login and/or registration page - **[www.catavault.com/autologin](http://www.catavault.com/autologin)**

## Catavault Technical White Paper All Access Pass to the Internet

Catavault only requires the following information from a user to create a Catavault account:

- First name
- Last name
- Email address
- Password

The required information is stored in Catavault's User Profile. The user's email address and selected password serve as the Master Authentication Credential which grants them access to their personal vault of Sites including their respective Authentication Credentials and User Profile information. Email address was selected as the Master Authentication Credential since it serves as an easy-to-remember, unique identifier for registered users. Catavault's Master Authentication password chosen by the user:

- Must consist of five to twenty characters.
- Must contain at least one letter and one number.
- Must not contain spaces or special characters.

Please see Figure 3 for a matrix illustrating Catavault's User Profile & Authentication Credentials management services. Please see Figure 4 for an illustration of Catavault's User Profile management services.

**Figure 3: User Profile & Authentication Credentials Matrix**

<b>Catavault All Access Pass Account Data</b>		<b>Required for registration</b>	<b>Shared during sign-in</b>
<b>Catavault User Profile</b>	Email Address First Name Last Name	Yes	User-defined: Shared only when a user opts in for Catavault to auto-register the user for a participating site and those specific data points are required.
	Address (Mailing and/or Billing); City; State; Zip Code; Country; Home Phone Number; Work Phone Number; Gender; Income; Credit Card Numbers; and Social Security Number.	No	
<b>Catavault's Master Authentication Credential</b>	Master User Name (Email Address)	Yes	Never
	Master Password 5-20 characters, alphanumeric combination required	Yes	
<b>Third Party Sites' Authentication Credentials</b>	User Names; User IDs; Passwords; PINs; Account Numbers; etc.	No – entered when a user places Sites into his/her vault	User-defined: Shared only when a user logs onto a site from their vault

# Catavault Technical White Paper All Access Pass to the Internet

Figure 4: Catavault's User Profile Management Tool

The screenshot displays the 'update your profile' page on the Catavault website. The page features a navigation bar with links for 'MY VAULT', 'update your profile', 'mobile', 'privacy', 'security', 'partners', 'demo', 'MCLP', and 'LOGOUT'. Below the navigation bar, there are buttons for 'delete account', 'change password', 'email preferences', and 'password recovery'. The main content area is divided into two columns. The left column contains a form for updating the user's profile, including fields for salutation, first name, middle initial, last name, email address, billing address, and shipping address. The right column contains a 'Our Pledge' section with a quote from Jonathan Bari, CEO, and a 'Privacy Pledge' section with a 'TRUSTe' logo. Callouts point to various elements: 'Profile Management' points to the 'update your profile' button; 'Email Preferences' points to the 'email preferences' button; 'Change Password' points to the 'change password' button; 'Password Recovery' points to the 'password recovery' button; 'Intelligent Database' points to the form fields; and 'Privacy Pledge' points to the 'Our Pledge' section.

## Registration Confirmation

When a user concludes his/her Catavault account creation, various iterations of the Catavault service may commence a process to validate the e-mail address provided by the user during the registration process. This process sends an email containing a confirmation URL to the e-mail address which the user used to register. By clicking on this confirmation URL, the user is linked to a Catavault page where he/she can validate his/her e-mail address and the fact that he/she wants to open a Catavault account. This process ensures that the Catavault account holder owns this particular e-mail address, and that the Catavault service ensures that the user has a valid e-mail address.

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Adding Third Party Sites to One's Vault**

A user can find a site he/she wants to add to his/her "vault" by using the "Lookup" box, or searching by category. If the site the user wants to add is not part of the Catavault Network, the user can then suggest that particular site in the "Suggest a site" area. Catavault Member Services will then add that site to the system's database and notify the user by email when the third party site has been added to the Catavault Network.

### **Auto-Registration for Third Party Sites**

The User Profile stored in the user's personalized vault is an intelligent database to aid the user in registering for, storing, managing, and linking Authentication Credentials for third party Sites going forward. As discussed, third party Sites require different registration information. However, much of the information required is common across the various Sites, such as name, physical mailing address, e-mail address, telephone number, etc. The data points for these common information requests may be stored for each user in his/her personal User Profile. Then, when the user goes to a new site for which registration is required, the Catavault service searches the User Profile for the required information. If the User Profile in the Catavault service does not have all of the information required to automatically register the user at the particular third party Site, the Catavault service will present a page of queries in order to capture the missing information.

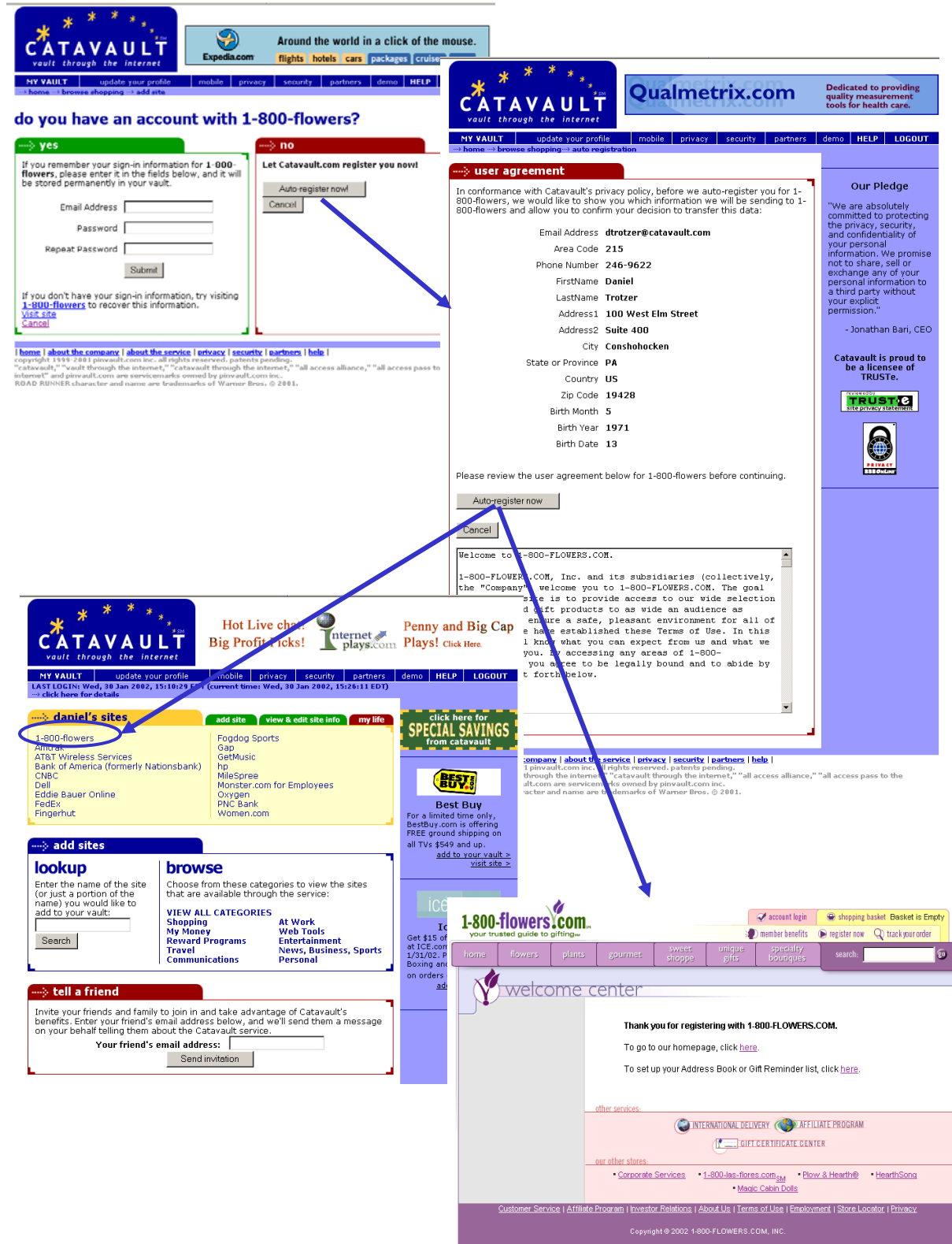
Concurrently, this new information is stored in the User Profile for future queries and registration for new third party Sites, at the express opt-in permission of the user. If and when the User Profile contains all the information required, the Catavault service can automatically input the requisite registration information to the third party site, and thus automatically register the user with the new third party site, as shown in Figure 5.

When the Catavault service automatically registers a user at a third party site at the user's express opt-in permission, the Catavault service may create and then securely store the unique and sometimes randomly generated Authentication Credentials such as a user name and password for that particular third party site in the user's personalized vault.

Immediately following the automatic registration, the Catavault service opens a new browser, links the user to the third party site and logs the user onto the third party site. The user may never need to know what the newly and automatically created Authentication Credentials for the third party site are because the Catavault service will automatically retrieve and securely transmit the Authentication Credentials to the site from the user's vault whenever the user indicates a desire to log onto that particular third party site.

# Catavault Technical White Paper All Access Pass to the Internet

Figure 5: Catavault's Auto-Registration Flow Chart





# Catavault Technical White Paper

## All Access Pass to the Internet

### Linking & Logging onto a Third Party Site from Catavault

When a registered user enters the Catavault service, they are asked for their Master Authentication Credential. The Catavault service uses digital server certificates, as well as customized user name and password schemes to verify that these credentials correspond to a registered user's Individual Unique Identifier (IUI). Once verified, the user is authenticated and they are given access to their personal "vault" of Sites. The user's personal vault consists of authenticated links to specific third party Sites that the user has previously stored in his/her vault. Please see Figure 6 for an illustration. When a user clicks on one of those authenticated links, the Catavault service:

- Queries the database and retrieves the encrypted Authentication Credentials for the specific site selected by the user;
- Spawns a new browser window;
- Presents that user's Authentication Credentials in an encrypted manner via HTTP to the site;
- Decrypts the user's Authentication Credentials and transparently performs the Form Action of logging the user onto the third party site, and then delivering the user to their personalized page at the third party site (i.e., Hotmail, My CDNOW, etc).

Figure 6: Catavault's One-Click Login to Third Party Sites



### My Life Functionality

The My Life functionality on Catavault allows users to store any information for their offline world, such as their driver's license number, spouse's social security number, home security system code, bank ATM PIN, software registration number, etc. This vital information is available at anytime and via any device since it is network-enabled, just like the Authentication Credentials and User Profile data.

# Catavault Technical White Paper All Access Pass to the Internet

## Catavault Private Label Partners

### Case Study: Time Warner Communications' Road Runner

Catavault Private Label Partners (www.catavault.com/privatelabel), such as Time Warner Communications, license Catavault's proprietary technology to offer a customized version of Catavault's All Access Pass to the Internet for their users. Because Catavault has developed the infrastructure for this offering, a private label partnership can usually be executed and implemented with alacrity by the parties. Figure 7 illustrates an example of a private label "All Access Pass to the Internet" service as it is marketed to Road Runner High Speed Online cable modem subscribers.<sup>6</sup>

Figure 7: Private Label All Access Pass to the Internet, Powered by Catavault

The image shows a screenshot of the Road Runner All Access Pass website. The page is divided into several sections:

- Header:** Features the Road Runner logo, navigation links (Main, Member Services, Home, Search, Shop), and a promotional banner for Omaha Steaks and a Digital Entertainment Pak.
- Left Sidebar:** A vertical menu with categories like "ALL ACCESS PASS", "AROUND TOWN", "NEWS", "BUSINESS", "SPORTS", "WEATHER", "OUT 'N' ABOUT", "MOVIES", "COMPUTERS", "GAMING", "VIDEO IMAGES", "HOT LINKS", "DEEP FREEZE", "LOTTO RESULTS", "HOMES", "SHOPPING", "CLASSIFIEDS", and "SEARCH".
- Main Content Area:**
  - ARE YOU frustrated WITH LOSING YOUR usernames AND passwords?** A large headline with a question mark.
  - ROAD RUNNER ALL ACCESS PASS to the internet** logo.
  - New users: Click here to register now.** A registration form with fields for Email (@cfl.rr.com) and Password, and a Submit button.
  - Existing users: sign in below** with a login form.
  - add sites** section with a "lookup" form and a "browse" category list.
  - tell a friend** section with an email address field and a "Send invitation" button.
- Right Sidebar:** Promotional banners for "SPECIAL SAVINGS from catavault", "1-800-flowers.com", "800.com", and "The New York Times (nytimes.com)".
- Footer:** Includes copyright information (© 2000 PINvault.com Inc.), privacy policy, and contact information.

# Catavault Technical White Paper All Access Pass to the Internet

## Embedded Private Label Login

The embedded Private Label Login is an optional feature of Catavault's "All Access Pass to the Internet" so that private label partners can make the service a more integrated feature of their product offering. Rather than providing a link to the Private Label All Access Pass login page, a small login module can be embedded within the partner's page(s), allowing the partners to offer the service while maintaining more control of their users' experiences. Figure 8 illustrates the embedded private label login as it could appear on a participating private label partner site.

Figure 8: Embedded Private Label Login & My Vault Functionality

The screenshot displays a website interface with a top navigation bar containing 'COX FAIRFAX COUNTY', '53° EXTENDED', 'HELP & MEMBER SERVICES', 'WHAT'S NEW', and 'LOG OUT'. Below this is a search bar and various menu items like 'ROAD RUNNER HIGH SPEED ONLINE™', 'WEB', 'SHOPPING', and 'RR HELP'. The main content area features a 'MEDIA RUNNER' section with a video player for a 'Pollock' interview, a 'WELCOME jgreene YOUR' section with a menu of links (CALENDAR, NEWS, SPORTS, HOROSCOPES, STOCKS, WEATHER), and a 'MY VAULT' section. The 'MY VAULT' section is highlighted with a yellow circle and contains a login form with fields for 'Email:' and 'Password:', a 'Submit' button, and a 'New Users: Click here to register.' link. Below the login form is a 'frustrated WITH LOSING YOUR usernames AND passwords?' section. The 'MY VAULT' section also includes a list of sites under 'daniel's sites', an 'add sites' section with a 'lookup' form, a 'browse' section with categories like 'Shopping', 'Travel', and 'Communications', and a 'tell a friend' section. The bottom of the page features a 'Catavault Member Specials' section with various offers like '1-800-flowers.com' and '800.com'. The page footer contains copyright information for 1998-2002 Catavault, Inc.

## Catavault Technical White Paper All Access Pass to the Internet

### Catavault Auto-Login Button & Auto-Checkout Button

#### Placement & Functionality

The Catavault Auto-Login Button and Auto-Checkout Buttons ([www.catavault.com/autologin](http://www.catavault.com/autologin)) are commercially licensed to third party businesses and contextually placed on any or all of the following pages at a third party site:

- Login Page
- Checkout Page
- Registration Page
- Invalid Login Page

When a user clicks on the Auto-Login Button or Auto-Checkout Button, they are redirected to the Catavault sign-in page which can be co-branded with the third party site. Sites that implement the Auto-Login and/or Auto-Checkout functionality can control certain design elements and features of the co-branded page. Figure 9 illustrates the Catavault-branded Auto-Login Button and Auto-Checkout Button.

**Figure 9: Catavault Auto-Login Button & Auto-Checkout Button**



#### Redirecting from a Third Party Site to Catavault and Back to the Site

When a registered user clicks on the Catavault Auto-Login Button and/or Auto-Checkout Button at a third party site, they are “redirected” to the secure Catavault server complex. The Catavault service verifies that the site requesting the identification and authentication is a valid and participating site; and displays the applicable co-branded login page for that particular site, if the user is not already authenticated by the Catavault service.

The co-branded login page prompts the user for their Catavault Master Authentication Credential. If the user is not already a registered Catavault user, he/she can sign-up for Catavault at that time. If the user is a registered Catavault user, then he/she can login with their Catavault Master Authentication Credential. When the Catavault service verifies that this Master Authentication Credential corresponds to a registered user’s IUI, the user is authenticated with the Catavault service. Once authenticated with the Catavault service, Catavault queries the database with a series of binary-like questions to determine the appropriate action(s) by the Catavault service for that particular user and the corresponding third party site.

Figure 10 illustrates the process flow of how the Auto-Login Button works. Note that Catavault’s Auto-Checkout Button functions in a similar manner. Moreover, the Auto-Login Button and the Auto-Checkout Button can be completely private labeled by a partner. For example, American Express could offer the “American Express Auto-Login Button” and

# Catavault Technical White Paper

## All Access Pass to the Internet

“American Express Auto-Checkout Button.” Figure 11 illustrates an example of a co-branded login page.

Figure 10: How Catavault’s Auto-Login Button & Auto-Checkout Button Work

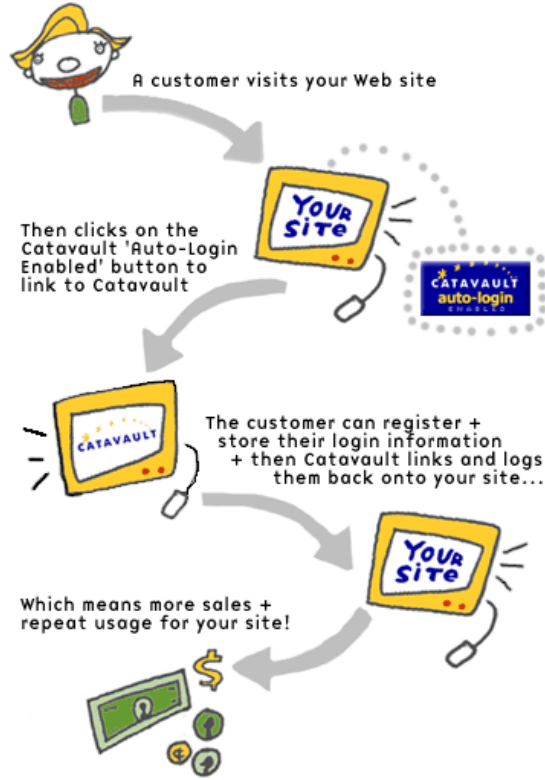




Figure 11: Co-branded Login with Catavault’s Auto-Login/Auto-Checkout Button(s)



**CATAVAULT**  
vault through the internet

CATAVAULT provides automatic login without passwords for members of the EASTERN TECH COUNCIL



EASTERN TECH COUNCIL  
TECHNOLOGY

HOME
update your profile
mobile
privacy
security
partners
demo
HELP
LOGOUT

**welcome to catavault**

Catavault is a free service that manages your usernames and passwords so that you can surf the Internet without needing to remember your passwords at every site. Once you are a member of Catavault, you will no longer need to remember your passwords to access any of Catavault's 3534 sites like Eastern Technology Council.

**If you are not yet a Catavault member,** [click here to sign up now.](#) It's FREE! Or, you can [take a guided tour of the service.](#)

**If you are already a Catavault member,** please enter your email address and Catavault password below to continue to Eastern Technology Council:

Email address:

Catavault password:

To preserve your privacy, Catavault will automatically log you off when you have been inactive for a period of time. For secure access to your private information, you need to log in again.


If you do not yet have a Catavault account, [click here to sign up.](#)


**Our Pledge**

"We are absolutely committed to protecting the privacy, security, and confidentiality of your personal information. We promise not to share, sell or exchange any of your personal information to a third party without your explicit permission."

- Jonathan Bari, CEO

**Catavault is proud to be a licensee of TRUSTe.**

  
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BBB Online

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ROAD RUNNER character and name are trademarks of Warner Bros. © 2001.

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Scenario A – Auto-Login/Auto-Checkout**

If the user **has stored** the Authentication Credentials for the third party site (from where they clicked on the Catavault Auto-Login Button and Auto-Checkout Button) in their personal vault, the Catavault service:

- Transports the user’s Authentication Credentials in an encrypted manner to that particular site;
- Decrypts the user’s Authentication Credentials for that particular site, and
- Performs the requisite Form Action transparently of logging the user onto the third party site and then “transporting” the user to their personal account area at the third party site.

### **Scenario B – Auto-Login/Auto-Checkout**

If the user **has not stored** the third party site in their personal vault of Sites, the Catavault service prompts the user to:

- Enter the Authentication Credentials for his/her existing account at that third party site; or
- Create a new account at that third party site by clicking Catavault’s “auto-registration button; or
- Link to the site to create a new account at that site without using the auto-registration functionality, and then manually store the new Authentication Credentials for the third party site in his/her personalized vault.

### **Scenario C – Auto-Login/Auto-Checkout**

If the user enters the Authentication Credentials into Catavault for their existing account at the third party site, the Catavault service:

- Stores the corresponding site’s Authentication Credentials in the user’s personal vault of Sites;
- Transports the user’s Authentication Credentials in an encrypted manner to that particular site;
- Decrypts the user’s Authentication Credentials for that particular site, and
- Performs the requisite Form Action of transparently logging the user onto the third party site and “transporting” the user to their personal account area at the third party site.

### **Scenario D – Auto-Login/Auto-Checkout**

If the user wants to create a new account at the third party site by clicking on Catavault’s auto-registration button, the Catavault service:

- Reviews the profile information required by the third party site to create an account against the personal information securely stored in Catavault’s User Profile;
- Prompts the user for any additional information that the third party site requires, and which is not currently stored in the User Profile;
- Stores the newly entered data into Catavault’s User Profile which is an intelligent database that learns by doing so that the next time that the user needs this data to register for another third party site, the User Profile will already contain the data and enable auto-registration more quickly;
- Displays the User Profile information to the user (that will be sent to the third party site) along with the third party site’s membership agreement;
- Prompts the user to auto-register for the third party site by clicking the “register now” button.

## **Catavault Technical White Paper All Access Pass to the Internet**

When the user clicks on the “register now” button, the Catavault service:

- Transports the user’s User Profile data in an encrypted manner to the third party site;
- Decrypts the information from the User Profile and transparently performs the Form Action of registering the user for an account at the corresponding third party site;
- Creates a set of randomly generated Authentication Credentials for the user at the third party site and associates those credentials with the user’s IUI.
- Stores the third party site and its corresponding Authentication Credentials in the user’s personal vault of Sites; and
- Decrypts the user’s Authentication Credentials and transparently performs the Form Action of logging the user onto the third party site, delivering the user to their personal account page at the third party site.

### **Scenario E – Manual Registration Facilitating Future Auto-Login/Auto-Checkout**

If the user links to the site to create a new account at that site without using Catavault’s auto-registration functionality, then the user can return to Catavault at any time to manually enter the Authentication Credentials in their “vault.”

### **Auto-Checkout Functionality**

Catavault can also manage and store credit card numbers and their associated expiration dates, billing addresses, shipping addresses, account holder names, etc. The Catavault service enables users to securely transfer this information to a participating Catavault-enabled merchant which will use the data to quickly complete an online purchase.

The Catavault Auto-Checkout service uses the same redirection technology as described with the "Auto-Login Button" in the section “Redirecting from a Third Party Site to Catavault and Back to the Site” previously addressed herein. Participating Sites do not have to install any additional software on their site to implement Catavault’s Auto-Checkout Button. They simply have to apply for the Auto-Checkout Button, and upon approval from Catavault, place the Auto-Checkout Button and some minimal code on their site that redirects Catavault users with the appropriate seamless processes described in the scenario examples previously discussed.

Catavault does not receive product information and/or track the purchase price and/or purchases when processing Auto-Checkout Button-enabled transactions. In addition, Catavault is not a credit card or debit card processing solution. Participating Sites are still required to process the transaction directly and/or through a third-party service. Catavault can use a basic Luhn checksum to determine the validity of the credit card or debit card number provided by the user, however, it does not perform card authorization. (The Luhn formula, also called modulus 10, is an algorithm used to validate the number on a credit card.)

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Netscape 6 My Sidebar Functionality**

Located on the left side of the Netscape 6 interface, My Sidebar gives users a convenient place to access the Sites that are most important to them. Catavault offers a My Sidebar tab so that users can log into their personal vault with the My Sidebar feature and have their vault of Sites persistently present on the left side of the Netscape 6 interface. When a user clicks on one of the authenticated links in the My Sidebar, the Catavault service links and logs the user onto that particular third party site in the main browser window which is immediately to the right of the My Sidebar, hence the name as branded by Netscape. Please see Figure 12 for an illustration of the Netscape 6 My Sidebar functionality.



# Catavault Technical White Paper All Access Pass to the Internet

## Figure 12: Netscape 6 - My Sidebar Functionality

**1) A User is surfing the Web with the Netscape 6 My Sidebar and wants to email an interesting "BusinessWeek" article to a friend.**

**2) Using the Catavault service via the My Sidebar feature of Netscape 6, the user logs into their vault of third party sites.**

**3) With one-click, the user can log onto their Yahoo! Mail account and send an email to their friend about the article.**

**4) Then, with just one-click, the user can log onto "The New York Times" site to see if there are any other articles on the subject.**

The screenshots show the following content:

- BusinessWeek online:** Article titled "Please Tell All" about Enron and the White House. Other articles include "New Tricks" and "E\*Trade group".
- Yahoo! Mail - Netscape 6:** Welcome message for user dtrotzer2000@yahoo.com. Unread Messages section.
- The New York Times:** Article titled "Cheney Is Set to Battle Congress to Keep His Enron Papers Secret".

# Catavault Technical White Paper

## All Access Pass to the Internet

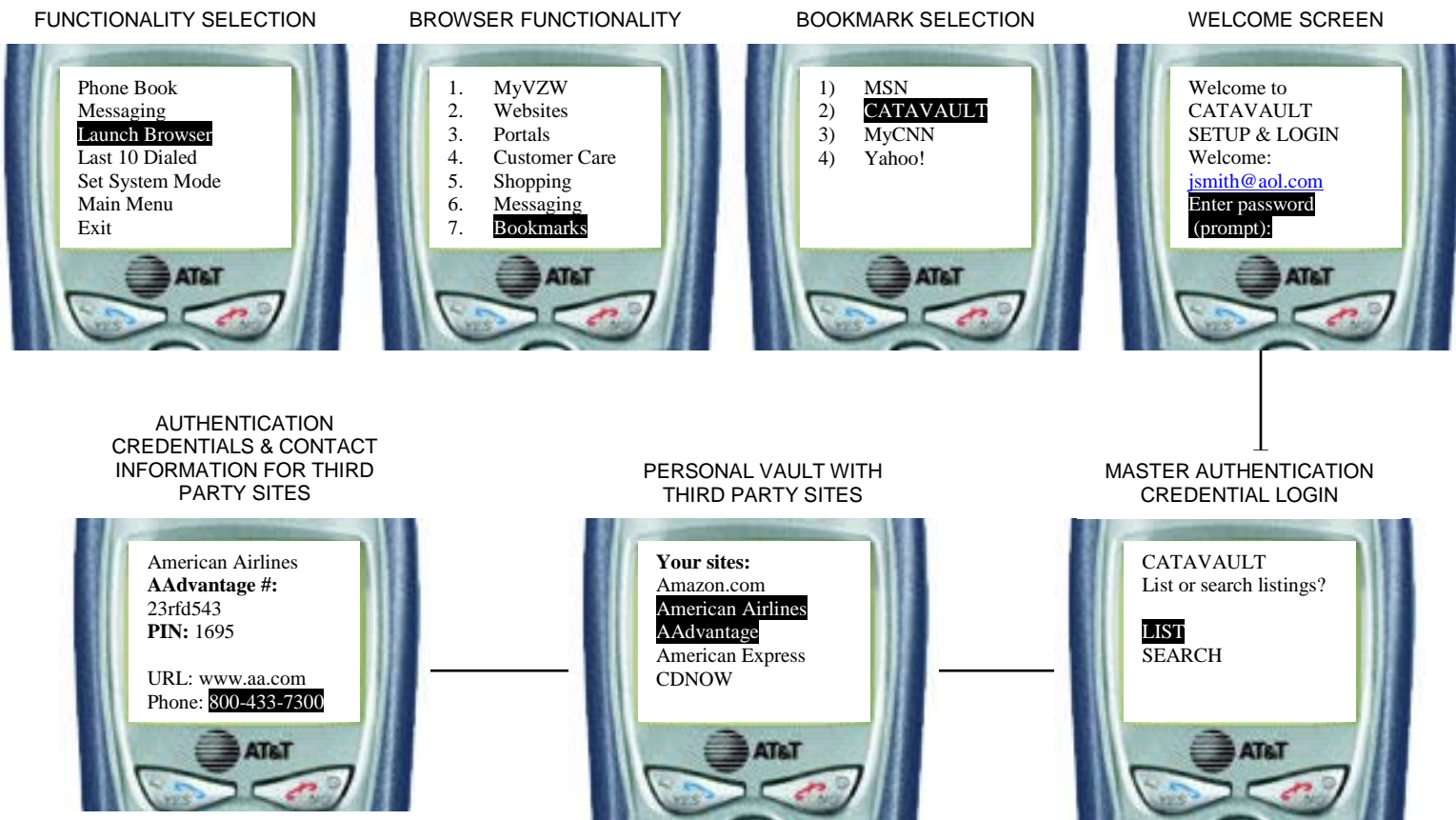
### Catavault Mobile

Catavault is available today on PCs, PDAs, mobile phones and digital set-top boxes with microbrowsers. Catavault Mobile allows users to access Catavault from any PDA that is capable of running Palm Clipping Applications (PQA) or any mobile phone equipped with a microbrowser. Additionally, Catavault Mobile also enables users to synchronize their vault with their PDA using the AvantGo Synchronization service available at [www.avantgo.com](http://www.avantgo.com).

### Mobile Phone & PDA Microbrowser Functionality

Existing users who have enabled their account for mobile device functionality can log onto their personal vault of Sites with their Master Authentication Credential and view their third party Sites' Authentication Credentials safely stored within their vault. Figure 13 illustrates the functionality of mobile phones and PDAs that have a wireless Internet connection. When a registered user launches the microbrowser on their mobile phone or PDA, the user will click on the "Catavault" bookmark selection to see the Catavault home page. The user is then prompted for their Master Authentication Credential and is subsequently logged into his/her personal vault once he/she is authenticated. Sites stored in the user's vault are listed in alphabetical order. Clicking on an individual site shows the Authentication Credentials for that particular site.

**Figure 13: Mobile Phone & PDA Microbrowser Functionality – Flow Chart**



*(highlighting here indicates that the user has decided to dial this phone number corresponding to the business (i.e., American Airlines), and the user can then be authenticated accordingly.)*

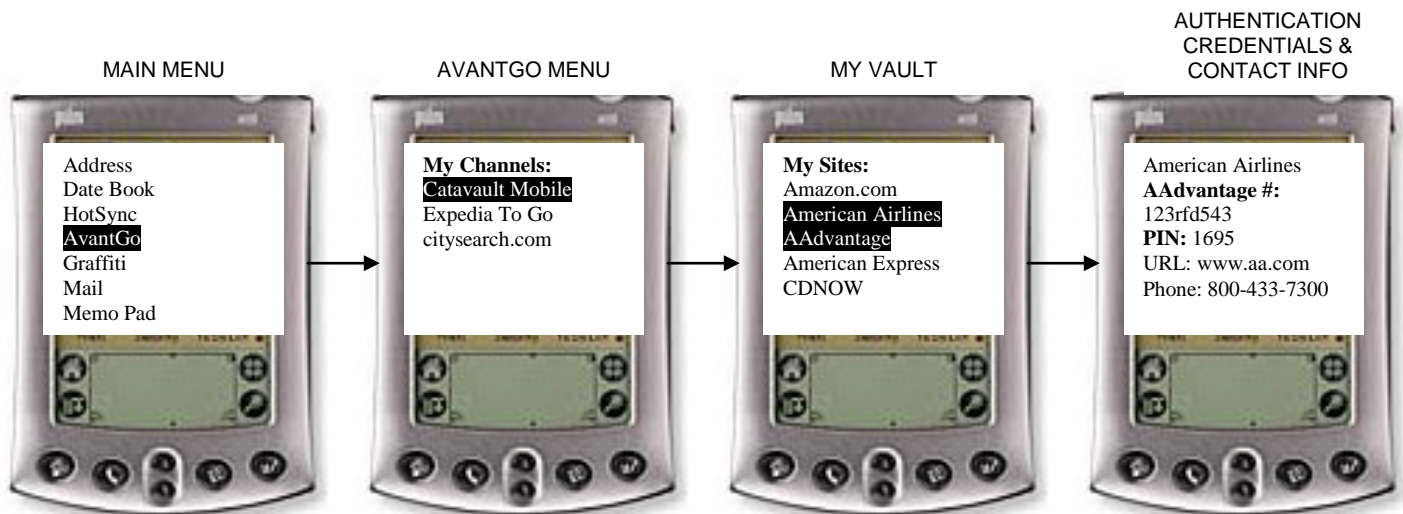
## Catavault Technical White Paper All Access Pass to the Internet

While the previous example uses a mobile phone, the same functionality occurs with a PDA that has a wireless connection. Note that while this example illustrates a phone from AT&T Wireless, Catavault is operator and device agnostic. As such, Catavault functions with various wireless carriers including Cingular, Sprint, Verizon, etc. and with various phone and handheld manufacturers including Compaq, Kyocera, Motorola, Nokia, Palm, Samsung, Sony, etc.

### PDA Synchronization Functionality with the AvantGo Service

Existing users who have downloaded the AvantGo software for PDAs and have selected Catavault Mobile as one of the “Channels” within their AvantGo account can synchronize their PDA with Catavault, log onto their personal vault of Sites with their Master Authentication Credential and view the Authentication Credentials for third party Sites stored within their personalized vault. Figure 14 illustrates how the AvantGo service works with Catavault.

**Figure 14: PDA Synchronization Functionality with AvantGo – Flow Chart**



# Catavault Technical White Paper

## All Access Pass to the Internet

### Catavault Technology Overview

#### Scalability

The Catavault platform is modeled on a CORBA-based middleware platform which can enable a highly scalable distributed applications infrastructure. The platform enables an application to run simultaneously on multiple host systems, allowing for large numbers of concurrent users while at the same time optimizing network performance and resource utilization. In addition, the Catavault platform has been designed to transparently deploy new services and hardware while existing applications remain operational. As well, the Catavault platform reduces communications bottlenecks resulting from limited numbers of connections to database servers through load balancing and intelligent management of database connections and some object caches - where appropriate with factoring in security considerations - which reduces the need to query database servers for frequently used data. Additional Web servers can be added to the existing system to accommodate an increase in traffic and usage. In order to support continued growth, the Catavault service was built with the intention of migrating from the MySQL database to the Oracle database.

#### Rapid Application Development & Implementation

The Catavault platform is designed to enable rapid application development and integration. The technology platform was modeled to support object-oriented/modular programming which can accelerate the design process through object reuse. Catavault maintains a comprehensive set of object libraries, called core services, that allow developers to rapidly build complex applications. The platform is also designed for deploying applications developed by third parties with relative ease. The platform interfaces with legacy systems by accepting industry standard ANSI X.12 and HL7 electronic data interchange formats.

#### High Availability

The Catavault platform architecture is designed to ensure high availability through the replication of applications and other software services, failure detection and automatic restart of failed services and applications. Running multiple copies of a service or application is intended to remove any single point of failure within the system and ensure that at least some copies of the service will be available while others may have failed. In addition, the servers that host the Catavault's software applications are duplicated to provide redundancy. Catavault's secure hosting facility also uses duplicate fiber optic cable connections to ensure highly-available Internet access. Catavault's platform also uses a mix of fault-tolerant hardware, redundant equipment and back-up power systems.

#### Manageability

The Catavault management framework can provide a single "radar screen" image view of every Catavault service and application, thus simplifying administration in a distributed environment. Catavault services and applications can be safely managed from a Web-based management station. The Catavault management and administration framework monitors service performance and generates event notifications of system abnormalities, thus ensuring uptime all the time for Catavault's users.

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Platform Independence**

Designing the Catavault platform to be “platform independent” enables the Catavault service to support all major operating systems including Windows, Macintosh, Linux, Solaris and Palm.

### **Disaster Recovery Plans**

Although Catavault believes that its operations and facilities are highly resistant to systems failure, sabotage and disaster, Catavault has developed a comprehensive disaster recovery and business continuity operations plan. In addition, all of Catavault’s services are linked to advanced storage systems that provide data protection through techniques such as secure replication. Catavault also maintains on-site backup power systems.

Unfortunately, Catavault’s disaster recovery and business continuity operations plan was put to the test on January 28, 2001 when the company’s corporate headquarters in Center City Philadelphia was destroyed due to fire; however, the disaster recovery plan passed with flying colors, and the service never skipped a beat.

### **Uptime Performance**

From January 1, 2001 to December, 31, 2001, Catavault maintained 99.9% system uptime and availability, and in spite of the fire on January 28, 2001, the Catavault service never skipped a beat for any of its end users, as noted above.

### **Technology Audits**

Catavault’s technical team and insurance underwriters at AIG periodically perform audits and retain accredited third parties to perform independent audits of Catavault’s operational procedures under both internally-developed audit procedures and externally-recognized standards.

# Catavault Technical White Paper

## All Access Pass to the Internet

### Security & Privacy

The Catavault platform is designed to ensure the privacy and integrity of data and communications by utilizing a combination of security methodologies to provide multiple lines of defense against potential hackers, data pirates and data thieves. Below Catavault has detailed some of its security techniques, but in the interest of maintaining the highest level of security, Catavault cannot publicly disclose all of its security measures.

### Background

Many identification and authentication methods used by Sites today do not use advanced privacy and security technology. This makes it easier for unauthorized people to gain access to personal information. To counteract this, Catavault uses secure communications protocols and proven Internet security technologies, as described below, to prevent unauthorized access to personal data. Catavault's single sign-on solution provides an optimal balance of security, privacy, flexibility, usability and utility because Catavault's product development team has grappled with multiple constraints and interests that are often contradictory. For example:

- An identification and authentication service like Catavault must be easy to use. For example, the user's Master Authentication Credential should be easy to remember.
- The identification and authentication service must be turnkey and cost-effective for participating Sites to implement so that many Sites can utilize and leverage the technology.
  - The identification and authentication service must provide an adequate level of security and privacy.
  - The Catavault service works without the user being required to download any software.

However, the demands of privacy and security often conflict with ease of use for the end users and turnkey implementation by the Sites:

- To protect the user's security even more, Authentication Credentials can be strengthened by stringent requirements imposed on the user including, but not limited to, the following characteristics: length; alphanumeric; randomly generated and assigned; case sensitive; symbols; and expiration dates. However, this increases the possibility of users making typographical errors and forgetting their Authentication Credentials, thus just moving the problem downstream. Ergo, there is a delicate balance between utility and security for users and Sites.
- To avoid "brute-force dictionary attacks" on users' Authentication Credentials (an automated and evil program which uses thousands of common passwords in conjunction with the user's e-mail address), Catavault can block access when there are too many unsuccessful attempts to identify and authenticate a user. However, a malicious user could block the user account of another by intentionally providing incorrect Authentication Credentials. This would prevent the real user to get access even to content with a low level of security (i.e., nytimes.com), and it would force the real user to go through a potentially cumbersome reset process.
- While Catavault can require communication to be end-to-end SSL protected, this might create an overload on the servers and lengthen download times for the users and access and transaction times for the Sites.

## Catavault Technical White Paper All Access Pass to the Internet

Catavault proactively solves these challenges by:

- Using standard Web technologies and techniques such as SSL, HTTP redirects, cookies, and JavaScript.
- Implementing a few security levels. Participating Sites can request the secure level of authentication which it needs based on the sensitivity of content or service it delivers. In all cases, **the Catavault Master Authentication Credential is never sent to third party Sites, Authentication Credentials and User Profile information is always sent in an encrypted fashion.**
- Blocking access with denial techniques. If anyone using Catavault makes several incorrect attempts at guessing a user's Master Authentication Credential during sign-in, then Catavault can automatically block access to that user's account for some period of time. This makes it significantly more difficult for password-cracking programs, such as a "brute-force dictionary attack" to be successful. However, even using secure sign-in techniques, a determined brute-force attack still represents a risk.
- Setting traps and monitoring activities and message boards of hackers. Catavault deliberately sets traps for hackers which are designed to monitor their activities and techniques, while at the same time diverting them from their evil mission, if and when necessary. Catavault's corporate policy on hackers is that we publicly communicate that it is against the law to try and access Catavault's backend technologies, data and operations without the express written permission of the company. Catavault is committed to prosecuting any violators to the fullest extent of the law within the United States and abroad.
- Insuring our Web site. Catavault has secured coverage for errors and omission insurance (i.e., Web site security) that is underwritten by AIG.
- Simplifying access. Users do not have to download any Catavault software to their PC, PDA, Mobile Phone or Set-top Box. Catavault is compatible with current browsers, such as Microsoft Internet Explorer, Netscape Navigator, and America Online.

### Processes

Each time a user connects to Catavault, his/her data is protected by Secure Sockets Layer (SSL) technology which encrypts all communications between a user's Web browser, Catavault's servers and third party Sites. Catavault's SSL certificate was issued by Thawte, a Verisign subsidiary, ensuring the safety and integrity of user data.

Once user data is received by Catavault's servers, it is immediately encrypted before it is stored in the Catavault databases. Catavault uses proprietary techniques to ensure that only the end-user can decrypt this data. No Catavault employee has the authorization or the capability to decrypt and view users' personal information. As an added measure of security, Catavault employs a multiple-tiered architecture with redundant firewalls that prevents penetration by outside parties.

In addition to SSL, Catavault uses digital server certificates, as well as customized user name and password schemes to authenticate users. Subscribers can arrange their own unique Master Authentication Credential which permits access to Catavault's database storing all of the subscriber's personal information. Additionally, in conjunction with Catavault's Privacy Policy in Appendix 2 and Catavault's User Agreement in Appendix 3, every Catavault application records confidential usage tracking information, thus creating an **audit trail** that is available to

## Catavault Technical White Paper

### All Access Pass to the Internet

both the end user consumer, business and Catavault staff, if and when necessary, in conformance with Catavault's Privacy Policy and User Agreement. Figure 7 illustrates the audit trail functionality and other features in the Catavault service. To secure Catavault's physical network infrastructure, Catavault relies on firewall complexes. In addition, network vulnerability scanners are utilized on a regular basis to proactively monitor the system's security status. To ensure uninterrupted 24x7x365 availability, Catavault utilizes redundant, fault-tolerant servers with associated software. Physical security controls are comprised of comprehensive measures including: 1) multi-layered internal network and information system safeguards, 2) biometric scanners, 3) dual-level access points and 4) multiple alarm systems.

Some implementations of the Catavault service may cause a small minority of end users to ask why Catavault sometimes does not show up as a secure site in the browser by displaying a "lock" icon. One should note that in the standard implementation of the Catavault service, the browser is divided into two frames - the upper frame, where navigation and a banner ad appear, and the lower frame, where all of the end user's personal information is displayed in the user's vault.

While the upper frame is in fact not secure, **the bottom frame is absolutely secure.** One can independently verify this by right-clicking in any part of the background of the lower frame and showing document "properties." The properties will reveal that the page is in fact a secure "https" page. As such, Catavault's end user personal data is completely protected and totally secure with Catavault's encryption methodologies. Depending upon the nature of the implementation of the Catavault service by a private label partner, the ad rotations can be stripped out of the Catavault service and replaced with static or rotating promotional message(s). This will then enable the browser to always indicate the lock icon to alleviate any concerns that its end users may have about security issues.

### Password Recovery

In the event that a user loses the Master Authentication Credential password to his/her Catavault account, Catavault has developed a secure method for users to recover their data.

If a user chooses to enable Catavault's Password Recovery feature, and the user then loses or forgets their Catavault Master Authentication Credential password, Catavault will then email the user with the following information:

- First character of password
- Last character of password
- Total length of password
- An optional hint that the user supplied

### Session Time-out

Catavault recommends that users always logout after use, however, as a proactive security feature, Catavault has implemented a 15 minute session time out to protect a user's information if they are inactive on Catavault for more than approximately 15 minutes.

Additionally, in the event that a series of consecutive failed login attempts are made from the same source, the Catavault servers will cut access to the Catavault service by that particular source.



# Catavault Technical White Paper

## All Access Pass to the Internet

### Privacy

Catavault views Internet privacy as a paramount tenet in the Catavault's operations. As such, Catavault has worked vehemently to ensure that the data which users entrust to Catavault is safe, secure, confidential and private:

- Catavault does not view personal information
- Catavault does not view Authentication Credentials that are stored in Catavault's database
- Catavault does not view any of the Sites and pages that its users visit
- Catavault does not permit other Catavault users to access and view other Catavault users' personal information
- Catavault does not sell users' personal information
- Catavault does not send unwanted email

### Independent Privacy Certification

Catavault is a licensee of the TRUSTe Privacy Program. Catavault's Privacy Policy discloses the privacy practices Catavault's online identity and authentication software service. TRUSTe serves as a liaison with Catavault to resolve any concerns related to Catavault's privacy practices. By participating in the Council of Better Business Bureau's BBBOnLine Privacy Program, Catavault has made a commitment to meet the programs' strict requirements regarding how Catavault respects and treats user information.



### Information Collection & Disclosure

When a user registers with Catavault to create a personalized account, he/she is required to provide Catavault with his/her name and email address so that Catavault can contact him/her if and when necessary regarding account administration and new Catavault features/enhancements. This information is available for administrative purposes only, and it is not shared with any third party for marketing purposes.

For each registered third party site account that is part of the Catavault service, Catavault will collect users' Authentication Credentials. Authentication Credentials may include Email address, user ID, user name, password and/or PINs that are specific to a user's account with third party Sites. Users agree that the provision of such Authentication Credentials serves as their signature and authorization for Catavault to serve as the agent in "transporting" (i.e., linking) them to and authenticating them at third party Sites accordingly. Users are responsible for and must provide all hardware, software and connectivity (i.e., Internet service provider, telephone line, wireless phone line, etc.) in order to access and use Catavault.

Catavault will not release any information about individual users to any third party without the user's express permission. Catavault may share or publicly announce compiled, aggregated data containing no personally identifiable information. For example, Catavault may publicly state that, in total, "its members are enrolled in 10.3 million frequent flyer accounts;" "Catavault has

## **Catavault Technical White Paper All Access Pass to the Internet**

1.5 million unique users per month;" and/or "Shopping is the most trafficked Catavault page."

### **Cookies**

Cookies are small pieces of information that are exchanged between a user's Web browser and Sites' servers. There are two types of cookies - permanent cookies which are stored on a user's computer in a small text file, and temporary cookies which are kept to identify a user once they have logged onto Catavault, but which disappear completely when the user closes his/her browser or shuts off his/her computer.

Catavault does not set any permanent cookies on a user's computer. The only cookies Catavault sets are two temporary, encrypted cookies to manage a user's login session when he/she first enters the Catavault service. Because of this, cookie support is required for all browsers to access and use the Catavault service.

### **Account Management**

Users can review and update their personal information within Catavault, including their Master Authentication Credential, at any time by using the "Update Your Profile" feature within Catavault. Users can also opt-in or opt-out of marketing communications (i.e., emails) at anytime by also using the "Update Your Profile" feature.

If a user loses their Catavault Master Authentication Credential password, he/she will need to contact Catavault Member Services and follow the secure processes that Catavault has in place in order to authenticate that the account holder is actually the person who is requesting a new Master Authentication Credential. Please see the "Password Recovery" section previously described herein.

Users can cancel their enrollment in Catavault at any time and have all of their information deleted from the secure Catavault database by emailing Catavault Member Services at [help@catavault.com](mailto:help@catavault.com) and following the secure processes that Catavault Member Services will provide or by using the "Update Your Profile" feature on Catavault.

## Catavault Technical White Paper All Access Pass to the Internet

### Market Research

“Invalid Login Frustration” and “Registration Rage” have resulted in market inefficiencies. Catavault believes that most E-Commerce sales today are lost due in large part to consumer frustration with the proliferation of Authentication Credentials which has been termed by some as “Password-itis.”

- According to a recent study conducted by the Boston Consulting Group in San Francisco, less than 2 percent of visits to online merchants resulted in a purchase. The reason(s)? Consumers express concerns about privacy, security and the need to enter personal data repeatedly at various Sites.<sup>7</sup>
- Additional findings, with arguably the same underlying causes, indicates that more than two-thirds of online shopping carts are abandoned prior to the sale being completed at the point of purchase.<sup>8</sup>
- As well, they estimate that password management and account management incidents alone account for up to 50 percent of service requests. Lost user names and passwords account for over half of all inquires that site support organizations answer. As a result, companies worldwide spend over \$30 billion annually to manually resolve these and other end user management requests.<sup>9</sup>
- There are well over a billion passwords in use today.<sup>10</sup>
- Active Internet users have reached password overload and struggle to manage as many as 15 or more user names and passwords in a typical day.<sup>11</sup> Users of the top 20 Sites alone represent 428 million password accounts and hundreds of millions of monthly logins.<sup>12</sup>
- Projected growth in new Internet users and Sites in the future will create an explosion of password accounts that need to be created and managed by consumers.<sup>13</sup>

Catavault increases the sell-through of various E-Commerce goods and services by both eliminating consumers' hassles associated with remembering so many user names and passwords and eliminating abandoned shopping carts for businesses. Additionally, Catavault helps to reduce the billions of dollars in costs that Sites and businesses annually pay with respect to online identity and authentication management issues. For more information, please see [www.catavault.com/research](http://www.catavault.com/research).

# Catavault Technical White Paper

## All Access Pass to the Internet

### Catavault Benefits

#### For Consumer End Users

With Catavault, users just have to remember one Master Authentication Credential to log onto their Catavault account - the "All Access Pass to the Internet" - which provides private and secure access to all of the other third party Sites that the users want to visit by offering:

- **One-click login** - With "My Vault," users can store Authentication Credentials for more than 3,500 leading Sites ranging from Amazon.com to ZDNet. Then Catavault can link and log users onto those Sites that require Authentication Credentials with just one-click.
- **Auto-registration** - Catavault can auto-register users for their choice of leading Sites so they won't have to fill out the repetitive forms required to register and checkout at so many Sites.
- **Access from any device** - Users can access their information on their PC, PDA, mobile phone, digital set-top box, wireless phone, wireline phone, pagers, etc.
- **Access anytime** - Users can access their information 24 hours per day, 7 days per week, 365 days per year.
- **Access through any band** - Users can access their information via a narrowband or broadband connection.
- **Access through any protocol** - Users can access their information through Internet Protocol (IP), Wireless Application Protocol (WAP) and other protocols that come to market.
- **Access any place** - Users can access their information at home, at the office, in any geographic location - locally, regionally, nationally, globally, universally, etc.

#### For Businesses

Placing the Catavault Auto-Login Button and/or Auto-Checkout Button on a third party site will make the site easier to use and more secure for the customer, thereby enabling third party Sites to attain:

- **Higher sell-through** - Attain higher sell-through by reducing the number of abandoned carts that result when users cannot remember their Authentication Credentials.
- **Repeat usage** - Generate greater repeat usage (stickiness).
- **Invalid login reductions** - Reduce the number of invalid logins.
- **Customer service cost reductions** - Reduce customer service costs associated with invalid logins and forgotten user names and passwords.
- **Registered users** - Grow the number of registered users by leveraging Catavault's auto-registration feature.
- **Value of customers** - Increase the overall lifetime value of the customer.
- **Marketing** - Receive marketing support through prominent positioning on the Catavault service including, for example, the Home Page and/or relevant category page(s).

# Catavault Technical White Paper

## All Access Pass to the Internet

### Case Study: Federated Authentication with eBay

eBay has taken an industry leading approach in offering multiple sign-in options: 1) sign-in directly using the eBay User ID and eBay Password or 2) sign-in with Microsoft's .Net Passport. Additionally, eBay has also joined the Liberty Alliance which signals that it intends to offer multiple online identification and authentication alternative(s). Today, when a user visits "my eBay," the right column header above the .Net Passport sign-in option states, "Or sign in with other services:"<sup>14</sup> This is a positive harbinger for user choice when multiple authentication service providers and federations form and are implemented by market leading early adopters such as eBay.

Catavault's single sign-on authentication technology can be licensed by name space providers, such as American Express, to establish their own private label Auto-Login Button and/or Auto-Checkout Button, thereby presenting the opportunity for third party name space partners to offer their customers more choices in terms of online identity and authentication management. The screen shot below serves as an example of what could be implemented by eBay and American Express licensing Catavault's technology. As such, this does not represent any endorsement of the Catavault service by American Express and/or eBay. Please see Figure 15 which illustrates eBay's login page with multiple authentication alternatives.

Figure 15: eBay Login Page Example

The screenshot shows the eBay login page with the following elements:

- Navigation bar: AUCTION for AMERICA, Star Wars Props, Art Calendars, Celebrities for America.
- Links: home, my eBay, site map, sign in.
- Navigation menu: Browse, Sell, Services, Search, Help, Community.
- Section: Please Sign In...
- Main sign-in area: eBay User ID (with email note), eBay Password (with forgot password link), Sign In button, Register Now link, Keep me signed in checkbox, and help links.
- Right sidebar: "Or sign in with other services:" section featuring Passport Sign In and American Express Auto-login buttons.

[Announcements](#) | [Register](#) | [SafeHarbor \(Rules & Safety\)](#) | [Feedback Forum](#) | [About eBay](#)

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# Catavault Technical White Paper

## All Access Pass to the Internet

### Future Offerings

#### **Catavault Personal Assistant - Client-Side Form Filler**

Future versions of Catavault will offer a client-side application providing a downloadable and intelligent, form filler application. Profile information, and Authentication Credentials captured by the client-side application will be exportable to the server-based Catavault service through a synchronization process analogous to a PDA-PC synchronization.

Catavault will provide a downloadable software application for all browsers including Internet Explorer, Netscape and AOL that will:

- Store individually identifiable login information for third party Sites
- Store individually identifiable registration information for third party Sites
- Recognize when a user lands on a login page or a registration page
- Store the login or registration page URLs
- Determine which data points are required by that particular form and create an exportable site record that can be exported to a user's personal vault of Sites

Site records stored by the client-side application will be encrypted and "transported" to Catavault's secure server complex and stored in the individual user's personal vault.

#### **Linking a User from One Third Party Site to Another Site in a Federated manner**

With new technology standards currently under development for online identity and authentication, it is anticipated that various forms of public key encryption technology will be implemented by different Sites as a method of authenticating users. Public key encryption technologies are used to generate unique pairs of codes, or keys, which authenticate a user at a participating site and allow the user to carry the authentication key with them from one site to another. Future versions of Catavault's All Access Pass to the Internet will evolve with the industry and will include interoperability with public key encryption technologies and enable site-to-site authenticated peering. (For more information on federated approaches to online identity and authentication see Catavault's *Open Sesame White Paper* on online identification & authentication federations).

#### **Electronic Change of Address – Global & Local**

Future versions of Catavault's All Access Pass to the Internet will include an electronic change of address service whereby any changes made to the User Profile in the Catavault service will, at the user's discretion, be passed onto the third party Sites stored in the user's vault.

#### **Two-Factor Authentication**

Going forward, Catavault will offer a premium subscription version of Catavault's All Access Pass to the Internet that features "two-factor authentication." Two-factor authentication provides a higher level of reliability than just a user name and password. For example, two-factor authentication is based on **something that you know** such as user name and password, and **something you that you have**, such as an authenticator (i.e., secure token or smart card). This two-factor authentication provides a much more reliable level of user authentication than just reusable passwords. As previously discussed, there is a delicate balance of security and privacy

## **Catavault Technical White Paper All Access Pass to the Internet**

on the one hand with utility and ease of use on the other. This delicate balance will always be addressed as Catavault implements new services such as two-factor authentication.

Today, two-factor authentication is relied upon by thousands of companies worldwide to protect valuable network-enabled applications and services. Used in conjunction with Catavault's existing authentication scheme, a secure token or secure ID card, such as those offered by RSA, will ultimately provide an even higher level of security for the ultra-security conscious users of Catavault.

### **Strong Credential Sign-in**

Today, as previously addressed herein, if anyone using Catavault makes several incorrect attempts at guessing a user's Master Authentication Credential during sign-in, Catavault will automatically block access to the user's account for several minutes. This makes it significantly more difficult for password-cracking programs, such as a "brute-force dictionary attack," to use thousands of common passwords in conjunction with the user's e-mail address. However, even using secure sign-in techniques, a determined brute-force attack still represents a risk.

There are many ways to solve this problem, but each has its challenges:

- Making the password stronger would adversely affect the usability of the basic Catavault service because the stringent requirements imposed on the user, including, but not limited to, the following characteristics: length; alphanumeric; randomly generated and assigned; case sensitive; symbols; and expiration dates make the Catavault service provide less utility.
- Blocking the account after a given number of unsuccessful attempts to login could result in a denial of service, even for accessing such low-sensitivity information (i.e., nytimes.com).
- The Catavault service can add in another layer of protection for guarding secure Sites with a two-stage sign-in process. The first stage is standard login with your Authentication Credentials for a particular Site. The second stage involves a secondary sign-in page that requires the user to enter a secure four-digit security key. The second sign-in prompt is displayed only through an SSL connection and incorporates a persistent failed-attempts counter for each user. This counter is reset upon a successful sign-in.

Tomorrow, for example, in the event that several consecutive login attempts are unsuccessfully made, regardless of the time interval involved, the user's security key will be disabled. The user will still be able to use the normal sign-in, but will have to go through a secure process to reset the security key. If further unsuccessful attempts are made, users will be redirected to a Catavault Member Services section where they can initiate the process to reset the security key. Since the security key will be locked after several failed sign-in attempts and then must be reset to restore access, it is not vulnerable to a dictionary "brute force" attack, and therefore the security key constitutes a "strong credential."

Strong credential sign-in will be one of the highest levels of security Sites can request and will be used by Sites for which preventing malicious access to a user's account is more important than ease of use. By using a relatively "weak" password combined with an additional key with persistent lockout after a small number of failed attempts, Catavault provides resistance to "brute-force dictionary attacks." This resistance is equivalent to a strong password combined

## **Catavault Technical White Paper All Access Pass to the Internet**

with an expiration timeout. This maintains ease of use because users can still use their standard Authentication Credentials to access less-protected content (i.e., nytimes.com).



# Catavault Technical White Paper

## All Access Pass to the Internet

### Appendices

#### Appendix 1: Glossary of Terms

For more information, see [www.catavault.com/faqs](http://www.catavault.com/faqs).

**All Access Alliance** – Sites that place Catavault’s Auto-Login Buttons and Auto-Checkout Buttons and offer a single sign-on solution to their users.

**All Access Pass to the Internet** – Your backstage pass to the Internet which lets users visit Sites with relative ease and conquer “password-itis.”

**Authentication Credentials** - Any personal identifier that a site requests/requires for a user to login, such as user names, user IDs, passwords, PINs, account numbers, etc.

**Auto-Registration** - If you do not have an established account at a site, Catavault will automatically register a user at a third party site, if he/she chooses.

**Brute Force Dictionary Attacks** - Brute force dictionary attacks use an automated program or script which uses thousands of common passwords in conjunction with the user's e-mail address, for example, to try and illegally log onto another user’s account.

**Catavault** - Catavault’s safely transports Authentication Credentials to third party Sites and authenticates users accordingly at the those Sites. Catavault’s branding was conceived as a compound contraction brand name from the words, “catapult” and “vault.” Catapult illustrates the motion or transportation of its users’ Authentication Credentials, and “vault” has the double entendre of a safe and of motion. Moreover, Catavault’s logo of cascading asterisks connotes Authentication Credentials being encrypted and transported through the Internet to third party Sites where Catavault’s users are then identified and authenticated.

**Catavault Mobile** - Catavault is available on any device, at any time, from anywhere. Users can access Catavault with Web-enabled PDA or microbrowser-equipped mobile phone, for example.

**Catavault Network** – The 3,500+ Sites ranging from Amazon.com to ZDNet to which users can login with just one-click using Catavault’s All Access Pass to the Internet.

**Catavault Service** – The entire offering, application and technical solution which powers the All Access Pass to the Internet.

**IUI** – Individual Unique Identifier used to make Catavault’s authentication services operate safely, privately, efficiently and effectively.

**Invalid Login Frustration** – Encountered from users guessing when they forget their Authentication Credentials for third party Sites. Visit [www.catavault.com/invalidlogin](http://www.catavault.com/invalidlogin). Also see “Registration Rage.”

**Lookup** - If there is a specific site a user wants to search for, he/she uses the Lookup box.

## Catavault Technical White Paper All Access Pass to the Internet

**Master Authentication Credential (User Name and Password)** - The only Authentication Credentials (email address and password) that users will ever have to remember from now on in order to log onto Catavault, and then gain access to the vault of Authentication Credentials for third party Sites.

**My Life** - The area on Catavault where users can store personal information that is not related to any Sites, such as ATM PINs, car stereo code, drivers license number, software registration codes, etc. Users can customize the categories for their personal information.

**My Vault** - The secure and private area on Catavault where users can store, view and edit their Sites, as well as link and log onto Sites.

**One-click Login** - Users can be logged onto a site via Authentication Credentials that are stored in their “vault” just by clicking on the link.

**Password-itis** – Encountered from being required to remember too many Authentication Credentials as the volume of personal passwords proliferates. Visit [www.catavault.com/passworditis](http://www.catavault.com/passworditis).

**Registration Rage** – Encountered from users required to register over and over again for third party Sites because they cannot remember their Authentication Credentials. Visit [www.catavault.com/registrationrage](http://www.catavault.com/registrationrage). Also see “Invalid Login Frustration.”

**Redirect** – Linking from a third party Web site back to Catavault’s servers, redirecting the appropriate Authentication Credentials to the third party site and logging the user in accordingly; Catavault’s Auto-Login and Auto-Checkout Buttons function in the same redirect manner like Microsoft Passport, AOL Screen Name and AOL Quick Checkout Service.

**Suggest a Site** - If a user comes across a site that is not in Catavault’s database, this is where the user can suggest Sites for Catavault to add into the Catavault Network.

**Tell a Friend** – Refer a friend to Catavault’s All Access Pass to the Internet via a private and personalized email from one member to a prospective member.

**Two-factor Authentication** – Two-factor authentication is based on something that you know such as user name and password, and something you that you have, such as an authenticator (i.e., secure token or smart card).

**User Profile** - A User Profile contains personal information such as email address, name, billing address, phone number, credit card information, as well as email preferences.

# Catavault Technical White Paper

## All Access Pass to the Internet

### Appendix 2: Catavault Privacy Policy

#### Overview

Wouldn't it be great if every company respected your privacy on the Internet? Rest assured, PINvault.com Inc., the provider of the Catavault Service (the "Service"), respects your privacy. In our Privacy Policy, we describe specifically how Catavault protects your privacy and why you can trust us with your personal information. Our mission is to provide a very secure site for you in which:

- We don't view your personal information
- We don't view your User Names, Passwords, PINs that you store in your Catavault account
- We don't view any of the Sites and pages that you visit
- We don't permit other Catavault end users to access and view your personal information
- We don't sell your personal information
- We don't send you unwanted email

Catavault is a free, Web-based service that securely stores and manages your user names and passwords, as well as auto-registers you for various Sites that you select, and subsequently links and logs you onto those Sites when you request. In order to ensure your satisfaction, Catavault views Internet privacy as a paramount tenet in Catavault's operations. The success of our business depends upon Catavault's ability to maintain the trust of the Catavault's end users like you. As such, Catavault has worked vehemently to ensure that the data which you entrust to Catavault is safe, secure, confidential and private. Additionally, you have a responsibility to safeguard your personal information and not to share your Catavault Master User Name and Password with anyone. Below you will learn more about:

- Independent Certification
- Security Measures
- Information Collection & Disclosure
- 3rd Party Sites & Links
- Email Links
- Special Offers
- Account Updates, Lost Password & Account Cancellation
- Comments & Questions
- Notification of Changes
- Conclusion

**And Now For A Few Thousand Words From Our Privacy Specialists (a.k.a. lawyers)...**

#### Independent Certification

This confirms that Catavault is a licensee of the TRUSTe Privacy Program. This privacy statement discloses the privacy practices for [www.catavault.com](http://www.catavault.com).

If you have questions or concerns regarding this statement, you should first contact Catavault's Customer Care Department by sending email to [privacy@catavault.com](mailto:privacy@catavault.com). If you do not receive acknowledgment of your inquiry or your inquiry has not been satisfactorily addressed, you should then contact TRUSTe by clicking on <http://www.truste.org/users/watchdog.html>.

## **Catavault Technical White Paper All Access Pass to the Internet**

TRUSTe will then serve as a liaison with Catavault to resolve your concerns.

By participating in the Council of Better Business Bureau's *BBBOnLine* Privacy Program, Catavault has made a commitment to meet the programs' strict requirements regarding how we treat your information and have it verified by *BBBOnLine*. Further information about this program is available at <http://www.bbbonline.org>.

### **Security Measures**

The Catavault technology platform is designed to ensure the privacy and integrity of data and communications by utilizing a combination of security methodologies to provide multiple lines of defense against potential hackers, data pirates and data thieves. Below Catavault has detailed some of its security techniques, but in the interest of maintaining the highest level of security, Catavault cannot disclose all of its security measures in this document.

Each time you connect to Catavault, your data is protected by Secure Sockets Layer (SSL) technology which encrypts all communications between your web browser and Catavault's servers. Catavault's SSL certificate was issued by Thawte, a Verisign subsidiary, ensuring the safety and integrity of your data.

Once your data is received by Catavault's servers, it is immediately encrypted before it is stored in the Catavault databases. Catavault uses proprietary techniques to ensure that only you, the end-user, can decrypt this data. No Catavault employee has the authorization or the capability to decrypt and view your personal information. As an added measure of security, Catavault employs a multiple-tiered architecture with redundant firewalls that prevent penetration by outside parties.

### **Information Collection & Disclosure**

When you register with the Catavault Service to create a personalized account, you will be required to provide Catavault with your name and E-Mail address so that Catavault can contact you when necessary regarding account administration and new Catavault Service features and enhancements. This information is available for administrative purposes only and is not shared with any 3rd party for marketing purposes.

Catavault agrees to provide you with the Service that auto-registers you for 3rd (third) party Sites, stores your user names and passwords, links you to 3rd party Sites, logs you onto 3rd Party Sites and facilitates your E-Commerce transactions with ease. Catavault may collect personal information including name, email address, billing and shipping address(es), zip code (s), phone numbers, gender, social security number, income, credit card information, friends' email addresses and customer correspondence (from email links and Contact Us forms). For the "Tell A Friend" feature of Catavault, Catavault will automatically send your friend a one-time email message inviting them to join Catavault. Catavault stores this information for the sole purpose of sending this one-time email. The friend may contact Catavault at [help@catavault.com](mailto:help@catavault.com) to request removal of this information from their database.

In addition, for each of your registered 3rd party site accounts on the Service, Catavault will collect your online account Authentication Credentials. Authentication credentials may include

## **Catavault Technical White Paper All Access Pass to the Internet**

your Email address, user ID, user name, password and/or Personal Information Numbers (PINs) that are specific to your 3rd party site accounts. You agree that your provision of such Authentication Credentials serve as your signature and authorization for Catavault to serve as your agent in transporting (i.e., linking) and authenticating you to 3rd party Sites. You are responsible for and must provide all hardware, software and connectivity (i.e., Internet service provider, telephone line, wireless phone line, etc.) in order to access and use the Service.

Catavault will not release any information about you individually to any 3rd party without your express permission. Catavault may share or publicly announce compiled, aggregated data containing no personally identifiable information. For example, Catavault may publicly state that, in total, "its members are enrolled in 10.3 million frequent flyer accounts;" "Catavault has 1.5 million unique users per month;" and/or "Shopping is the most trafficked Catavault page."

Cookies are small pieces of information that are exchanged between your web browser and our web server. There are two types of cookies - permanent cookies which are stored on your computer in a small text file, and temporary cookies which are kept to identify you once you have logged in to Catavault but which disappear completely when you close your browser or shut off your computer. Sometimes these types of passive or behavioral information is linked to identifiable information.

Catavault does NOT set any permanent cookies on your computer. The only cookies we set are two temporary, encrypted cookies to manage your login session when you first enter the Catavault site. Because of this, cookie support is required for all browsers to access Catavault.

Some of Catavault's advertisers, however, may choose to set permanent cookies on your PC; However, personally identifiable information is not connected to those cookies or log files. While Catavault has ensured that its advertisers follow basic privacy guidelines, we are not responsible for the placement of cookies by our advertisers.

Catavault neither accepts 3rd party submissions nor uses any means of indirect collection that could personally identify you. Catavault will not share, sell or exchange any of your personal information to a 3rd party (including a site that you reached from Catavault) unless you specifically authorize this action.

When you create a Catavault account, you control who has access to your personal information. Because Catavault has complete respect for your privacy, Catavault will not access the information you store in your Catavault account. Catavault advises that you should always exercise caution when disclosing your personal information to others. As with situations in the offline world, consumers must take basic precautions to ensure their own security. To help familiarize online consumers with these precautions, the United States Federal Trade Commission has prepared a useful checklist that one can find by visiting [www.consumer.gov](http://www.consumer.gov).

From time to time, Catavault may solicit your feedback or opinions via email. Responding to these queries is optional. Any information collected will be used by Catavault and its partners solely for product evaluation and market research purposes. None of the collected information will be transmitted in any way that could personally identify you.

## **Catavault Technical White Paper All Access Pass to the Internet**

Catavault will not disclose the contents of your Catavault account or any part of your account unless acting under a good faith belief that such action is necessary to:

- Comply with court order and/or other legal process
- Protect the rights or property of Catavault.com
- Enforce the terms of the Catavault User Agreement with respect to terms and conditions
- Protect the interests of Catavault.com subscribers or the public.

Catavault uses the Microsoft bCentral, LinkShare, Commission Junction, Performics and Be Free services to provide banner ads on the site. Microsoft bCentral, LinkShare and Be Free may collect information and operates under its own privacy and security policies, which can be further evaluated at the following URLs:

- <http://www.bcentral.com/privacy.html>
- <http://www.linkshare.com/privacy.html>
- <http://www.commissionjunction.com/privacy.asp>
- <http://www.performics.com/privacy.html>
- <http://www.befree.com/docs/includes/privacy.htm>

### **3<sup>rd</sup> Party Sites & Links**

3rd party Sites that you auto-register for, link to and log onto via Catavault may collect personally identifiable information about you. Catavault's Privacy Statement only addresses the personal information that you provided directly to Catavault when you request that Catavault auto-register you, link you to or log you onto a 3rd party site.

If you have questions about the privacy and security practices of 3rd party Sites that you reached from Catavault and/or from another site, Catavault encourages you to review the privacy statement for that particular site. Please note that 3rd party Sites may not maintain the privacy and integrity of your data and personal information to the highest level that Catavault adheres to, as detailed in this Privacy Statement.

### **Email Links**

We use email links located on the "contact us" and "help" page to allow you to contact us directly with any questions or comments that you may have. We read every message sent to us and try to reply promptly to every one. This information is used to respond directly to your questions or comments. We may also file your comments to improve the site and program, or review and discard the information. Your personal information is only shared with third parties with your express permission. The types of third parties with whom we share your information with your express permission may include financial institutions, e-commerce Sites, content Sites, application Sites and any other internet organizations that are a part of the Catavault service.

### **Special Offers**

We send all new members a welcoming email to verify User Name and Password. Existing Catavault users will occasionally receive information on products, services, special offers and a newsletter. Out of respect for the privacy of our users we present the option to not receive these types of communications. At any time you can opt out by clicking on "Update Your Profile."

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Account Updates, Lost Password, Account Cancellation**

You can review and update your personal information within Catavault, including your Master User Name and Password, at any time by using the "Update Your Profile" feature within Catavault. You can also opt-in or opt-out of our marketing communications at any time by using the "Update Your Profile" feature.

If you lose your Catavault password, you will need to contact Catavault customer service department and follow the secure processes that Catavault has in place in order to authenticate that the account holder is actually the person who is requesting a new password.

You can cancel your enrollment in Catavault at any time and have all of your information deleted from the secure Catavault data base by calling Catavault and following the processes that a Catavault customer service agent will provide to you or by using the "Update Your Profile" feature on Catavault.

Any inaccuracies or discrepancies on your 3rd party site account data will need to be addressed by you with that specific 3rd party site itself.

### **Comments & Questions**

Catavault hopes you will work with us and help improve the Catavault Service. If you have any suggestions regarding how Catavault can build a better Service, please contact:  
Catavault

c/o PINvault.com Inc.  
100 West Elm Street, Suite 400  
Conshohocken, PA 19428  
610.941.3388  
privacy@catavault.com

### **Notification of Changes**

If we decide to change our privacy policy, we will post those changes on our Homepage so our users are always aware of what information we collect, how we use it, and under circumstances, if any, we disclose it. If at any point we decide to use personally identifiable information in a manner different from that stated at the time it was collected, we will notify users by way of an email. Users will have a choice as to whether or not we use their information in this different manner. We will use information in accordance with the privacy policy under which the information was collected.

### **Conclusion**

We at Catavault strongly believe in respecting the privacy of all our users. Users should read this Privacy Policy in parallel with our User Agreement. To ensure that we meet the highest standards in protecting your privacy, we will update this statement if and when it is necessary. Please check back often to read our most updated statement.

This Privacy Policy is effective as of July 24, 2000.

# Catavault Technical White Paper

## All Access Pass to the Internet

### Appendix 3: Catavault User Agreement

#### Overview

This is a legal agreement between You, the User, (“You” and “User” are utilized interchangeably) and PINvault.com Inc. (“PINvault.com,” “We” or “Our”), the provider of the Catavault Service, for the use of this service and its related features (the "Service" or the “site”). In order to complete the registration process and use the Service, you must agree to the terms and conditions outlined below in this User Agreement (“User Agreement”).

BY CLICKING ON “I AGREE” OR BY ACCESSING, BROWSING, OR USING THIS SITE, YOU ACKNOWLEDGE THAT YOU HAVE READ, UNDERSTOOD, AND AGREE TO BE BOUND BY THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THESE TERMS AND CONDITIONS, YOU ARE NOT AND WILL NOT BE GRANTED PERMISSION BY CATAVAULT TO ACCESS OR USE THIS SITE.

#### And Now For A Few Thousand Words From Our Lawyers...

#### The Service

We agree to provide you with the Service that auto-registers you for 3rd (third) party sites, stores your user names and passwords, links you to 3rd party Sites, logs you onto 3rd Party Sites and facilitates your E-Commerce transactions with ease. In order to provide you with the Service, Catavault will collect your personal information as you register for the Service. Personal information may include various pieces of data including, but not limited to, name, email address, billing and shipping address(es) and zip code(s). In addition, for each of your registered 3rd party site accounts on the Service, Catavault will collect your online account authentication credentials. Authentication credentials may include, but not be limited to, your Email address, user ID, user name, password and/or Personal Information Numbers (PINs) that are specific to your 3rd party site accounts. You agree that your provision of such authentication credentials serve as your signature and authorization for Catavault to serve as your agent in transporting (i.e., linking) and authenticating you to 3rd party Sites. You are responsible for and must provide all hardware, software and connectivity (i.e., Internet service provider, telephone line, wireless phone line, etc.) in order to access and use the Service.

By posting updated versions of this Agreement on the Service or otherwise providing notice to you, Catavault may modify the terms of this Agreement, and may discontinue or revise any or all other aspects of the Service in its sole discretion and without prior notice. All such changes shall become effective upon posting of the revised Agreement on the Service, as to your future use of the Service. The updated, online version of this Agreement shall supersede any prior paper or other media-based copies of this Agreement that may have been included in any software or related materials provided by Catavault. Your continued use of the site after such modifications constitutes your acceptance of the modified terms and conditions of Agreement.

#### Privacy

Catavault will not sell, exchange, or release your personal information to a 3rd (third) party without your express permission, unless required by law or court or government order. However, Catavault may share or publicly disclose compiled, aggregated data containing no



## **Catavault Technical White Paper All Access Pass to the Internet**

personally identifiable information. To learn more, please see Catavault's Privacy Statement. Catavault is a proud licensee of the TRUSTe Privacy Program, an independent, nonprofit, privacy initiative. Catavault is the process of being certified by the Council of Better Business Bureau's BBBOnLine® Privacy Program ([www.bbbonline.com](http://www.bbbonline.com)).

Each time you connect to Catavault, your data is protected by Secure Sockets Layer (SSL) technology which encrypts all communications between your web browser and Catavault's servers. Catavault's SSL certificate was issued by Thawte, a Verisign subsidiary, ensuring the safety and integrity of your data. You can learn more information about Catavault's SSL certificate by clicking [here](#).

### **Other Responsibilities of User**

You agree that you will be responsible for all usage of the Service and any fees associated with use of other 3rd party Sites and services accessed through the Service on your account whether or not authorized by you. You agree not to use the Service to conduct any business or activity or solicit the performance of any activity that is prohibited by law. You agree to comply with all applicable laws, rules and regulations in connection with the Service. You acknowledge that you are aware that certain content, services or locations of the Service or of other parties that may be accessible through the Service may contain material that is unsuitable for minors (person under 18 years of age).

### **Term**

This Agreement will be in effect from the date your completed registration is accepted by PINvault.com on behalf of Catavault. Either You or We may terminate this Agreement. You may terminate this Agreement and your use of the Service at any time, and/or We may terminate this Agreement at any time with or without notice on your default or breach hereof. The provisions of the paragraphs entitled The Service; Privacy; Other Responsibilities of Users; Limitation of Warranties and Liability; Disclaimer of Warranties; Limitation of Liability; Remedies of Users; Indemnification by User; Use of Marks, Materials & Suggestions; Endorsements; and General as well as all obligations of and restrictions on you and any user of your account with respect to the Service shall survive any termination of this Agreement.

### **Limitation of Warranties; Disclaimer of Warranties**

YOU EXPRESSLY AGREE THAT USE OF THE SERVICE IS AT YOUR SOLE RISK. NEITHER CATAVULT, PINVAULT.COM INC. NOR ANY OF ITS UNDERLYING SERVICE PROVIDERS, INFORMATION PROVIDERS, LICENSORS, EMPLOYEES, DISTRIBUTORS OR AGENTS WARRANT THAT THE SERVICE WILL BE UNINTERRUPTED OR ERROR FREE NOR DOES CATAVULT / PINVAULT.COM OR ANY OF ITS UNDERLYING SERVICE PROVIDERS, INFORMATION PROVIDERS, LICENSORS, EMPLOYEES, DISTRIBUTORS OR AGENTS MAKE ANY WARRANTY OR CONDITION AS TO THE RESULTS TO BE OBTAINED FROM USE OF THE SERVICE. THE SERVICE IS DISTRIBUTED ON AN "AS IS", "AS AVAILABLE" BASIS WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OR CONDITIONS OF TITLE OR IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE, ALL SUCH WARRANTIES AND

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CONDITIONS BEING EXPRESSLY DISCLAIMED. NEITHER CATAVULT, PINVAULT.COM INC. NOR ANY OF ITS UNDERLYING SERVICE PROVIDERS, INFORMATION PROVIDERS, LICENSORS, EMPLOYEES, DISTRIBUTORS OR AGENTS SHALL HAVE ANY LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT OR SPECIAL DAMAGES SUFFERED BY YOU OR ANY OTHER PARTY AS A RESULT OF THE OPERATION, INABILITY TO OPERATE OR MALFUNCTION OF THE SERVICE, REGARDLESS OF WHETHER OR NOT SUCH PARTIES HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. YOU EXPRESSLY ACKNOWLEDGE THAT THE PROVISIONS OF THIS SECTION SHALL ALSO APPLY TO ALL CONTENT OR OTHER SERVICES AVAILABLE THROUGH THE SERVICE. YOU AGREE THAT YOU WILL NOT IN ANY WAY HOLD CATAVULT AND PINVAULT.COM RESPONSIBLE FOR ANY SELECTION OR RETENTION OF, OR THE ACTS OR OMISSIONS OF THIRD PARTIES IN CONNECTION WITH THE SERVICE (INCLUDING THOSE WITH WHOM CATAVULT AND/OR PINVAULT.COM MAY CONTRACT TO OPERATE VARIOUS AREAS ON THE SERVICE).

### **Limitation of Liability**

PINvault.com, doing business as Catavault, does not assume responsibility for malfunctions in communications facilities not under Our control that may affect the ability and/or timeliness of information you request with respect to accessing the Service, being transported and/or being authenticated to 3rd party Sites. PINvault.com and/or Catavault are also not responsible for any losses or delays in transmission of instructions arising out of the use of any Internet service provider providing connection to the Internet or caused by any third party software or systems. In the event that a court should hold that the limitations of liabilities or remedies available as set forth in this Agreement, or any portions thereof, are unenforceable for any reason, or that any of your remedies under this Agreement fail of their essential purpose, you expressly agree that under no circumstances shall Catavault's and PINvault.com's total liability to you or any party claiming by, through or under you for any cause whatsoever, and regardless of the form of action, whether in contract or in tort, including negligence or strict liability, in the aggregate, exceed \$5,000 (five thousand dollars in U.S. currency). Because some states do not allow the exclusion or limitation of liability for consequential or incidental damages, in such states liability is limited to the extent permitted by law.

With regard to authentication credentials, Catavault provides special protection to you. Notwithstanding anything herein to the contrary, if your authentication credentials are improperly disclosed to a 3rd party without your consent, and this disclosure is the direct result of Catavault's and/or PINvault.com's gross negligence or willful misconduct in operating the Service, then You and We agree that PINvault.com's liability for your direct and actual damages in this circumstance shall not, in the aggregate, exceed \$5,000.00 (five thousand dollars in U.S. currency).

### **Remedies of User**

Your sole and exclusive remedy for any failure or non-performance of the Service (including any associated software or other materials supplied in connection with the Service) shall be for Catavault to use commercially reasonable efforts to effectuate an adjustment or repair of the Service.

## **Catavault Technical White Paper All Access Pass to the Internet**

### **Indemnification by User**

You shall indemnify and hold harmless Catavault, PINvault.com and any of its underlying service providers, information providers, licensors, employees, distributors or agents from and against any and all claims, demands, actions, causes of action, suits, proceedings, losses, damages, costs, and expenses, including reasonable attorneys fees, arising from or relating to your use of the site, or any act, error, or omission of you or any user of your account in connection therewith, including, but not limited to, matters relating to inability to access authentication credentials, inability to be transported and authenticated to a 3rd party site, incorrect, incomplete, or misleading information; libel; invasion of privacy; infringement of a copyright, trade name, trade mark, service mark, or other intellectual property; any defective product or any injury or damage to person or property caused by any products sold or otherwise distributed through or in connection with the Service; or violation of any applicable law.

### **Use of Marks, Materials & Suggestions**

The Catavault online service and PINvault.com Company names and logos, including Catavault, Vault through the Internet, Catavault through the Internet, PINvault.com, and all related product and service names, design marks and slogans are the property of PINvault.com and/or its affiliates. You are not authorized to use any Catavault name or mark in any advertising or publicity materials or in any other commercial manner without the prior written consent of PINvault.com You may use, copy and distribute the materials found on the Service for internal, noncommercial, informational services only. All copies that you make of the material must bear any copyright, trade mark or other proprietary notice which pertain to the material being copied. Except as authorized in this paragraph, you are not being granted a license under any copyright, trade mark, patent or other intellectual property right in the material or the products, services, processes or technology described therein. Catavault, PINvault.com, its affiliates and/or any 3rd party owner of such rights retain all such rights. Any feedback, questions, comments, suggestions, ideas or the like, which you send to Catavault will be treated as being non-confidential and nonproprietary. Catavault will also be free to use any ideas, concepts, know-how or techniques contained in such information for any purpose whatsoever including but not limited to developing, manufacturing and marketing products and services incorporating such information.

### **Endorsements**

All product and service marks contained on or associated with the Service that are not Catavault marks are the trademarks of their respective owners. References to any names, marks, products or services of 3rd parties or hypertext links to third party site or information do not necessarily constitute or imply PINvault.com's endorsement, sponsorship or recommendation of the 3rd party, information, product or service.

### **Arbitration**

Except for allegations that you have infringed or threatened to infringe any of Our intellectual property rights, any dispute or controversy between you and us, or arising under or concerning performance or breach of any terms of this Agreement, shall be settled by one arbitrator in binding arbitration, to be held in Philadelphia, Pennsylvania, U.S.A., under the then-current rules of the American Arbitration Association. Judgment on the arbitration may be entered in any

## **Catavault Technical White Paper All Access Pass to the Internet**

court of competent jurisdiction. In the event We allege that you have infringed or threatened to infringe Our intellectual property rights, then, in addition to any other rights and remedies We may have, We may seek any preliminary or permanent injunctive relief from any court of competent jurisdiction. For such actions, you irrevocably consent to the exclusive personal jurisdiction and venue of the federal and state courts in and for Philadelphia, Pennsylvania, U.S.A.

### **Links**

We make no claims or representations regarding the quality, content, nature or reliability of sites accessible by hyperlink from this site or sites linking to this site, and We accept no responsibility herewith. Any linked sites are not under Our control, and We are not responsible for the content of any linked site or any link contained in a linked site, or for any review, changes or updates to any such sites. Any linked sites are provided to you only as a convenience. The inclusion of any link does not imply affiliation, endorsement or adoption by us of the linked site or any information contained therein. When leaving this site, you should be aware that Our terms and policies may no longer govern, and therefore, you should review the applicable terms, conditions and policies, including privacy and data-gathering policies, of each site.

### **Confidentiality on the Internet**

Use of the Internet is solely at your own risk and is subject to all applicable local, state, national and international laws and regulations. We are not responsible for the security of any information transmitted over the Internet. You assume all risks in transmitting material to or from this site and must make your own determinations as to these matters. For more private communication with Catavault, you may contact us at: Catavault, c/o PINvault.com Inc.; 100 West Elm Street; Suite 400; Conshohocken, PA 19428; 610-941-3388.

### **Events Beyond Our Control**

You agree to release us from any claim of harm resulting from any cause beyond Our control, including, but not limited to, failure of electronic or mechanical equipment or communication lines telecommunications or other interconnect problems, computer viruses or other damaging code or data, unauthorized access, theft, operator errors, severe weather, earthquakes, natural disasters, strikes or other labor problems, wars, or governmental restrictions.

### **General**

This Agreement and the Service shall be governed by the laws of the Commonwealth of Pennsylvania without regard to its conflicts of law provisions. If any provision or provisions hereof shall be held to be invalid, illegal, or unenforceable, the validity, legality and enforceability of the remaining provisions shall not be in any way affected or impaired thereby. This Agreement and any modifications published by Catavault over the Service constitute the entire and only agreement between you and Catavault with respect to the Service. No modification may be made to this Agreement except those made by us in writing and posted on the site.

Any action or claim against us must be brought within one year following the date on which the claim first accrued or shall be deemed forever waived. We reserve all rights not expressly granted herein.

## **Catavault Technical White Paper All Access Pass to the Internet**

A printed version of this Agreement and any notice given in electronic form shall be admissible in judicial or administrative proceedings based upon or relating to this Agreement to the same extent and subject to the same conditions as other business documents and records originally generated and maintained in print form.

### **Notices**

Except as expressly stated otherwise, all notices shall be sent to [counsel@catavault.com](mailto:counsel@catavault.com) or to Catavault, c/o PINvault.com Inc.; 100 West Elm Street; Suite 400; Conshohocken, PA 19428. All notices to you shall be sent to the email address you provide to us when you register. Such notice shall be deemed given one day after the email is sent.

# Catavault Technical White Paper

## All Access Pass to the Internet

### ENDNOTES

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<sup>1</sup> "In Person: Number Crunched," Powers, John, The Boston Globe Magazine, July 2, 2000.

<sup>2</sup> [www.nytimes.com](http://www.nytimes.com)

<sup>3</sup> [www.americanexpress.com](http://www.americanexpress.com)

<sup>4</sup> Forrester Research.

<sup>5</sup> In development and may function with the Liberty Alliance and/or the Internet Trust Network. Additionally, Catavault has sought to protect this method and system as part of its patent pending claims.

<sup>6</sup> ROAD RUNNER character and name are trademarks of Warner Bros. © 2001

<sup>7</sup> Boston Consulting Group Research and Faulkner & Gray, March 2, 1999.

<sup>8</sup> Action News, 6ABC, WPVI-TV, "Cyber6" Report, Philadelphia, Pennsylvania, January 4, 2000.

<sup>9</sup> The Gartner Group and Courion, [www.courion.com](http://www.courion.com), March 20, 2000.

<sup>10</sup> Zyman Marketing Group Findings, 2000.

<sup>11</sup> Forrester Research, 2000.

<sup>12</sup> Zyman Marketing Group Findings, 2000.

<sup>13</sup> Catavault Marketing and Zyman Marketing Group Findings, 2000.

<sup>14</sup> [www.ebay.com](http://www.ebay.com)