

SEACW DELIVERABLE D.1.6

“Validation Methodology Specifications”

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0.1	23/07/2013	Table of contents and paragraph assignment among authors
0.2	06/09/2013	Introduction
0.3	16/10/2013	First document revision
0.4	12/11/2013	Applications Indicators
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0.7	07/01/2013	Modify Applications Indicators
0.8	22/01/2014	Modify web Indicators
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Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and work of others has been made through appropriate citation, quotation or both.

Abstract:

Deliverable 1.6 *Validation Methodology Specifications* describes the indicators that will be monitored to check that the ecosystem and applications meet the expected aims. These indicators play a key role to get to know if the ecosystem and its applications meet with the technical specifications, which were detailed in D2.5 *Technical requirements report*. Summarizing, the indicators will allow us to know if the ecosystem is working correctly.

This document is an alive document, the indicators are to be monitored and they might be altered if the ecosystem or the deployed applications and environments increase or change.



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1 Introduction

The present document describes methodologies and tools required to perform a validation of the SEACW ecosystem. These methodologies will provide different metrics, which should be constantly monitored, and which will ensure that the objectives of the project are met at a given point in time, as well as that users can perform all the possible tasks provided by the ecosystem in adequate conditions.

In particular, these metrics should be able to reflect whether:

- The system is capable to run within specific hardware resources, either physical or virtual, checking the status of these resources at a given point or period of time.
- The system is able to scale appropriately, thus providing a performance which is suitable for the required traffic under specific constraints and the available resources.
- The content provided by the ecosystem upon a specific request corresponds with the expected one, providing assertions for each possible resource to be requested in the ecosystem.
- How the users interact with the ecosystem, generating analytics for the visitors and studying how the interaction can be optimized so that the user experience is improved.

All these metrics will be considered for the different platforms over which the ecosystem is developed, i.e., web, mobile and smart TVs.

2 Applications Indicators

It is necessary to define the indicators to be taken into account when users try the developed applications. It is important to remember the environments of the developed applications. These are Android, iOS and Samsung Smart TV. The following questions arise: What indicators are needed? What tool should be used for each type of environment (to the results of these indicators)?

Below, there are different sections providing the most viable solutions to cover all relevant indicators in each environment.

2.1 Markets: Google Play (Android environments), iOS developer program (iOS environment) and Samsung Apps Seller Office (Samsung Smart TV environment)

Once a developed application has been published, it is easy to detect indicators with relevant information through the markets from those have been published.

Therefore Google Play Developer Console (for Android), iOS Developer Program (for iOS) and Samsung Apps Seller Office (Samsung Smart TV) are appropriate tools for reporting the necessary data on the acceptance and distribution of the applications.

Through the previous markets, it can be obtained the following application data:

- Number of downloads
- Number of devices with the application currently downloaded

- Rating and user comments
- Errors
- Sales revenue
- Users' information: Devices, OS version, country, language, application version and mobile network operator from people have downloaded the application (not all markets allow to show these features)

2.2 Google Analytics and Google Mobile App Analytics (all environments)

As the information provided by the markets is not always enough to make a good tracking application, Google Analytics will be used to evaluate more relevant indicators.

Google can be used to track own websites (HTML5 applications). However, now there is Google Mobile Apps Analytics and it can be used to track mobile applications. Google Mobile Apps Analytics is fully integrated with Android and iOS applications. Regarding Samsung Smart TV, it can be tracked through Measurement Protocol Overview (from Google Mobile Apps Analytics too).

Google Mobile App Analytics enables developers to:

- Visualize user navigation paths.
- Measure user interactions with UI elements.
- Measure in-app payments and revenue.
- Create your own report dimensions and metrics.

Specifically, Google Mobile Apps Analytics provides a suite of reports composed of the tools and metrics developers need to analyze and evaluate the app performance, including:

- The number of installations.
- Devices and networks used to access app.
- The geographic location and languages spoken by visitors.
- In-app purchase totals.
- Customized tracking of special content, like video.
- The number of screens seen per visit, and the order in which visitors move through these screens.

Combining information from Google and markets, it can get complete indicators, obtaining all relevant users' information.

3 Web Indicators

This document proposes different metrics to evaluate the performance of the ecosystem. In particular, it aims to analyze two different areas:

- The *health* of the ecosystem, i.e., the state of the physical (or virtual) infrastructure on which the ecosystem is deployed.
- The *behavior* of the ecosystem, i.e., how the different users interact with the ecosystem itself.

These metrics can be analyzed either in a given point in time, or as an aggregate for a given period.

3.1 Health

The *health* of the ecosystem will be determined by the health of both the physical machines and the virtual machines hosting the ecosystem.

3.1.1 Physical Machines

In the case of the servers located at UC3M facilities, they provide a remote management console for observing the status of the server, in terms of the next parameters (among others):

- Failure: whether the server is malfunctioning due to some identified issue.
- CPU: the current clock speed for each of the CPU processors.
- Memory: the total memory in use by the system.
- Hard drive: the status of the hard drives.
- Temperatures: the temperatures of each component.
- Fans: the fan speeds for each fan in the system.

Regular analysis of the logs of these parameters will assist the administrator to check the proper behavior of the physical machines.

3.1.2 Virtual Machines

In the case of the virtual instances launched over the OpenStack platform, OpenStack Telemetry Service (Ceilometer) will allow gathering statistics about instances, such as network and disk usage.

Besides, the guest operating system will reveal additional information about the CPU and memory usage.

3.2 Behaviour

The interaction of the users with the ecosystem will be studied by using an analytics service. [Open Web Analytics \(OWA\)](#) is proposed, which consists on an open-source analytics product quite similar to Google Analytics.

OWA will provide a web interface providing metrics from users, being the most relevant:

- Visits, unique visitors, visits duration, bounce rate, etc.
- Visitors demographics, such as age and *geolocation*.
- *Heatmap* and click streams.

- Search terms reaching the web site.
- Custom action tracking.

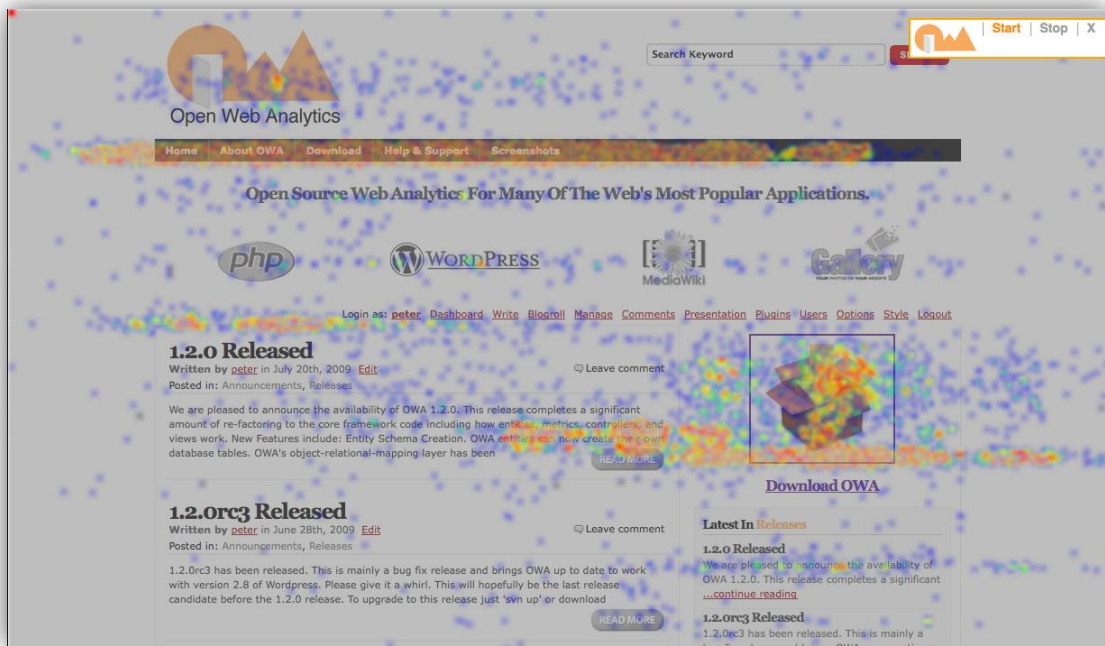


Figure 1: Open Web Analytics - Screenshot 1



Figure 2: Open Web Analytics - Screenshot 2

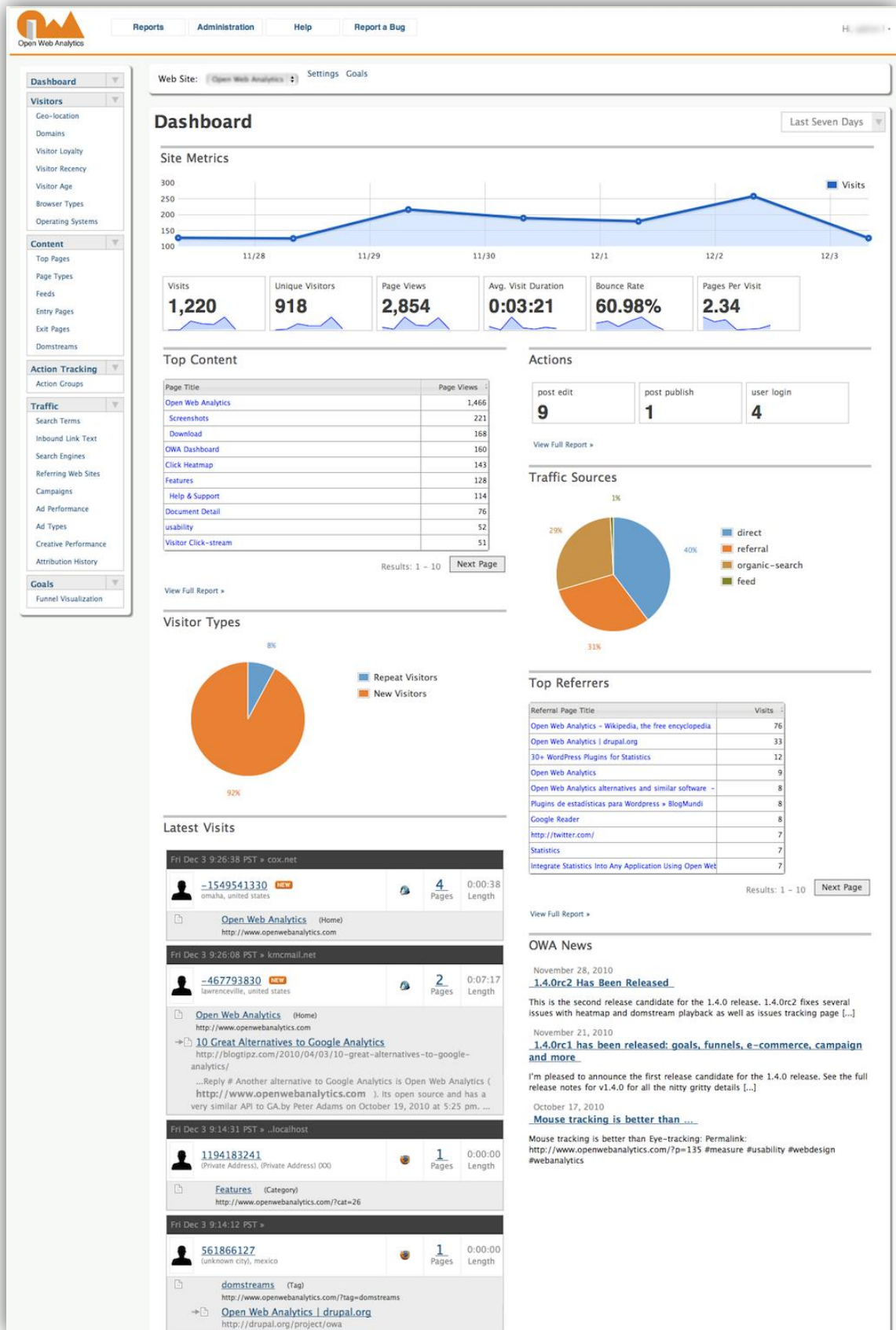


Figure 3: Open Web Analytics - Screenshot 3

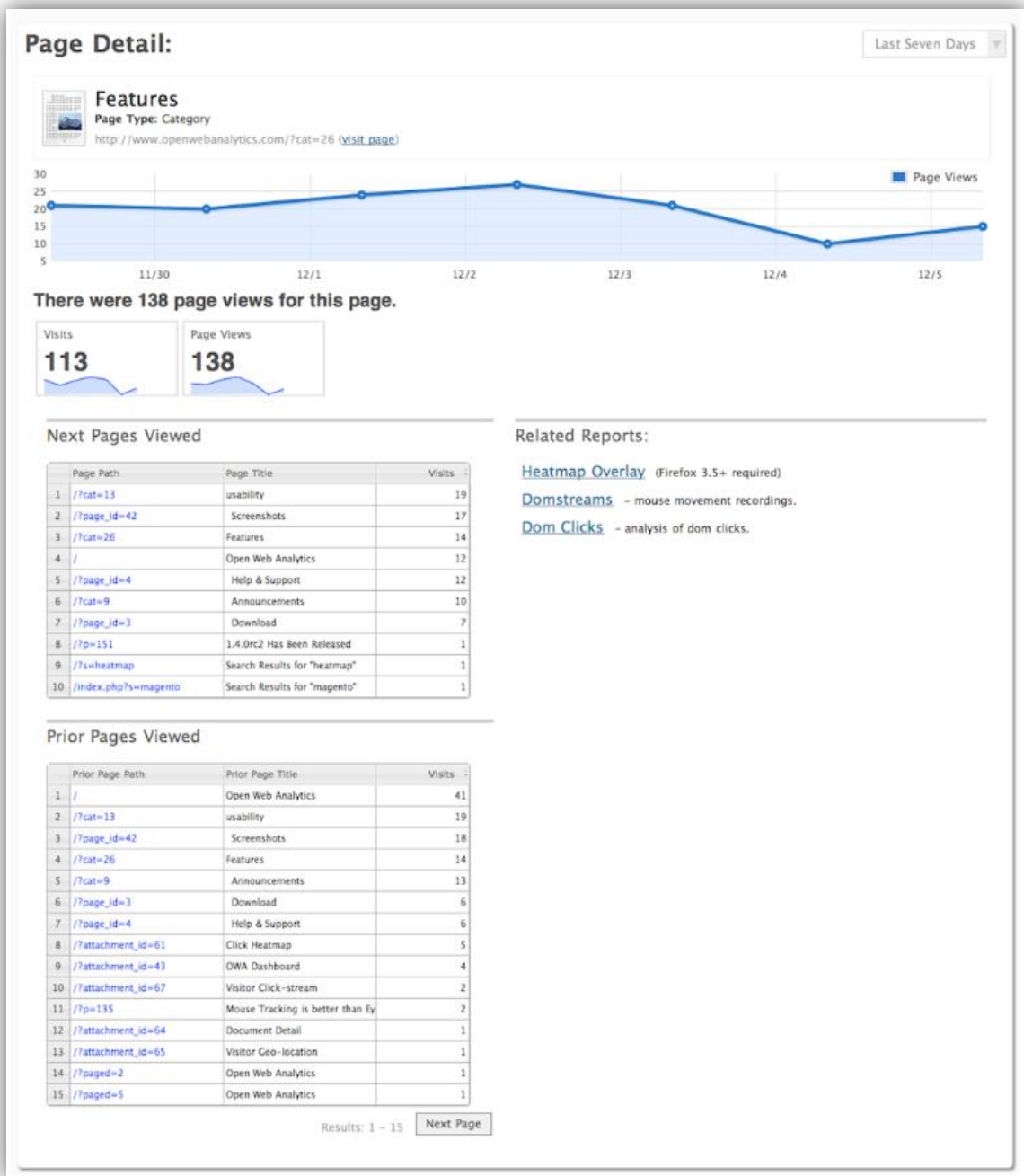


Figure 4: Open Web Analytics - Screenshot 4

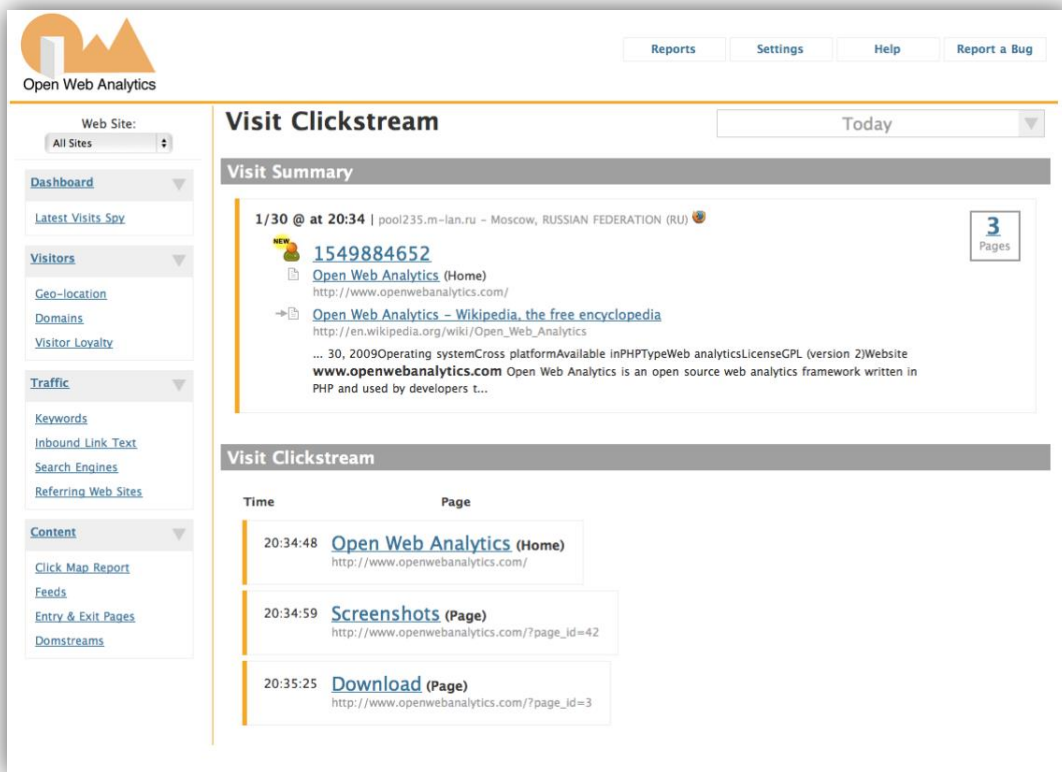


Figure 5: Open Web Analytics - Screenshot 5

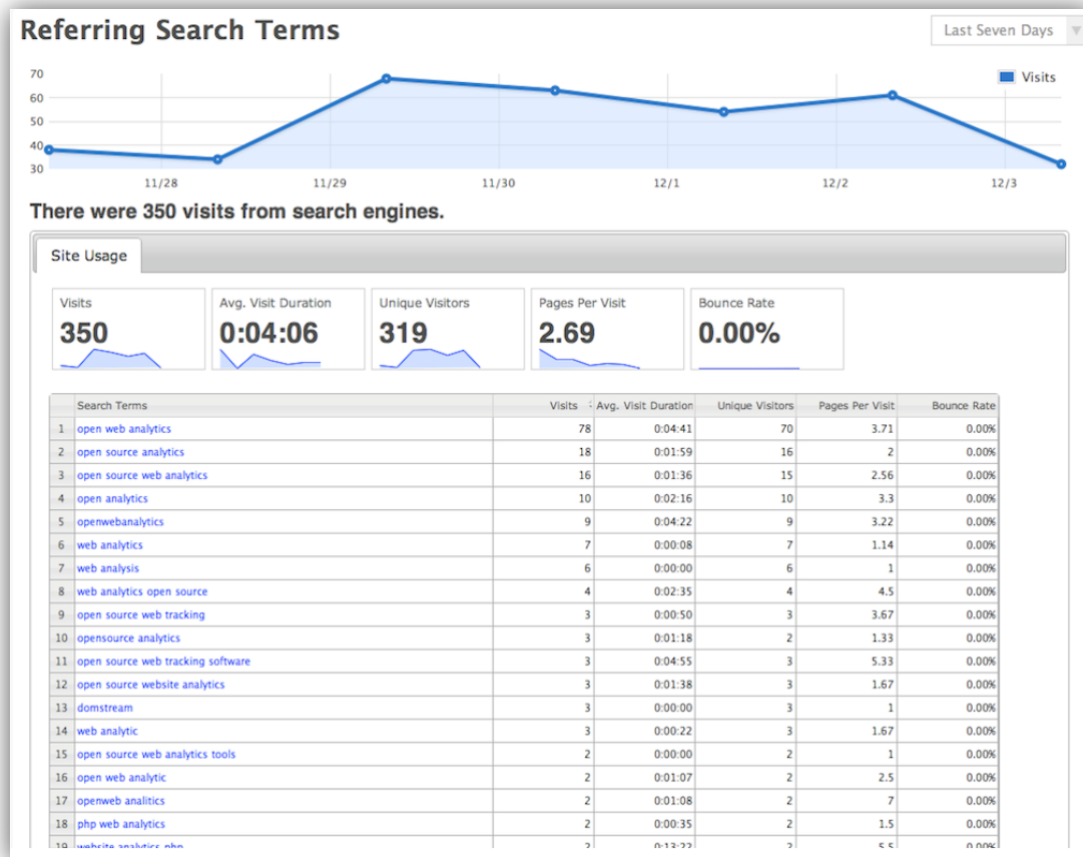


Figure 6: Open Web Analytics - Screenshot 6