



Whitepaper 2006

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1 Introduction

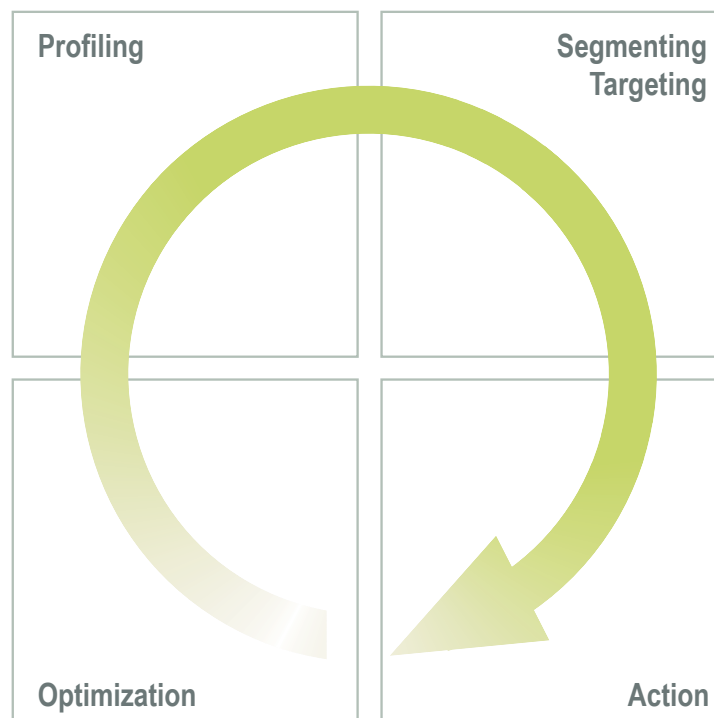
wunderLOOP technology integrates all available information to enable precise targeting of Internet users. It continuously analyzes users' current behavior – what they click on or their search engine queries, e.g. – and compares it, in real-time, with existing market research data from such sources as AGOF, Nielsen NetRatings and comScore, and, with the user's consent, with in-house data such as CRM profiles.

This real-time targeting forms the basis for displaying ads, content or shopping offers, which are accordingly served up at the actual moment of the user's interest. If the user's behavior changes one way or another, wunderLOOP immediately adjusts the content delivery, in real-time. Users remain anonymous for the wunderLOOP system and cannot be traced to actual individuals.

2 Integrated Behavioral Targeting: Closed Loop

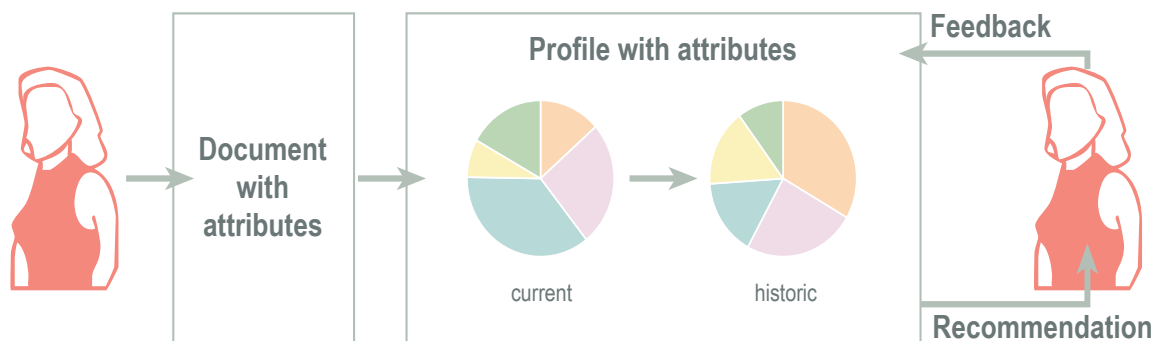
The wunderLOOP system analyzes user interests and behavior and delivers individual recommendations based on this to the user in real-time (used for advertising, content, products, ...). The business models in question are shown on the wunderLOOP dashboard.

The system learns from the user's current behavior and continually optimizes the results of its analysis and the targeting.



Profiling

Profiles are generated when a user visits a site. These profiles are compiled from a range of information – first and foremost the interest profile generated based on the classification (taxonomy) of the pages visited and the frequency of use. This means that the content of a site needs to be broken down by semantic categories or tagged according to some other type of standard criteria, in order to assign the user's interest accordingly. Another condition for creating “historical” profiles, i.e. profiles over longer periods of time, is user recognition. If the user permits a Cookie, he is assigned a unique ID under which his historical profile is kept. If this is not possible, a profile that draws only on data of the current session is used for this user.



A user's profile may contain a wealth of other attributes and data, e.g.:

- Behavior (number of clicks, number of sessions etc.)
- Search terms
- CRM data
- Market research data
- Data Mining

Segmenting / Targeting

The totality of profiles allows for identifying target groups or target persons. This involves defining profile attributes or combinations of attributes that describe a target group. A target group analysis then calculates the number of users that correspond to a target group description, and their use intensity.

Target group analysis also involves using data mining methods such as cluster analysis and control group models.

Action

The defined target groups can be used to trigger specific actions in real-time. For instance, qualified keywords can be forwarded to an AdServer, or lists of teasers to a webserver / CMS / shop system, if the wunderLOOP system notes that a user profile matches predefined target group attributes and/or a business objective.

Based on a prioritization of recommended content, the system can respond to the user's uptake of recommendations, and thereby automatically optimizes results.

Optimization

During every contact with a user, his profile is updated. This involves comparing the profile of the current session with the user's historical profile. This allows the system to learn from the current interests and needs of the individual user and to respond to changes in interest even at short notice.

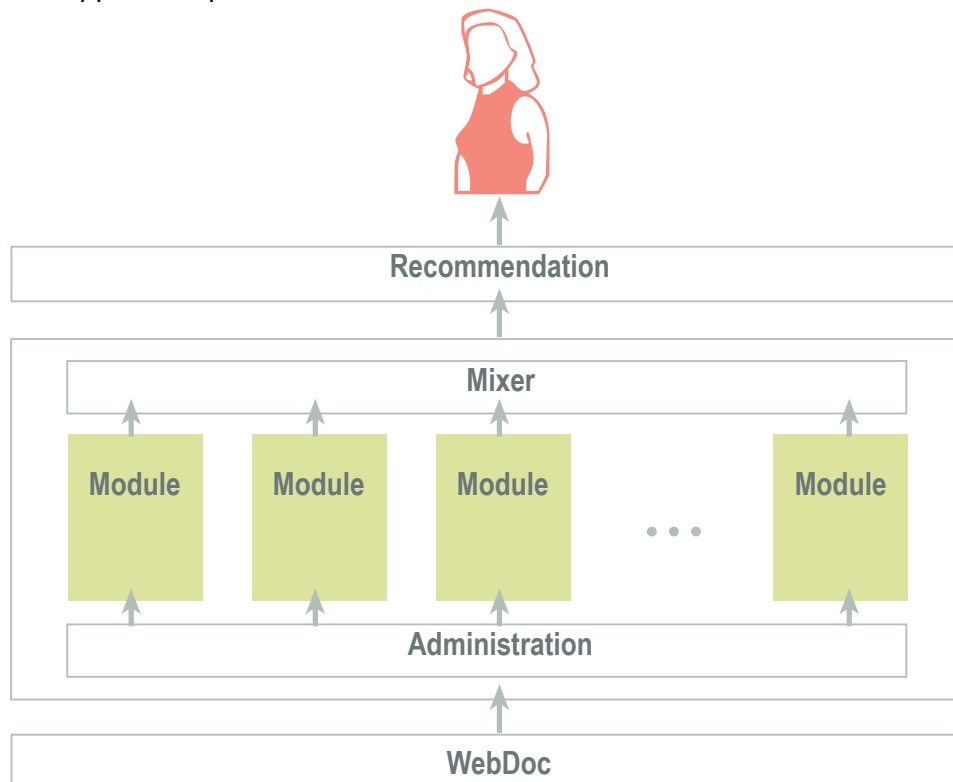
The wunderLOOP system can also take long-term trends into account; for instance, attributes that are no longer reinforced for lack of use lose their weight in a user's profile.

3 Technology

The wunderLOOP system works with various procedures that can be ideally adjusted to the desired and required business model by creating individual combinations. The system has a modular structure; the desired features are used "invisibly" for varying requirements.

The modules of the wunderLOOP system are versatile and may be used in a number of customer-specific ways. They are quickly and easily integrated via an HTTP-based interface. The client/server architecture understands JAVA, C++, perl, Python etc., making it absolutely simple to share data with external systems (CRM data, data mining etc.).

wunderLOOP's architecture makes it possible to generate recommendations in real-time on (partly) dynamic pages and to forward them to necessary third-party systems (Ad-Servers, CMS, Web Server etc.). Caching algorithms and additional special webserver modules support this process.



The linear scalability of the system has been proven in many customer installations.

The wunderLOOP system manages users by means of an encrypted User ID. Explicitly personal information (e.g. demographical information and other customer records) are not stored in the wunderLOOP system itself, but – with the user’s consent - in the external systems of the respective vendors. It is impossible to trace the ID through wunderLOOP, ensuring that no personal data or data traceable to individuals is processed in the wunderLOOP system.

4 wunderLOOP dashboard

The wunderLOOP dashboard is used to perform analyses and control the targeting. It also allows for managing and classifying the documents used in the analysis and the targeting. The dashboard contains detailed context-sensitive help for the various features.

The wunderLOOP dashboard requires no further installations, as it was designed for use in a Web browser. It supports the Internet Explorer, Firefox and Safari.

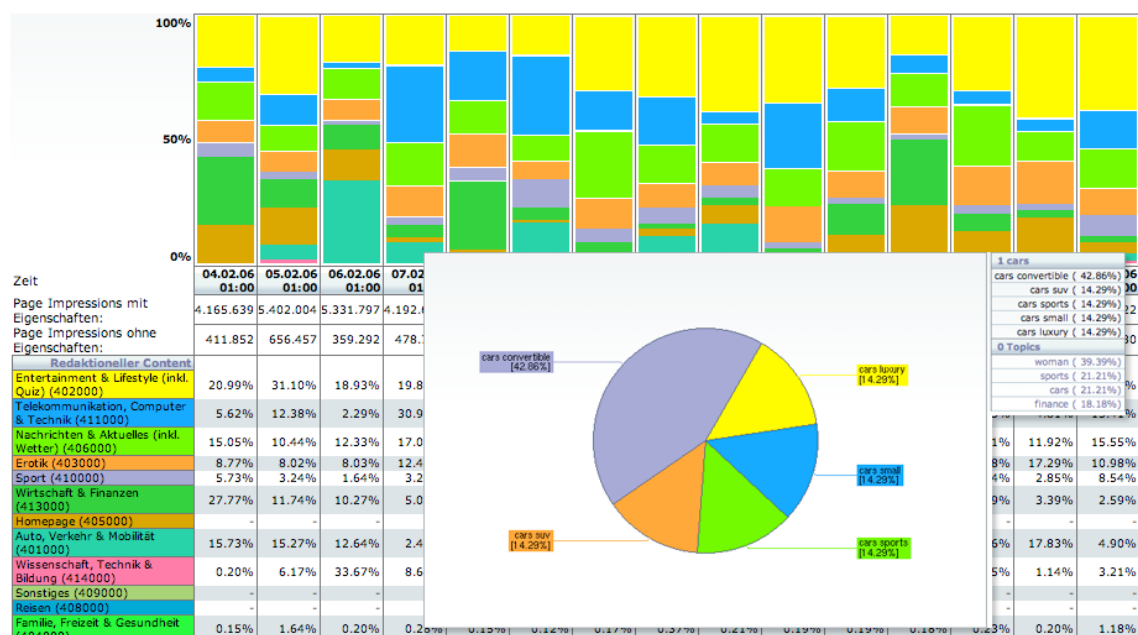
Statistics und Reporting

The wunderLOOP dashboard provides all salient statistics that are relevant to targeting. All views may be printed and exported in the csv format.

profile

profile serves to record and map interest-specific user profiles. These profiles are arrived at by evaluating the user’s interaction with a site’s content, and other behavior.

In addition to the behavior profiles, profile also provides additional quantitative data about usage of the site or the site network.



This quantitative data is mined from the users' general click behavior. The intensity of the site's use by individual user groups is an important aspect in monitoring success here. Criteria include:

- the frequency of use (number of user sessions)
- the median number of documents used (clicks per session).

page profile

page profile serves to analyze and illustrate the general interest profiles of users who have viewed specific documents (pages). The valid behavior profiles (see profile) for the individual users of a given document are summed up into a page profile. The result is an overview of the interests of users who viewed this particular document.

customer data

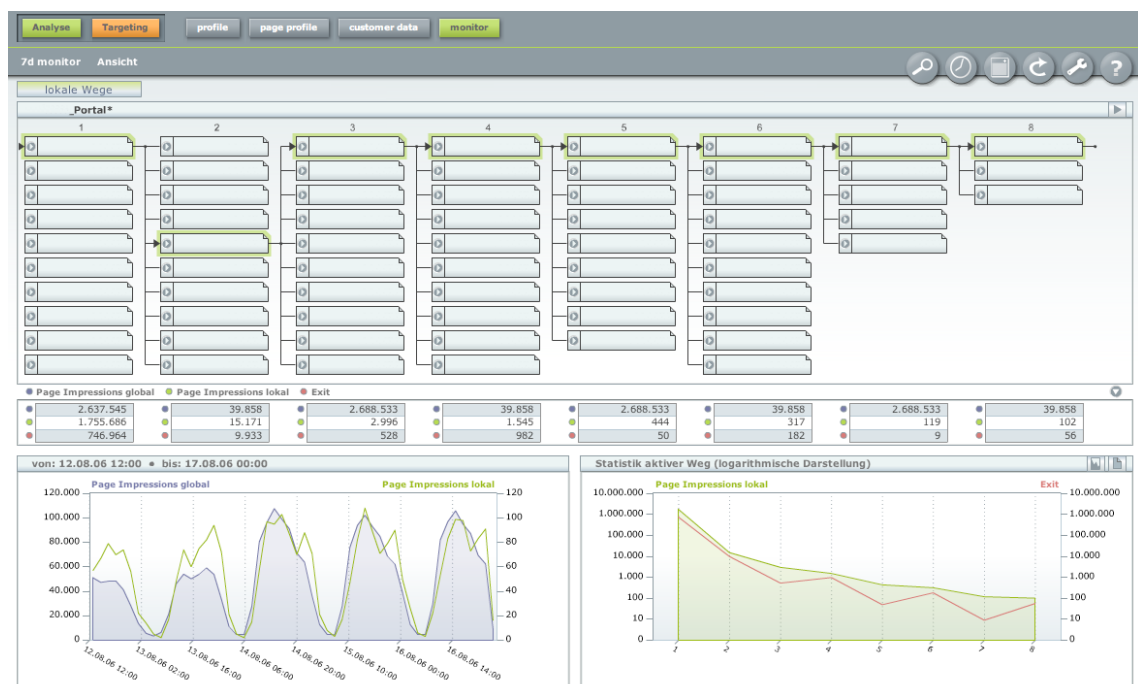
customer data serves to analyze and illustrate the data of registered users, who have consented to having their information processed further. Imported data (e.g. CRM data) on individual users of a given document are summed up into a profile.

wunderLOOP works only with unique IDs that the system cannot track back to individuals. The selected procedures allow for actively using this data. The result is an overview of the customer data of users who have viewed these documents.

monitor

The monitor is used to observe users' behavior directly and in near-time:

- The paths users take through a site, sorted by frequency: The monitor maps the navigation behavior in a tree map, which allows for reflecting complex graphs possible is. In addition to the paths taken by users, it can also map how often certain paths are used. You may also specify a timeframe for the mapping. Or select a document and show the paths leading to and away from this document.
- The paths, broken down by different entry points: navigation trees for each of the ten



most frequent entry points are shown individually (number of entry points may be configured/ is user configurable).

- The frequency of session terminations on these paths (“end of session”).
- The paths that lead users to a document and away from it.
- The relative frequencies of page views by a site’s semantic categories or tags: this is shown in monitor as a treemap, which allows for viewing, at a glance, complex statistics about the use intensities within a site/network (and the attendant vast volumes of information). Special algorithms are used to show the frequency distribution of page views as a treemap on a single uncluttered screen.
- The interest profiles of users who have viewed a given document.

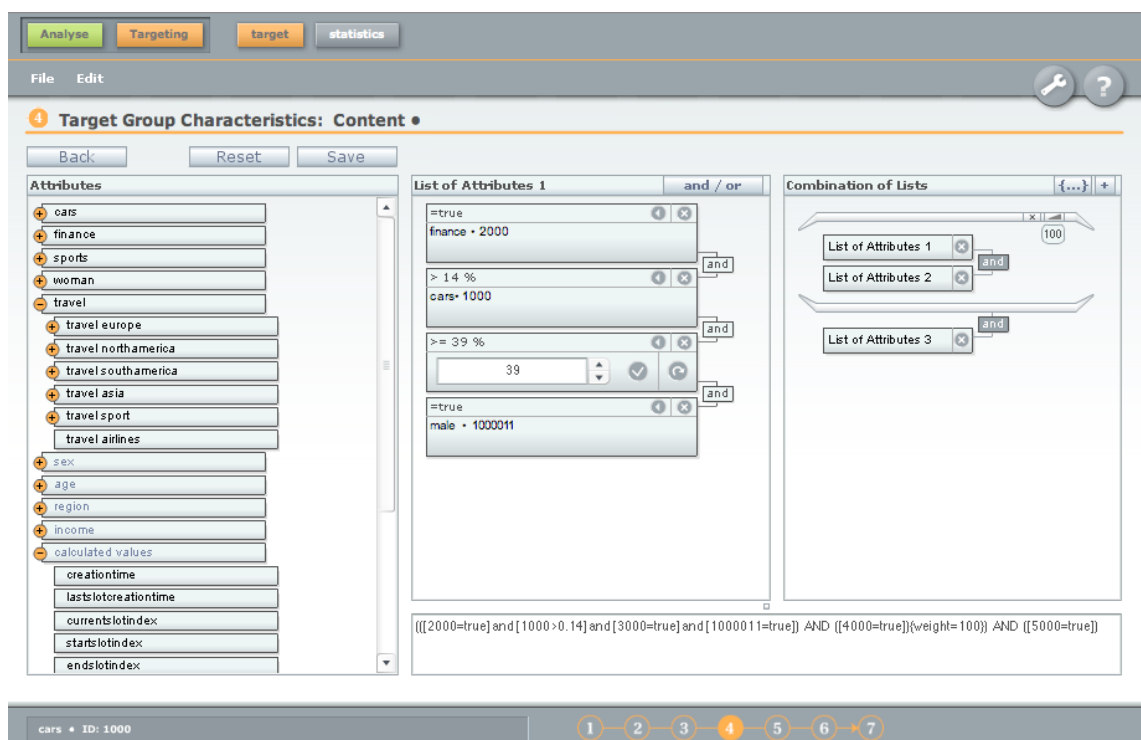
Using the monitor does not require any statistical skills or expertise. Thanks to the easily understood mapping of the analysis results, it is easy to track your users’ navigation patterns and interests and draw conclusions for optimizing your site based on this.

Targeting

target

target is used in planning and realizing marketing measures. On the one hand, it provides information about the number of users with defined attributes. And on the other, target allows for controlling measures that are tailored precisely to these users. target analyzes the attributes of individual users recorded by the wunderLOOP system. This involves defining a target group combining the different attributes of users .

Trait combinations represent a logical linking of different user attributes. These attributes may also be the users’ interests, socio-demographic data, master data or behavior-related data (average click depth, viewing frequency etc.).



The screenshot displays the Wunderloop Targeting interface. At the top, there are tabs for 'Analyse', 'Targeting', 'target', and 'statistics'. Below the tabs is a menu bar with 'File' and 'Edit'. The main area is titled 'Target Group Characteristics: Content'. On the left, there is a list of 'Attributes' including 'cars', 'finance', 'sports', 'woman', 'travel', 'travel europe', 'travel northamerica', 'travel southamerica', 'travel asia', 'travel sport', 'travel airlines', 'sex', 'age', 'region', 'income', 'calculated values', 'creationtime', 'lasts lotcreationtime', 'currents lotindex', 'starts lotindex', and 'ends lotindex'. In the center, there is a 'List of Attributes 1' section with a dropdown menu set to 'and / or'. It contains several conditions: '=true', 'finance • 2000', '> 14 %', 'cars • 1000', '>= 39 %', and '=true', 'male • 1000011'. On the right, there is a 'Combination of Lists' section with a dropdown menu set to 'x | |'. It contains three lists: 'List of Attributes 1', 'List of Attributes 2', and 'List of Attributes 3'. At the bottom, there is a text box containing the logical expression: '(((2000=true) and [1000 > 0.14] and [3000=true] and [1000011=true]) AND [(4000=true)](weight=100)) AND [(5000=true)]'. At the bottom of the interface, there is a status bar showing 'cars • ID: 1000' and a navigation bar with buttons 1 through 7.

The attributes may easily be combined and parameterized by Drag & Drop.

Typical combinations of attributes would be:

- male = true & interest in computers = true
- (male = true & interest in computers = true) or (interest in cars = false)
- interest in sports = true & interest in culture = false & number of clicks > 12

A combination of attributes is used to define a specific sample (target group) from the totality of all users, which accurately represents the defined attributes.

The number of Unique Clients and the number of PageViews associated with them can then be determined for a given combination of attributes. The combinations of attributes also allow for steering external systems such as AdServers, CMS, and shop systems.

statistics

The recommendation statistic records the delivery and acceptance of recommendations. A recommendation is considered accepted when a user clicks on the recommendation delivered, i.e. on a banner, an editorial teaser, to buy a product and so forth.

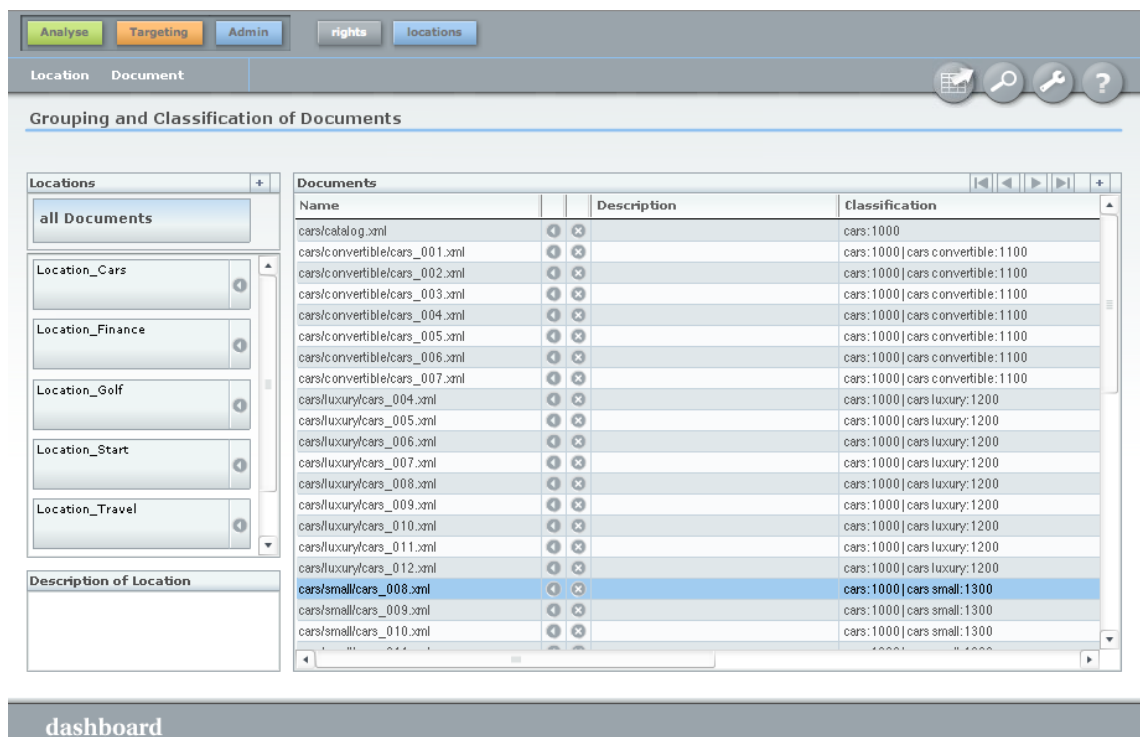
Administration

Managing and Classifying Documents

The list manager manages the documents in the wunderLOOP system. Documents to be included may be entered in and modified for the wunderLOOP system.

Documents may be grouped into clusters or locations using Drag & Drop. Locations are special groups of documents used within the wunderLOOP system to map profiles and customer data in terms of their location on the site (page profile and customer data).

These Locations are also used to limit the target analysis to certain sections of a page.



The screenshot shows the 'Administration' section of the wunderLOOP interface, specifically 'Grouping and Classification of Documents'. It features a navigation bar with 'Analyse', 'Targeting', 'Admin', 'rights', and 'locations' tabs. Below the navigation, there are tabs for 'Location' and 'Document'. The main content area is divided into two panels: 'Locations' and 'Documents'.

The 'Locations' panel on the left shows a tree view with 'all Documents' at the top, followed by several location categories: 'Location_Cars', 'Location_Finance', 'Location_Golf', 'Location_Start', and 'Location_Travel'. Below this is a 'Description of Location' field.

The 'Documents' panel on the right displays a table with the following columns: 'Name', 'Description', and 'Classification'. The table lists various XML documents and their corresponding classifications.

Name	Description	Classification
cars/catalog.xml		cars:1000
cars/convertible/cars_001.xml		cars:1000 cars convertible:1100
cars/convertible/cars_002.xml		cars:1000 cars convertible:1100
cars/convertible/cars_003.xml		cars:1000 cars convertible:1100
cars/convertible/cars_004.xml		cars:1000 cars convertible:1100
cars/convertible/cars_005.xml		cars:1000 cars convertible:1100
cars/convertible/cars_006.xml		cars:1000 cars convertible:1100
cars/convertible/cars_007.xml		cars:1000 cars convertible:1100
cars/luxury/cars_004.xml		cars:1000 cars luxury:1200
cars/luxury/cars_005.xml		cars:1000 cars luxury:1200
cars/luxury/cars_006.xml		cars:1000 cars luxury:1200
cars/luxury/cars_007.xml		cars:1000 cars luxury:1200
cars/luxury/cars_008.xml		cars:1000 cars luxury:1200
cars/luxury/cars_009.xml		cars:1000 cars luxury:1200
cars/luxury/cars_010.xml		cars:1000 cars luxury:1200
cars/luxury/cars_011.xml		cars:1000 cars luxury:1200
cars/luxury/cars_012.xml		cars:1000 cars luxury:1200
cars/small/cars_008.xml		cars:1000 cars small:1300
cars/small/cars_009.xml		cars:1000 cars small:1300
cars/small/cars_010.xml		cars:1000 cars small:1300

At the bottom of the interface, there is a 'dashboard' button.

Documents may also be classified by semantic attributes. This classification in turn directly influences the formation of the interest profiles.

Rights Administration

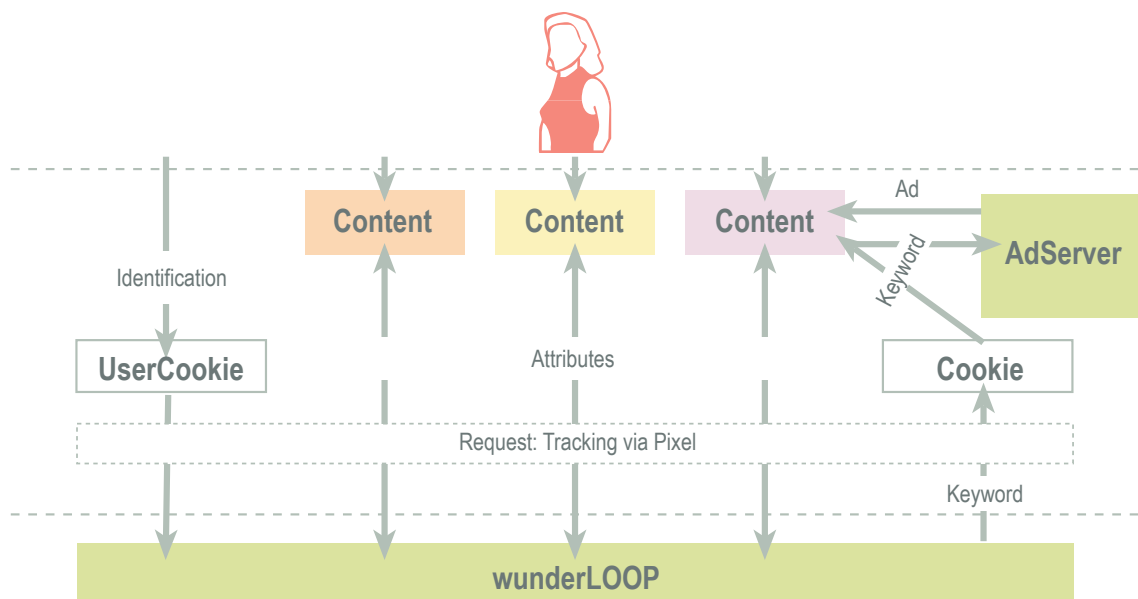
Rights may be assigned and administrated for accessing/using the dashboard. This makes it possible for limiting different user groups to select areas and/or features of the dashboard.

5 System Integration

Three standard versions are used to integrate the wunderLOOP system in a customer's environment. Adaptations to other systems may be realized as customer-specific integration. The integration with an AdServer is outlined here as an example.

Integration via Recommendation Cookie

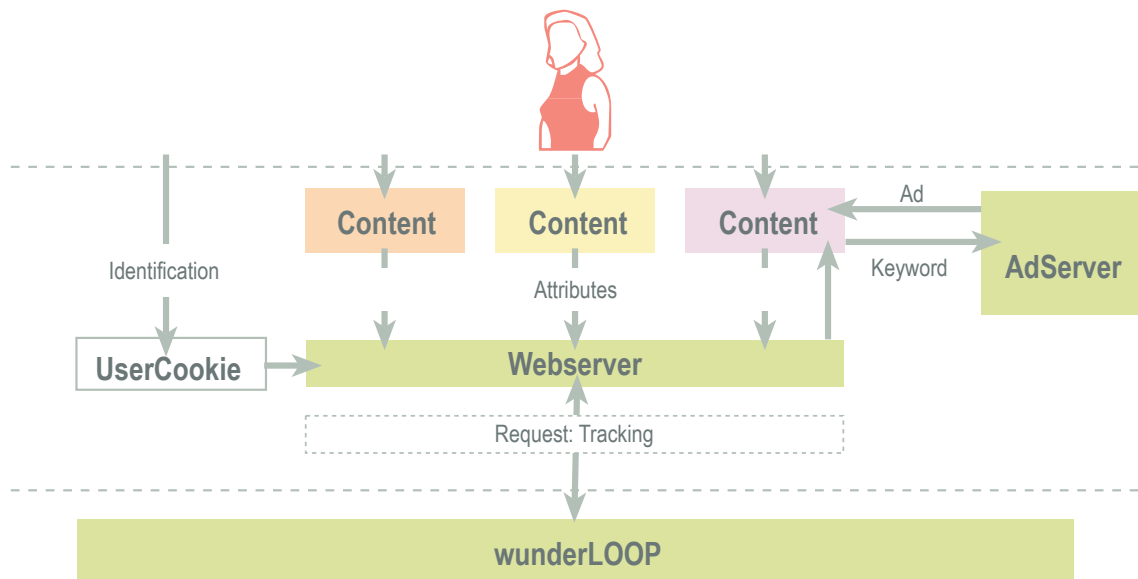
The wunderLOOP system uses a Cookie to identify the user (UserCookie). The system is connected by means of the tracking request, which is triggered by a tracking pixel. The target group information is transmitted via a Recommendation Cookie placed during the tracking request. This ensures a fast and easy connection to the AdServer.



Integration via webserver

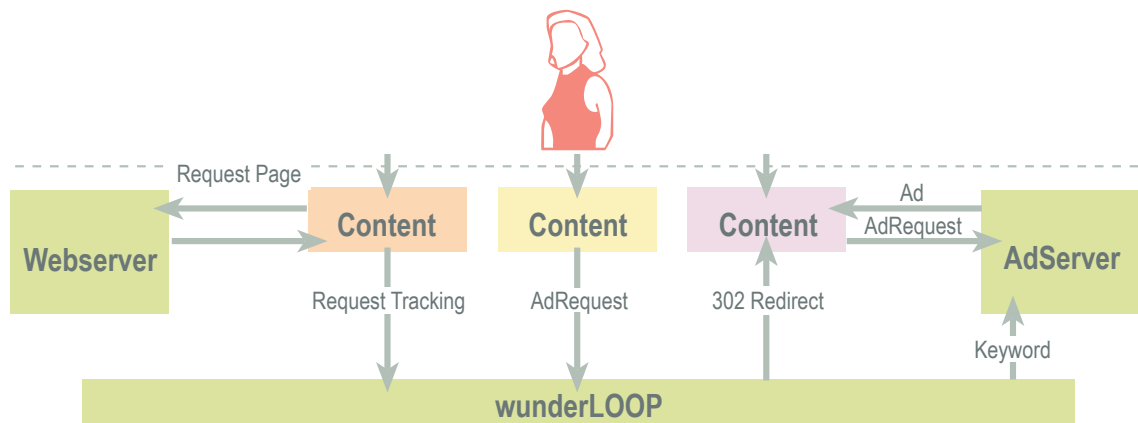
The wunderLOOP system uses a Cookie to identify the user. The webserver transmits the tracking requests to the wunderLOOP system via HTTP. The target group information for the AdServer can be requested at the same time.

This approach is a good choice for all procedures in which pages are generated dynamically. The wunderLOOP system remains invisible to the outside.



Integration via Redirect

The wunderLOOP system uses a Cookie to identify the user. The Tracking Request is generated by a tracking pixel or is integrated in an AdServer call on the page. However, the AdServer call first goes to the wunderLOOP system, which then inserts the target group information in the request before forwarding it to the AdServer by 302 Redirect. In this solution, the wunderLOOP system and the AdServer are more closely inter-linked.



6 System Requirements

If the system is operated by license or as a Managed ASP, the following system requirements apply (to be adjusted to specific tasks on a case by case basis):

Hardware

The system basically consists of 2 types of computers.

1. Base computers

These computers do the actual computing. In general, each additional base computer will boost the performance of the overall system. The application itself runs on these computers. A backup copy of the current configuration is kept at all times. Depending on the project, additional, special data may be stored on these computers as well, but usually they remain “dataless”.

Requirements (Stand fall 2006):

- Dual CPU computer with i686 CPU > 2.8 GHz
- 2 GB RAM
- 32 GB hard disk
- at least 1 100MBIT/1GBIT Ethernet network interface

2. Database computers

These computers serve to store data in an SQL database. The application may be distributed to a number of databases and servers to optimize performance.

Requirements (as of Fall 2006):

- Dual CPU computer with i686 CPU > 2.8 GHz
- >= 4 GB RAM
- 32 GB hard disk plus storage space for the database
- High-performance Disk-IO system, optimized for OTLP, as many spindles as possible, mirrored for reliable operation
- min. 1 100MBIT/1GBIT Ethernet network interface

Software

At this point, the software supports the Unix-based operating system Linux. The Software is shipped in RPM packages.

Operating system

- Full support: Suse SLES 8, SELS 9
- Partial support: Redhat, Debian

Database

Because all the targeting-relevant data that is constantly needed is stored in the databases, the database has to be configured for maximum performance.

- MySQL: At least v4.1.11, recommended v5.0 (min. 5.0.19).
- Oracle: At least v9.2 with the latest Patch Level.

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