Master of Technology in Enterprise Business Analytics
(Web Analytics Elective)

Introduction to Web Analytics

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What is Web Analytics?

- Web Analytics
  - The measurement, collection, analysis and reporting of web data for purposes of understanding and optimizing web usage (Wikipedia)
  - The study of visitor, traffic and navigation patterns to discover the success of a particular website
  - GOALS ~ increase website traffic, improve the user experience (UX), ensure website meets its business goals

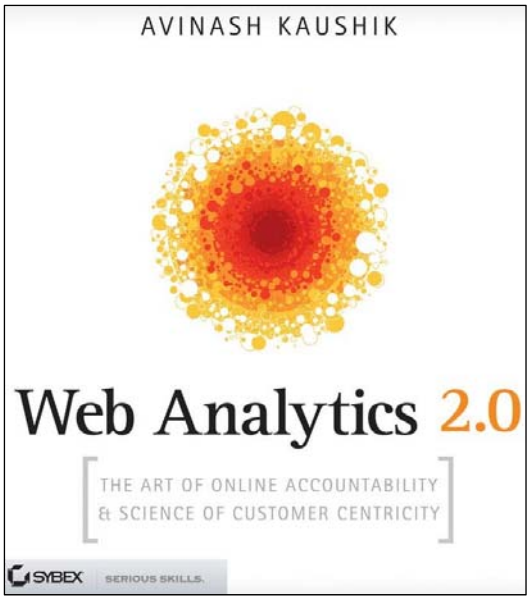
What most people think of as Web Analytics

Web Analytics Tools: Google Analytics, WebTrends, ….

Web Analytics 2.0?

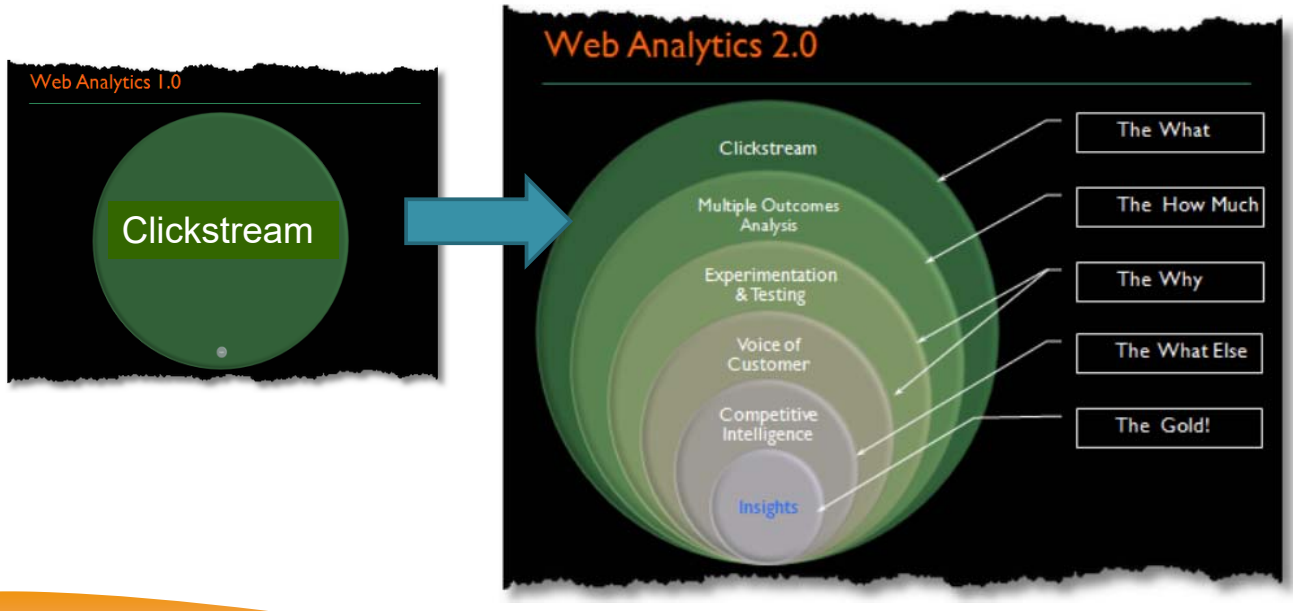
Web Analytics 2.0 is defined as:

1. The analysis of qualitative and quantitative data from your website and the competition
2. To drive a continual improvement of the online experience of your customers and prospects
3. Which translates into your desired outcomes (online and offline)



Web Analytics 2.0

- https://www.kaushik.net/avinash/rethink-web-analytics-introducing-web-analytics-20/



On-site vs Off-Site Web Analytics

- On-Site Web Analytics
  - Analysis of visitors behavior once they are at your website – analysis of webserver logs
  - Example tools include Google Analytics, Adobe Site Catalyst, WebTrends etc
- Off-Site Web Analytics
  - Analysis of your *potential* website audience and how you website compares to others
  - Main Tools and Methods:
    - **Panels**: Companies such as comScore and Nielsen recruit panels of users who install monitoring software to measure their web activity. Panelist demographics are known but they are mostly home users.
    - **ISP Data:** Companies such as Hitwise aggregate anonymous data provided by ISPs – the ISP web log data. Covers all visitor types: home, work, mobile, educational, public access etc. This data is anonymous hence demographics are not available.

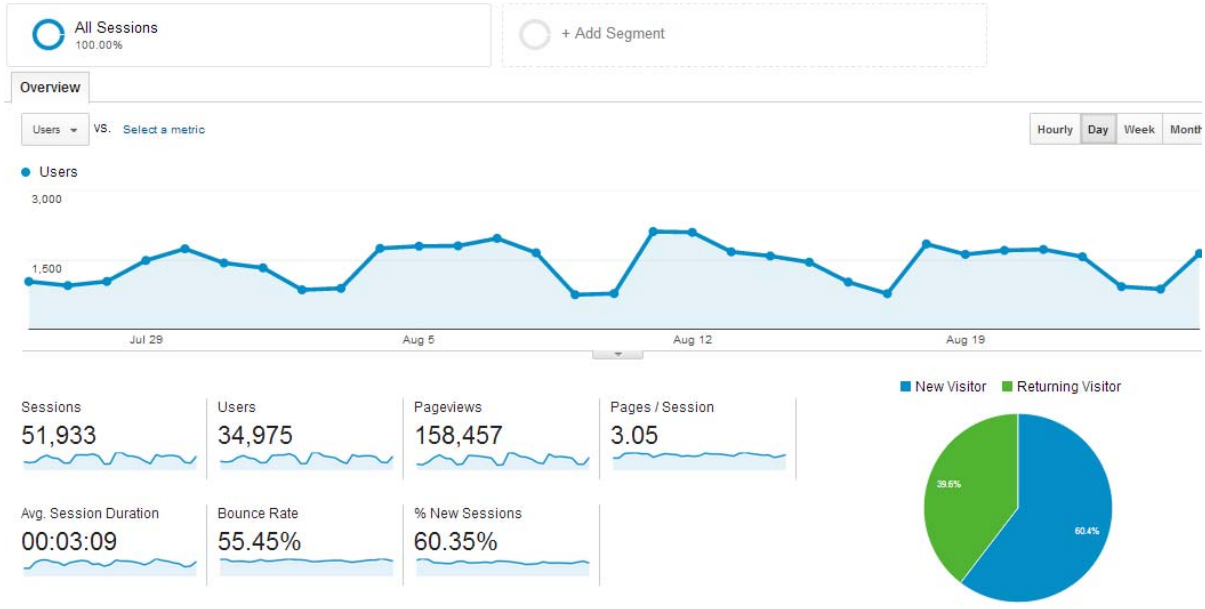
The Bigger Picture: Web Mining

- Web Usage Mining
  - Understanding and modeling how users interact with the web, determining what their interests are and what they are looking for
  - Focus on: website optimisation, improved search, behavioral modeling, content personalisation, making recommendations, ….
- Web Content Mining
  - What can we learn from the content that is on the web?
  - Focus on web crawling & sampling, text mining
- Web Structure Mining
  - What can we learn about the interconnection between websites and between entities on the web?
  - Focus on graph & network mining, e.g. social network mining

Agenda for the Elective

- Day1: Web Site Analytics (Barry)
  - Website Analytics methods and tools
  - Google Analytics Workshop
- Day2: Web Usage Mining (Barry)
  - Mining Web Server Logs (page-view and search query logs)
  - Mining Online User Behaviors (Search relevance prediction, Ad click prediction, Content Recommendation)
- Day3 & 4 & 5: Web Structure Mining (Dr Li Xiaoli, I2R)
  - Graph & Network Mining concepts
  - Link Analysis, Social Network Mining
  - Day5 (pm) will be presentations for Xiaoli's assignment project

On-Site Web Analytics: How is it done?



ISS Website Users (shown using Google Analytics)

On-Site Web Analytics: How is it done?

- Log File Analytics
  - Whenever a webserver delivers a webpage to your browser this is recorded into a web server log
    - Typical fields = Date-time, IP-address of client, Browser Type, URL requested…..
  - Every served page (page-view) is logged – log size can hence be huge
  - Usually performed in-house – you buy and maintain the analytics software
- Page Tagging
  - You insert some small tracking code (*usually JavaScript or Flash)* onto every important web page in your website
  - When the users browser displays the webpage it executes the tracking code which send a message back to the Web Analytics Server
    - Typical fields = Page-ID, Date-time, IP address of client, Browser Type, Screen Resolution ….
  - Can be performed in-house, but usually provided as a third-party service

Advantages of log file analysis

- Pros
  - No changes to website required, the raw data is already available
  - Easy to switch web analytics tool, the data is on the company's own servers, in a standard, not proprietary, format
  - The web server records every transaction it makes, e.g. serving PDF docs - does not rely on the visitors browser cooperating - does not require JavaScript to be enabled
  - Search engine spiders get logged, can be useful information for SEO
  - Doesn't slow page loading, no external server calls (e.g. DNS lookups)
- Cons
  - Search engine spiders and robots get logged – they must be detected in the logs and removed for normal analysis
  - Web caching isn't logged; if a person revisits a page that can be retrieved from the browser cache, then the web server gets no request. The person's path through the site is hence lost. Caching can account for up to one-third of all page-views, omission can seriously skew many site metrics.
  - Can be more expensive to set up Web Log Analytics tools: can require specialist knowledge of web logs
  - Web logs can periodically be purged

Advantages of Page Tagging

- Pros
  - Available to companies who don't have access to their own web servers
  - Also records visits to cached pages
  - Can record events which do not involve a request to the web server, e.g. interactions within Flash movies, partial form completion, mouse events, visitor screen sizes, even (potentially) price of goods the visitor purchased.
  - The page tagging service manages the process of assigning cookies to visitors; with log file analysis the server has to be configured to do this
- Cons
  - Require JavaScript to be enabled in the visitor's browser
  - Requires an additional DNS look-up by the user's computer to determine the IP address of the collection server. Delay or failure in completing a DNS look-up may result in data not being collected

Web Analytics Tools Survey

Self-hosted software [edit]

Free / Open source (FLOSS) [edit]

This is a comparison table of web analytics software released under a free software license.

Name	Platform	Supported databases	Tracking Method
Analog	C	Logfile-based	Web log files
AWStats	Perl	Logfile-based	Web log files
Open Web Analytics	PHP	MySQL	JavaScript or PHP pagetag
Piwik	PHP	MySQL	JavaScript or PHP pagetag or Web log files
W3Perl	Perl	Logfile-based	Web log files
Webalizer	C	Logfile-based	Web log files

From: http://en.wikipedia.org/wiki/List_of_web_analytics_software

Web Analytics Tools Survey

Proprietary [edit]

This is a comparison table of web analytics proprietary software.

Name	Company	Platform	Tracking Method	l
Mint	Mint	PHP	Cookies via JavaScript	
Sawmill	Flowerfire Inc	Windows/Linux/BSD/POSIX	Web log files	etary
Splunk	Splunk Inc.	Windows/Linux/BSD/Solaris	Web log files	
Tealeaf CX	IBM	Windows/Linux	Network traffic monitor	
Unica NetInsight	IBM	Windows/Linux/Solaris	Web log files & Cookies (with or without JavaScript)	
Urchin	Google	Windows/Linux/BSD	Cookies & Logs	

Web Analytics Tools Survey

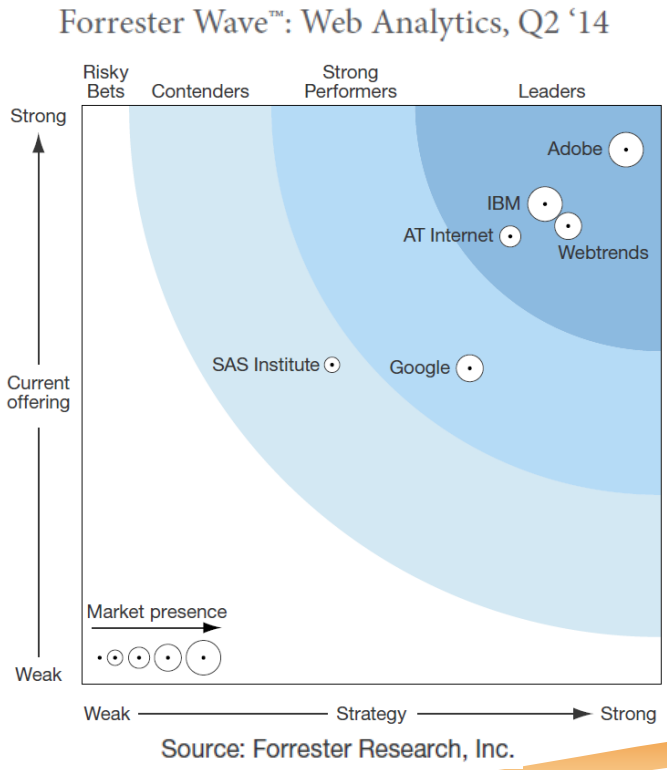
Hosted / Software as a service [edit]

This is a comparison table of hosted web analytics software as a service.

Name	Company	Tracking Method	Latest stable release	Price in USD
Adobe Analytics	Adobe Systems	Cookies via JavaScript	15	Negotiable
Bing Webmaster Tools	Microsoft	Cookies via JavaScript	N/A	Free
Analyzer	AT Internet	Cookies via JavaScript	N/A	Negotiable
Bango Mobile Web Analytics	Bango plc	Mobile ID and cookies	4.0	From $49/month
Data Workbench	Adobe Systems	Cookies via JavaScript	6.51	Negotiable
Google Analytics	Google	Cookies via JavaScript	N/A	Free (Standard), $150,000 Annual (Premium)
Kissmetrics	Kissmetrics	Mobile libraries; Cookies via JavaScript	N/A	$159-$599 Monthly Plans
LiveChat	Livechat Software	Cookies via JavaScript	N/A	from $36/month
Logentries	Logentries	Web log files; Mobile libraries; JavaScript	Continuous	Free
Mapmyuser.com	Mapmyuser, LLC	Cookies via JavaScript	N/A	Free
Mixpanel	Mixpanel	Cookies via JavaScript	N/A	Free (Start)/ Monthly Plans
Nullstack Analytics	Nullstack Labs	Javascript, Cookies via Server	14	Free / Monthly Plans
Piwik Cloud	Piwik PRO	User ID, fingerprint and Cookies	2.14.0	$29+/month
Quantcast	Quantcast Corporation	Cookies via JavaScript	N/A	Free
SimilarWeb	SimilarWeb Ltd.	Cookies via JavaScript	N/A	Free / Monthly plans (from $199)
StatCounter	StatCounter	Cookies via JavaScript	N/A	Free - $5/month ... $119/month
Webtrekk Q3	Webtrekk	Cookies via JavaScript	N/A	From $202/month
Webtrends	Webtrends	Cookies via JavaScript	N/A	N/A
Woopra	iFusion Labs LLC	Cookies via JavaScript	1.2	Free - $499.95+/month
Yahoo! Web Analytics	Yahoo!	Cookies via JavaScript	Not available anymore	Free

Enterprise Web Analytics Tools

Vendor	Product evaluated
Adobe	Adobe Analytics Premium
AT Internet	Analyzer III
Google	Google Analytics Premium
IBM	IBM Digital Analytics
SAS Institute	Adaptive Customer Experience (ACE)
Webtrends	Analytics On Demand
	Segments
	Streams
	Action Center
	Webtrends Explore

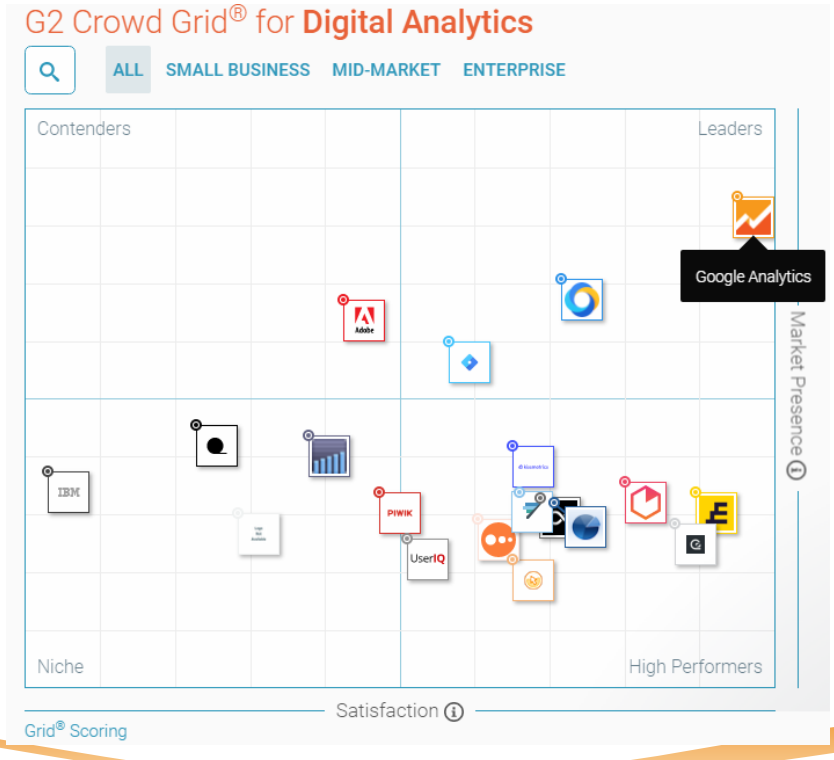


Source: Forrester Research, Inc.

Digital Analytics Tools

"Digital analytics software tracks website visitors and measures web traffic."

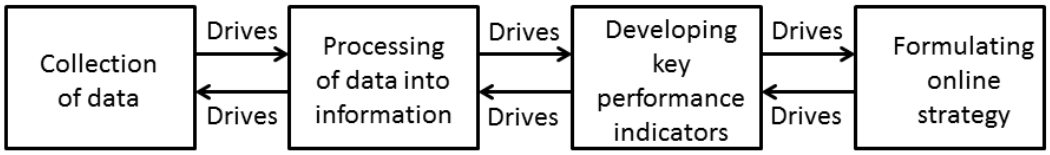
https://www.g2crowd.com/categories/digital-analytics



On-Site Web Analytics: Main Objectives

- How popular is your website – how much traffic?
  - Basic site usage & traffic metrics. **GOAL = Monitor website health**
- What types of people visit your website?
  - Demographics & interests
  - **GOAL = Reach the right people / tailor your website to your audience**
- How did they get to (find) your website ?
  - Search engine, referral, bookmark. **GOAL = Increase traffic / monitor campaigns**
- What do they do on your site?
  - How long do they stay? Most/least popular pages? Is it easy to use?…
  - **GOAL = Ensure the website meets the customer/visitor needs**
- Does your website achieve its business goal(s)?
  - Measure Conversions, downloads, sign-ups etc.
  - **GOAL = Ensure the website meets your needs**

Basic Web Analytics Process

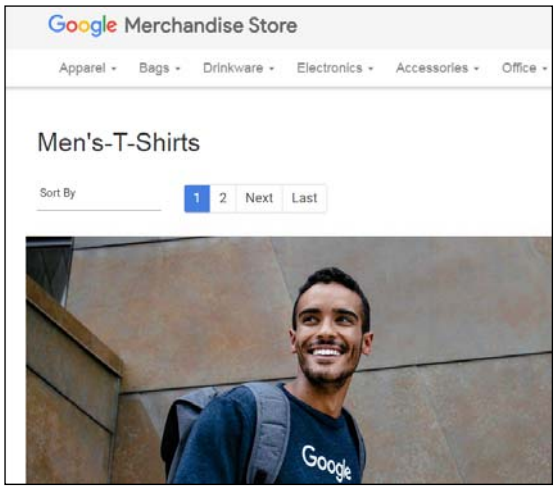


Typically, counts. Basically, data collection	Typically, ratios. Data becomes metrics.	Counts and ratios infused with business strategy.	Online goals, objectives, or standards for organization.
Examples: • Time stamp • Referral URL • Query terms	Examples: • Time on page • Bounce rate • Unique visitors	Examples: • Conversion rate • Average order value • Task completion rate	Examples: • Save money • Make money • Marketshare

From https://en.wikipedia.org/wiki/Web_analytics#/media/File:Basic_Steps_of_Web_Analytics_Process.png

Getting Started with Google Analytics

- Create your own Google Analytics (GA) demo account
  - This will give you access via GA to Google's e-commerce store traffic data
  - To set up the account: https://analytics.google.com/analytics/web/demoAccount

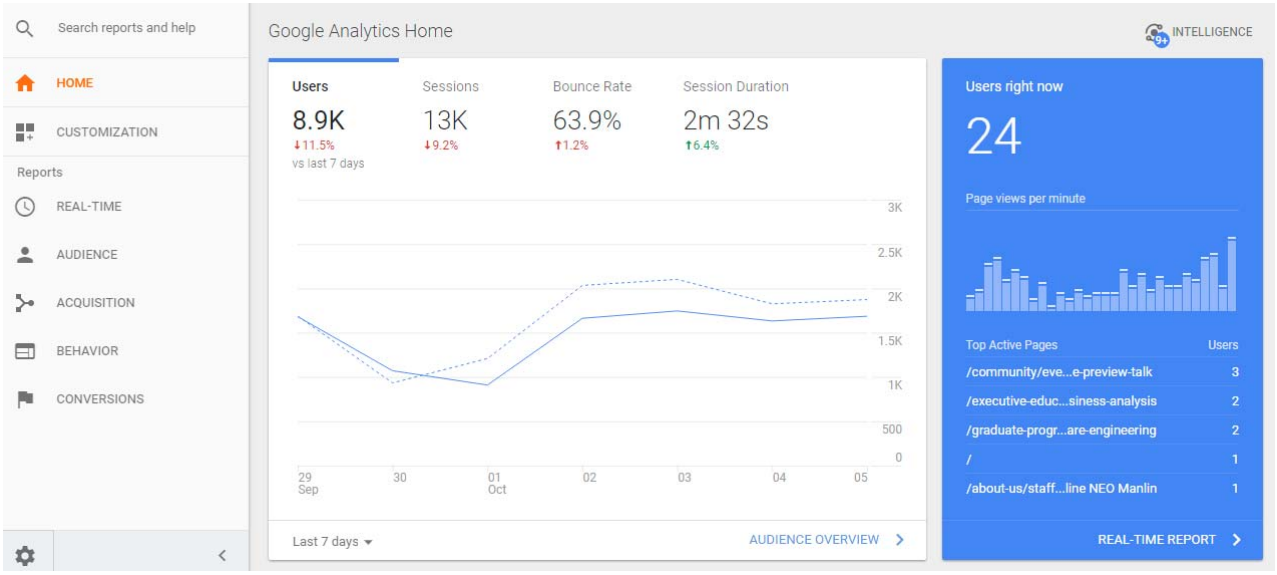


shop.googlemerchandisestore.com

The GA demo account allows you to explore traffic data from a real e-retail site

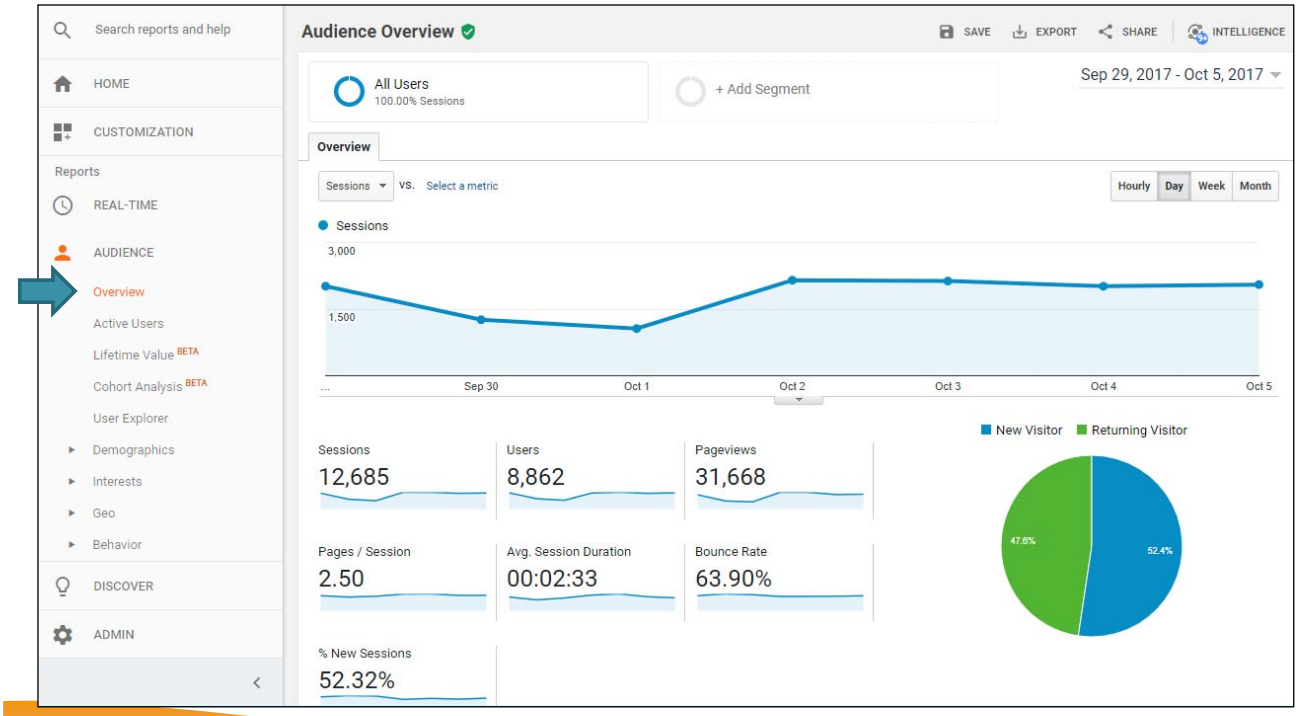
Getting Started with Google Analytics

- Once you have the account created you should see something like this…..



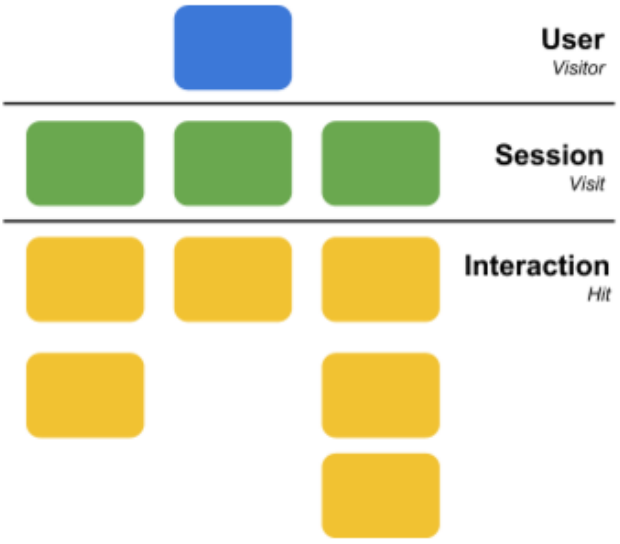
Plus more info when scrolling down

Basic Website Metrics (Audience)



The GA Data Model

- **User (visitor)**—the client that visits the site, such as the browser or mobile phone operated by a person.
- **Session (visit)**—the period of time during which the visitor is active on the site.
- **Interaction (hit)**—the individual activities that send a GIF request (hit) to the Analytics servers. These are typically characterized by a pageview, but can include:
  - a pageview
  - an event (e.g. click on a movie button)
  - a transaction
  - a social interaction



Basic Website Metrics (Audience)

Page View Metrics

A request for a file, or an event such as a click, that is defined as a page in the setup of the web analytics tool. An execution of the page tagging script

- Number of Page Views
- Page View Duration

  Difference between time of the request for a page and the time of the next request. Not recorded if there is no next request

- Number of Hits

  A request for any file from the web server. Available only in log analysis. Overestimates site popularity since webpage usually comprise many files

Note: All metrics require you to define a date range

Visit (Session) Metrics

A series of page views from the same user during the same web "session"

- Number of Visits
- Average Visit Duration
- Average Page Depth (pages per visit)
- Bounce Rate (%visits to single page only)

Visitor Metrics

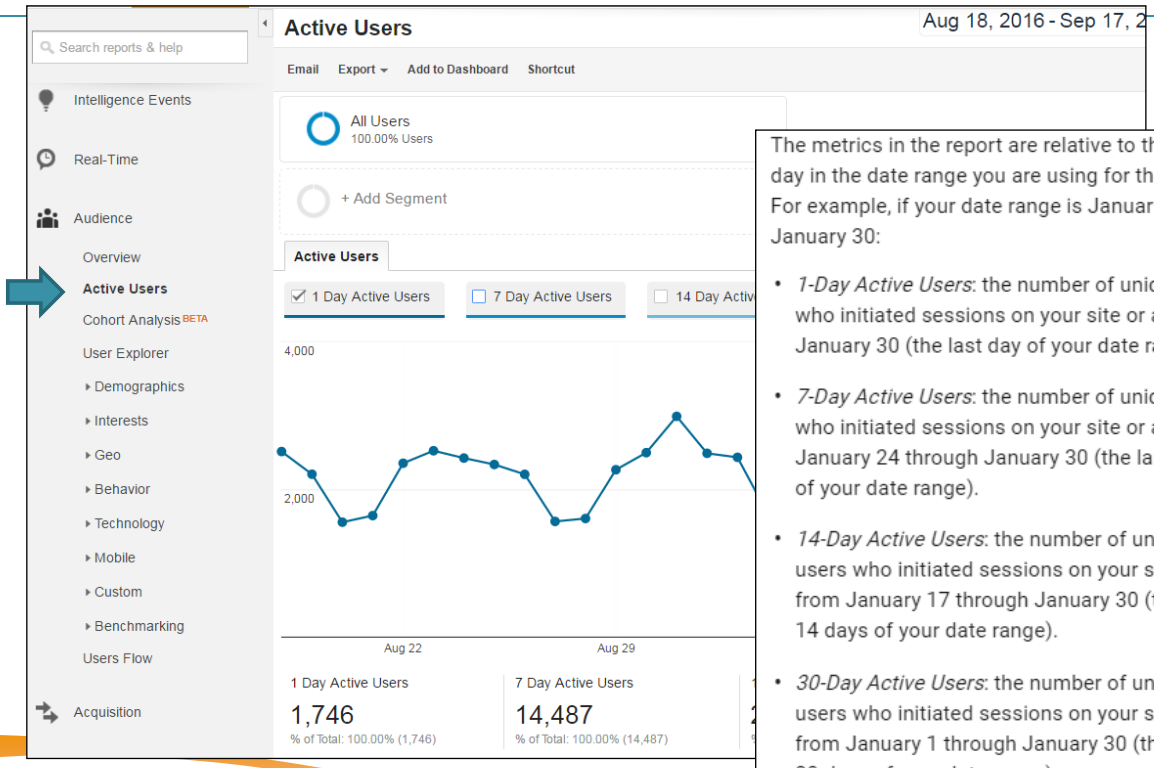
Visitors are usually identified by cookies OR the unique combination of IP address and User Agent (browser). Not same as unique person – many people can share the same computer and a user may have many machines.

- Number of Visitors
- New vs Returning Visitors (%new visits)
- Conversions & Conversion rate
  (any action on the site you define as a goal)

Basic Website Metrics: Time Dimension

- Day-of-week, week-of-month, month-of-year, season – these may all be expected to impact site usage in (potentially) predictable ways
- But, also look for unexpected changes in any of the metrics, this may indicate something on the website or elsewhere has changed and perhaps needs fixing, e.g.
  - Removal of popular pages or products (decrease in visit duration, conversions, ..)
  - Addition of new pages or products (increase in visit duration, conversions, ..)
  - Positive changes in the structure of the site (pages viewed increases, visit duration increases …)
  - Negative changes in site structure (evidence of navigational difficulty, repeat page views, looping, initial increase in page views but then decrease …)
  - Negative changes to homepage or poorer targeting/marketing (bounce rate increases)
  - Improvements to homepage or better targeting/marketing (bounce rate decreases)
  - Better marketing (# visitors increases, % of new visitors increases …)

Basic Website Metrics: Users (Visitors)



The metrics in the report are relative to the last day in the date range you are using for the report. For example, if your date range is January 1 to January 30:

- *1-Day Active Users*: the number of unique users who initiated sessions on your site or app on January 30 (the last day of your date range).
- *7-Day Active Users*: the number of unique users who initiated sessions on your site or app from January 24 through January 30 (the last 7 days of your date range).
- *14-Day Active Users*: the number of unique users who initiated sessions on your site or app from January 17 through January 30 (the last 14 days of your date range).
- *30-Day Active Users*: the number of unique users who initiated sessions on your site or app from January 1 through January 30 (the entire 30 days of your date range).

Counting Users: issues (1)

- Metrics such as page-views are additive, you can add up the days
- Unique Users cannot be easily added over days, weeks, months
- E.g. A hotel has two rooms (Room A and Room B). How many unique visitors were there over the 3 days period?

	Day 1	Day 2	Day 3	Total
Room A	John	John	Mark	2 Unique Users
Room B	Mark	Jane	Jane	2 Unique Users
Total	2	2	2	?

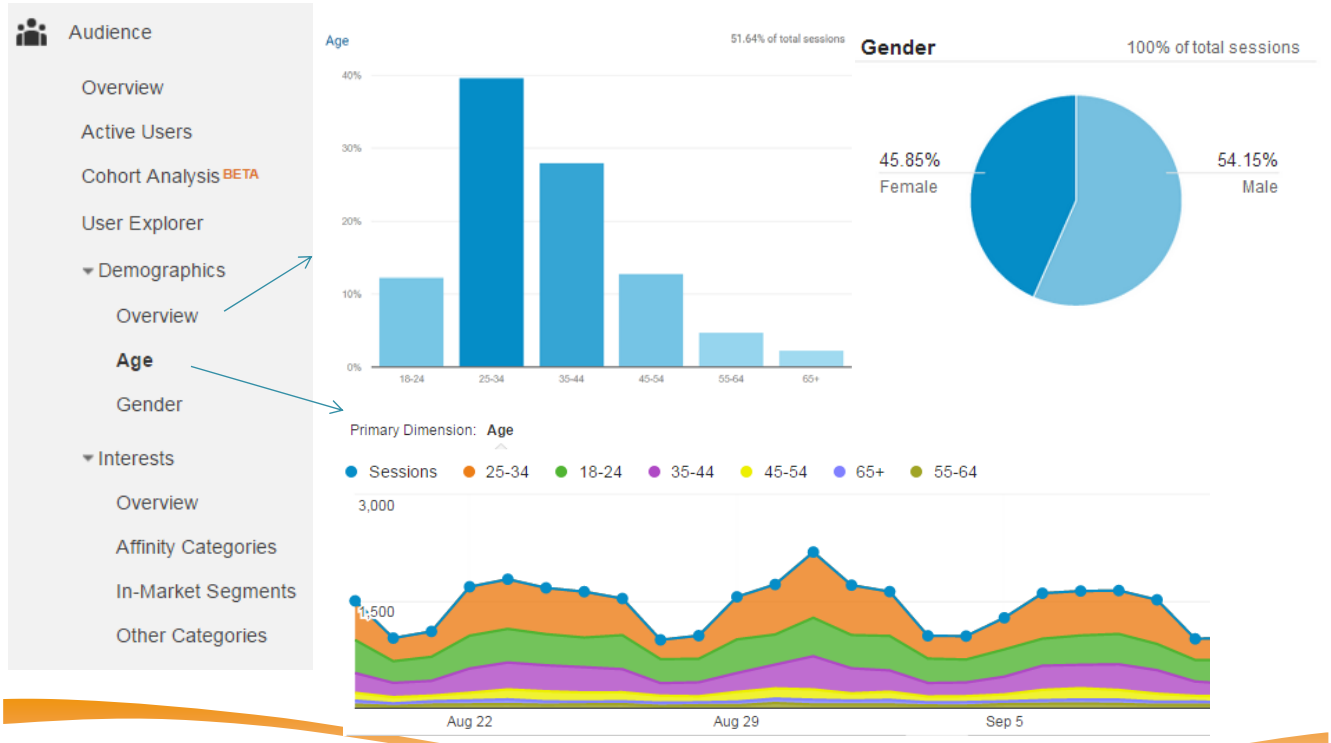
Counting Users: issues (2)

- New visitors + Repeat visitors do not equal total visitors
- If a user makes their first visit to the website then they are (correctly) a new visitor.
- But if they revisit the site again that day or week – then they appear to be a returning user on the same day or week

Counting Users in GA

- GA will automatically select which of the following two calculations to use depending on the report being viewed.
- Pre-Calculated Data
  - A set of unsampled, pre-aggregated data tables, updated on a daily basis.
  - Fast - Enables you to quickly select reports for any date range
  - Derived by counting sessions
- On-The-Fly Calculations
  - Takes much longer and is used when you choose to view users over any non-date dimension
  - Uses cookies to identify unique users
    (warning: counting unique cookies overestimates unique users potentially by up to 25% or more)

Who is the Audience? Demographics in GA



Interests

Affinity Category (reach) — 69.32% of total sessions

3.86%	Technophiles
3.41%	Movie Lovers
3.30%	TV Lovers
2.94%	Shutterbugs
2.87%	Mobile Enthusiasts
2.85%	News Junkies & Avid Readers/Entertainment & Celebrity News Junkies
2.72%	Travel Buffs
2.38%	Avid Investors
2.35%	Music Lovers/Pop Music Fans
2.26%	Political Junkies

In-Market Segment — 65.80% of total sessions

3.76%	Consumer Electronics/Mobile Phones
3.45%	Financial Services/Investment Services
3.25%	Travel/Hotels & Accommodations
2.72%	Employment
2.24%	Education/Post-Secondary Education
2.17%	Computers & Peripherals/Computers/Laptops & Notebooks
2.08%	Travel/Air Travel
1.77%	Real Estate/Residential Properties
1.74%	Software/Business & Productivity Software
1.72%	Autos & Vehicles/Motor Vehicles/Motor Vehicles (Used)

Affinity Categories	Lifestyles similar to TV audiences, for example: Technophiles, Sports Fans, and Cooking Enthusiasts
In-Market Segments	Product-purchase interests
Other Categories	Provides the most specific view of your users. For example, Affinity Categories includes Foodies, while Other Categories includes Recipes/Cuisines/East Asian

Obtaining Demographics & Interests

- **Inferencing**: Whenever you visit a website that has partnered with the Google Display Network this is stored in a cookie on your machine**.** Different sites are associated with different demographics hence the list of sites you have visited can be used to infer gender and age etc. Note that cookies identify a web browser on a specific computer, not a specific person
- **Volunteered to 3rd Party Sites**: some sites might provide Google with demographic and interests information that people share on certain websites, such as social networking sites
- **Volunteered to Google**: demographics derived from Google profiles

Obtaining Demographics & Interests

Once you update Analytics to support Advertising Reporting Features, Analytics collects Demographics and Interests data from the following sources:

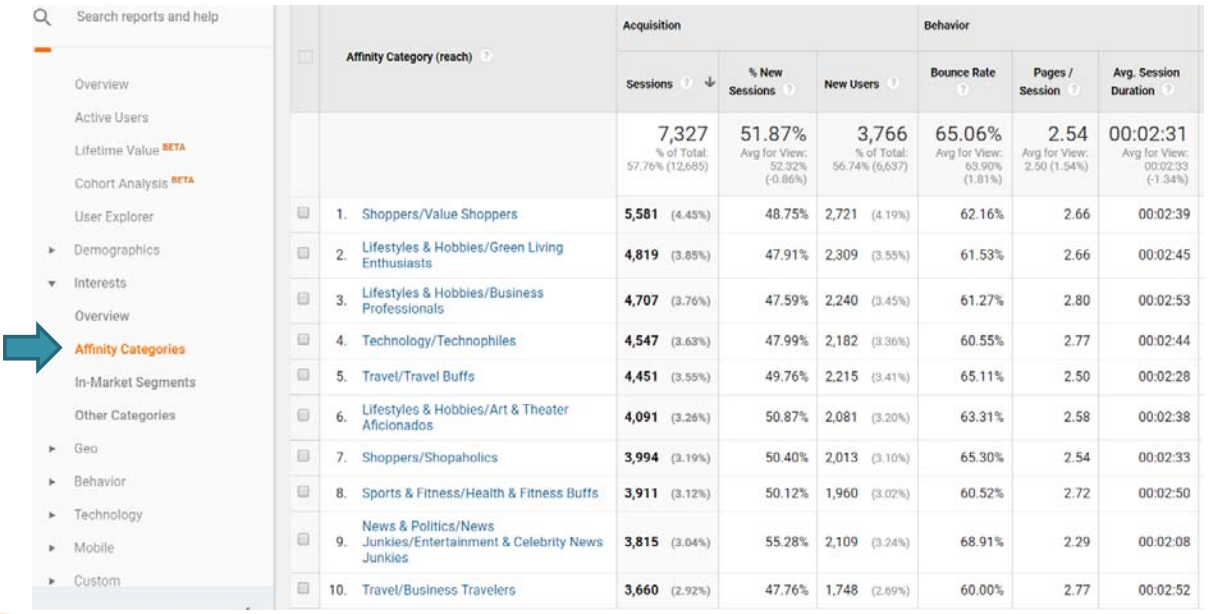
Source	Applies to	Condition	Result
Third-party DoubleClick cookie	Web-browser activity only	Cookie is present	Analytics collects any demographic and interests information available in the cookie
Android Advertising ID	App activity only	You update the Analytics tracking code in an Android app to collect the Advertising ID	Analytics generates an identifier based on the ID that includes demographic and interests information associated with users' app activity
iOS Identifier for Advertisers (IDFA)	App activity only	You update the Analytics tracking code in an iOS app to collect the IDFA	Analytics generates an identifier based on the IDFA that includes demographic and interests information associated with users' app activity

Demographics and interests data may only be available for a subset of your users, and may not represent the overall composition of your traffic: Analytics cannot collect the demographics and interests information if the DoubleClick cookie or the Device Advertising ID is not present, of if no activity profile is included.

By enabling the Advertising Features, you enable Google Analytics to collect data about your traffic via *Google advertising cookies* and *anonymous identifiers*, in addition to data collected through a standard Google Analytics implementation.

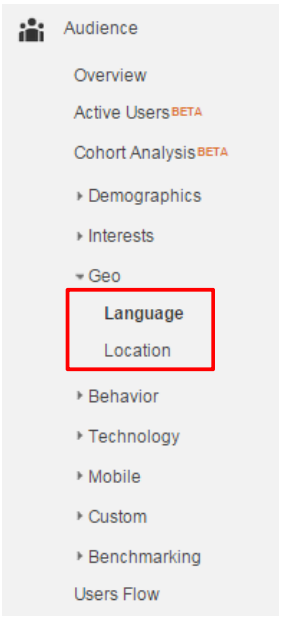
Affinity Categories

- These are marketing segments that you can buy



	Affinity Category (reach)	Acquisition			Behavior		
		Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
		7,327 % of Total: 57.76% (12,685)	51.87% Avg for View: 52.32% (-0.86%)	3,766 % of Total: 56.74% (6,637)	65.06% Avg for View: 63.90% (1.81%)	2.54 Avg for View: 2.50 (1.54%)	00:02:31 Avg for View: 00:02:33 (-1.34%)
1.	Shoppers/Value Shoppers	5,581 (4.45%)	48.75%	2,721 (4.19%)	62.16%	2.66	00:02:39
2.	Lifestyles & Hobbies/Green Living Enthusiasts	4,819 (3.85%)	47.91%	2,309 (3.55%)	61.53%	2.66	00:02:45
3.	Lifestyles & Hobbies/Business Professionals	4,707 (3.76%)	47.59%	2,240 (3.45%)	61.27%	2.80	00:02:53
4.	Technology/Technophiles	4,547 (3.63%)	47.99%	2,182 (3.36%)	60.55%	2.77	00:02:44
5.	Travel/Travel Buffs	4,451 (3.55%)	49.76%	2,215 (3.41%)	65.11%	2.50	00:02:28
6.	Lifestyles & Hobbies/Art & Theater Aficionados	4,091 (3.26%)	50.87%	2,081 (3.20%)	63.31%	2.58	00:02:38
7.	Shoppers/Shopaholics	3,994 (3.19%)	50.40%	2,013 (3.10%)	65.30%	2.54	00:02:33
8.	Sports & Fitness/Health & Fitness Buffs	3,911 (3.12%)	50.12%	1,960 (3.02%)	60.52%	2.72	00:02:50
9.	News & Politics/News Junkies/Entertainment & Celebrity News Junkies	3,815 (3.04%)	55.28%	2,109 (3.24%)	68.91%	2.29	00:02:08
10.	Travel/Business Travelers	3,660 (2.92%)	47.76%	1,748 (2.69%)	60.00%	2.77	00:02:52

Geo: Identifying User Location

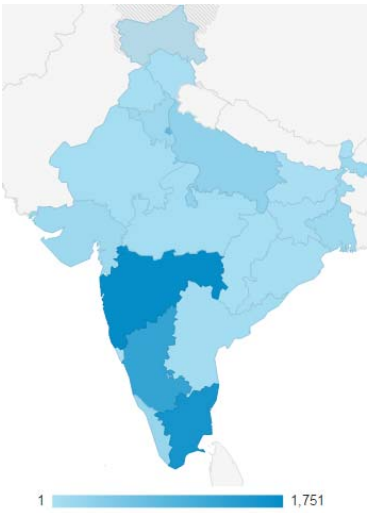


- Usually based on reverse-IP technology, your IP address is used to infer your location
- In general, reverse-IP is very accurate at country-level (~ 99%), less accurate at city and postal code level (~ 90%+)

	Country	Acquisition			Behavior
		Sessions	% New Sessions	New Users	Bounce Rate
		49,701 % of Total: 100.00% (49,701)	57.21% Avg for View: 57.06% (0.26%)	28,432 % of Total: 100.26% (28,359)	55.60% Avg for View: 55.60% (0.00%)
1.	Singapore	32,833 (66.06%)	49.84%	16,365 (57.56%)	56.39%
2.	India	7,147 (14.38%)	60.08%	4,294 (15.10%)	49.90%
3.	China	3,651 (7.35%)	90.93%	3,320 (11.68%)	49.82%
4.	United States	1,344 (2.70%)	77.31%	1,039 (3.65%)	58.93%
5.	Malaysia	446 (0.90%)	73.09%	326 (1.15%)	67.49%
6.	Hong Kong	370 (0.74%)	66.76%	247 (0.87%)	51.08%
7.	Indonesia	316 (0.64%)	64.87%	205 (0.72%)	57.91%
8.	Taiwan	247 (0.50%)	79.35%	196 (0.69%)	67.21%
9.	(not set)	247 (0.50%)	61.54%	152 (0.53%)	57.49%
10.	Myanmar (Burma)	246 (0.49%)	52.03%	128 (0.45%)	40.65%

User Location Drill-down

- GA allows drill down to the state-level, e.g. clicking on India yields:



Region	Acquisition			Behavior
	Sessions ↓	% New Sessions	New Users	Bounce Rate
	7,147 % of Total: 14.38% (49,701)	60.08% Avg for View: 57.06% (5.30%)	4,294 % of Total: 15.14% (28,359)	49.90% Avg for View: 55.60% (-10.26%)
1. Maharashtra	**1,751** (24.50%)	59.91%	1,049 (24.43%)	60.37%
2. Tamil Nadu	**1,583** (22.15%)	55.02%	871 (20.28%)	44.54%
3. Karnataka	**1,266** (17.71%)	60.19%	762 (17.75%)	49.76%
4. Delhi	**809** (11.32%)	68.36%	553 (12.88%)	46.72%
5. Telangana	**513** (7.18%)	60.62%	311 (7.24%)	44.05%
6. Uttar Pradesh	**273** (3.82%)	53.85%	147 (3.42%)	41.03%
7. Kerala	**194** (2.71%)	49.48%	96 (2.24%)	37.11%
8. Haryana	**142** (1.99%)	57.04%	81 (1.89%)	48.59%
9. Gujarat	**133** (1.86%)	57.89%	77 (1.79%)	47.37%
10. West Bengal	**132** (1.85%)	62.12%	82 (1.91%)	51.52%

New versus Returning Users

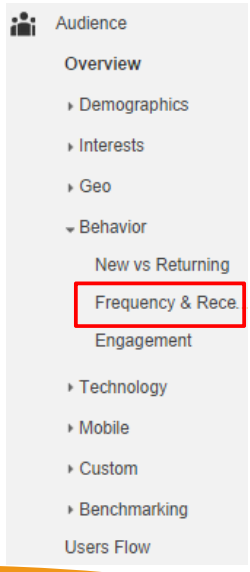
- The best ratio is business goal specific. E.g. online newspaper versus (say) online funeral services!

User Type	Acquisition		
	Sessions ↓	% New Sessions	New Users
	46,987 % of Total: 100.00% (46,987)	55.72% Site Avg: 55.64% (0.13%)	26,179 % of Total: 100.13% (26,145)
1. New Visitor	**26,179** (55.72%)	100.00%	26,179 (100.00%)
2. Returning Visitor	**20,808** (44.28%)	0.00%	0 (0.00%)

Behavior			Conversions Goal 1: Registration
Bounce Rate	Pages / Session	Avg. Session Duration	Registration (Goal 1 Conversion Rate)
53.98% Site Avg: 53.98% (0.00%)	3.16 Site Avg: 3.16 (0.00%)	00:03:14 Site Avg: 00:03:14 (0.00%)	0.00% Site Avg: 0.00% (0.00%)
54.89%	2.76	00:02:18	0.00%
52.83%	3.66	00:04:25	0.00%

Recency & Frequency

- Histograms of #visits per user and #days since last session
- Expectations should be in line with website business domain



Distribution

Count of Sessions Days Since Last Session

Sessions	Pageviews
46,987	148,426
% of Total: 100.00% (46,987)	% of Total: 100.00% (148,426)

Days Since Last Session	Sessions	Pageviews
0	37,563	114,275
1	1,938	6,125
2	952	3,407
3	709	2,327
4	511	1,875
5	452	1,589
6	440	1,533
7	347	1,496
8-14	1,207	4,717
15-30	1,232	4,765
31-60	749	2,877
61-120	503	1,986
121-364	312	1,224
365+	72	230

Engagement

- Average Visit Duration & Page Depth (number of pages users visit in a session). Typically long-tail distributions - most users visit few pages and spend little time!

All Sessions
100.00%

+ Add Segment

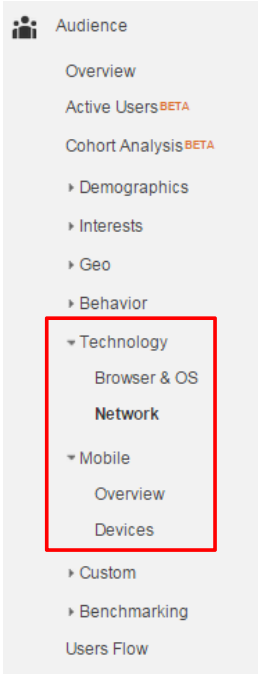
Distribution

Session Duration Page Depth

Sessions	Pageviews
46,987	148,426
% of Total: 100.00% (46,987)	% of Total: 100.00% (148,426)

Session Duration	Sessions	Pageviews
0-10 seconds	28,796	33,688
11-30 seconds	3,379	9,051
31-60 seconds	1,906	6,019
61-180 seconds	3,785	15,781
181-600 seconds	4,414	29,262
601-1800 seconds	3,626	32,629
1801+ seconds	1,081	21,996

Technology & Mobile

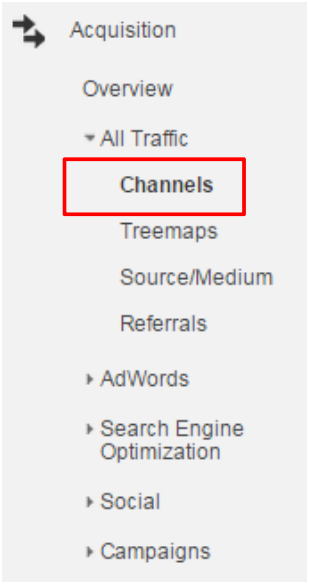


- Technology – Browser & OS
  - Use this to determine which browsers and O/S to optimise your website for
- Mobile
  - Counts users using a phone or tablet

Service Provider	Acquisition Sessions
	49,701 % of Total: 100.00% (49,701)
1. singnet pte ltd	5,698 (11.46%)
2. imported inetnum object for nus-1	4,161 (8.37%)
3. singapore telecom mobile pte ltd	2,573 (5.18%)
4. m1 ltd	1,893 (3.81%)
5. starhub cable vision ltd	1,835 (3.69%)
6. starhub mobile	1,766 (3.55%)
7. (not set)	1,487 (2.99%)
8. starhub-ltd-ngnbn-services	1,287 (2.59%)
9. imported inetnum object for ida singapore	1,173 (2.36%)
10. m1 connect pte ltd	850 (1.71%)

Device Category	Acquisition Sessions
	49,701 % of Total: 100.00% (49,701)
1. desktop	34,580 (69.58%)
2. mobile	13,130 (26.42%)
3. tablet	1,991 (4.01%)

Where did your Audience come from?



- Search Engine
  - they did a search and found your website (paid or organic)
- Referral
  - they clicked on a link in another website
- Direct traffic
  - they typed in your URL directly or had it bookmarked
- Advertising
  - they clicked on your display ad or arrived via social media

Traffic Analysis Goals

- Which traffic source yields the most traffic?
- Which traffic source yields the most profitable traffic?
  - Overlay with conversion rates, engagement rates, return rates, bounce rates ….
- Optimise the website to increase (profitable) traffic - SEO

Default Channel Grouping	Acquisition			Behavior		
	Sessions ↓	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
	45,957 % of Total: 100.00% (45,957)	56.30% Site Avg: 56.23% (0.12%)	25,872 % of Total: 100.12% (25,842)	54.40% Site Avg: 54.40% (0.00%)	3.12 Site Avg: 3.12 (0.00%)	00:03:10 Site Avg: 00:03:10 (0.00%)
1. Organic Search	20,331 (44.24%)	51.24%	10,418 (40.27%)	52.27%	3.51	00:03:42
2. Direct	11,581 (25.20%)	50.99%	5,905 (22.82%)	64.20%	2.72	00:03:03
3. Referral	11,247 (24.47%)	77.91%	8,762 (33.87%)	47.21%	2.63	00:01:51
4. Email	1,463 (3.18%)	27.68%	405 (1.57%)	60.83%	3.88	00:04:55
5. Social	668 (1.45%)	54.19%	362 (1.40%)	74.10%	2.13	00:01:48
6. (Other)	666 (1.45%)	3.00%	20 (0.08%)	36.19%	5.51	00:08:25
7. Display	1 (0.00%)	0.00%	0 (0.00%)	0.00%	7.00	00:14:35

Channels

Traffic Analysis Drill-Down

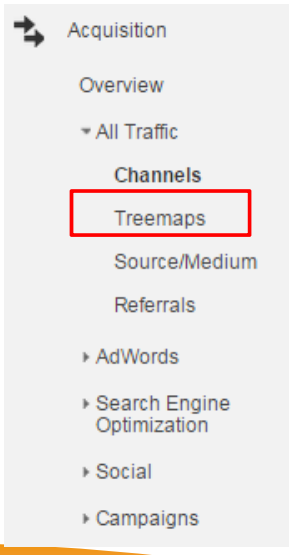
- Click on "**Organic search**" to see the top keywords that led people to your website
  - The top keywords indicate the topics users are most interested in - ensure these get covered adequately in your site
  - What keywords yielded less traffic than expected? This could indicate that the website doesn't have enough content in this area (not getting indexed by Google)

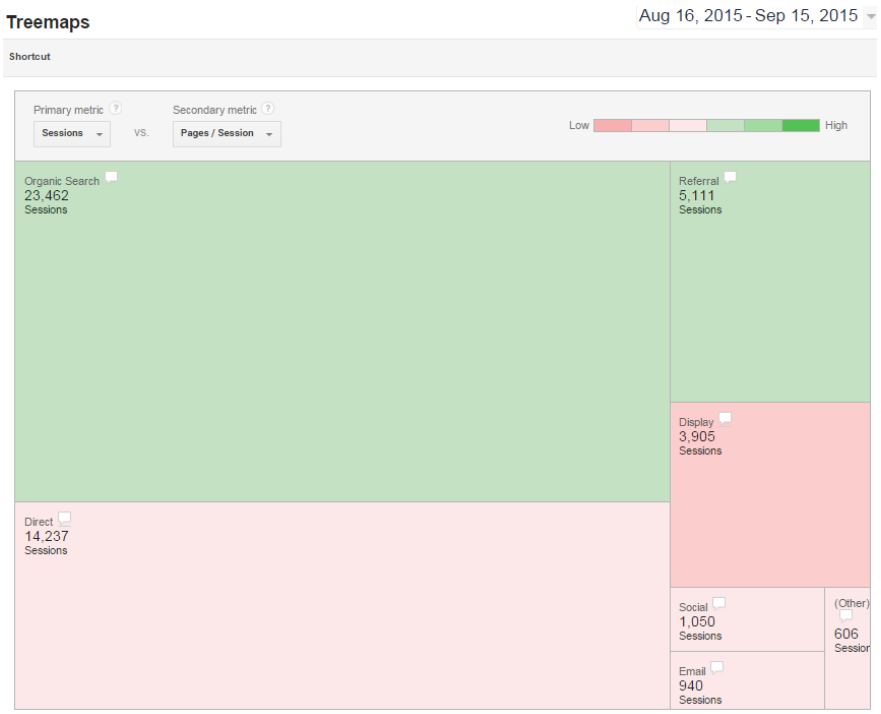
Keyword	Acquisition			Behavior			Conversions Goal 1: Registration		
	Sessions ↓	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Registration (Goal 1 Conversion Rate)	Registration (Goal 1 Completions)	Registration (Goal 1 Value)
	23,462 % of Total: 47.58% (49,311)	50.19% Avg for View: 57.50% (-12.72%)	11,775 % of Total: 41.53% (28,355)	50.20% Avg for View: 56.21% (-10.69%)	3.53 Avg for View: 2.94 (20.20%)	00:03:58 Avg for View: 00:03:03 (29.76%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	$0.00 % of Total: 0.00% ($0.00)
1. (not provided)	22,125 (94.30%)	50.32%	11,134 (94.56%)	50.28%	3.55	00:03:59	0.00%	0 (0.00%)	$0.00 (0.00%)
2. nus iss	133 (0.57%)	28.57%	38 (0.32%)	21.80%	4.76	00:04:53	0.00%	0 (0.00%)	$0.00 (0.00%)
3. iss nus	73 (0.31%)	27.40%	20 (0.17%)	36.99%	5.21	00:05:19	0.00%	0 (0.00%)	$0.00 (0.00%)
4. (not set)	37 (0.16%)	35.14%	13 (0.11%)	40.54%	2.84	00:03:23	0.00%		
5. iss.nus.edu.sg	29 (0.12%)	6.90%	2 (0.02%)	20.69%	3.76	00:02:28	0.00%		
6. institute of systems science	17 (0.07%)	47.06%	8 (0.07%)	23.53%	6.18	00:07:28	0.00%		
7. iss nus singapore	17 (0.07%)	5.88%	1 (0.01%)	35.29%	2.65	00:02:27	0.00%		
8. www.iss.nus.edu.sg	15 (0.06%)	26.67%	4 (0.03%)	33.33%	4.47	00:04:49	0.00%		
9. project management course singapore	14 (0.06%)	57.14%	8 (0.07%)	78.57%	2.00	00:01:18	0.00%	0 (0.00%)	$0.00 (0.00%)
10. cissp singapore	9 (0.04%)	66.67%	6 (0.05%)	55.56%	4.44	00:03:35	0.00%	0 (0.00%)	$0.00 (0.00%)

More analysis can be performed by downloading the raw data into (say) Excel

Traffic Analysis: TreeMap

You can view any of the summary numbers as a tree map

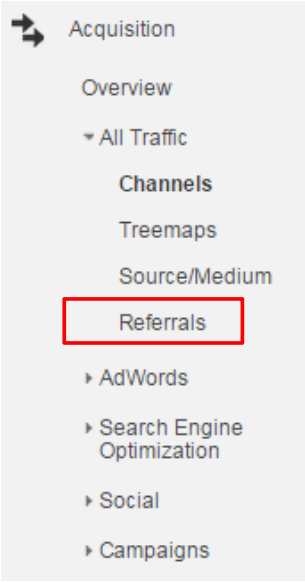




Traffic Analysis: Source/Medium

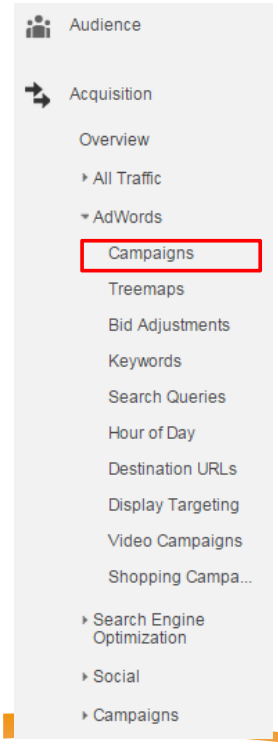
Source / Medium	Acquisition			Behavior			Conversions Goal 1: Registration		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Registration (Goal 1 Conversion Rate)	Registration (Goal 1 Completions)	Registration (Goal 1 Value)
	49,311 % of Total: 100.00% (49,311)	57.64% Avg for View: 57.50% (0.25%)	28,425 % of Total: 100.25% (28,355)	56.21% Avg for View: 56.21% (0.00%)	2.94 Avg for View: 2.94 (0.00%)	00:03:03 Avg for View: 00:03:03 (0.00%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	$0.00 % of Total: 0.00% ($0.00)
1. google / organic	22,525 (45.68%)	50.46%	11,367 (39.99%)	50.44%	3.52	00:03:58	0.00%	0 (0.00%)	$0.00 (0.00%)
2. (direct) / (none)	14,237 (28.87%)	61.35%	8,735 (30.73%)	69.23%	2.21	00:02:14	0.00%	0 (0.00%)	$0.00 (0.00%)
3. Gter / banner	3,620 (7.34%)	99.56%	3,604 (12.68%)	54.67%	1.76	00:00:09	0.00%	0 (0.00%)	$0.00 (0.00%)
4. nus.edu.sg / referral	2,520 (5.11%)	51.51%	1,298 (4.57%)	35.40%	4.05	00:04:41	0.00%	0 (0.00%)	$0.00 (0.00%)
5. thehindu.com / referral	619 (1.26%)	91.11%	564 (1.98%)	65.91%	1.90	00:01:25	0.00%	0 (0.00%)	$0.00 (0.00%)
6. bing / organic	497 (1.01%)	40.24%	200 (0.70%)	40.44%	4.12	00:04:13	0.00%	0 (0.00%)	$0.00 (0.00%)
7. m.facebook.com / referral	421 (0.85%)	73.16%	308 (1.08%)	70.31%	1.92	00:01:17	0.00%	0 (0.00%)	$0.00 (0.00%)
8. AIS-practice-emailer / email	396 (0.80%)	44.70%	177 (0.62%)	71.97%	2.14	00:01:48	0.00%	0 (0.00%)	$0.00 (0.00%)
9. facebook.com / referral	376 (0.76%)	31.38%	118 (0.42%)	51.33%	2.74	00:03:41	0.00%	0 (0.00%)	$0.00 (0.00%)
10. yahoo / organic	360 (0.73%)	49.44%	178 (0.63%)	50.83%	3.77	00:04:04	0.00%	0 (0.00%)	$0.00 (0.00%)

Referral Websites



- Which websites refer most traffic to you & which websites refer users with the highest conversion rates?
  - This can give insights into the interests of your most valuable users (where else do they visit?)
- Do the referral sites send users to different landing pages?
- Are the referral sites those that you think your users will visit?
  - E.g. your website sells cameras but most referrals are from heath-food websites!
  - If not then how to get referrals in relevant sites?

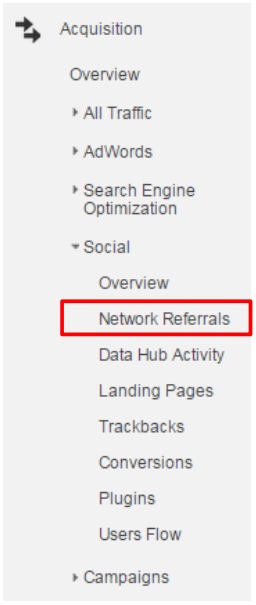
AdWord Marketing Campaign Analysis

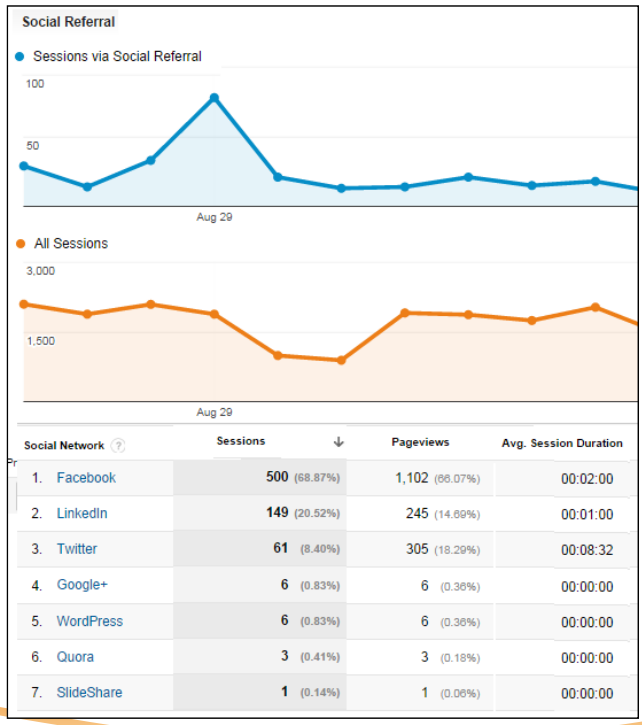


Campaign / Campaign ID	Acquisition				Behavior		Conversions Goal 1: Registration		
	Clicks	Cost	CPC	Sessions	Bounce Rate	Pages / Session	Registration (Goal 1 Conversion Rate)	Registration (Goal 1 Completions)	Registration (Goal 1 Value)
	1,108 % of Total: 100.00% (1,108)	$1,409.21 % of Total: 100.00% ($1,409.21)	$1.27 Avg for View: $1.27 (0.00%)	296 % of Total: 1.35% (21,996)	79.39% Avg for View: 66.66% (19.10%)	1.71 Avg for View: 2.15 (-20.61%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	$0.00 % of Total: 0.00% ($0.00)
1. Display - Remarketing 396032808	749 (67.60%)	$408.16 (28.96%)	$0.54	220 (74.32%)	80.91%	1.72	0.00%	0 (0.00%)	$0.00 (0.00%)
2. Search 395590488	329 (29.69%)	$989.23 (70.20%)	$3.01	59 (19.93%)	76.27%	1.68	0.00%	0 (0.00%)	$0.00 (0.00%)
3. Display 395594688	30 (2.71%)	$11.82 (0.84%)	$0.39	7 (2.36%)	71.43%	1.43	0.00%	0 (0.00%)	$0.00 (0.00%)
4. (not set)	0 (0.00%)	$0.00 (0.00%)	$0.00	10 (3.38%)	70.00%	1.70	0.00%	0 (0.00%)	$0.00 (0.00%)

Social Traffic

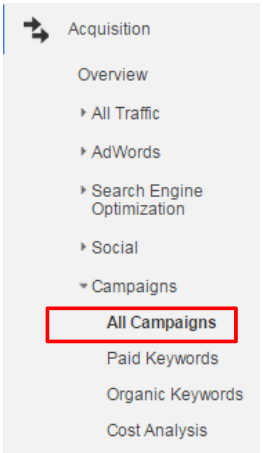
- Identify where to increase your social effort





Social Network	Sessions	Pageviews	Avg. Session Duration
1. Facebook	500 (68.87%)	1,102 (66.07%)	00:02:00
2. LinkedIn	149 (20.52%)	245 (14.69%)	00:01:00
3. Twitter	61 (8.40%)	305 (18.29%)	00:08:32
4. Google+	6 (0.83%)	6 (0.36%)	00:00:00
5. WordPress	6 (0.83%)	6 (0.36%)	00:00:00
6. Quora	3 (0.41%)	3 (0.18%)	00:00:00
7. SlideShare	1 (0.14%)	1 (0.06%)	00:00:00

Monitoring Traffic from Custom Campaigns

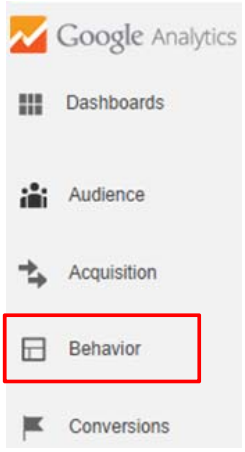


Campaign	Acquisition			Behavior	
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session
	5,483 % of Total: 11.12% (49,311)	79.04% Avg for View: 57.50% (37.46%)	4,334 % of Total: 15.28% (28,355)	57.96% Avg for View: 56.21% (3.11%)	Avg for Vi (-
1. Gter GDipSA banner	3,620 (66.02%)	99.56%	3,604 (83.16%)	54.67%	
2. ISSLearningDay2015	345 (6.29%)	17.68%	61 (1.41%)	60.58%	
3. aSpecialmedia GDipSA banner	265 (4.83%)	91.32%	242 (5.58%)	61.89%	
4. BM-SepOct2015	216 (3.94%)	59.72%	129 (2.98%)	83.33%	
5. SysCat9	97 (1.77%)	0.00%	0 (0.00%)	39.18%	
6. AIS-emailer	86 (1.57%)	51.16%	44 (1.02%)	58.14%	
7. AIS-emailer-SA	83 (1.51%)	50.60%	42 (0.97%)	84.34%	
8. 150813_PM_emailer	70 (1.28%)	25.71%	18 (0.42%)	68.57%	
9. AIS-emailer-SFB	61 (1.11%)	36.07%	22 (0.51%)	77.05%	
10. AIS-emailer-CA	59 (1.08%)	32.20%	19 (0.44%)	74.58%	

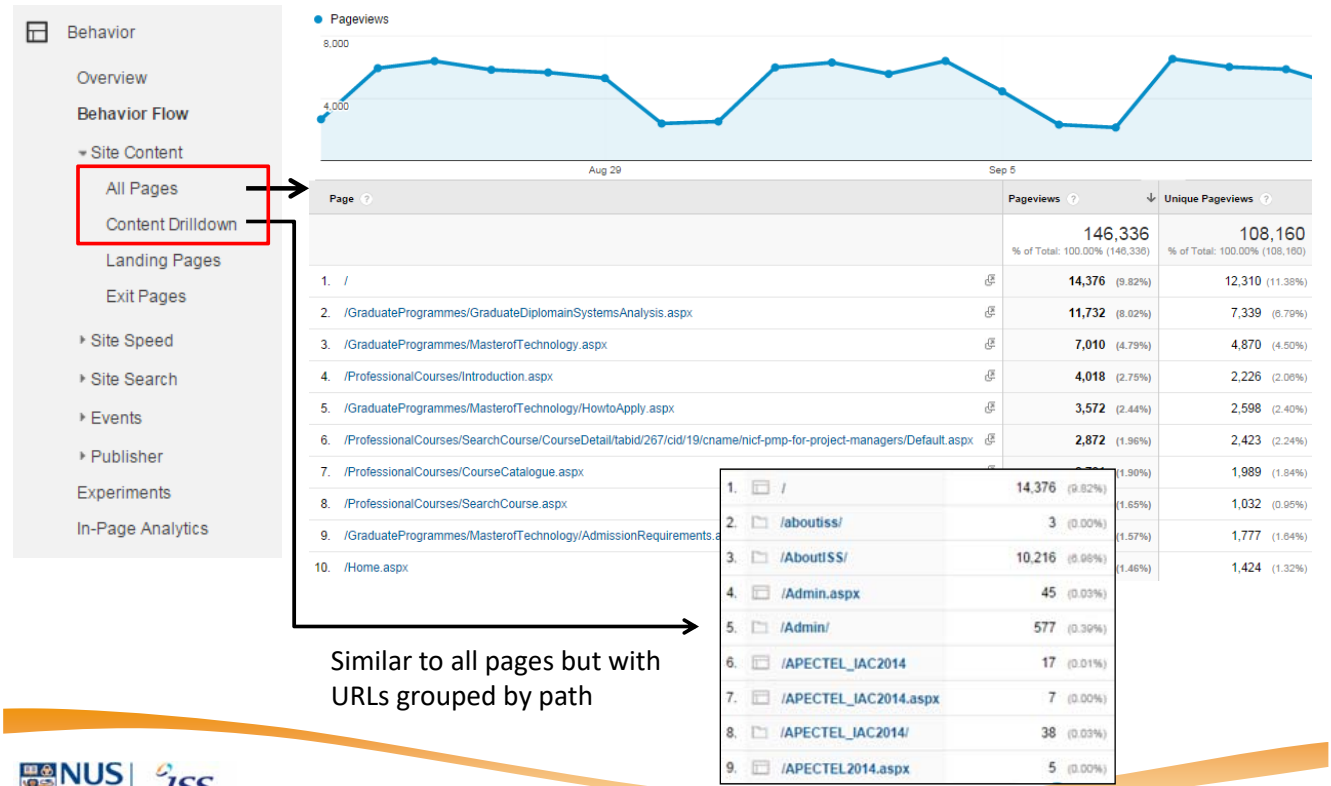
To monitor traffic from a custom campaign you must add campaign parameters to the referring URL (e.g. the URL link to your website in an email or the URL link in a banner ad)

Audience Behavior: How do visitors use the site?

- Where do users go on the website, how long do they stay?
  - Are the pages you think important the ones most visited?
- Which pages get most & least traffic?
  - Is low traffic because users can't find the page OR page is no value?
  - Is high traffic because page is useful OR page easy to find (many links)?
- What pages do users use to enter & exit the site?
  - If the ratio of entrances to unique page-views for a page is high then the page is a landing page => needs welcome info & navigation aids
- Which Pages have high Bounce & Exit Rates and why?
  - High Bounce or Exit rate does not always imply bad page design
    - Page could do its job well, e.g. product page (high bounce), checkout page (high exits)
    - Page might be indexed by search engine inappropriately or referenced incorrectly from anther website => users with no interest may arrive



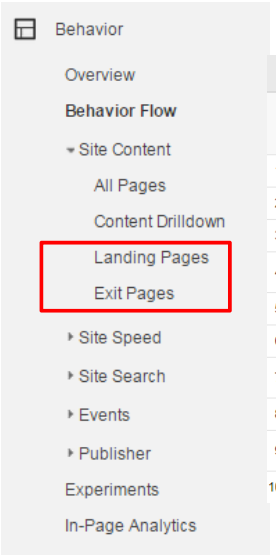
Audience Behavior: What Pages are Viewed?



Similar to all pages but with URLs grouped by path

Landing and Exit Pages

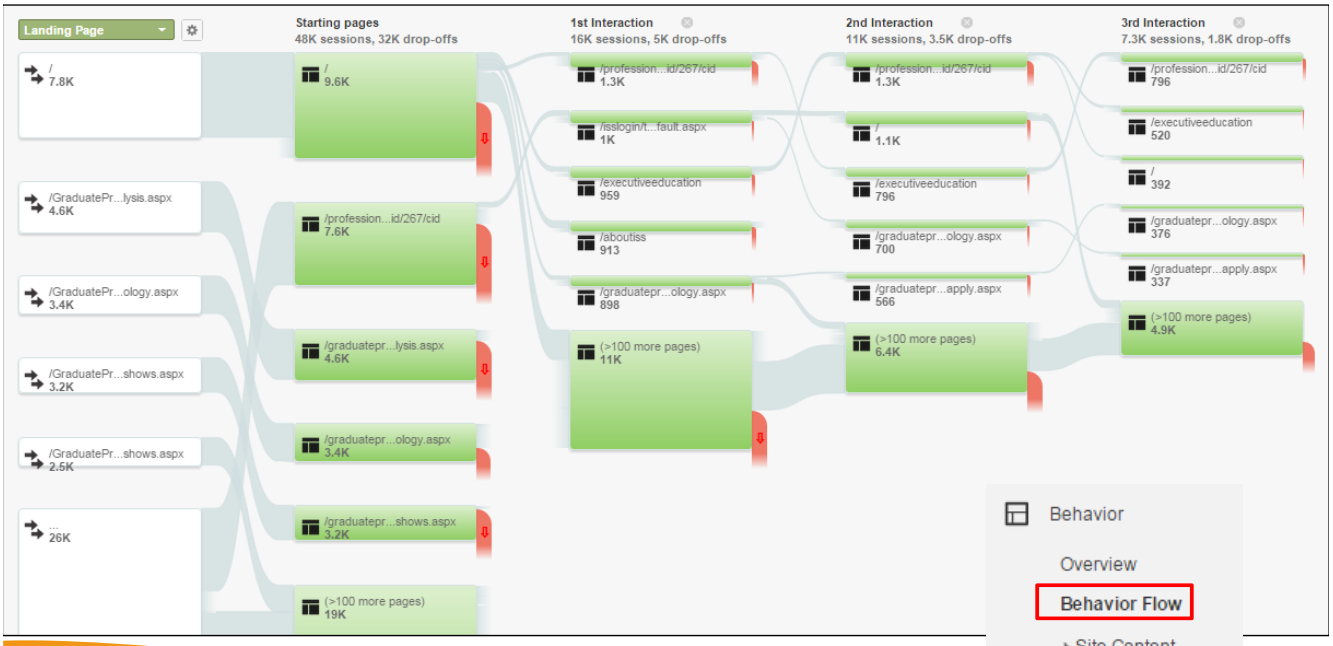
- High bounce rate is not always bad if the user gets what they are looking for first time!



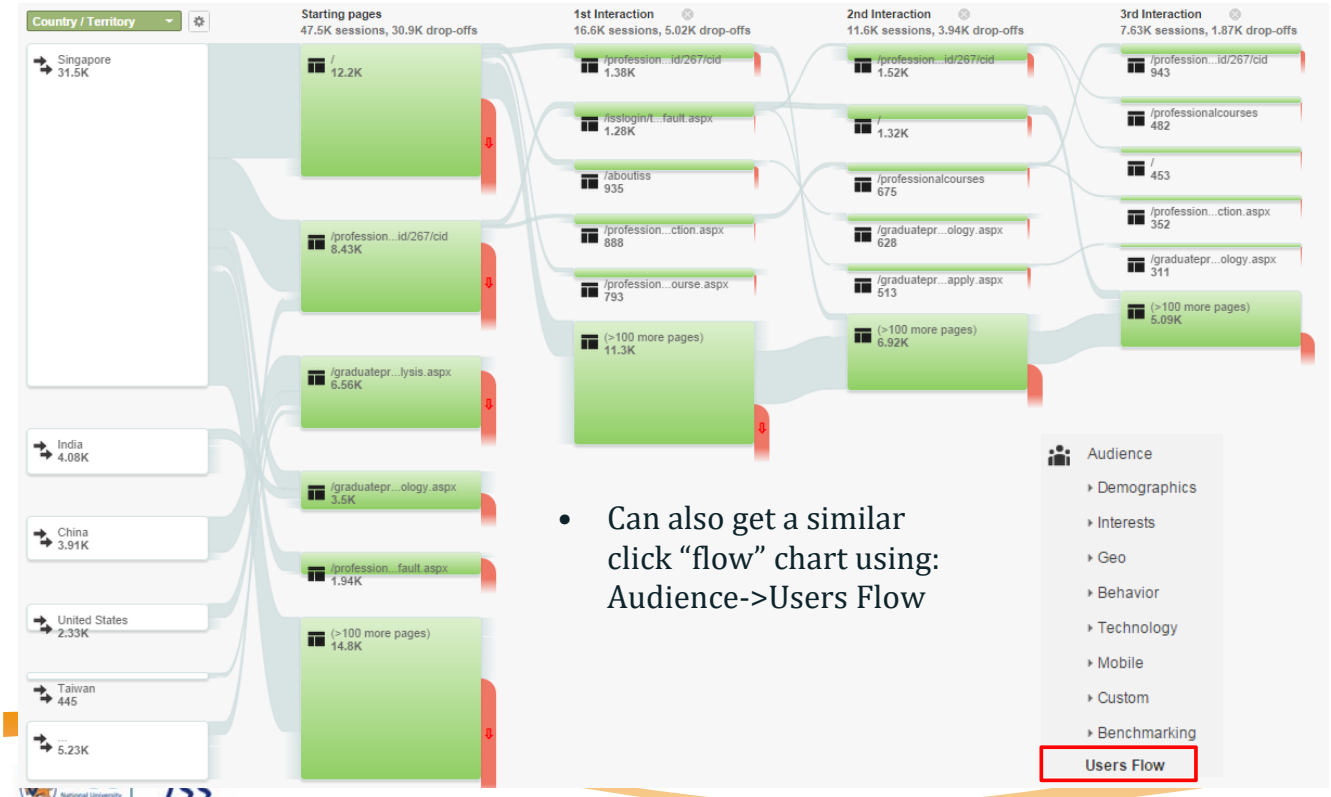
	Landing Page	Sessions	% New Sessions	New Users	Bounce Rate
		46,987 % of Total: 100.00% (46,987)	55.72% Site Avg: 55.64% (0.13%)	26,179 % of Total: 100.13% (26,145)	53.98% Site Avg: 53.98% (0.00%)
1.	/	11,459 (24.39%)	35.86%	4,109 (15.70%)	53.60%
2.	/GraduateProgrammes/GraduateDiplomainSystemsAnalysis.aspx	6,502 (13.84%)	93.85%	6,102 (23.31%)	43.83%
3.	/GraduateProgrammes/MasterofTechnology.aspx	3,456 (7.36%)	63.11%	2,181 (8.33%)	33.91%
4.	/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/19/cname/nicf-pmp-for-project-managers/Default.aspx	1,919 (4.08%)	69.20%	1,328 (5.07%)	71.29%
5.	/AboutISS/GettingtoISS/LocationMap.aspx	812 (1.73%)	57.51%	467 (1.78%)	36.95%
6.	/GraduateProgrammes/MasterofTechnology/PreviewTalksRoadshows/IndiaRoadshows.aspx	760 (1.62%)	71.32%	542 (2.07%)	70.79%
7.	/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/21/cname/nicf-certified-scrummaster/Default.aspx	747 (1.59%)	54.35%	406 (1.55%)	56.09%
8.	/ProfessionalCourses/CourseCatalogue.aspx	714 (1.52%)	35.71%	255 (0.97%)	28.01%
9.	/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/33/cname/nicf-itil-v3-foundation-for-it-service-management/Default.aspx	711 (1.51%)	61.88%	440 (1.68%)	68.50%
10.	/GraduateProgrammes/MasterofTechnology/HowtoApply.aspx	649 (1.38%)	25.27%	164 (0.63%)	61.02%

Behavior Flow: Click Path Analysis

- What are the common routes thro the website?

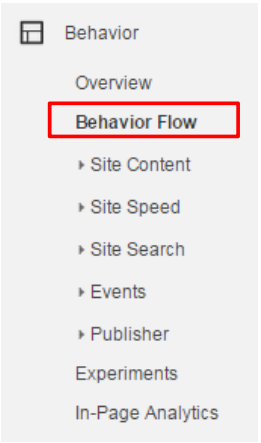


Users Flow



- Can also get a similar click "flow" chart using: Audience->Users Flow

Click Path Analysis



- What routes do users take through your website?
- Are there typical paths associated with different visitor segments?
- Is there an identifiable path from page type to page type?
  - May be easier to detect patterns looking only at page categories (will cover in workshop)
- Identifying click-patterns is also useful for
  - Ad Promotion
  - Fraud Detection
- BUT first we need to sessionise the page views

Sessionisation

- Determining the sequence of webpages that were visited by the same person during a single visit
  - "Visit" is a conceptual term referring to a continuous period of interaction with the website. E.g. I may be logged into Gmail all day but actually only interact with it once in the morning and once in the afternoon (e.g. after lunch) – two sessions conceptually
- Issues:
  - (1) finding all pages viewed by a single user ~ typically use cookies, unless logged-in
  - (2) finding those pages viewed in a single visit ~ typically use heuristics
    - E.g. The time spent on a page cannot exceed 30mins (time-out threshold)
    - E.g. The total session duration may not exceed a fixed threshold
    - E.g. All page-views (except the first) must be referred from another page in same session (referrer based heuristics, h-ref)
  - Usually a "big data" task => Map-Reduce frequently used
  - Personalised Sessionisation: E.g. Compute the average time a user spends on each page on the website and set the page time-out threshold according to this

Sessionisation: Examples

User 1

Time	IP	URL	Ref
0:01	1.2.3.4	A	-
0:09	1.2.3.4	B	A
0:19	1.2.3.4	C	A
0:25	1.2.3.4	E	C
1:15	1.2.3.4	A	-
1:26	1.2.3.4	F	C
1:30	1.2.3.4	B	A
1:36	1.2.3.4	D	B

Session 1

0:01	1.2.3.4	A	-
0:09	1.2.3.4	B	A
0:19	1.2.3.4	C	A
0:25	1.2.3.4	E	C

Session 2

1:15	1.2.3.4	A	-
1:26	1.2.3.4	F	C
1:30	1.2.3.4	B	A
1:36	1.2.3.4	D	B

Sessionisation using Time-Based Heuristic

User 1

Time	IP	URL	Ref
0:01	1.2.3.4	A	-
0:09	1.2.3.4	B	A
0:19	1.2.3.4	C	A
0:25	1.2.3.4	E	C
1:15	1.2.3.4	A	-
1:26	1.2.3.4	F	C
1:30	1.2.3.4	B	A
1:36	1.2.3.4	D	B

Session 1

0:01	1.2.3.4	A	-
0:09	1.2.3.4	B	A
0:19	1.2.3.4	C	A
0:25	1.2.3.4	E	C
1:26	1.2.3.4	F	C

Session 2

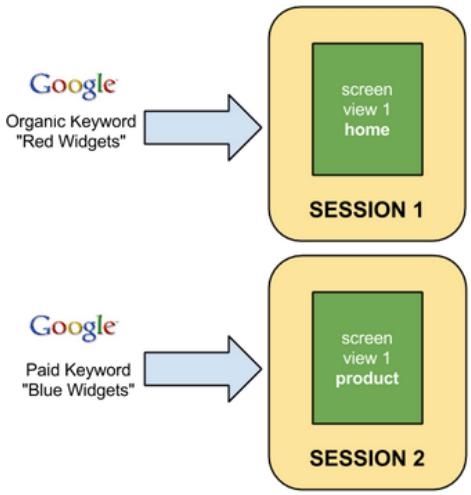
1:15	1.2.3.4	A	-
1:30	1.2.3.4	B	A
1:36	1.2.3.4	D	B

Sessionisation using h-ref heuristic

Sessionisation in Google Analytics

- There are two methods by which a session ends:

- Time-based expiry
  - After 30 minutes of inactivity
  - At midnight
- Campaign change:
  - A campaign is what drove you to the website ~ a search engine, referring website, or campaign tagged URL (but not direct traffic)
  - If a user arrives via one campaign, leaves, and then comes back via a different campaign then this counts as a new session



E.g. even if the time between two page-views on a website is small the session will change if the refer was outside of the site (e.g. you did a second search)

Click-Path Analysis: Navigation Summary

- Behavior->Site Content->All pages-> Navigation Summary (tab)
- Select a page and see what pages users visited before and after

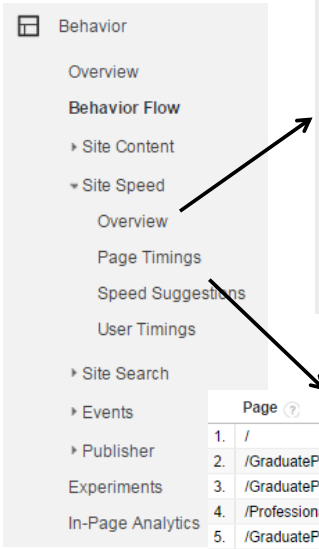
Explorer | Navigation Summary | In-Page

Group pages by: Ungrouped Current Selection: /ProfessionalCourses/Introduction.aspx Show rows: 10

Entrances Aug 25, 2014 - Sep 24, 2014: 12.48%
Previous Pages Aug 25, 2014 - Sep 24, 2014: 87.52%
Exits Aug 25, 2014 - Sep 24, 2014: 10.57%
Next Pages Aug 25, 2014 - Sep 24, 2014: 89.43%

Previous Page Path	Pageviews	% Pageviews	Next Page Path	Pageviews	% Pageviews
/	337	10.85%	/ProfessionalCourses/ProjectManagement.aspx	474	14.89%
/ProfessionalCourses/SearchCourse.aspx	191	6.15%	/ProfessionalCourses/BusinessAnalysis.aspx	315	9.90%
/ProfessionalCourses/BusinessAnalysis.aspx	171	5.51%	/ProfessionalCourses/AdvancedSoftwareDesignandDevelopment.aspx	227	7.13%
/ProfessionalCourses/ProjectManagement.aspx	167	5.38%	/ProfessionalCourses/ITServiceManagement.aspx	226	7.10%
/ProfessionalCourses/ITStrategyandManagement.aspx	109	3.51%	/ProfessionalCourses/ITGovernanceandRiskManagement.aspx	217	6.82%
/ProfessionalCourses/ITServiceManagement.aspx	107	3.45%	/ProfessionalCourses/CourseCatalogue.aspx	210	6.60%
/ProfessionalCourses/ITGovernanceandRiskManagement.aspx	104	3.35%	/ProfessionalCourses/EnterpriseBusinessAnalytics.aspx	200	6.28%
/ProfessionalCourses/EnterpriseBusinessAnalytics.aspx	98	3.16%	/ProfessionalCourses/ITStrategyandManagement.aspx	168	5.28%
/ProfessionalCourses/AdvancedSoftwareDesignandDevelopment.aspx	97	3.12%	/ProfessionalCourses/Agile.aspx	158	4.96%
/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/196/cn-diploma-in-enterprise-architecture/Default.aspx	87	2.80%	/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/196/cn-diploma-in-enterprise-architecture/Default.aspx	145	4.56%

Site Speed



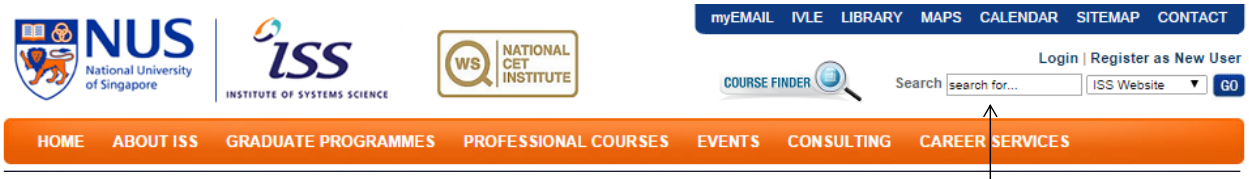
This is where you measure the speed of your site or app.

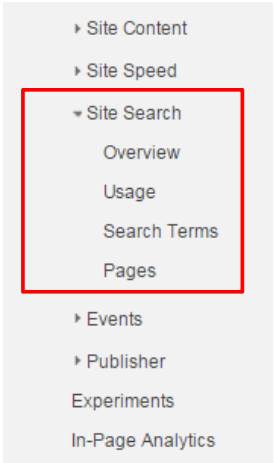
A slow loading website can be frustrating for users and can hurt your advertising and search rankings. Find and fix slow pages to improve your conversion rates and make your users happier. The Site Speed reports measure two aspects of latency:

- Page load time (latency) for a sample of pageviews on your website pages. This allows you to examine how quickly your pages load in different browsers, geographic areas, etc. No setup is required. Go to **Site Speed > Page Timings** to see your data.
- Execution speed or load time of any discrete hit, event, or user interaction that you want to track. This can include measuring how quickly specific images load, how long it takes for your site to respond to specific button clicks, etc. To collect this data, you'll need to add **_trackTiming()** method calls to the source code of the interactions you want to track. Go to **Site Speed > User Timings** to see your data. Set up User Timings.

	Page	Avg. Page Load Time (sec)	PageSpeed Suggestions	PageSpeed Score
1.	/	7.26	7 total	67
2.	/GraduateProgrammes/GraduateDiplomainSystemsAnalysis.aspx	6.89	7 total	85
3.	/GraduateProgrammes/MasterofTechnology.aspx	10.89	7 total	76
4.	/ProfessionalCourses/Introduction.aspx	2.44	7 total	74
5.	/GraduateProgrammes/MasterofTechnology/HowtoApply.aspx	4.77	7 total	83
6.	/ProfessionalCourses/SearchCourse/CourseDetail/tabid/267/cid/19/cname/	13.70	7 total	74
7.	/ProfessionalCourses/CourseCatalogue.aspx	4.75	7 total	74
8.	/ProfessionalCourses/SearchCourse.aspx	1.97	8 total	72
9.	/GraduateProgrammes/MasterofTechnology/AdmissionRequirements.aspx	7.61	7 total	84
10.	/Home.aspx	8.61	7 total	69

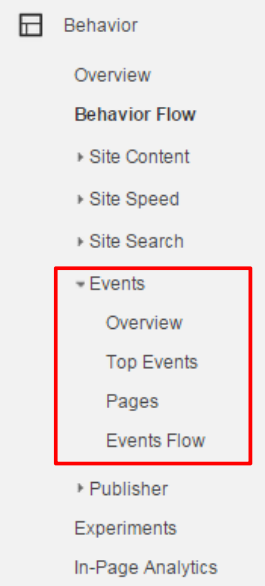
Site Search Analysis





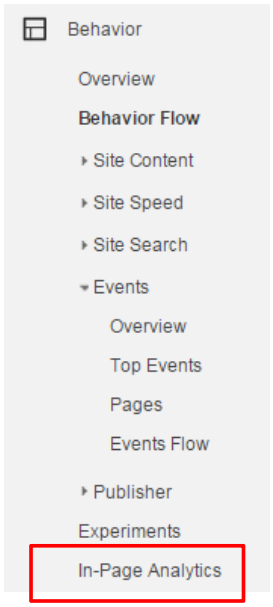
- What terms are most searched by users using your website search box?
- Which site searches were most frequent ~ tells exactly what users are interested in
- Which site searches fail the most ~ information that your website is not providing

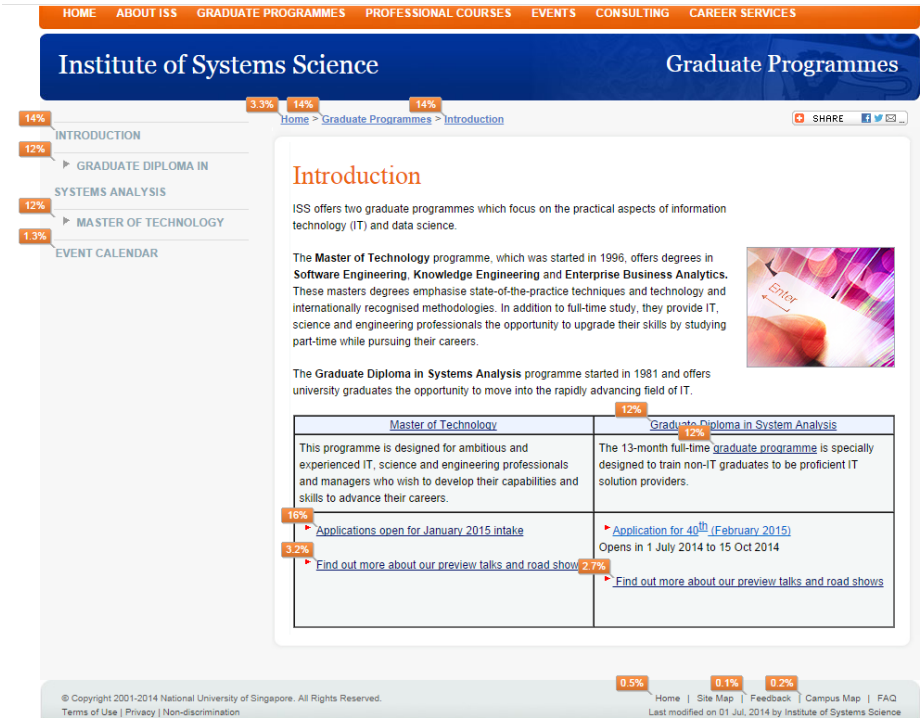
Within-Page Behavior: Events



- Shows how people use interactive elements in your site/app. For example, many websites contain video players, games, and other interactive experiences.
- Simply tracking page views doesn't allow you to capture these kind of interactions. When a user interacts with a video player, no page view is generated.
- Other examples of interactions that don't generate page views are Ajax-based activities, file downloads, and clicks on links that take the user to another site.
- Tracking detailed events may require more tracking code to be added to the website

Within-Page Behavior: Clicks





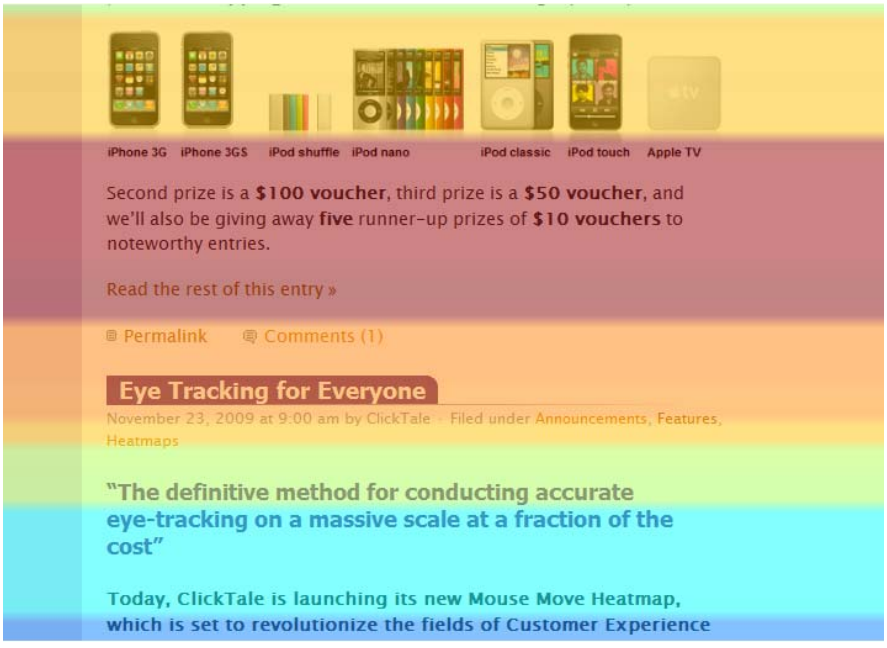
Click Analytics Tools: E.g. Clicktale.com

- Session Playback
  - Visitor Recordings
  - Real Time Monitor
- Data-Rich Heatmaps
  - Mouse Move
  - Mouse Click
  - Attention
  - Scroll Reach
  - Link Analytics
- Conversion Tools
  - Conversion Funnels
  - Form Analytics
  - Page Console
  - Advanced Filtering
  - Custom Alerts
  - Dashboard
  - Page Reports

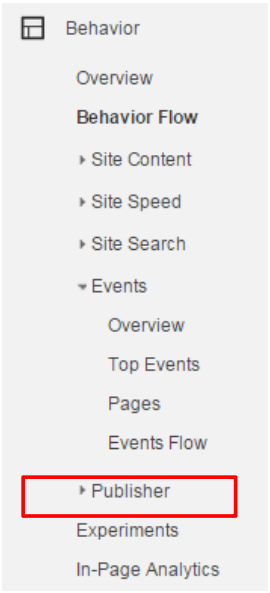
Example mouse move heat map

Clicktale.com

Example attention heat map



Publisher



Link AdSense or Ad Exchange to your Analytics property.

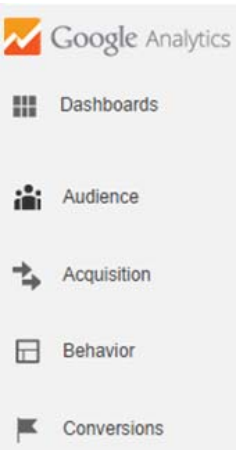
Get started

Linking your AdSense or Ad Exchange and Google Analytics properties gives you access to metrics such as impressions, clicks, and revenue which you can add to your favorite analytics reports to get a better understanding of how well your pages or content is monetizing. Once you've linked your properties, you can use insights from Analytics to refine and optimize your AdSense or Ad Exchange ad units, improving the overall performance of your business.

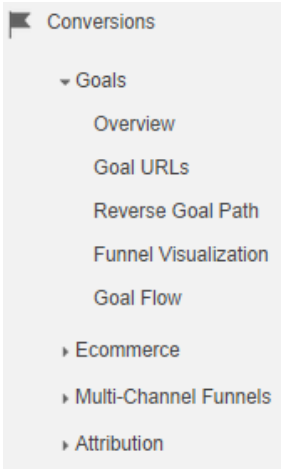
Linking properties requires a user who has Edit permission on the Analytics property and Administrator access on the Adsense or Ad Exchange account. Learn more about linking AdSense or Ad Exchange

On-Site Web Analytics: Main Objectives

- How popular is your website – how much traffic?
  - Basic site usage & traffic metrics. GOAL = Monitor website health
- What types of people visit your website?
  - Demographics & interests, GOAL = Reach the right people
- How did they get to (find) your website ?
  - Search engine, referral, directly etc… GOAL = Increase traffic
- What do they do on your site?
  - How long do they stay? Most/least popular pages? Is it easy to use?…
  - GOAL = Ensure the website meets their needs
- Does your website achieve its business goal(s)?
  - Measure Conversions etc.
  - GOAL = Ensure the website meets your needs



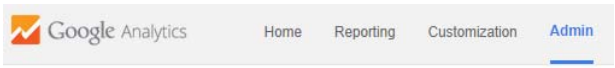
Setting Website Goals

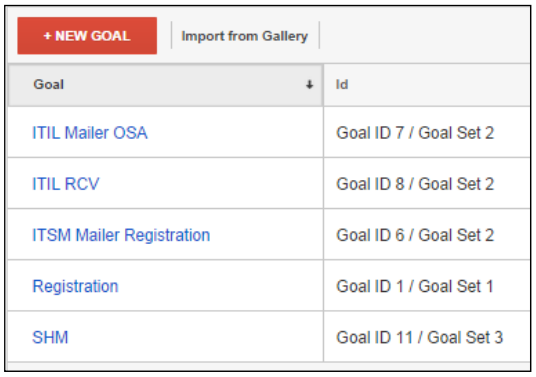


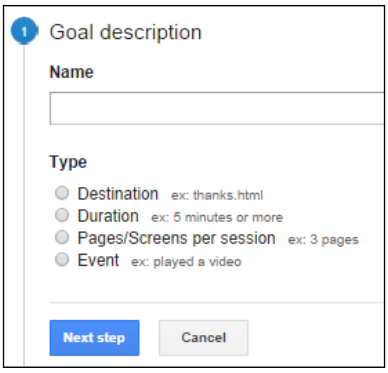
- What is your website for? What is its business/other goal?
- What do you want users to do when they visit?
- Distinguish the user's goals from the website goals
- Typical website goals (aka conversions)
  - E.g. make an on-line purchase, signup for newsletter, complete a survey, download a pdf file, view a video, download a coupon, get driving directions etc.
- What can be measured?
  - Reaching a page
  - Interacting with a page (watching a movie, using a widget, downloading a file etc.)
  - Remaining on the website for X minutes or visiting Y pages
  - Goal Conversion Rate ~ Percentage of users visiting the site that convert

Defining Goals in Google Analytics

- Create goals using the Admin tab

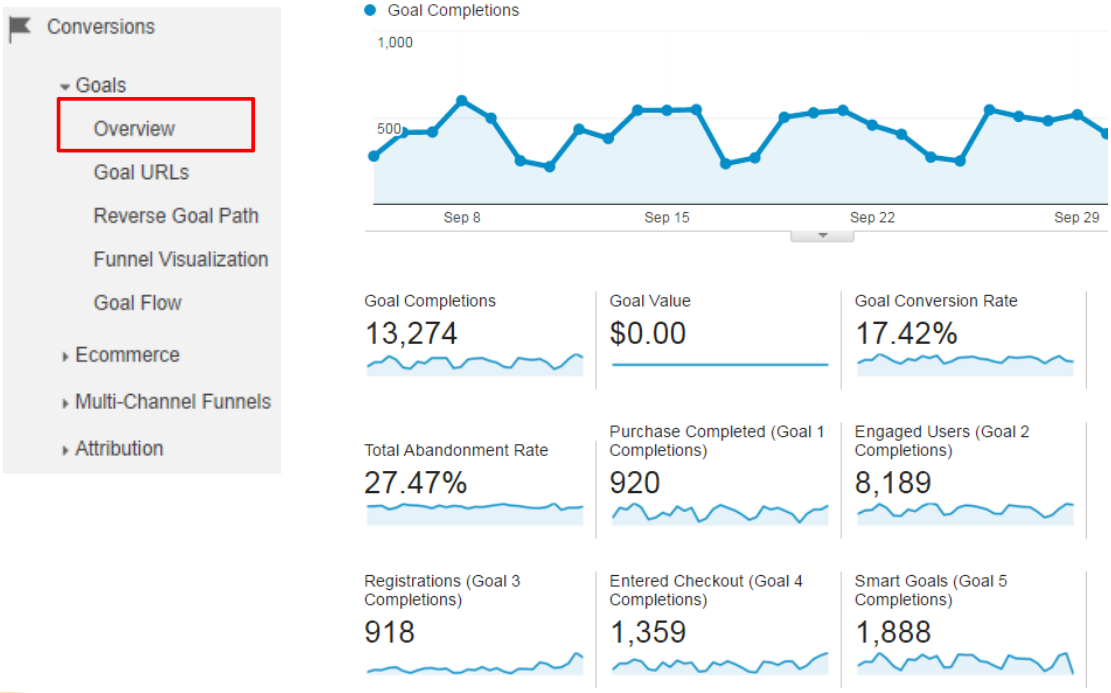






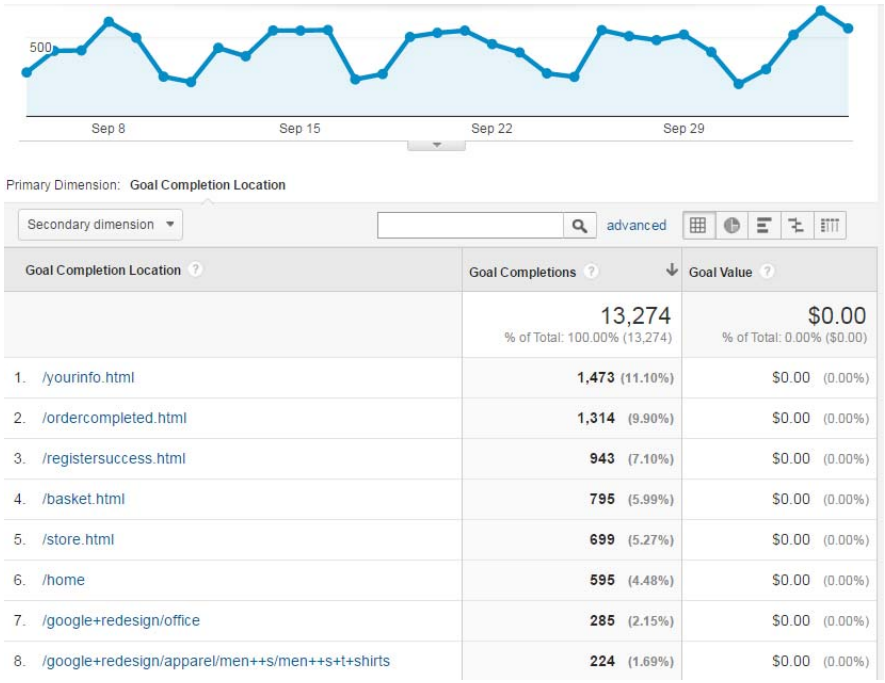
- Ecommerce Tracking Goals
  - Transaction data: product name, SKU, category, price, quantity, tax, shipping
  - Requires more JavaScript tracking code
  - Should be tracking this anyway, but adding to GA enables tie in with website stats

Goal Reports in Google Analytics



Goal URL's Report

Useful if a goal can be achieved from many different pages, e.g. set a goal as "whitepaper download" but have multiple whitepapers to download each from different pages in the website



Goal Completion Location	Goal Completions	Goal Value
	13,274 % of Total: 100.00% (13,274)	$0.00 % of Total: 0.00% ($0.00)
1. /yourinfo.html	1,473 (11.10%)	$0.00 (0.00%)
2. /ordercompleted.html	1,314 (9.90%)	$0.00 (0.00%)
3. /registersuccess.html	943 (7.10%)	$0.00 (0.00%)
4. /basket.html	795 (5.99%)	$0.00 (0.00%)
5. /store.html	699 (5.27%)	$0.00 (0.00%)
6. /home	595 (4.48%)	$0.00 (0.00%)
7. /google+redesign/office	285 (2.15%)	$0.00 (0.00%)
8. /google+redesign/apparel/men++s/men++s+t+shirts	224 (1.69%)	$0.00 (0.00%)

Reverse Goal Path

- Show the 3 pages prior to the goal page
- What pages did a user complete a goal on + the 3 pages prior to this

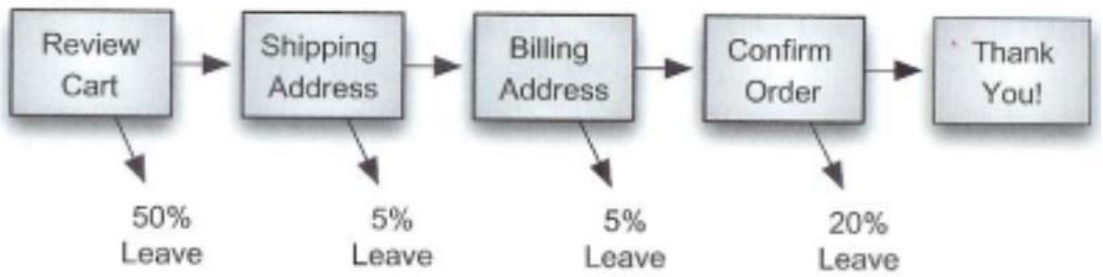
Reverse Goal Path

Customize Email Export Add to Dashboard Shortcut advanced

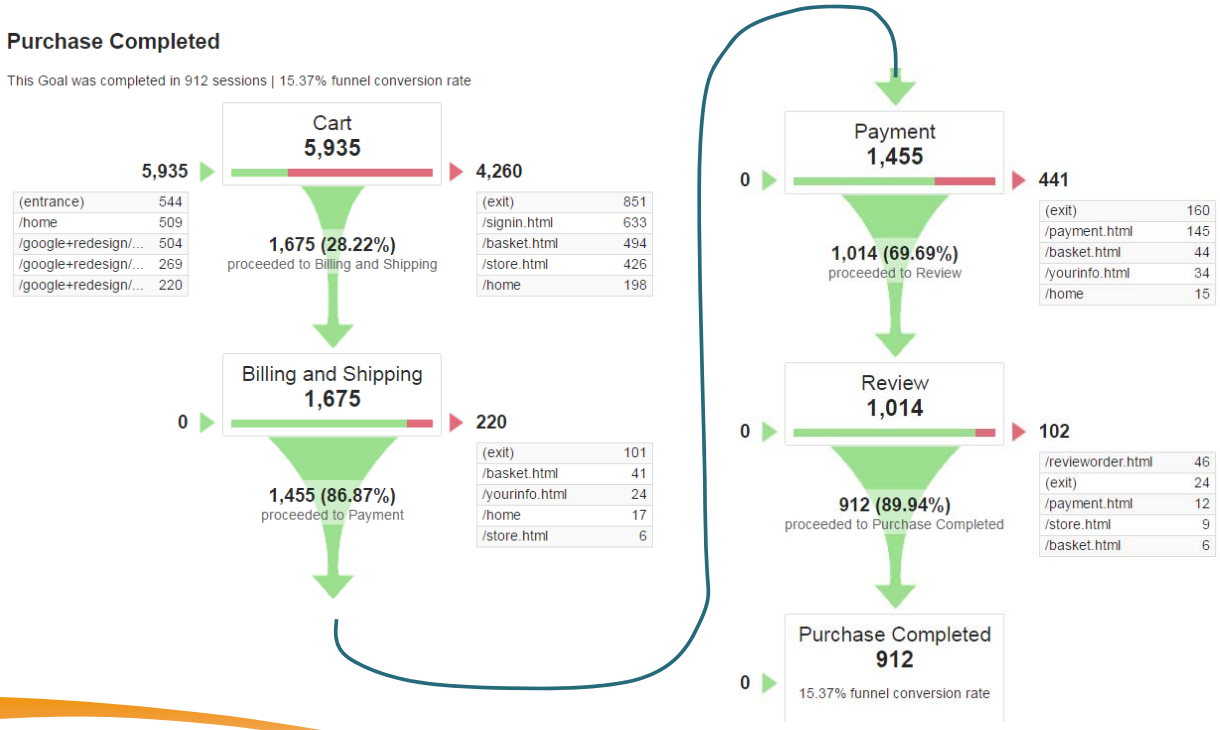
	Goal Completion Location	Goal Previous Step - 1	Goal Previous Step - 2	Goal Previous Step - 3	Goal Completions
1.	/ordercompleted.html	/revieworder.html	/payment.html	/yourinfo.html	414 (3.12%)
2.	/ordercompleted.html	/ordercompleted.html	/revieworder.html	/payment.html	341 (2.57%)
3.	/ordercompleted.html	/revieworder.html	/payment.html	/payment.html	312 (2.35%)
4.	/yourinfo.html	/basket.html	/store.html	/registersuccess.html	174 (1.31%)
5.	/registersuccess.html	/signin.html	/home	(entrance)	165 (1.24%)
6.	/ordercompleted.html	/revieworder.html	/payment.html	/register.html	96 (0.72%)
7.	/yourinfo.html	/basket.html	/basket.html	/basket.html	87 (0.66%)

Funnel Visualisation Report

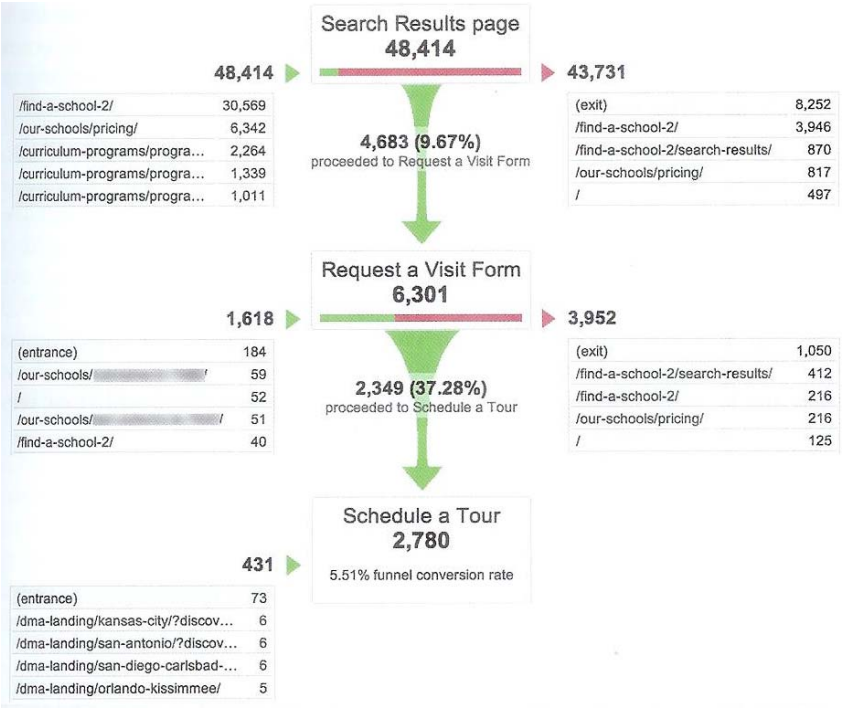
- Useful when the goal involves a sequence of page visits
- See how many people enter & complete, also how many quit before the end or enter from another (side) route



Funnel Visualisation Report

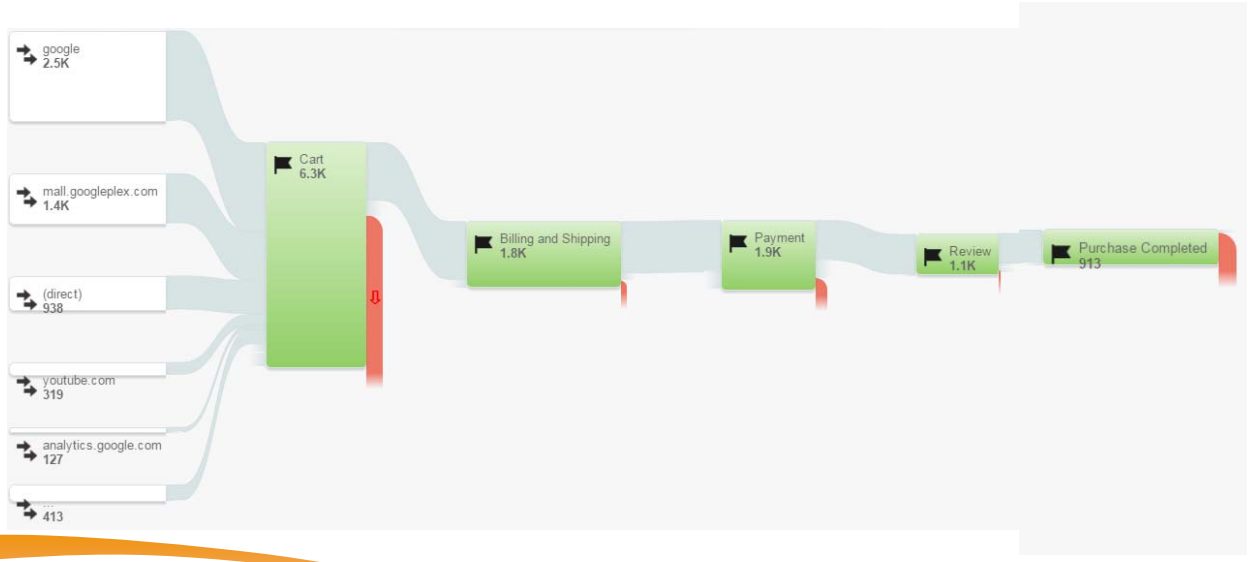


Funnel Visualisation – Another Example



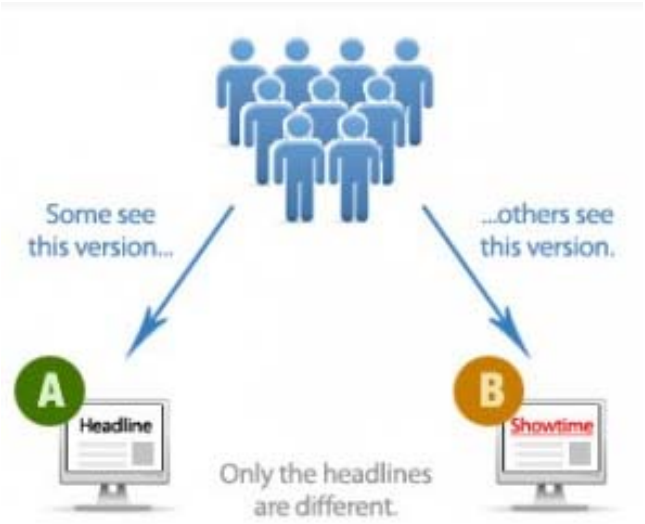
Goal Flow

- The Goal Flow report is an interactive graphic that visualizes the path users traveled through a funnel towards a Goal. This report can help you see how people are navigating and complete a Goal



Experiments: A/B Testing

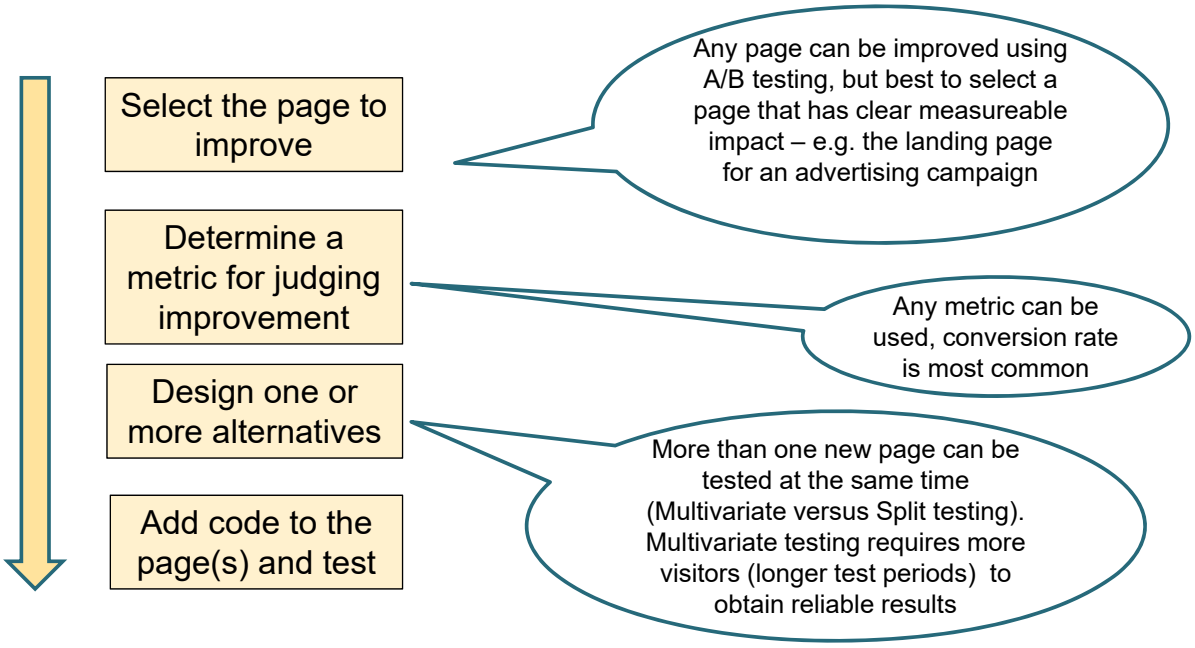
- You want to test a new design for a page – how to proceed?
- Create the new page (call it B), show it to some of the visitors to the website instead of the original page (call this A)
- After a while see which page (A or B) had more conversions (or other success measure)



Essentials

- Each visitor is randomly assigned to a variation, either A or B.
- The visitor always sees either only A or only B (even for repeat visits)
- Record which variation this visitor saw.

Designing an A/B Test



A/B Experimental Design Questions

- What split? (what percentage of users should see A versus B) ?
  - Normally. A = 50%, B = 50%
- How Long to Run?
  - Depends on complexity of test (number of pages being tested) and website traffic.
  - Ideally until any significant difference is observed, but clearly if there is no difference then need a cut-off time limit. You need to estimate your website traffic in advance to set a test completion date or else run until sufficient visitors have been logged.
  - A good rule of thumb for simple split test is at least 5000 visitors to the website*
  - For Multivariate testing a good rule of thumb is to add 2000 visitors per day for a one month test for every additional page being tested. Hence a 4-way test would require about 8000 daily visitors over a month to complete*

See Practical Web Analytics for User Experience, Michael Beasley, Morgan Kaufman

Testing Significance

- Most methods use the z-score, students t-test or welches t-test

$$z = \frac{\bar{x} - \Delta}{\frac{\sigma}{\sqrt{n}}}$$

$\bar{x}$ is the sample mean,
Δ is a value to be tested,
σ is the population standard deviation
n is the size of the sample

→ Look up the significance level of the z-value in the standard normal table

- E.g.

$$ZScore = \frac{p_{variationB} - p_{variationA}}{\sqrt{SE^2_{variationA} + SE^2_{variationB}}} \qquad SE = \sqrt{\frac{p(1-p)}{sampleSize}}$$

Where P ~conversion rate

E.g. see https://developer.amazon.com/sdk/ab-testing/reference/ab-math.html

Testing Significance: An Example

- Original page (A): 200,000 unique visitors with 10,000 converting
- Test page (B): 100,000 unique visitors tested with 4000 converting
- Lift of A over B ~ 25%
- If A had only **8,100** visitors converting => conversion rate of 4.05%
- Lift of A over test B = (4.05 *100)/ 4.00 = 1.25%

Group A is a clear winner (99.9%*)

Group A: 5% conversion
Group B: 4% conversion

	Visitors:	Goals:
Group A:	200000	10000
Group B:	100000	4000

Calculate

Sorry, you have no clear winner
We estimate that you'll need 1583527 more visitors*

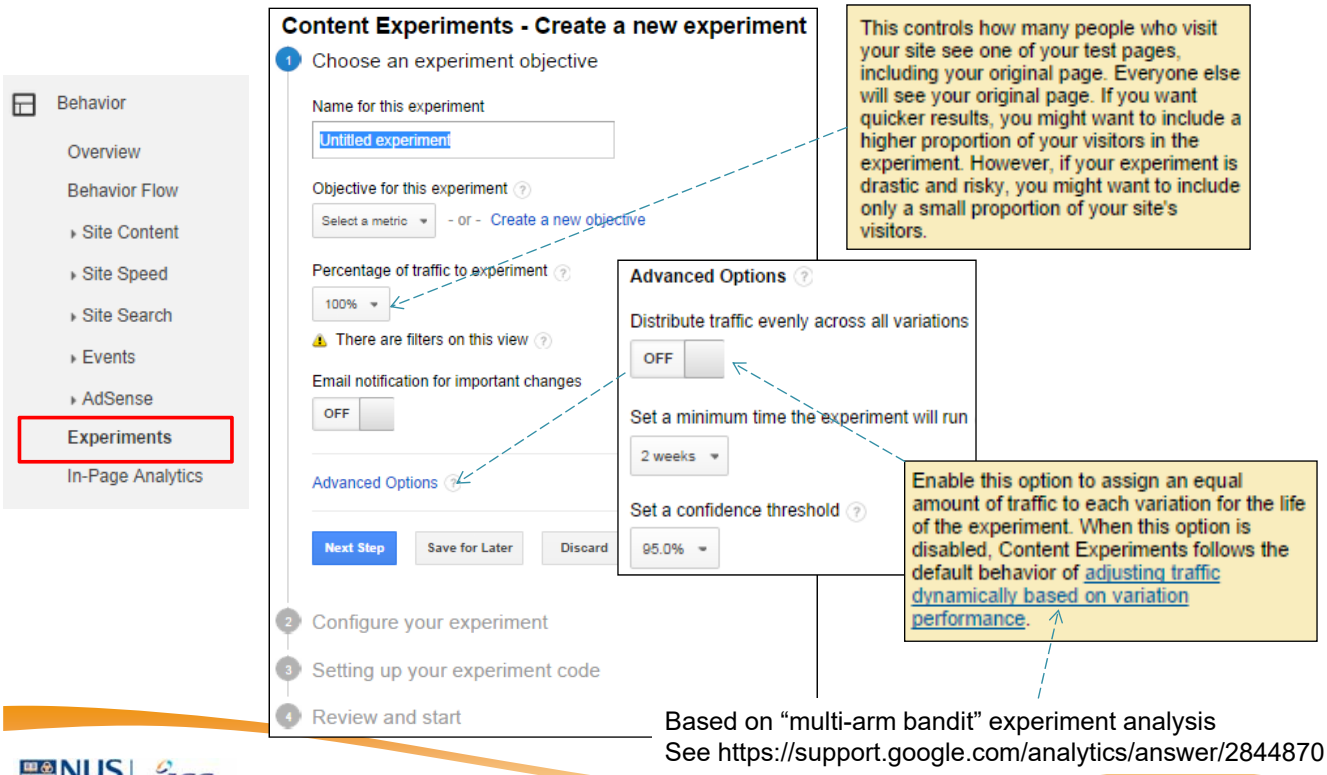
Group A: 4.05% conversion
Group B: 4% conversion

	Visitors:	Goals:
Group A:	200000	8100
Group B:	100000	4000

Calculate

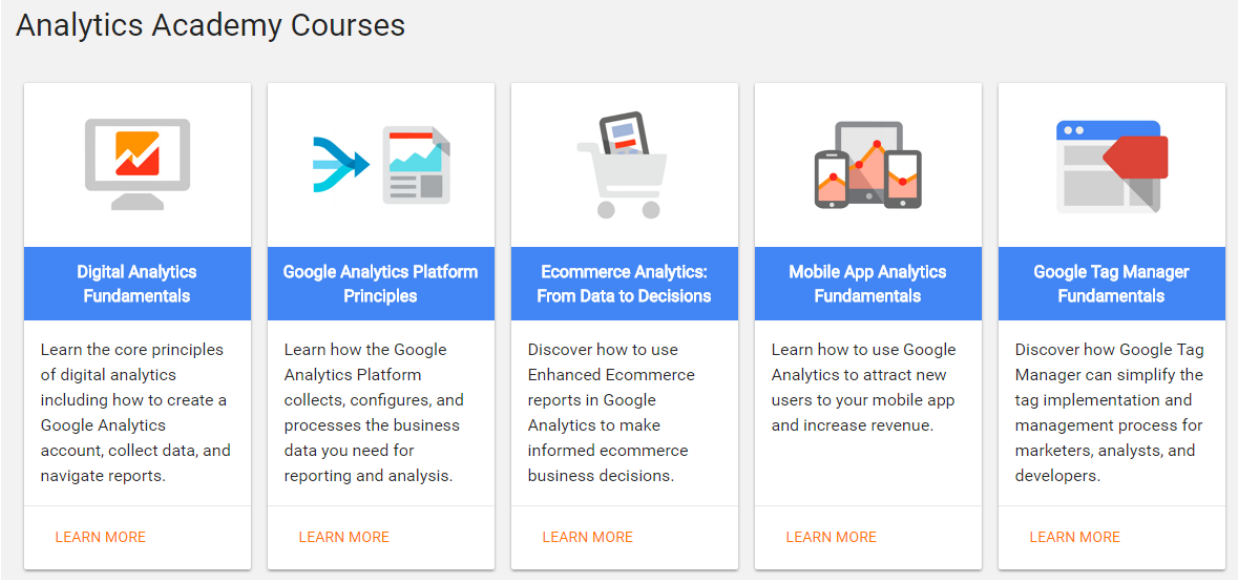
See http://www.usereffect.com/split-test-calculator

A/B Testing in Google Analytics



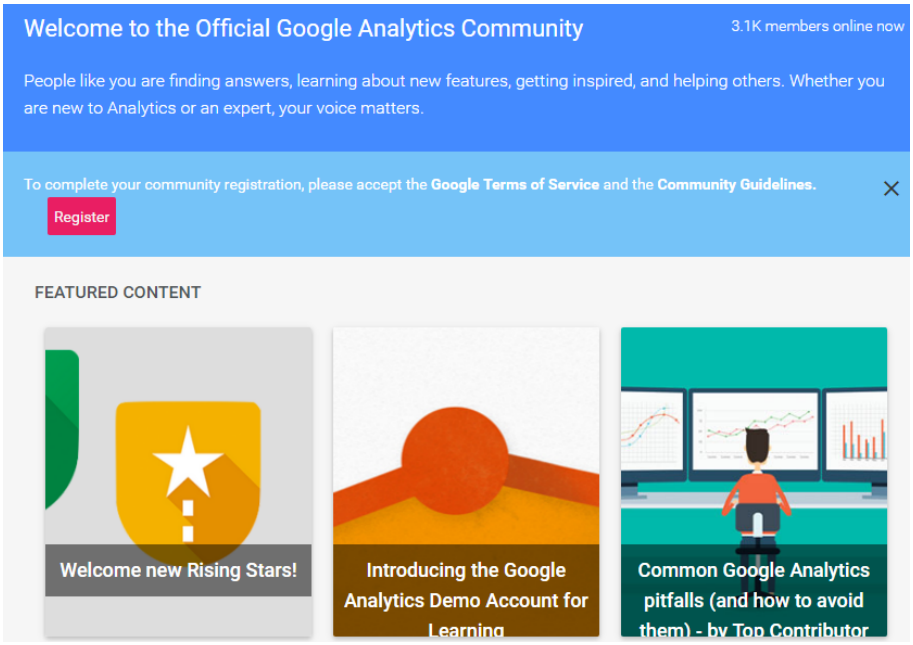
Based on "multi-arm bandit" experiment analysis
See https://support.google.com/analytics/answer/2844870

Google Analytics Academy



https://analyticsacademy.withgoogle.com/

Google Analytics Community



https://www.en.advertisercommunity.com/t5/Google-Analytics/ct-p/Google_Analytics#