

Is there an Individualization GPT?

Individualization is a general-purpose technology, creating ability to

- *Recognize individual people, items, and information*
- *Remember relevant information and to learn from current activity,*
- *React on an individual basis to the available knowledge and demands.*

Move from aggregate measures to individual measures.



Applications of the Individualization GPT

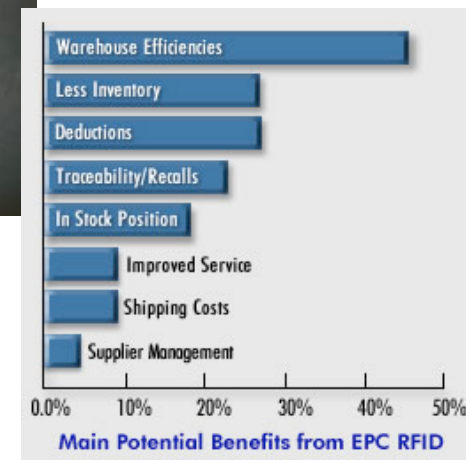
The screenshot shows the Amazon.com website interface in Microsoft Internet Explorer. The browser address bar displays a URL: http://www.amazon.com/gp/yourstore/pym/ref=pd_ws_nav_pym/104-1675817-8907951. The page features a search bar with "Amazon.com" entered. Below the search bar, there are navigation links for "Recommended For You" and "Page You Made". The "YOUR HISTORY" section is visible, showing a list of items in the user's history, including "The Art of Modeling with Spreadsheets: Management, Spreadsheet Engineering, and Modeling Craft" by Stephen G. Powell and Kenneth R. Baker. Below this, there are "Update" and "Clear all" buttons. The main content area displays "Customers who bought the items in your history also bought:" followed by a list of three books:

1. **Applied Risk Analysis : Moving Beyond Uncertainty in Business (Wiley Finance)** by Johnathan Mun
Publication Date: December 19, 2003
Our Price: \$56.67
2. **Management Decision Making: Spreadsheet Modeling, Analysis, and Applications** by George E. Monahan
Average Customer Review: ★★★★★
Publication Date: January 15, 2000
Our Price: \$70.00
3. **VBA for Modelers: Developing Decision Support Systems Using Microsoft® Excel** by S. Christian Albright
Average Customer Review: ★★★★★

Individualized recommendations based on searching or ownership.



Individualized products

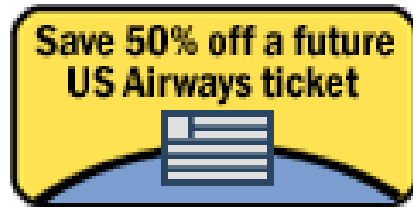


“Personal numbers” such as credit scores.

Quote the Right Price



Is this a new customer?



Vacation traveler

*Is this a price-driven decision,
or a service-driven?*



Business traveler

Individualization Requires *Authentication*

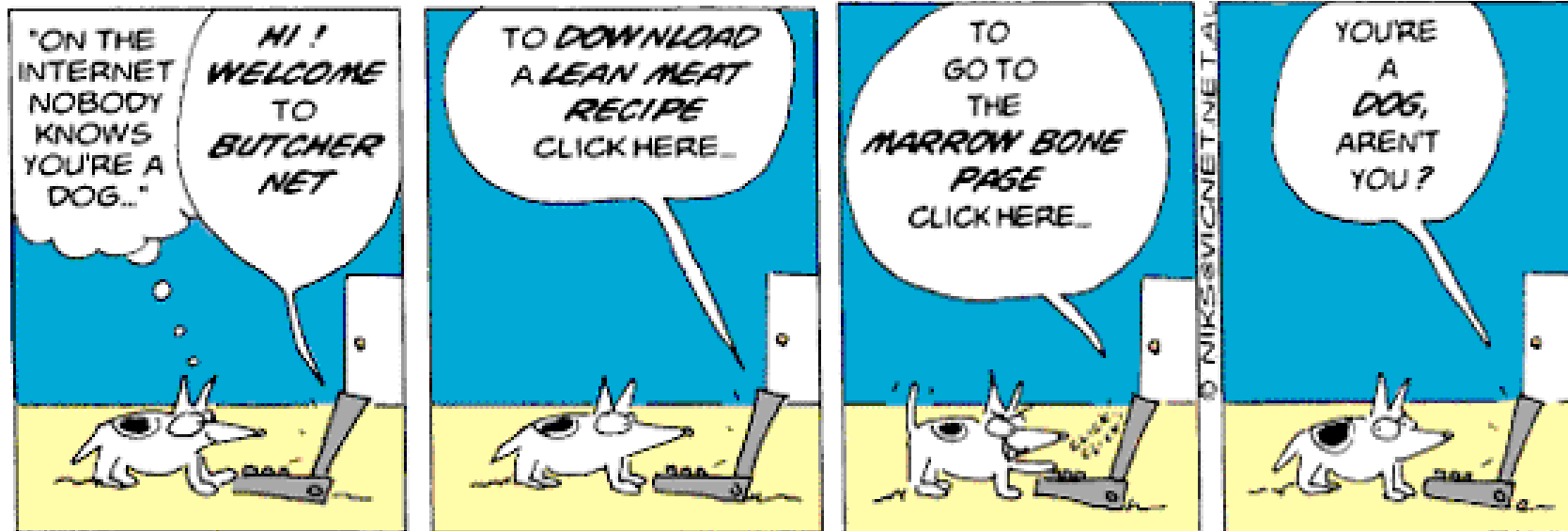
Authentication is the ability to identify an individual user or device.
Authentication answers the question “Who are you?”

Authentication Element	Cave of the 40 Thieves	Password Login	ATM Machine	Secure Web Server to Client
1. What is authenticated?	Anyone who knew the password	Authorized user	Owner of a bank account	Web site owner
2. What is the distinguishing characteristic, token, or authenticator?	The password “Open, Sesame”	Secret password	ATM card and PIN	Public key within a certificate
3. Who is the proprietor, system owner, or administrator?	The forty thieves	Enterprise owning the system	Bank	Certificate authority
4. What is the authentication mechanism?	Magical device that responds to the word	Password validation software	Card validation software	Certificate validation software
5. What is the access control mechanism?	Mechanism to roll the stone from in front of the cave	Login process, access controls	Allows banking transactions	Browser marks the page “secure”

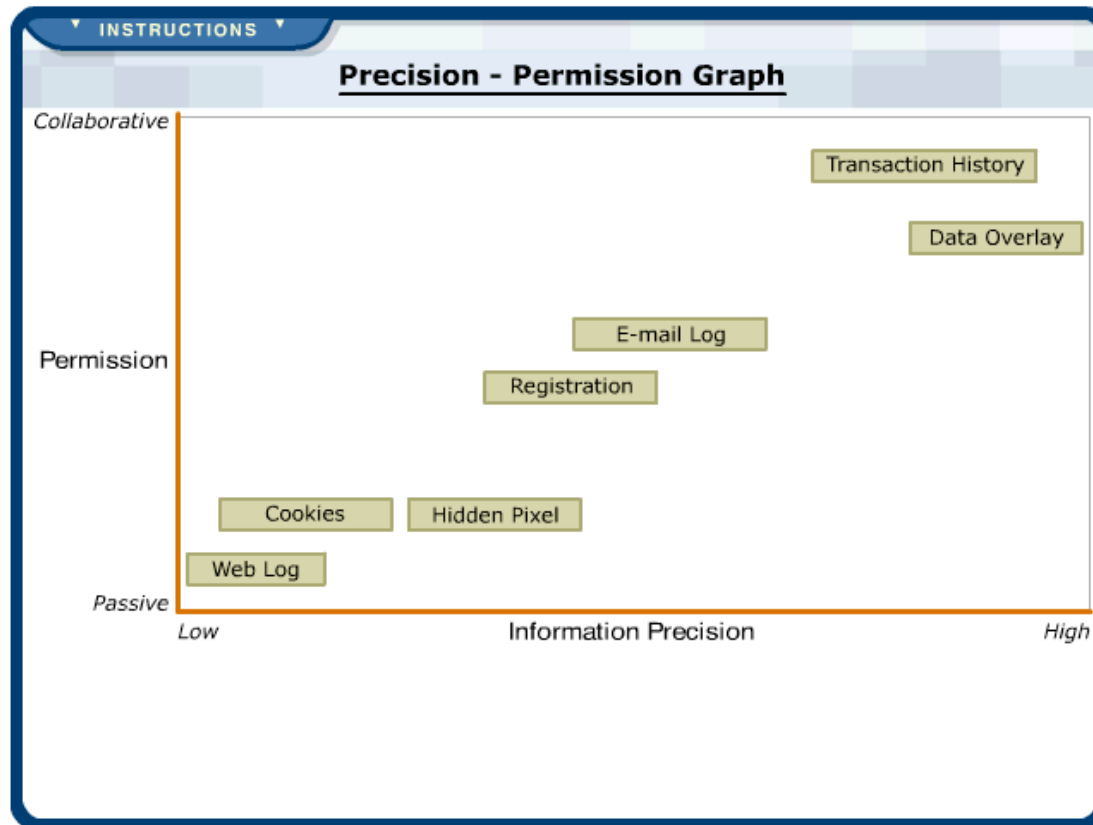
Table 4-1: Elements of an authentication system
Source: Adapted from R. Smith (2002)

Improving Information Precision Improves *Association*

Association is the ability to ability to connect observable online choices with a customer profile.
Association answers the question "What are you?"



The Precision-Permission Graph



Improving identification means better authentication and association.

Currently, the precision of information requires increasing levels of Net user cooperation with a site.

As the Individualization GPT develops, this becomes automated and possibly less dependent on permission.

```
function setCookie (name, value, expires) {  
    if (!expires) expires = new Date();  
    document.cookie = name + "=" + escape (value) + <-- save cookie value  
"; expires=" + expires.toGMTString() + "; path="/"; <-- set expiration date and path  
    }
```

Software
used by
server

*SothebysId7.829677108537132e+307
sothebys.com/0232858124830124712354996572829390457*
SothebysFirstReferrerSothebyssothebys.com/
0232858124830124712355006572829390457*
SothebysFirstTimeThu, 6 Jan 2005 18:11:57 UTCsothebys.com/
0232858124830124712355066572829390457**

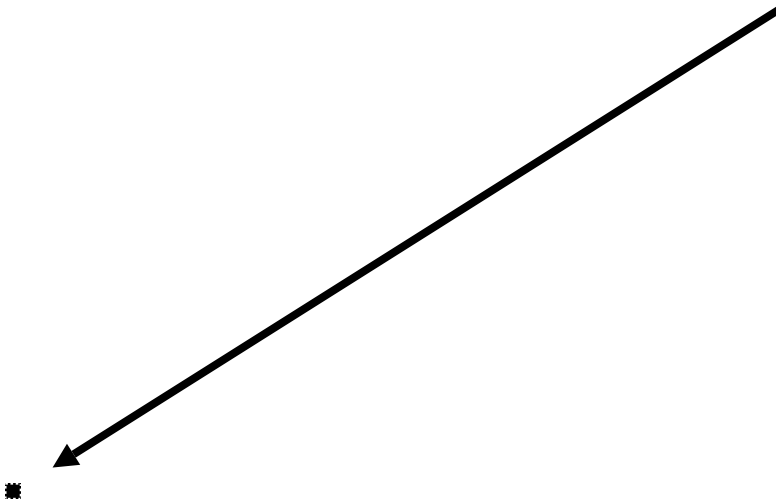
Sothebys.com

Typical cookie text

Hidden Pixels let measurement companies also set cookies.

Only a server writing a file to your browser has the right to write a cookie.

Q: How to outsource measurement to another company such as [Coremetrics?](#)



Registration Improves Accuracy



[Home](#) | [Login](#) | [Tour](#) | [Help](#)

Sign Up for a free SAVE THIS/EMAIL THIS account

Create your *free*, permanent SAVE THIS account to access your saved links from any computer or Web connected wireless device... any time, any place.

After you sign up, the links you saved will be added to your permanent account. Access all of your saved links at www.savethis.com.

Required fields are marked with an asterisk ()*

E-mail Address * ← Enter you email address.

User ID ← 10 characters maximum, no spaces. Your UserID is shown when sharing links.

Create Password * ← 10 characters maximum, no spaces. Passwords are case sensitive.

Confirm Password * ← Confirm your password by re-typing.

ZIP/Postal Code

Birth Date * Month: Day: Year: ← You must be 13 years of age or older in order to sign up.

I agree to the [Terms and Conditions](#) *

I would like to receive updates about SAVE THIS, EMAIL THIS and other great tools offered by Clickability

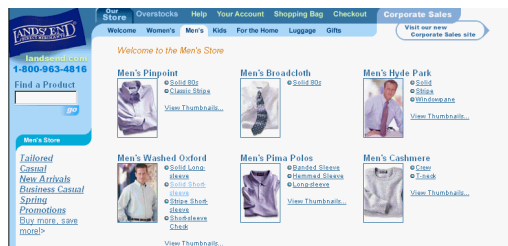
Create a user-specific registration system, based on values provided and verified at the individual level.

Transactions and additional data improves details even more.

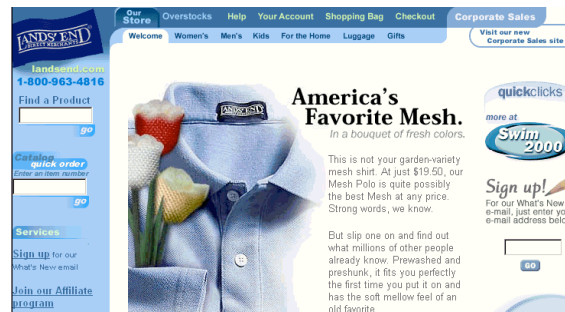
After authentication and association comes *individualized*

Individualized interaction is the ability to present customized information, services, or products. Interaction answers the question “What to do?”

A user arrives - what to show?



Men's homepage



Generic homepage



Women's page

Bayesian Learning

Prior

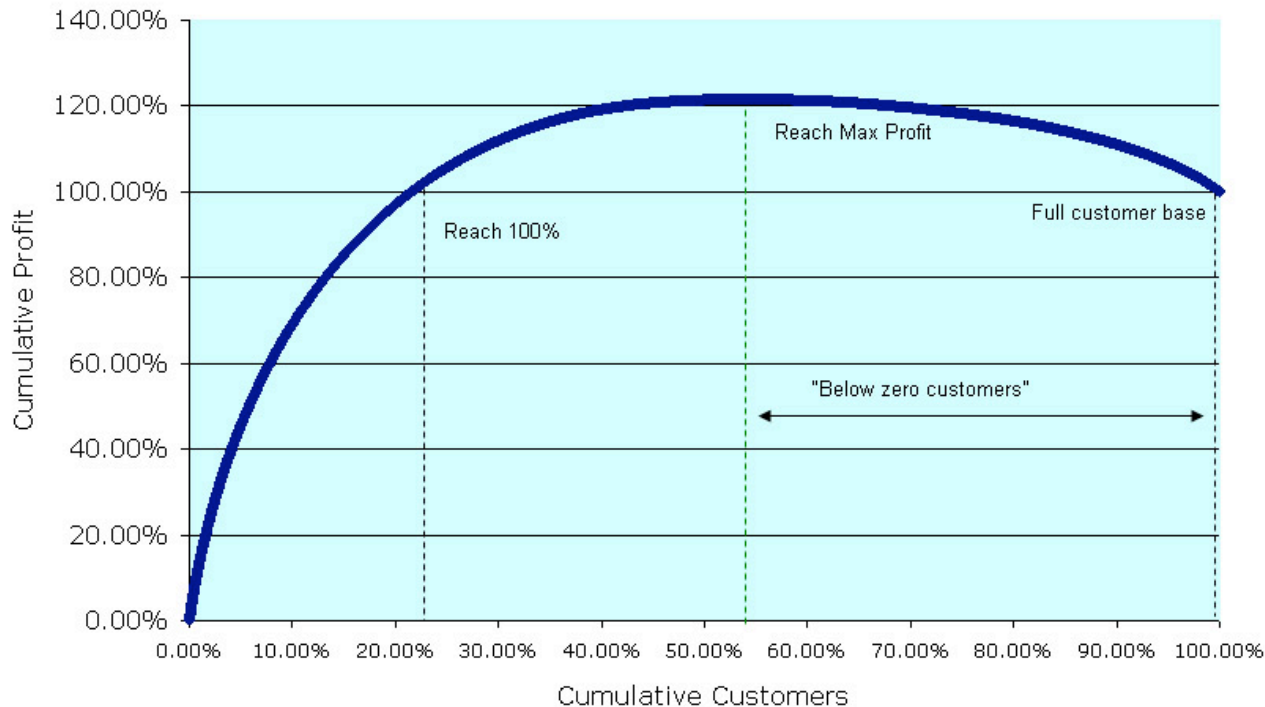
Posterior

Observation

$$P(B_j | A) = \left[\frac{P(B_j)P(A | B_j)}{P(A)} \right]$$

A Fundamental Lesson That Arises from Identification: *Customers Vary Greatly in Profitability*

Typical results from ranking **current customers** by **annual profitability**.



A profitability skew diagram of banking customers.

Profits would rise with fewer (bad) customers.

Does a business only worry about current customers? How do we extend this to the future?

Relevant variables:

Formula for a constant series

- Discounting means that a series of payments every period forever has a net present value.

- Example: $(\pi, \pi, \pi, \dots) \textcircled{R} \sum_t^{\infty} \frac{\pi}{(1+i)^t} = \frac{\pi}{i}.$

Profit of 1 per period,

10 periods \$5.02

25 periods \$6.46

100 periods \$6.67

Formula \$6.67

Customer Lifetime Value

- Individual level profitability

$$LTV = \pi_{j0} + \sum_{t=1}^T \left[\frac{\pi_{jt}}{(1+i)^t} \prod_{k=1}^t r_{jk} \right], \text{ with}$$

π_{jt} = Customer j profit in period t,

r_{jt} = Customer j retention rate in period j, $0 \leq r_{jt} \leq 1$,

i = interest rate to discount future profits.

Example of Lifetime Value

- Profit constant at \$275 per year, Retention rate constant at 90%. Discount rate constant at 10%, 5 year horizon.

$$LTV = 275 + \sum_{t=1}^5 \left[\frac{275}{(1+.10)^t} \prod_{k=1}^t .90 \right] =$$
$$275 + \frac{275}{(1+.1)} * .9 + \frac{275}{(1+.1)^2} * (.9 * .9) + \frac{275}{(1+.1)^3} * (.9 * .9 * .9) + \frac{275}{(1+.1)^4} * (.9 * .9 * .9 * .9) + \frac{275}{(1+.1)^5} * (.9 * .9 * .9 * .9 * .9) =$$
$$275.00 + 225.00 + 184.09 + 150.62 + 123.23 + 100.83 = \$783.77$$

Bayesian Decision Making

- Use Bayesian learning to update probabilities.
- Use LTV to help assign value of different events.
- Choose the action that maximizes profits given the observed actions.

Summary

- General purpose technologies dynamically shape the economy.
- Internet developments are being driven by three GPTs.
 - Digital, Network, Individualization
- Individualization allows a much richer set of economic strategies – individual focus, not the full market.