



Mobile Analytics

Maximize Revenues and Optimize Network Usage through Informed Business Intelligence

About Openwave

Openwave Systems Inc. (Nasdaq: OPWW) is one of the world's leading innovators of software applications and infrastructure designed to enable revenue-generating, personalized services, including mobile analytics, content adaptation, mobile and broadband advertising, and a suite of unified messaging solutions.

As the communications industry intersects with the Internet, Openwave software enables service providers to converge services, in an effort to increase the value of their networks by accelerating time to market and reducing the cost and complexity associated with new service deployment. Openwave's unique product portfolio provides a complete range of mobile internet service management, messaging, and location based solutions. Openwave is a global company with a blue chip customer base spanning North America, Latin America, Australia and New Zealand, Asia, Africa, Europe, and the Middle East. Openwave is headquartered in Redwood City, California. For more information please visit www.openwave.com.

Openwave and the Openwave logo are registered trademarks of Openwave Systems Inc. in various jurisdictions. All other trademarks are the properties of their respective owners.

Openwave and the Openwave logo are registered trademarks and/or trademarks of Openwave Systems Inc. in various jurisdictions. All other trademarks are the properties of their respective owners.

Copyright © 2009 Openwave Systems Inc. All rights reserved. August 2009

Mobile Analytics

Table of Contents

| | |
|--|-----------|
| Introduction | 4 |
| In-Network vs. Out-of-Network Mobile Analytics | 4 |
| Improving Business Performance with a 360-Degree-View of Subscribers..... | 6 |
| Improving Subscriber Satisfaction..... | 6 |
| Adding Value to the Mobile Ecosystem | 7 |
| Openwave Mobile Analytics..... | 8 |
| Insights to Support Key Decisions..... | 8 |
| Conclusion | 10 |

Mobile Analytics

Introduction

After years of talk about the increased adoption of mobile data services, the demand is finally matching the hype. In the last two years, we have seen smartphones become widely adopted by mainstream consumers, and we expect continued uptake, along with the development of other mobile devices such as netbooks and PC dongles that also access mobile data services. While the growth of the mobile data service market is largely driven by better hardware, we have also seen a number of other non-traditional players entering the mobile internet market, competing for the same customers.

As a result, mobile operators are facing less-than-committed customers who quickly switch providers for low-cost plans, introductory offers, a better user experience, or the latest in services and devices. As subscriber turnover increases, revenue decreases; while at the same time the costs of maintaining networks, infrastructure improvements, and new service deployments continues to increase.

Mobile operators today must make *informed* business decisions to meet day-to-day marketplace challenges. Too often, the information available is either lacking or too complex to be useful immediately. **In short, data is gathered but not analyzed; reported but not understood; shared but not acted upon.**

In order to make sense of subscriber behavior and analyze the sheer volume of data being consumed, analytics tools that monitor customer activity have become essential. These tools can help operators to:

- Understand what motivates customers, and as a result, offer mobile data services that will be profitable
- Track data network usage and, using current and historical reports, model and anticipate the effect of new services or popular sites, thereby preventing bottlenecks
- Determine how best to manage network costs and increase network performance
- Equip decision-makers at every level with fact-based insight so that they can take action and make better day-to-day business decisions

Discovering how analytics tools work and what they can achieve is essential - analytics tools can improve business performance through a 360-degree-view of subscribers; can improve subscriber satisfaction; and can stimulate the wider mobile eco-system.

In-Network vs. Out-of-Network Mobile Analytics

Mobile analytics tools tend to work in one of two ways: out-of-network analytics are usually web-based solutions that monitor how specific sites or applications are being used. In-network analytics are installed within the operator network and monitor all mobile internet usage.

Out-of-network web analytics are better suited for content publishers and website owners who are most concerned with user behavior on a much more limited basis such as their own properties or those adjacent sites in a given browsing session. The data provided by out-of-network analytics solutions is generally inadequate for mobile operators seeking a holistic view of entire user segments because they capture only tagged mobile internet pages using JavaScript or cookies. Pages that are not tagged are not captured, so there is no clear picture of what users are doing.

In addition, out of network web-analytics can be inadequate for operators because they:

- Only provide the network address of the operator gateway
- Cannot uniquely identify individual subscriber visits
- Use embedded JavaScript from the web, which is not widely supported on mobile phones
- Use cookies in some cases, which are unreliable on mobile phones
- Cannot process handset information: model, screen size, handset capabilities, or operating system version

An in-network mobile analytics solution deployed at a central point in the mobile operator network captures all on-deck and off-deck mobile internet traffic. This means that operators can understand the whole picture of consumer surfing habits, as opposed to collecting consumer data from a limited number of sites.

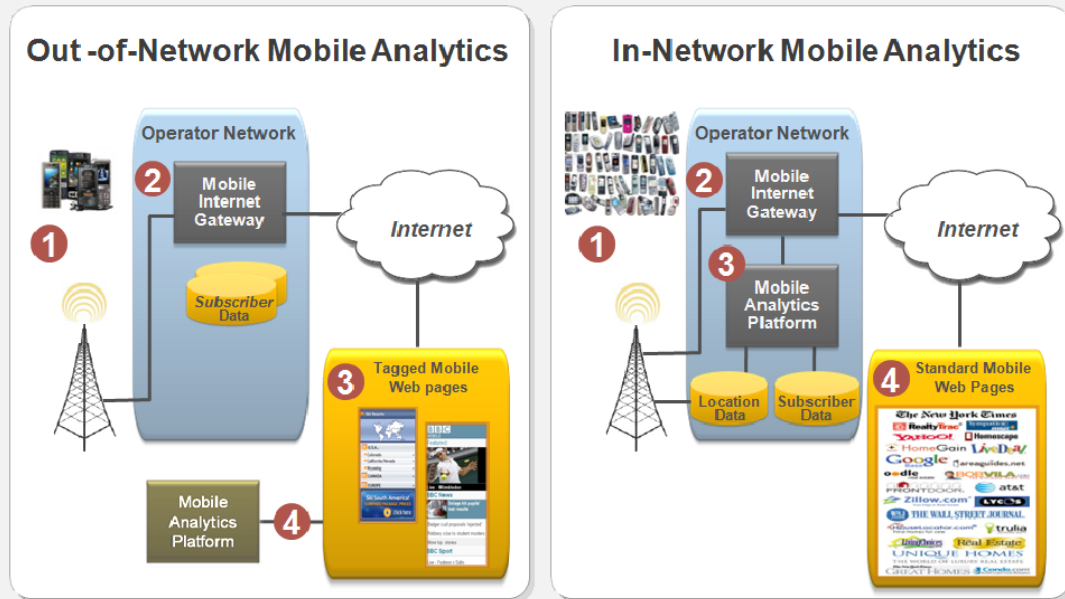


Figure 1: Out-of-Network and In-Network Mobile Approaches

The Out-of-Network Scenario

- Step 1: Users initiate access to the mobile internet through their mobile phone browser, but not all phones are supported.
- Step 2: All requests pass through the Mobile Internet Gateway, which sees every user transaction going through it.
- Step 3: As soon as users access a **tagged mobile page**, the JavaScript tag is executed and is transmitted to the Mobile Analytics Solution, which is outside the operator network.
- Step 4: The Mobile Analytics Solution stores the captured information and provides analytics reports for that particular **tagged mobile web page only**. In some cases, the user may experience some latency in the browsing session during this time. Note that there is no data enrichment in this case.

The In-Network Scenario

- Step 1: Users initiate access to the mobile internet through any mobile phone browser. All mobile devices and browsers are supported.
- Step 2: All requests pass through the Mobile Internet Gateway, which sees every user transaction.
- Step 3: The mobile analytics solution deployed within the operator network captures each user interaction, from the Mobile Internet Gateway, which is also enriched with location and other subscriber data.
- Step 4: The Mobile Analytics solution provides reports on **every on-deck and off-deck** mobile internet page or site that users visit (as opposed to reports on tagged mobile pages only).

Improving Business Performance with a 360-Degree-View of Subscribers

We have seen how an in-network analytics solution can capture all internet surfing habits, but how can this help improve an operator's business performance? The key is that collecting online behavior completes the circular view of subscribers when combined with other data points unique to the mobile operator.

This 360-degree subscriber view can be created from Call Detail Records (CDRs), data logs, and customer relationship management (CRM) databases, plus data from analytics tools. Ultimately, this data enables operators to do a number of things, including:

- Segment subscribers by a wide variety of variables, including usage patterns, browsing behavior, and geographies
- Prioritize segments
- Identify emerging trends
- Develop service bundles for segments and introduce new services
- Target individual users with personalized services
- Optimize internal business processes and the user experience by increasing operational and business performance

To make the most of these capabilities, operators should begin by identifying business goals, such as targeting niche groups, reducing customer churn, or increasing subscriber retention. The maturity of the market in which the operator is competing can affect the goals for improving business performance. For example, in growing markets, the focus of operators is usually on mass customer acquisition with a strong emphasis on pricing. In more mature markets, the focus is on customer service, proactive outreach, loyalty programs and subsidized services.

As part of the analysis process, some key steps include:

- Defining who the subscribers are and trying to understand what they really want
- Measuring subscriber data and developing a number of measurement metrics
- Implementing, changing, or improving the desired user experience to address subscriber needs and solve subscriber problems
- Monitoring and benchmarking against competitors after changes have been implemented
- Obtaining subscriber feedback from different subscriber segments to validate the effect of any change

If operators can develop this holistic picture of customer behavior, and get the process right for targeting customers with relevant services, it can be critical to developing long term customer relationships and increasing revenue.

Improving Subscriber Satisfaction

Given such a competitive market, one of the primary ways to retain customers and increase revenue is to monitor the effectiveness of new products, and as a result, adapt them in response to customer satisfaction levels.

Using the 360-degree-view of the customer, operators can understand the subscriber and the effectiveness of services by asking:

- What are the subscriber's interests?
- What is the subscriber's demographic profile?
- Which products has the customer subscribed to and how are they being used?
- Is the subscriber on contract or pay-as-you-go?
- Which products does the subscriber use while at home or at work?

Once the subscriber is profiled, mobile analytics can enable up-selling of new services and service bundling. For up-selling, operators should analyze the subscriber's product preferences, their needs and spending threshold in relation to their particular segment.

For example:

- Is the new service pricing within the subscriber's spending limits?
- Does the device provide a superior user experience?
- Can the subscriber share the same services within his/her social network?
- Does the network have sufficient capacity to offer good quality of service?

Successful service bundles are those that are tailored to address the subscribers' specific needs. Using mobile analytics, operators can analyze usage patterns of subscriber segments and then develop highly targeted services for those segments.

Mobile analytics can help an operator identify groups of heavy data users across different segments. Armed with an understanding of their usage habits, operators can offer incentives to these heavy data users (e.g. increasing their usage allowance for a small fee), which could result in increased revenues.

Furthermore, by analyzing historical service usage patterns, operators' customer care agents can address customer issues more efficiently and can even offer new services to subscribers based on their profiles and usage habits.

In short, the ability to adjust service bundles to specific user segments will lead to greater customer satisfaction, increased customer loyalty and ultimately drive operator revenues higher.

Adding Value to the Mobile Ecosystem

Besides increasing ARPU and improving customer satisfaction, mobile analytics can turn operators into information brokers engaged in powerful partnerships with advertisers, content publishers, and Web 2.0 companies to create new revenue streams. Using mobile analytics, an operator can aggregate, anonymize and sell access to consumer data to ecosystem partners as a subscription service.

VAS resellers, MVNOs, advertisers, media planners and third-party application developers are hungry for high-quality consumer data to improve their targeted campaigns and brand promotions. For example, if an advertiser wants help in determining a more effective ad campaign, specific information about the effectiveness of an MMS ad – whether the subscriber reads it, acts on it, forwards it or simply deletes it – is essential.

All the benefits of a good analytics tool disappear without the trust of your subscriber base. Operators must share subscriber information with care to build and protect the relationship with the subscriber. While detailed knowledge about a subscriber is the key to capitalizing on new revenue opportunities, operators must be able to protect the data by adhering to privacy laws and maintaining their own transparent privacy policy. Here are some general guidelines around using subscriber information.

- Users must give their consent for personal data to be collected.
- Personally Identifiable Information (PII) must be protected at all times.
- The operator holds a position of trust and must not abuse that trust.
- Operators must inform customers exactly what they are opting in to.
- Options for opting out must also be presented to subscribers when they sign up for any promotions or services.
- These opt-in/opt-out mechanisms are well defined by the [Mobile Marketing Association](#) (MMA).
- Operators should conduct targeted marketing campaigns with the approval of subscribers who have opted in to receive the promotions.

Openwave Mobile Analytics

Openwave's Mobile Analytics is an in-network analytics solution that provides subscriber insight by tracking on-deck and off-deck subscriber data and click-stream data. Mobile Analytics is purpose-built for mobile operators, leveraging a rich set of data uniquely tracked by Openwave products. The solution offers:

- Key metrics (current and historical) on network, device and subscriber usage trends for improved capacity planning.
- Operational reporting for improved utilization of limited mobile network resources.
- Subscriber and device reports pinpoint those users and devices most likely to cause network congestion.
- Traffic reports determine network congestion areas across the access network, internet backhaul and web applications/sites.
- Site reports help plot the course to increased revenue by identifying popular trends (current and historical) on which to base relevant services and premium content.
- The ability to analyze content consumption patterns to improve on-portal and off-portal user experiences and help reduce churn.
- Accurate mobile audience metrics provide strong leverage in forming advertising partnerships.
- When used with Openwave Accelerator, provides compression and optimization to address network congestion problems.
- When used with Openwave Passport, enables promotions and recommendations to be delivered to users.

Mobile Analytics enables data collection from multiple disparate sources via FTP and off-deck URI categorization using sophisticated matching heuristics. It offers an extensive library of mobile device vendors, handsets, and device capabilities, such as video, audio, and input types. Mobile Analytics also can be integrated with advertising offerings, providing click-through analysis and segmentation of customers via behavioral targeting for advertising purposes.

Insights to Support Key Decisions

The following Openwave Mobile Analytics reports can provide an accurate picture of subscriber activity on the network.

- **Device reports** - provide a breakdown of devices by vendor and model, which is useful in determining the most popular devices that subscribers are using to access the internet or the amount of data consumed per device. High data volumes per device could reflect easy-to-use devices for accessing the mobile internet coupled with a good user experience (Figure 2). Additionally, high data volumes on devices could point to those users who abuse their data plans by consuming more data than allowed by their plan. As a result, they could be subject to bandwidth throttling or charged according to the fair usage policies set up by the operator.



Figure 2: Device reports help predict device trends

- **Traffic reports** - (Figure 3) can be used to track the most popular types of content being consumed over a particular period of time. These historical and current reports are useful in planning and forecasting how traffic volumes will evolve over time.

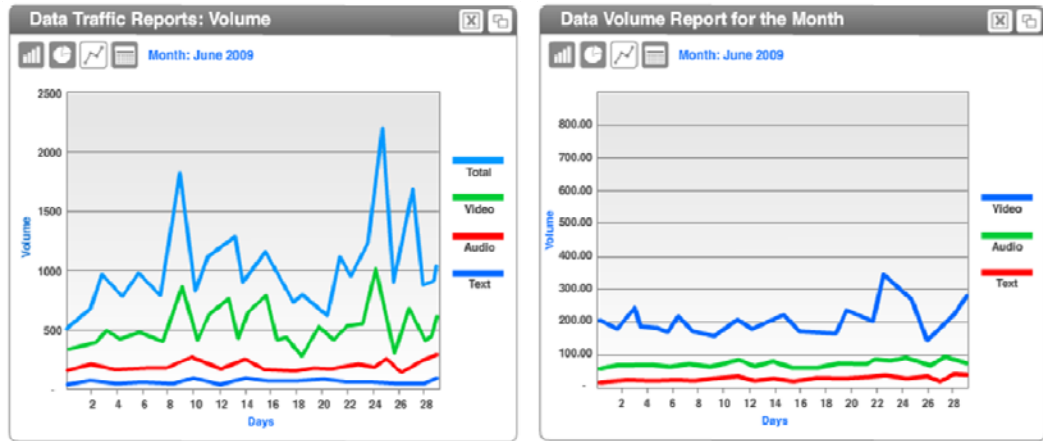


Figure 3: Traffic reports show new content consumption trends.

- **Destination reports** - (Figure 4) can be used to identify the top website destinations for purposes of partnering with those sites to promote banner ads or affiliate marketing. Anonymized subscriber information can also be made available to partners for a subscription fee. These reports can be used to further analyze the different content categories that subscribers frequent, with the aim of offering targeted content propositions to specific subscribers.

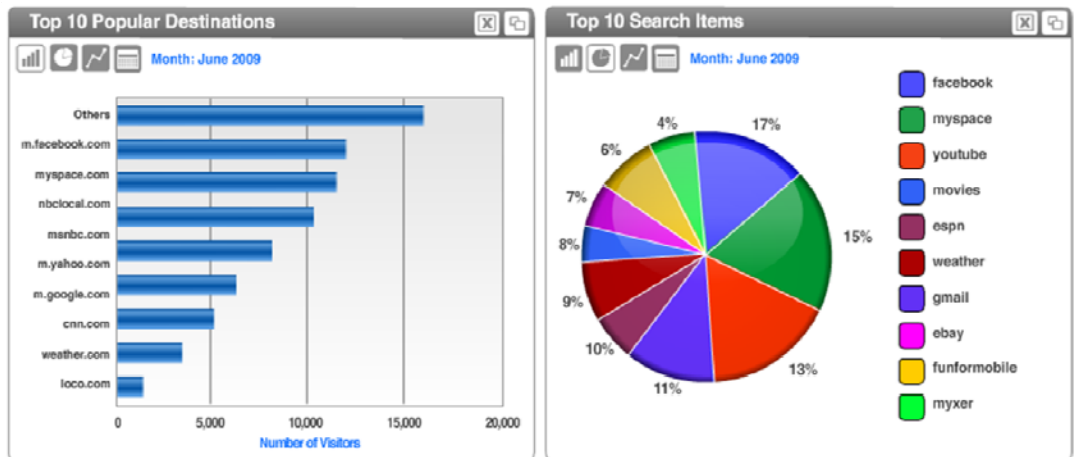


Figure 4: Destination reports help target new services

Conclusion

The vast increase in mobile data usage poses an undeniable challenge to operators. It is also a real opportunity. The operators' unique position as the holder of multiple data points means that if they can harness the data consumption habits of their consumers, operators can create a valuable 360-degree-view of their subscribers' behavior. This view will help operators tailor their products, increase customer satisfaction, sell additional services, and grow their revenue stream. It also creates new opportunities for operators to partner with other developing parts of the mobile internet eco-system, such as advertisers and application developers, to diversify their revenue stream. Openwave's Mobile Analytics solution provides a unique toolkit to help operators analyze subscriber data to achieve their business goals.

Since 1996, Openwave has been involved in creating solutions that deliver valuable subscriber information to operators. Openwave knows which data has business value, how to infer value from data, what data to correlate, what other network elements to leverage, and how to turn strategic insights into actionable intelligence.

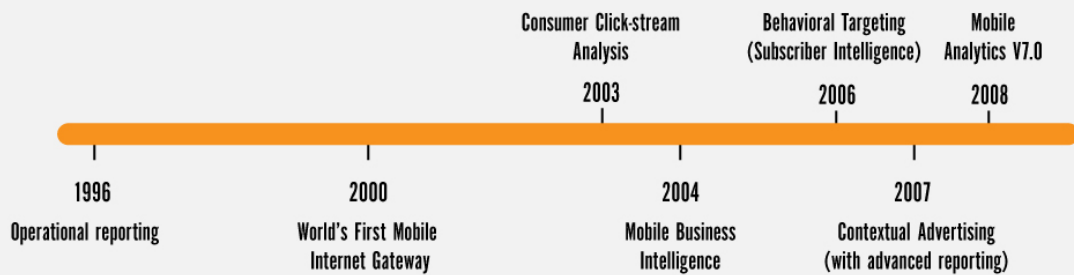


Figure 5: A History of Collecting Intelligence

Authors

Openwave Systems Inc.

Feedback

Mayur.Pitamber@openwave.com



Openwave Systems Inc.
2100 Seaport Boulevard
Redwood City, California 94063 U.S.A.
Corporate +1 650 480 8000
Europe +44 2890 416 200
Japan +81 3 5909 6100
www.openwave.com