



INSIGHTS DRIVEN COMPUTING REALIZING WEB ANALYTICS STRATEGY

Paper discusses the methods and techniques to leverage the web analytics based services to gain insights into customer behavior to enhance user's online experience by providing a personalized and customized experience. Enhanced user experience would translate into increased business revenues. The paper also discusses a framework to realize the analytics seamlessly from the business team without the involvement of implementation team. Finally the relevance and utility of Web analytics for the emerging markets is discussed.

Introduction

Traditional online platforms were a one-way traffic wherein the key design elements including the main user interface, navigation, flow etc. were designed by the organization. The end-user had little or no say in that. With the emergence of web 2.0, the web is now more user-focused than ever. The complete online experience is shifting towards the intuitiveness which is likely to engage the end-users and keep them interested an increase the likeliness of their participation.

User centered experience is changing the way information is presented. It is in the interest of business that the presentation is designed which appeals to the end user and the information is presented in its most intuitive fashion. The same thing applies for navigation design as well. Analytics is a broad area which deals with capturing and understanding user's explicit and implicit actions and trying to make sense out of which. This in turn will be used to optimize the business operates. Web analytics mainly deals with collecting, measuring, analyzing, and reporting the data on presentation components.

In this paper, I introduce the key business process steps in designing a web analytics strategy for an online platform. In addition to that, I have also narrated an intuitive way of realizing a web analytics framework from business team in real-time without the need of implementation or operations team. The paper is structured as follows: It provides the general advantages and relevance of web analytics in section II. Section III discusses the key business process steps required for implementing a web analytics strategy. Section IV discusses about steps in the implementation of web analytics and Details of realizing a web analytics framework is discussed in section V. Section VI provides the performance management details and Section VII provides the relevancy of web analytics for emerging markets and section VI summarizes the paper.

Analyzing Web

Prior to the arrival of web analytics the

most popular ways to understand the user behavior on Web was done in one of the following ways:

- Market research
- Beta testing the web site and collecting the feedback
- Perform usability testing from specialized third-party agencies.

However all these methods lacked one important factor: real-time end-user feedback and analysis. Some of the e-commerce sites need to analyze user behavior in real-time to promote and recommend their products. They also need this information to understand any seasonal patterns, emerging trends etc. so that they can customize their selling based around it.

In scenarios such as these, the business needed an analytics system which continuously monitored user behavior and provide real-time feedback in intuitive reports so that the business heads can make sense out of their customer behavior and prepare their action plan around it. It would also help them measure the effectiveness of their web site UI, online campaign etc.

Measuring analytics of Web is a two-way traffic:

- Business wants to measure and improve their intended and promoted online strategies
- Business also wants to understand the patterns emerging from their customers' behavior

Web analytics play a key role in analyzing both the intended and emerging topics in real time. Following are some of the key benefits by successfully implementing a web analytics strategy:

- Visualize the key site data (traffic, time spent, exit rate etc.) in intuitive fashion.
- Track and measure the effectiveness of online campaigns
- Derive patterns, emerging trends and gain valuable customer insights.

Following table provides web analytics usage for few typical web scenarios:

Sample Business Scenario	Required Analytics
How effective is my online seasonal campaign?	Track clicks on campaign and conversion ratio
How useful is the existing online platform?	Track site usability metrics including site traffic, visitor profile, exit rate, visits duration.
How can we improve the product recommendation?	Track the recently viewed products and user interests to provide personalized product recommendations

Table 1 : Web analytics sample scenarios

Understand customers by their clicks :

Many a times customers do not explicitly provide feedback/rate their online experience. However we can get a rough idea of their overall satisfaction by "connecting the clicks" user did on the site and other key metrics like time spent on site, conversion ratio etc. Web analytics play a vital role in making sense of these user clicks and metrics to uncover any hidden trends, providing customer insights and to make a sense of overall online strategy.

The importance of metrics also varies across industries. For instance following metrics would assume importance in e-commerce industry ^{[9][10]} :

- Clickthrough rate
- Traffic
- Revenue per visit
- Bounce Rate
- Page view
- Value per order
- Repeat customer frequency
- Conversion rate

Analytics Driven Online Business

“If you cannot measure it, you can’t improve it” holds true for managing and improving online business. Hence the primary step for a business is to layout the criteria for measuring their online platform. I am providing below two broad strategies which follow the “measure-and-improve” model.

A. Measure effectiveness of intended strategy

In this strategy the business wants to measure the effectiveness of their intended online strategy. A three step process in implementing this strategy is given below:

- **Step-1 Establishing business goals:**

Identify the key business success factors for the online business. For instance a manufacturing website is designed with the key intent of enabling “easy information discoverability” for its customer; an e-commerce site is designed to “maximize revenue per customer”

- **Step-2 Identification of metrics for measuring business goals:**

The business needs to identify the metrics which will measure the business goals identified in step – 1. Below mentioned table provides an indicative mapping of goals – metrics:

Business Goal	Measuring metrics
Improve information discoverability	Site Usability metrics (page views, time on site, click paths, exit rate, bounce rates, traffic source) Conversion statistics (site traffic, new visitor, returning visitors)
Increase online revenue per customer	Metrics for measuring cross-sell and up-sell (revenue per visit, repeat purchase rate, items per order, conversion rate), duration.

Table 2 : Indicative business goal-metrics mapping

- **Step – 3 Measure and manage metrics:**

Once the business has established the metrics to measure the effectiveness of intended online business strategy. All the web analytics frameworks provide intuitive graphs which can be developed around the

key metrics and monitored. In addition, the business also needs to set-up appropriate real-time notification and exception handling process to manage and improve these metrics. For instance if the page view metrics drop below a pre-configured threshold, the notification mechanism should alert the relevant business team to investigate this further and take appropriate action. Some of the critical metrics like page load times; availability needs immediate attention to avoid risking customers.

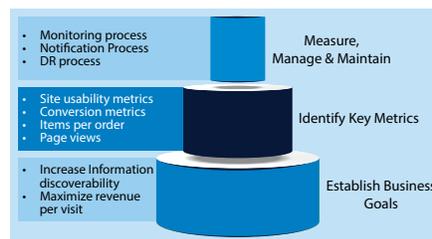


Figure 1 : Hierarchy of steps in implementing web analytics intended strategy

B. Identify and act on emerging trends/patterns strategy

It is not enough that business monitor and manage their intended business strategies; more often than not they need to watch out for emerging and hidden trends from their customers’ behavior. In the absence of such strategy, business will not be able to react to seasonal trends and patterns. Implementing this strategy is easier said than done as it is often difficult to arrive at emerging patterns. Following are key steps in implementing this strategy:

- **Step-1 Identify the categories and flows:**

Identify the category of consumers, transactions and flows which form the major chunk of business. For instance a banking site can have all transactions which a customer can perform ranked by priority into the “key transactions” group. Similarly a multi-geo site can identify the locales and countries into “key geo factors” group.

Note: These categories and flows/ transactions need not be part of their

main business goals. This set would generally include all key features of the website.

- **Step-2 Mark and measure the categories, flows and transactions:**

Once the boundaries of the online business transaction is established through key categories, flows and transactions they can be marked. This is done by page tagging using a web analytics framework. The page tagging will add client-side JS event handlers which triggered when the event occurs. The event could be as small as clicking a link to as large as completing a full order processing flow.

- **Step-3 Identify patterns:**

This is the complex step in the overall process. The business analysts have to monitor the graphs regularly and identify any patterns that emerge. For instance if a particular type of clothing product outsells all other types in summer season, business needs to perform detailed analysis of the product attributes, seasonality factor to offer more attractive packages. Similarly if the bounce rate has increased after a site redesign it needs to be analyzed if any of the UI elements caused this issue.

It needs deep business and customer understanding to derive the patterns from customers’ behavior. Often a combination of multiple factors can contribute to establish the correct pattern. For instance, if there is an increase in exit rate/bounce rate in the order page there could be various reasons. However when we discover that the page load time of order page has increased off-late it helps us to conclude the cause-effect analysis.

It is always recommended that organizations adopt both the strategies to get sound customer insights and understand the trends to stay ahead of competition.

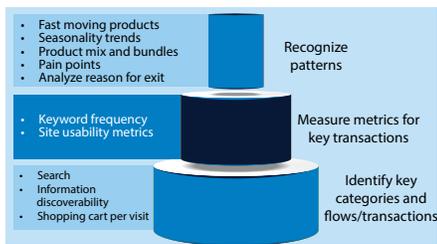


Figure 2 : Hierarchy of steps in implementing web analytics emergence strategy

Steps in implementing web analytics

This section provides key steps for implementing the Web analytics.

Essentially any effective web analytics implementation should cover these three steps:

- Acquire the key metrics
- Analyze the information acquired
- Act based on the analysis

Following diagram depicts these three steps with sample metrics information.

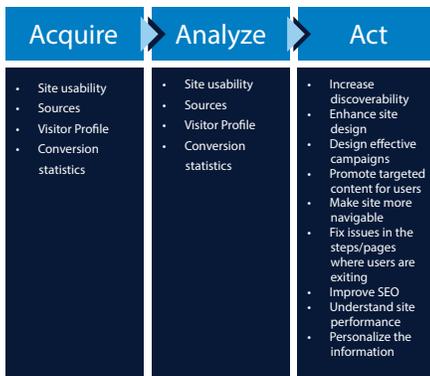


Figure 3 : The AAA framework of web analytics implementation

A. Acquiring

This step consists of acquiring the metrics related information. The metrics can be either obtained by mapping them to business goals (intended strategy) or can be obtained from markers at key flows and transactions (emerging strategy).

Site usability	Sources	Conversion statistics
<ul style="list-style-type: none"> • Page views • Time on site • Downloads • Click Map • Click Paths • Click-through Rate • Checkout Abandonment Rate • Items per order rate • Landing Page Bounce Rates 	<ul style="list-style-type: none"> • Referrals • Search engines • campaigns 	<ul style="list-style-type: none"> • New visitors • Returning visitors • Leads • Exit rate • Bounce Rate • Visit duration • Task completion rate • New Visitor Conversion Rate • Return Visitor Conversion Rate • Visitor Loyalty & Visitor Recency
	Visitor Profile <ul style="list-style-type: none"> • User segmentation • Search keywords • Geography 	
	Performance <ul style="list-style-type: none"> • Landing Page Load Times • Availability • Speed • Geo specific page load times 	

Few common metrics obtained during this step for an e-commerce site is given below:

These metrics need to be carefully selected based on the critical business goals and flows/functionalities. The list should also need to be refined based on the industry domain. For instance checkout abandonment rate is an essential part of e-commerce site whereas it is not applicable for information display sites.

B. Analyzing

Once the required information about key metrics is acquired, the business analysts need to analyze to make sense of the obtained information. Most of the web analytics frameworks provide intuitive visualizations and dashboards to provide holistic view of the captured information in near real-time. Following list provides the information that can be analyzed from the metrics captured in the previous step:

Site usability	Sources	Conversion statistics
<ul style="list-style-type: none"> • Information discoverability • Issues with page design • Site interactivity • Path/Information architecture effectiveness 	<ul style="list-style-type: none"> • Campaign effectiveness • SEO effectiveness • External ad effectiveness 	<ul style="list-style-type: none"> • Visitor stickiness • Transaction Completion/abandonment rate • Exit rate steps/pages
	Visitor Profile <ul style="list-style-type: none"> • Search effectiveness • Geo/browser visitor percentage 	

C. Act

After the analysis, the business team can come up with an action plan to “act” on the analysis. This is the crucial step in the model. Following is an indicative list of actions that can be taken from the analysis

done in the previous step:

- Increase critical information discoverability for the site
- Enhance site design
- Design effective campaigns for dealers, distributors etc.
- Promote targeted content for users
- Make site more navigable
- Fix issues in the steps/pages where users are exiting
- Improve SEO to increase site traffic from external search engines
- Understand site performance in different geographies
- Personalize the information and flow based on user’s interest/usage history

A business framework for automated web analytics implementation

Now we have understood the AAA model of web analytics implementation, we can now focus on implementation details. A typical implementation process involves following sequence of steps:

- Business identifying metrics
- Business providing detailed requirements to implementation team
- Implementation team updates relevant page tags and performs testing
- Operations team deploys the updated code to production

As we can see that above process involves multiple teams and there is definitely a lag when the business decides to its actual implementation in production environment. However in some mission critical applications the lag is not an acceptable option.

This section discusses methods and techniques to completely automate the above sequence of steps. We will also go one step ahead and eliminate the involvement of other teams. So when business decides the changes to its web analytics framework it can use this framework which deploys the changes automatically.

The following diagram depicts the high level working of this automation framework:

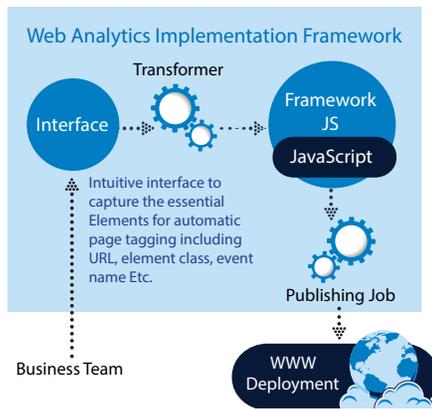


Figure 4 : Web analytics framework components

Before the explanation of the web analytics implementation framework a brief discussion of how most of web analytics frameworks work is given below:

1. Typically web analytics frameworks need the supporting JavaScript files which can be optimally placed in the footer section of the page. For instance Google Analytics requires ga.js file^[6]
2. Upon page load the required tracking code/JS variables are populated.
3. The tracking code will be sent to the web analytics server as an image request. The code is sent when the appropriate trigger happens (page load or event)
4. Web analytics server builds a near real time reports based on the data it receives.

Web analytics implementation framework is built on top of these steps and provides following additional capabilities:

- Automatic injection of tracking code values. For instance population of values related to locale, user attributes etc.
- Automatic addition of the events that need to be tracked. For instance tracking the click of a new button.
- Automatic re-deployment of the updates to all publishing servers.

These steps would essentially equip a

business team to fully automate the end-to-end management of a web analytics framework.

Here are the detailed components of the framework:

A. Interface

The framework offers an intuitive interface built for the business community. It's a web based interface wherein the business team can enter specific details of web analytics that need to be tracked. Let's consider a simplistic scenario for discussion purposes: business wants to track the traffic and page visit data for their product landing page (www.ecommerce.com/products). Normally a page visit tracking requires minimal tracking. Let's say that we require following variables for tracking page visit:

- URL
- Browser details
- User details
- Geo
- Locale
- Campaign

Business team has to specify that the products landing page wants a "page visit" tracking and also the values for the above variables. They can specify that details in the interface:

Page	Analytics Tracking Code
www.ecommerce.com/products	URL=D_url Browser=D_browser User = D_user Geo = D_geo Locale = D_locale Campaign = S_1234
www.ecommerce.com/products/*	productName = D_prodname

Table 3 : Framework interface details

Let's examine what the above table does: The "page" column indicates to the web analytics framework that the URL specified needs to be tracked. In the "Analytics Tracking code" column the business team can also specify the values for tracking code.

Note: The details of tracking code is technical; to abstract the inner details of this tracking code from business team, the interface pre-populates the tracking code names required for tracking. Business team

can specify "how" the framework needs to assign those variable names.

There are two simple ways to assign a value to a tracking code variable: static wherein the business specifies a hardcoded value and dynamic which depends on the page and user/session context. Static values are prefixed with "S_" followed by <constant_value> whereas dynamic values are prefixed by "D_". The framework has code to populate the values prefixed with D_ at runtime. For instance in the above example values like URL, locale etc. are dynamic. The framework assigns the appropriate values to these variables at runtime and provides information the meaning of these tracking code variable names and how the dynamic value would be calculated at runtime.

Another feature of the framework is that it "inherits" the tracking code. In the above example, all pages which matches products/* which are subsequent product pages will inherit all the values specified for products landing page. In addition it can also override and/or add new values. In this example we are adding a dynamic value for tracking product name.

Let's consider another scenario wherein the business wants to track the click of button. The business team wants to specify the values as given below:

- Page: The URL of the page
- Section/Module: The module which contains the button
- Element: Id or class name of the button
- Event name: Click or mouseover
- Tracking code: Tracking code as specified in the previous table.

The interface also offers highly intuitive features to visualize the sections while specifying markers. For instance they can preview the section and component (button) for which the tagging is specified to ensure that the marking is done for the correct component.

Specifying tracking code in the interface is the only key step that business needs to perform. Once it is done they can submit the details to the framework and it takes care of handling all subsequent steps till

the live deployment. Details are specified in the subsequent sections.

B. Transformer

The transformer component collects all the details submitted and converts it into a JSON object. JSON object is subsequently used by the framework JS files to inject the values on to the page. A sample JSON object for the table III is given below:

```
{
  page: 'www.ecommerce.com/products',
  URL: 'D_URL',
  Browser: 'D_Browser',
  User: 'D_user',
  Geo: 'D_Geo',
  Locale: 'D_Locale',
  Campaign: 'S_1234'
}
```

Once the JSON is created, the transformer sends it to the framework JS files.

C. Framework JS

The Framework JS files are the core components of this framework. They are developed in JS and will perform following tasks:

- Read the values from the JSON file
- Parse the page DOM after page load
- Inject the tracking code to the tracking code variables
- Inject the tracking code to the specific components and the events.

These JS files need to be included in the footer section of the page.

D. Publishing Job

Once the JSON and framework JS files are ready, the publishing job will push/ deploy these two assets to the appropriate publishing locations.

Post deployment all the user requests would get the updated assets once their local cache is cleared.

As we can notice that above four components would eliminate the need for development team and operations teams. It promotes a self-service model wherein business can deploy their changes on-demand.

Performance Management

Though traditionally the web analytics frameworks are used for tracking key parameters, another facet is related to performance. It is possible to understand the following key performance parameters using the same techniques ^[8]

- Complete Page load times across geographies
- Perceived page load time across geographies
- Load time for assets
- Availability across geographies
- Total transaction/process time across geographies.

Cross channel/device performance

These parameters would help the business understand how their online platform is performing across geographies. As performance is becoming the key success factor for the online strategy it is important to track the metrics related to these for a successful online campaign.

Performance needs special consideration as it is one of the critical factors for business continuity. In this regard the business has to adopt following process:

- Setup appropriate real time and cross-geography monitoring process. This can be achieved through web analytics and other monitoring tools.
- Setup an appropriate notification process. For instance if the site response time falls below a pre-configured threshold limit, it should send automatic notifications to the site admins.
- Setup a disaster recovery (DR) environment to handle business continuity

Relevancy of web analytics for the emerging markets

Emerging markets challenges in infrastructure and are developing economic countries. Following are the key factors that need consideration while adopting web analytics strategy in emerging economies:

- Challenges in infrastructure including low bandwidths
- Price sensitivity
- Multi device enablement

Let's look at the implications for each of these factors on web analytics framework and implementation.

A. Infrastructure challenges

As many locations of emerging markets have low bandwidth following web analytics metrics gain prime importance when implementing the web analytics strategy:

- Perceived page load time is important as the landing pages need to be light weight and load quickly.
- Availability
- Site usability metrics to enable easier information discovery

B. Price Sensitivity

E-commerce sites need to identify the fast moving products and seasonal trends and provide price-sensitive product recommendations. Following metrics need to be closely monitored:

- Average order value
- Exit rate/bounce rate

C. Multi device enablement

Enterprises also need to look out for multi-channel avenues for their online strategy. Following are the key metrics in this context:

- Multi-device load time
- Click path analysis
- Downloads

Note: In addition to identifying the key metrics, it is always recommended that firms also have a strong strategy for identifying emerging trends.

Summary

In this paper we started the discussion with a brief introduction of web analytics concepts and its importance. We discussed the utilities and few sample scenarios of web analytics. Then we also discussed two broad strategies to measure the

effectiveness of intended strategies and to discover the emerging patterns along with various metrics relevant for these two strategies. A sound web analytics strategy for a business adopts both of these strategies.

We then touch based AAA model of implementing a web analytics framework.

There was a discussion of automating the web analytics realization framework from business alone. We saw how web analytics can be used for performance management and how the discussion points are relevant for emerging markets.

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