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WEBSITE OPTIMIZATION PROPOSAL FOR THE ORGANIZATION BASED ON GOOGLE ANALYTICS

NAVRH OPTIMALIZACE WEBU ORGANIZACE NA ZAKLADĚ GOOGLE ANALYTICS

MASTER'S THESIS

DIPLOMOVÁ PRÁCE

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Theoretical Background
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Conclusions
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Basic sources of information:

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Abstrakt

Diplomová práce se zaměřuje na návrh konfigurace nástrojů Google Analytics 4 pro digitální společnost v Brně. Práce je rozdělena do tří hlavních částí. První část zkoumá teoretické základy webové analytiky a jejích nástrojů. Druhá část zahrnuje analýzu aktuálního stavu konfigurace nástrojů pro analýzu webových stránek společnosti a provedení důkladné analýzy výkonnosti webu. Nakonec třetí část představuje návrh řešení odvozený z analýzy současného stavu a požadavků společnosti s aplikací teoretických konceptů probíraných v celé práci.

Abstract

The Master's thesis focuses on proposing the configuration of a Google Analytics 4 tool for a digital company in Brno. The thesis is divided into three main parts. The first part explores the theoretical foundations of web analytics and its tools. The second part involves analyzing the current state of the company's website analytics tools configuration and conducting a thorough analysis of the website's performance. Finally, the third part presents a proposed solution derived from the analysis of the current state and company's requirements the application of theoretical concepts discussed throughout the thesis.

Klíčová slova

webová analytika, Google Analytics, Universal analytics, Google Analytics 4, Google Tag Manager, uživatel, tag, trigger, metriky, datová vrstva, událost, report

Key words

web analytics, Google Analytics, Universal Analytic, Google Analytics 4, Google Tag Manager, user, tag, trigger, metrics, data layer, event, report

ROZŠIŘENÝ ABSTRAKT

Tato diplomová práce si klade za cíl navrhnout implementaci konfigurace Google Analytics 4 (GA4) a Google Tag Manager (GTM) včetně poskytnutí definic hodnot pro sledování konkrétních událostí pro digitální společnost sídlící v Brně.

V lednu 2023 prošly webové stránky společnosti kompletním redesignem, což vedlo k nutnosti nastavení nové konfigurace v rámci sledování webových stránek. Návrhy by měly firmě pomoci při optimalizaci webu a vyhodnocení redesignu. Návrhy jsou formulovány na základě rozsáhlého výzkumu provedeného s využitím dostupné literatury, webových zdrojů a získaných znalostí. Pro formulování správných návrhů se diplomová práce skládá ze tří hlavních částí: teoretické, analýzy současného stavu a části návrhu řešení.

Společnost, pro kterou jsou návrhy v diplomové práci založeny, je digitální agentura, která byla založena v roce 2006 v Brně. Společnost poskytuje řadu digitálních služeb a také vyvíjí vlastní produkty. Agentura má vlastní webové stránky, které slouží k prezentaci jejích možností, úspěchů, k získávání nových klientů a nových zaměstnanců. Pro management společnosti je velmi důležité sledovat výkon webu, aby pochopil efektivitu webu a chování uživatelů. Na začátku kapitoly 3. je uveden podrobnější popis společnosti a jejích webových stránek.

Druhá kapitola práce je věnována teoretickým aspektům webové analytiky. V prvních částech kapitoly je popsána definice webové analytiky, její procesy a nastíněním klíčových pojmů je stanoven společný jazyk pro práci. Teoretická část se také zaměřuje na nástroje pro analýzu webu, kde je Google Analytics klíčový – díky nim zformulována analytická část a následné návrhy řešení. V rámci nástrojů Google Analytics byla popsána verze Universal Analytics, její model měření a reprezentované základní reporty, následovala nejnovější verze Google Analytics 4, kde byly uvedeny analogické informace s klíčovým porovnáním těchto verzí. Co je důležité zmínit, byl prozkoumán významný nástroj jako Google Tag Manager a jeho funkce s poskytováním informací o datových vrstvách.

Třetí část je zaměřena na analýzu současného stavu konfigurace firemních nástrojů pro analýzu webových stránek. Byl poskytnut popis společnosti a stručný popis webových stránek. Provádí se podrobné zkoumání stávajícího nastavení Universal Analytics (UA), včetně značky, pravidel a proměnných. Kromě toho je provedeno vyhodnocení výkonu

webu v zadaném rozsahu dat provedené ve vizualizačním nástroji Looker Studio za účelem zjištění případných nedostatků nebo oblastí ke zlepšení v konfiguraci webové analýzy. V průběhu analýzy byla nalezena různá slabá místa konfigurace a také v souladu s prohlášením společnosti Google, že Universal Analytics již nebude fungovat - v další kapitole budou uvedeny návrhy řešení na základě výsledků analýzy, redesignu webu a požadavků managementu.

Na základě teoretických znalostí a poznatků získaných analýzou čtvrtá kapitola představuje navrhované řešení. Zahrnuje návrh a implementaci konfigurace Google Analytics 4 a Google Tag Manager přizpůsobené konkrétním požadavkům a cílům digitální společnosti. Toto navrhované řešení je v souladu s úsilím společnosti o redesign webových stránek a jeho cílem je zlepšit možnosti sběru dat, sledování a analýzy. Navrhovaná konfigurace zahrnuje definici proměnných datové vrstvy, vytvoření přizpůsobených značek a spouštěčů a vytvoření relevantních přehledů. V sumarizaci návrhu řešení je zdůrazněna efektivnost navrhovaného řešení a jeho dopad na různá oddělení – pokud je obtížné sestavit, zda je navržený report dostatečně podrobný a splňující požadavky. Jako klíčová část kapitoly jsou uvedeny souhrnné výsledky webového výkonu po redesignu, které poskytují přehled o možnostech optimalizace webu a porozumění uživatelům na základě vytvořených vlastních událostí a definovaných proměnných datové vrstvy.

Závěrem lze zhodnotit, že navržená konfigurace splňuje všechny definované požadavky, zkvalitňuje proces webové analýzy pro oddělení digitálního marketingu ve firmě a poskytuje mnohem podrobnější informace. Kombinace navržené konfigurace a vizualizační zprávy poskytuje detailní pohled na výkon webu a interakci uživatelů s ním. Zobrazení kliknutí uživatele na konkrétní tlačítka, času stráveného na konkrétních stránkách, míry zapojení a sledováním metrik uvedených v reportu získává společnost cenné poznatky pro optimalizaci webu.

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Jan Luhan, Ph.D., MSc.

Affidavit

I declare that the present master project is an original work that I have written myself. I declare that the citations of the sources used are complete, that I have not infringed upon any copyright (pursuant to Act. no 121/2000 Coll.).

Brno dated 12th May 2023

Polina Sydorenko
author's signature

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1 INTRODUCTION

In today's digital age, where businesses increasingly rely on their online presence, web analytics is a key tool for measuring success and achieving growth. It is a critical component in understanding the effectiveness of a website and its impact on achieving business objectives. By tracking various of metrics, web analytics can provide valuable insights into the behavior and preferences of website visitors. These insights can inform strategic decisions about website design, content, and marketing efforts.

The Master's thesis will primarily address topics related to web analytics, including the configuration of web analytics tools, the significance of their presence, and the importance of data visualization within optimizing a company's web performance.

1.1 Objective

The aim of the thesis is to analyze and process proposals for optimization of the company's website from the point of view of web analysis based on the Google Analytics platform. The company's website recently underwent a complete redesign, creating a need to update the way analytical statistics are measured. As a proposal - a proposal to create a structured list of custom events, corresponding to the new design; proposal of implementation of Google Analytics 4, subsequent configuration of Google Tag Manager, and creation of a report of data from Google Analytics 4 through Looker Studio (Google Data Studio). Result - the proposal can help the organization gain a detailed view of the interactions with the website and the behavior of the users, it will provide information about whether the redesign was useful from the point of view of web analytics, whether it is user-friendly, users can navigate it and whether it fulfills its goals. The work will focus on the company's internal data. The preferences of the company of tracking the particular data will be taken into account in the solution proposals.

1.2 What work does not solve

The work does not deal with web development and web design, SEO, PPC, implementation of Google analytics tool on the website from the side of Front-end, cookies installations.

1.3 Processing methods

During designing of proposals, I was based on my own practice, the practice of experts in the given field and the professional literature. The methodologies of processing the proposals would be based on analyzation of current state, review of the web performance, comparison between Google Analytics 3 and Google Analytics 4.

2 THEORETICAL PART

The theoretical part of the Master's thesis will cover the definition of web analytics, its significance for website owners, and the terminology related to it. It will also explain the analytics tools, their dashboards, and various aspects of their configuration. Additionally, it will touch on the concept of data layer variables and their usage in the context of the thesis.

2.1 Web analytics definition

There are numerous terms related to web analytics, and their interpretation can vary. The author, Avinash Kaushik [1] refers to the definition provided by the Web Analytics Association (WAA):

“Web analytics is the objective tracking, collection, measurement, reporting, and analysis of quantitative Internet data to optimize websites and web marketing initiatives.” [1, s. 2]

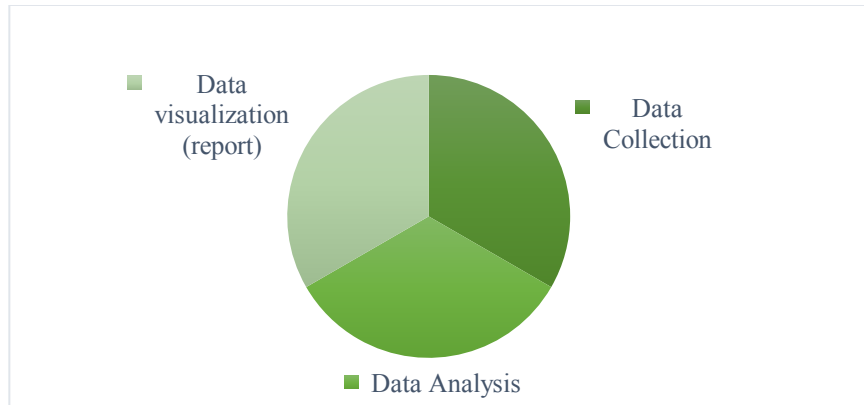
Later with time, Avinash Kaushik published a book Web Analytics 2.0, in which other definition of web analytics was presented:

“Web analytics means the analysis of qualitative and quantitative data from one's own website and the websites of competitors, in order to continuously improve the user experience of current and potential customers, which translates into the desired results on and off the website.” [2, s. 23]

Its objective is to establish metrics that align with business objectives and audience expectations, and then analyze the website data to evaluate the performance of those metrics. This enables to make informed decisions to enhance the overall strategy and optimize the website. [3]

2.2 Web analytics process

The process of web analytics can be divided into 3 phases:



Graph 1. Web analytics process [Source: Custom processing]

2.3 Web analytics terminology

Accurate comprehension of the terminology established in web analytics is crucial as it contains variety of expressions that can possess diverse meanings and understandings. While the terms used in web analytics may vary depending on the analytical tools being used, the terms presented in this chapter are among the most commonly used. In this chapter, will be explored key terms and concepts related to web analytics. By combining the definitions stated in different sources a common language and framework for discussing web analytics will be set up. The majority of provided terms will be frequently used both in the analytical and proposal sections within the Master's thesis.

2.3.1 Visitor/Unique Visitor

In the context of web analytics, a unique visitor is identified as an individual web browser that accesses or views pages on a website within a specific time period, such as a day, week, or month. Analytics tools record unique visitors only once during the designated time period, typically 30 days, although this may vary depending on the tool. A visitor may make multiple visits to the website during this period using the same computer and browser without being counted as an additional unique visitor. However, subsequent visits are included in the repeat visitor metric. Identification is typically based on the visitor's computer and browser, often utilizing cookies and/or a combination of the

visitor's IP address and browser information. It is important to note that the identification is based on the device/browser used, not the actual person, so if the same person uses different devices or browsers, they will be counted as multiple unique visitors. [5]

2.3.2 Visit/ Session

A visit or session is characterized as a sequence of requests made by a visitor that can be identified as unique, either through an IP address or a unique ID stored in a browser cookie. Visits usually outnumber Unique Visitors, and they are deemed to have ended when no requests are recorded after a specific amount of time has elapsed. Although a 30-minute timeout is commonly used by analytics tools. The time limit can be modified in some cases, as is the case with Google Analytics. It should be emphasized that analytics tools lack a reliable method of determining if a visitor has accessed other websites between page views, meaning that a visit will be considered as one visit as long as the events (such as clicks or page views) occur within a 30-minute period. It is also essential to keep in mind that a visit can consist of a single page view or thousands of them, and the session may be prolonged if the time elapsed between page loads suggests that the visitor has been continuously viewing the pages. [4]

2.3.3 Hit

A single file request from the server is called a hit, which could be an image, a JavaScript file, or a CSS file. It can help to improve the loading speed of web pages since too many loaded elements on a page can cause it to load slowly. Applicable within usage of “Log Analysis”, that will be explained in 2.4.1. section. Hits were previously used as a measure of site popularity by web administrators, but this number can be misleading and overestimate popularity. [6]

2.3.4 Page view

A pageview (also known as a pageview hit or page tracking hit) refers to the loading or reloading of a web page in a browser. This term is typically defined as the total number of pages viewed by website visitors. According to this definition, a pageview is registered whenever a user views a page on the website, including instances where a user reloads

the page. In cases where a user navigates away from the page and then returns to it, a second pageview is recorded. In many web analytics systems, Page views serve as the foundation for other reports. [4]

2.3.5 Event

An essential concept in web analytics is the Event metric, which captures specific user interactions on a website, beyond the standard page views. Events can include video views, clicks on outbound links, and social media shares. By tracking events, web analysts can gain a better understanding of user behavior and engagement on a website. Event metrics provide information on the total number of times a particular event was triggered and the number of unique sessions in which it occurred. Each event hit is associated with three key variables: category, action, and label, which provide additional context and detail on the event. [4]

2.3.6 Traffic source

Traffic source is used in web analytics to identify the sources that are generating traffic to a website. The three primary traffic sources include organic search, direct traffic, and referrals, although a website may also receive traffic from campaigns like banner advertisements or paid search.

- Organic traffic refers to the visitors who arrive at a website through non-paid search engine results, such as those provided by Google, Yahoo or Bing.
- Direct traffic refers to visitors who arrive at a website by typing the URL directly into their browser or by clicking on a bookmark. It also includes traffic that cannot be identified by analytics tools as coming from a specific source or campaign, such as traffic from unknown sources or emails without campaign tracking.
- Referral traffic refers to the visitors who come to a website by clicking a link from another website, without any campaign parameters attached to the link. This type of traffic may come from various sources such as news media, partner sites, or other external links. [4]

2.3.7 Bounce Rate

Bounce rate is a widely used web analytics metric that measures the percentage of sessions on a website in which users viewed only one page before leaving. It is calculated as the number of single-page sessions divided by all sessions. This metric is available in many web analytics tools and can be an important indicator of website engagement and user experience. However, it is important to use this metric correctly and in the right context to avoid misinterpretations and wrong conclusions about website performance. [2]

2.3.8 Time on page

In web analytics, time is a crucial metric that measures the duration of a visitor's stay on a webpage or the overall site during a single session. While time may seem like a simple concept, it is quite intricate and involves various factors. [2]

2.3.9 Goal

A goal in the context of a website refers to a specific objective that a site owner aims to achieve, excluding transactions. These goals are typically established based on a Key Performance Indicator (KPI) plan, which outlines the key metrics used to measure success. Alternative terms like targets or conversion points can also be used interchangeably with goals. Examples of goals include actions such as newsletter sign-ups, requests for offers, or contact inquiries, which are considered valuable outcomes for the website owner, often referred to as leads. [4]

2.3.10 Conversion

Conversion and the actions that lead to conversion are the primary purpose of having a website. Conversion refers to the successful completion of specific activities by visitors that positively contribute to the online business. It is important to note that a successful conversion doesn't necessarily have to be an online purchase. The actions such as initiating a document or application download, submitting information for lead generation, navigating from general to specific information, spending a defined amount

of time on the site, or viewing specific key pages such as pricing or service agreements – can be a conversion depending on the set goal. [6]

2.4 Data measurement ways

There are two main technical ways of collecting data for web analytics. The traditional method is server log file analysis, which reads the logfiles that the web server creates to record file requests by browsers. The second method is page tagging, which involves using JavaScript embedded in the webpage to make image requests to a third-party analytics-dedicated server. This occurs whenever a webpage is rendered by a web browser, or optionally, when a mouse click occurs. Both methods collect data that can be processed to produce web traffic reports.

2.4.1 Web log analysis

Web analytics tools were first introduced in the 1990s, starting with log analysis which involves examining server log files to track website traffic. Through the process of log analysis, it was possible to compile summary statistics for specific periods by using various aggregation operations on data for a large number of requests. This type of data could provide information such as the number of page views, visits, unique visitors, frequently visited sources, commonly used browser types, and more. However, this method was found to have several limitations. One major drawback was imprecise results, primarily due to visitor identification being based solely on the IP address. This method also recorded traffic generated by automated programs or bots, resulting in inaccurate data. On the other hand, it did not account for cached page views, which could lead to lower traffic counts. As a result, alternative methods such as page tagging were developed to address these limitations and improve the accuracy of web analytics data. [8]

2.4.2 Tag measurement

Measurement code tags or integrated labels on each domain page were given priority. This method is significantly more accurate and requires the use of JavaScript and cookies. When a webpage is loaded, a JavaScript code embedded in the page executes and calls

back the website's server, passing the user's information to the server. These callbacks are asynchronous and do not impair performance. The JavaScript also assigns a persistent cookie to store a client ID on the user's device. This cookie allows the user to be identified upon revisiting the page, as long as the cookie has not been deleted. If data is collected through a third party, such as Google Analytics, the data is passed onto that party's server and assigned a site ID for tracking purposes. Cookies are text files created by a web server and stored on a user's computer by their browser. However, a major issue with this approach is that many users may disable or delete cookies, which can result in unreliable data.[7][8]

2.4.3 GDPR and web analytics

In the past, disabling cookies was primarily done by individuals who were concerned about protecting their personal information and had a good understanding of the cookie system. However, since 2018, the use of cookies has been regulated by the GDPR (The General Data Protection Regulation) as a means of working with personal data. Personal data is not limited to just a user's name and contact information, but also includes information about their purchasing behavior and overall website usage. When a company collects cookies, they are gathering personal data. Under GDPR regulations, there are two scenarios in which a website user's personal data may be processed:

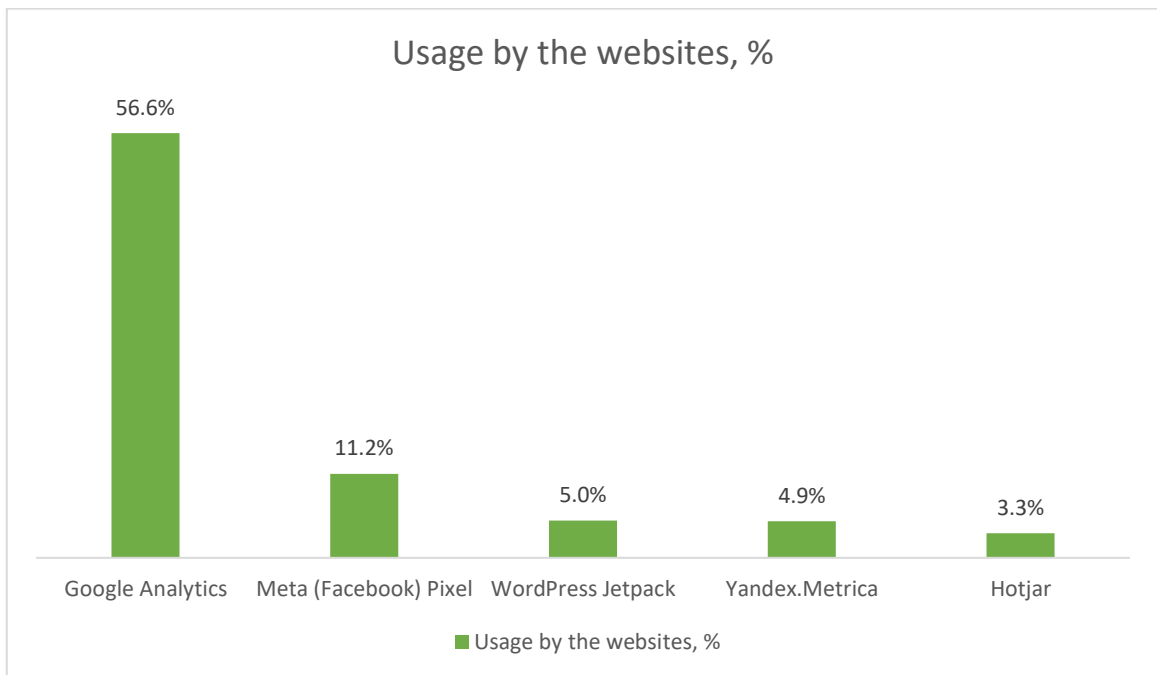
- In order to offer services in an online setting, functional cookies are necessary for facilitating purchases. These cookies can be processed by any website without requiring explicit consent from the user. Simply providing information about these cookies in the website header is enough.
- Legitimate interest refers to a legal basis for processing personal data that allows companies to use data for specific purposes without obtaining the explicit consent of the user. This includes analytics and marketing purposes, such as direct marketing or remarketing. However, from January 1st, 2022, companies can only use cookies for analytical purposes based on the voluntary consent of users. This means that companies must obtain user consent to the use of cookies for analytics and marketing purposes by means of pop-up bars until the European Commission approves a regulation that will require voluntary consent once every six months.

The User experience experts provide recommendations on how to design a cookies bar to encourage users to consent to the use of cookies for both analytics and marketing purposes, in order to avoid losing valuable data. Despite these efforts, however, there are still around 20-30% of users who decline to give consent for the processing of their personal data. As a result, analytical tools that rely on cookies are no longer able to automatically collect data from nearly all website users as they used to. Nonetheless, leading data analyst Jan Tichý believes that this change presents an opportunity for a new perspective on data analytics. If a company sets up measurement codes on their website pages to track the movement of new users without collecting other personal data, the analyst can still determine the percentage of users who declined to consent to cookie usage. [7]

2.5 Web analytics tools

Nowadays, web analytics tools are essential for anyone who wants to understand how their website is performing and how their audience interacts with their content. These tools collect and analyze data on number of sessions, user behavior, such as page views. Web analytics tools are used by a wide range of professionals, including digital marketers, web developers, UX designers, and data analysts. These professionals rely on web analytics to make informed decisions, measure the effectiveness of their campaigns, and improve their website's performance.

On the bar chart presented below will be displayed top 5 web traffic tools according to their usage by websites.



Graph 2. Top 5 analytics tools [Source:Custom processing according to 9]

According to the bar chart, Google Analytics is the most widely used tool with 56.6% usage by websites. Meta (Facebook) Pixel is the second most popular tool, used by 11.2% of websites. The third most used tool is WordPress Jetpack, with 5% of websites using it. Yandex.Metrica is the fourth most used tool with a usage percentage of 4.9%. Finally, Hotjar is the fifth most used tool, with only 3.3% of websites using it. Overall, the chart shows that Google Analytics is the dominant web traffic analysis tool among the websites surveyed, with a significantly higher usage percentage than any other tool. Other tools performed a relatively low percentage of usage (less than 3% of websites). In following sections will be given a brief description of each tool.

2.5.1 Google Analytics

Referring to Jan Brunec's statement about Google Analytics:

“Statistics show that more than half of websites use Google Analytics to monitor traffic. It is therefore the most widely used tool in this field in the world.

From a marketing point of view, the Internet is one of the most interesting channels because, unlike most others, it is almost perfectly measurable and

provides a huge amount of data practically online. However, an analytical tool is necessary to evaluate this data and determine the results.”[10, s. 9]

Google Analytics is a web analytics solution provided by Google Inc. in 2005, that provides highly precise statistical information about users of a given website. This service is utilized by website operators, owners, web agencies, marketing consultants, and others who are interested in obtaining data about website visitors. Google Analytics makes it possible to monitor current and historical data on user behavior, conversions, time spent on the website, sales, visitor behavior, and other indicators. While the service also offers advanced measurement of mobile applications. The service operates by collecting analytical data from the website, processing the data according to the user's settings, and displaying the selected data to the user.

Google Analytics employs a technique known as page tagging to gather information from a visitor's browser. A tracking code written in JavaScript is inserted into every page, which captures and transmits data to the Google Analytics server.

```
<script>
  (function(i,s,o,g,r,a,m)
  {i['GoogleAnalyticsObject']=r;i[r]=i[r]||function(){
  (i[r].q=i[r].q||[]).push(arguments)},i[r].l=1*new
  Date();a=s.createElement(o),
  m=s.getElementsByTagName(o)[0];a.async=1;a.src=g;m.
  parentNode.insertBefore(a,m)
  })(window,document,'script','https://www.google-analytics.
  com/analytics.js','ga');

  ga('create', 'UA-1231231-1', 'auto');
  ga('send', 'pageview');
</script>
```

Figure 1. Google Analytics script example [Source: 10]

In the upcoming chapters of the thesis, there will be a more detailed description of the Google Analytics tool as the focus of the thesis is on web optimization using this particular tool. [10]

2.5.2 Meta (Facebook) Pixel

The Meta pixel is an analytics tool for enhancing advertising effectiveness, with a historical foundation in tracking pixels and pixel advertising, originally used in email marketing and subsequently becoming a standard in various online advertising platforms. In 2013, Facebook introduced two types of pixels, namely the Website Custom Audience

Pixel for retargeting website visitors, and the Facebook Conversion Pixel for tracking website conversions. The former enabled creation of one custom audience pixel per Facebook ad account, while the latter allowed creation of many conversion pixels. In 2015, Facebook combined both types into a new and improved Facebook pixel, and subsequently updated it in 2017 to include additional tracking options such as button click activity and page metadata. Following the rebranding of the Facebook company to Meta in January 2022, the pixel was renamed "Meta pixel."

Overall, The Meta Pixel is a JavaScript code that can be inserted into a website to track visitor activity and enable measurement and enhancement of advertising campaigns. It gathers and analyzes user actions on the website to categorize them into target groups for future ad engagement. The tracking pixel is a graphic with a size of 1x1 pixel that is loaded when a user visits a website or opens an email, and is typically transparent or camouflaged to avoid standing out to users. The URL of the tracking pixel serves as the memory location on the server. [11]

2.5.3 WordPress Jetpack

Jetpack WordPress.com Stats, also known as WordPress.com Stats, is a plugin that provides a quick overview of website traffic statistics within the WordPress dashboard. It is included with the Jetpack plugin, which is developed by Automattic, the company behind WordPress.com. While the free version of Jetpack includes Site Stats, downtime monitoring, automated social media posting, and an activity log, additional features such as daily backups, scheduled social media posting, and anti-spam require payment for a bundle.

Jetpack Stats offers a user-friendly approach to traffic stats, presenting basic reports such as Top Posts & Pages, Referrers, and Clicks. Its simplicity makes it accessible to beginners, and it is free to use on WordPress sites. However, Jetpack Stats provides only basic traffic numbers, lacking the detailed insights into user behavior available in Google Analytics. Additionally, the stats feature is bundled with the Jetpack plugin and requires authentication through WordPress.com, which may not be necessary for those who do not require other Jetpack features. When compared to Google Analytics, Jetpack Stats falls short in terms of accuracy. [12]

2.5.4 Yandex.Metrica

Yandex Metrica is a no-cost website analytics service provided by Yandex, which monitors and generates reports on website traffic. This service was first introduced by Yandex in 2008 and was later publicly released in 2009. Yandex.Metrica employs an uncomplicated JavaScript tag that website owners can embed on their sites to gather information on audience, traffic, and behavior. The tool can also be associated with the Yandex.Direct digital advertising platform to obtain ad conversion rate data, allowing for the generation of detailed reports and tracking of individual user actions, exploration of search terms used on the site, compilation of statistics on every ad in Direct, and monitoring of conversion rates, even when offline. [13]

2.5.5 Hotjar



Figure 2. Hotjar logo [Source:14]

Hotjar is a tool that provides product experience insights by capturing behavior analytics and feedback data to help businesses understand their customers. It offers two sets of tools: 'Observe' tools such as Heatmaps and Recordings which allow businesses to see what their users see, and 'Ask' tools like Surveys and a Feedback widget which enable them to bring their customers into the conversation. In order to gather data using Hotjar, the unique JavaScript snippet known as the Hotjar Tracking Code must be installed on each individual site added to the Hotjar platform.

Previously, Hotjar captured data by manually creating 'snapshots' of user behavior based on pageviews, which led to gaps in understanding user behavior. However, it has since evolved to capture user sessions, recording a user's entire visit to a site and providing insights based on their actions during the session. This method of Session Capture eliminates the need for manually creating and enabling snapshots.

Hotjar is not meant to replace web analytics solutions like Google Analytics. Rather, it should be used in conjunction with them. While web analytics tools can provide data on which pages users are visiting and their behavior, Hotjar's focus is on understanding how

users are interacting with the pages themselves. This helps businesses identify areas for improvement and growth. [14]

2.6 Google Analytics tools

As Google Analytics is the primary subject of the Master thesis, this chapter will delve into the tools, configuration, features, and usage of Google Analytics, as well as comparisons between its versions. Additionally, the chapter will provide an explanation of Google Tag Manager, including the concepts of tags, triggers, and variables.

2.6.1 Google Analytics – a brief history

The inception of Google Analytics can be traced back to March 2005, when Google acquired Urchin, a software company that was developing an analytical system with the same name. Subsequently, Google led the development of a free and public online tool for web analytics. The launch of Google Analytics took place in November 2005 after rigorous internal testing, and due to unexpectedly high interest, new registrations were temporarily halted. Google then increased the service's capacity and implemented a lottery model by sending registration invitations to selected users. Finally, in mid-August 2006, the service was made freely available to everyone without restrictions. In April 2011, Google released a new version of Google Analytics, which was well-received by users and featured more options for customized reports and a new interface. Real-time data analysis and a user flow graph were later added to this version. [10] A newer version of Google Analytics was announced in 2012, known as Universal Analytics. This update brought significant changes, including a focus on cross-device tracking and a greater emphasis on user-centric data. It also introduced new features such as custom dimensions and metrics, user ID tracking, and measurement protocol.

In 2020, Google launched a new version of Google Analytics, known as Google Analytics 4 (GA4). [7]

2.6.2 How is it functioning?

Figure below depicts the complete process of how Google Analytics operates.

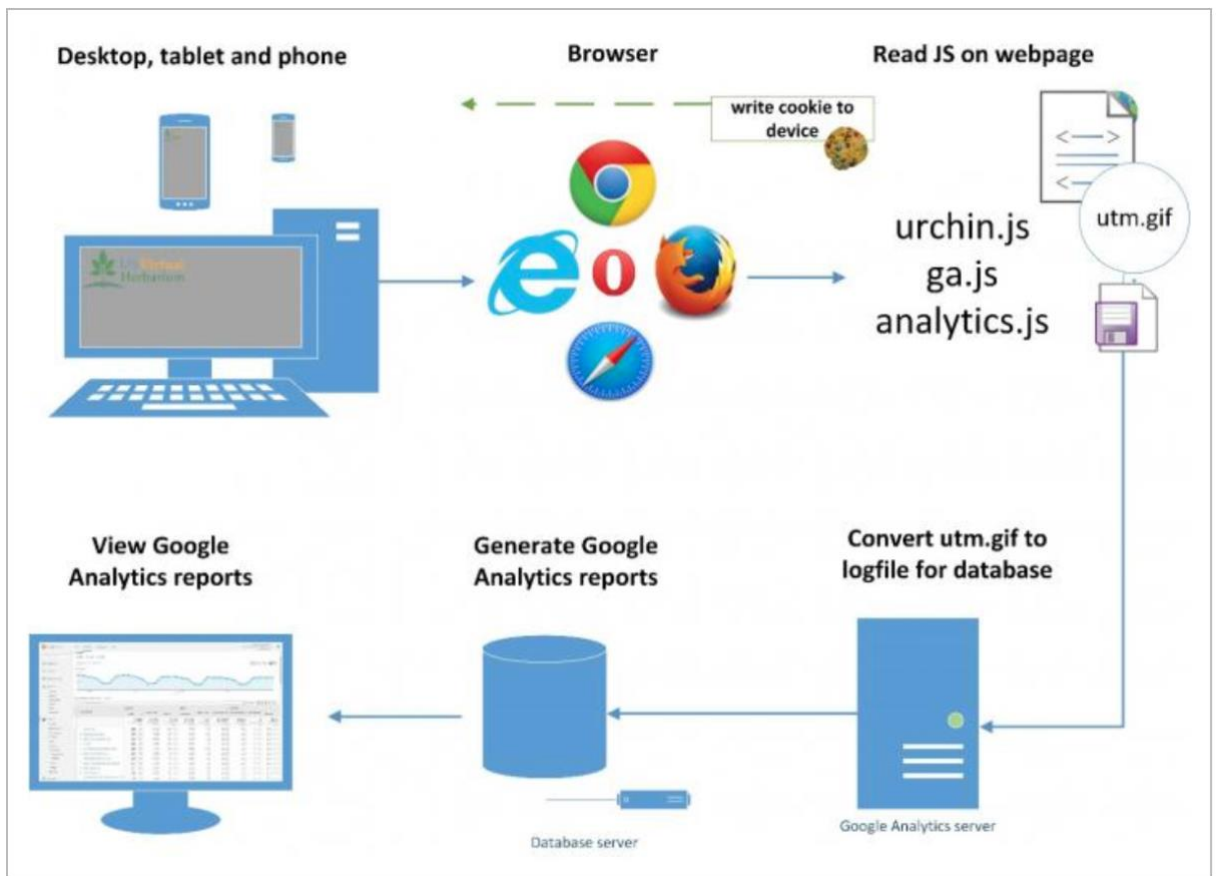


Figure 3. How Google Analytics works [Source: 35]

The tool functions by executing an embedded JavaScript code on the page being measured. The program and its functions are only executed on the server-side. The measurement script is stored in a separate file to avoid confusion in the source code of the page. Manually editing all pages would be required if there was a change in the measurement script, which would be impractical. Usually, the measurement script is located at `google.com/analytics`. However, it is also possible to host the script on one's own server where the website files are physically stored, but this can cause loading time delays if the script is not cached by the visitor's web browser. In addition, any changes made to the script by Google Analytics would result in improper measurement. [10]

2.6.3 Universal Analytics

Universal Analytics is a version of Google Analytics that was introduced in 2012. It is an updated and more advanced version of the original Google Analytics that allows for more customized data collection and analysis. Universal Analytics allows for more flexible tracking of user behavior across multiple devices and platforms, and provides advanced features for data analysis and reporting. The measurement model used by Universal Analytics is based on the tracking of user interactions with a website over time. This model consists of three key concepts: hit, user, and session. [10]

- A hit is a data point that is sent to Google Analytics server whenever a user interacts with a website or mobile app. Examples of hits include pageviews, events, transactions, and social interactions. Each hit contains information about the user's activity, such as the time of the hit, the user's browser, and the page or app that the user is interacting with.
- A user in Universal Analytics refers to a unique visitor to a website or mobile app. Each user is assigned a unique ID that is stored in a cookie on their device. This ID is used to track the user's activity across multiple sessions and interactions with the website or app.
- A session is a period of time during which a user interacts with a website or mobile app. A session starts when a user first visits the site or app and ends after a period of inactivity or when the user closes their browser or app. During a session, the user can perform multiple interactions or hits, such as viewing multiple pages or triggering events.

By tracking hits, users, and sessions, Universal Analytics provides detailed information about how users interact with a website or mobile app.

2.6.4 Hierarchy

The hierarchy in Universal Analytics is important because it allows for greater control and organization of data. By setting up multiple properties and views, users can filter and analyze data based on specific criteria, such as geographic location, user behavior, and marketing campaigns.

An Account is the highest level of the hierarchy, which represents the entire organization or business that owns the website or mobile app being tracked. The account settings page

allows for the configuration of basic account parameters and user access management. Here, one can find the account ID, account name, and country of establishment. The account user management function allows the account creator, who is automatically assigned the manage users role, to add additional users. It is recommended that the owner of the company or a long-time employee hold the highest position to prevent loss of access to the account. Users can set editing, collaboration, or read-and-analyze permissions for themselves, specifying the level of access they require.

A Property is the second level of the hierarchy, which represents a website or mobile app being tracked within the Account. It is associated with a unique tracking ID and contains one or more Views. The Property settings tab displays the measurement ID and other essential service settings. The Tracking info tab is crucial as it includes the location for inserting the measurement code on the website. Additionally, it provides permission to collect user data for remarketing purposes, the duration for which Google Analytics remembers visitor cookies (which affects metrics like new users on the page), and session settings (defaulted to 30 minutes). This setting determines the duration for which a visitor to the page is counted as one visit in the absence of activity. Once the inactivity time exceeds the set duration, the page is loaded as a new visitor, affecting the page visits metric. Finally, the Product linking tab allows users to link their Google Analytics account with other Google products, such as Google Ads, AdSense, and Ad Exchange.

A View is the lowest level of the hierarchy, which represents a filtered view of the data within a Property. This section allows for customization of how data is transformed into statistics and allows for the exclusion of certain data using filters. The "View settings" tab displays the ID of the data selection, time zone, website home page, and currency in which financial metrics are displayed. Correctly setting these data is important when creating an account. The "Goals" tab is where conversions, or goals, are set in Google Analytics. Filters can be used to determine which data is displayed in reports. Predefined filters or custom filters can be created to exclude certain data such as company IP addresses from statistics, or to create separate statistics for specific sources of visitors. The "E-shop settings" tab is important for e-commerce websites. The developer should insert measuring codes into the e-shop and can create a "funnel" to track the progress of purchases. [7][10]

2.6.5 Dimensions and metrics

In Google Analytics, a dimension refers to a descriptive attribute that assumes distinct values, such as Device Type. Metrics, on the other hand, represent the quantitative measurements of dimensions and can be presented either as an absolute number or a ratio. This dimension would describe the type of device used to access a website, such as desktop, mobile, or tablet. By assigning metrics such as "Sessions" or "Bounce Rate" to the Device Type dimension, website owners can gain insights into how users interact with their site on different devices. This information can be used to optimize the website for a better user experience on each device type, as well as to tailor marketing efforts towards users on certain devices. [10]

2.6.6 Main metrics of Universal Analytics

In following table 1 will be presented valuable metrics that are available for Universal Analytics user and their description.

Table 1. Main Metrics of Universal Analytics [Source: Custom processing according to 15]

Metric	Description
Users	Refers to the aggregate count of individuals who have visited a particular website.
New Users	Identifies visitors accessing the website for the first time within a chosen time period.
Sessions	Counts visits as long as a user remains active on the website, with a new visit recorded after a specified period of inactivity. The visit also ends automatically at midnight. Multiple visits may be recorded if a user navigates back and forth from external sites. [7]
Bounce Rate	Represents the percentage of single-page visits where users exit the site from the landing page.
Average Session Duration	Indicates the average time users spend on the website during a session.

Ratio of New to Returning Visitors	Measures the proportion of new visitors compared to returning visitors to the website.
Pages Per Session	Estimates the average number of pages viewed per session.
Pageviews	Represents the total number of pages viewed on the website.
Average Time on Page	Represents the average duration users spend on a specific page.
Goal Completions	Measures the number of defined website goals achieved.
Goal Conversion Rate	Represents the conversion rate for the defined website goals.

2.6.7 Core reports Universal Analytics

Universal Analytics provides several core reports for analyzing website traffic and user behavior. These reports include audience, acquisition, behavior, and conversion reports. In this section will be illustrated some snapshots from Google Analytics Demo Account.

2.6.7.1 Realtime report

Realtime reports in Google Analytics display the current activity of website or app users, such as their location, traffic source, and the content they are accessing. These reports are particularly useful when testing tag configurations in Google Tag Manager. Realtime reports can also be beneficial in situations where immediate action is required, such as during a website outage or technical issue. [16]

However, it is important to keep in mind that report offers a limited view of website or app traffic and should be used in conjunction with other analytics tools for a more comprehensive understanding of user behavior. [16]

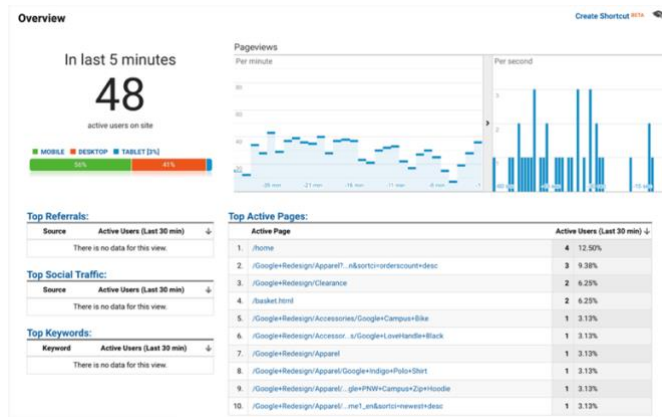


Figure 4. Realtime report example [Source: Google Analytics Demo Account]

2.6.7.2 Audience report

An audience report provides crucial information about website or app users during a specific date range. The report includes data about the number of users and new users during a particular date range, the total number of sessions and pageviews, the average session duration, bounce rate, and more. Moreover, an audience report also offers valuable information about users, such as their geographic location, age, gender, language, device type, and behavior, including whether they are new or returning users. This data allows businesses to tailor their content and marketing efforts to their target audience's preferences and needs, resulting in better engagement and customer satisfaction.[10]

2.6.7.3 Acquisition report

Acquisition report is one of the most significant features of Google Analytics that provides vital information about the sources of visitors to a website or e-commerce platform. The Acquisition overview offers insights into the effectiveness of advertising campaigns, their financial return, and opportunities for further development and promotion of the web project. The overview provides a quick breakdown of visitor channels and their percentage share in the total number of visitors. These channels include Natural search, Paid search, Direct visitors, Referral traffic, Social networks, and Other. The Natural search channel comprises visitors who arrived at the website via full-text search engines such as Google.com. Paid search includes visitors from click-through PPC

campaigns, while Direct visitors come to the website without a detectable source link. Referral traffic refers to visitors who clicked on a link from another website, and Social networks denote visitors who came to the website from social media platforms. Finally, the Other category displays traffic linked to campaigns tracked with UTM parameters. [10]

2.6.7.4 Behavior Report

In addition to showing what users are doing on a website and which content is most popular, behavior reports in Google Analytics provide a deeper analysis of user engagement and interaction on individual pages of the website. Formerly known as "content reports," these reports display metrics such as the average time spent on a page, the bounce rate, and the exit rate. The bounce rate is defined as the percentage of single-page visits, while the exit rate is the percentage of users who exit a website from a specific page after visiting multiple pages. The Behavior report also includes an "Events" section that tracks specific user actions, such as clicks on buttons or links, video plays, and file downloads.

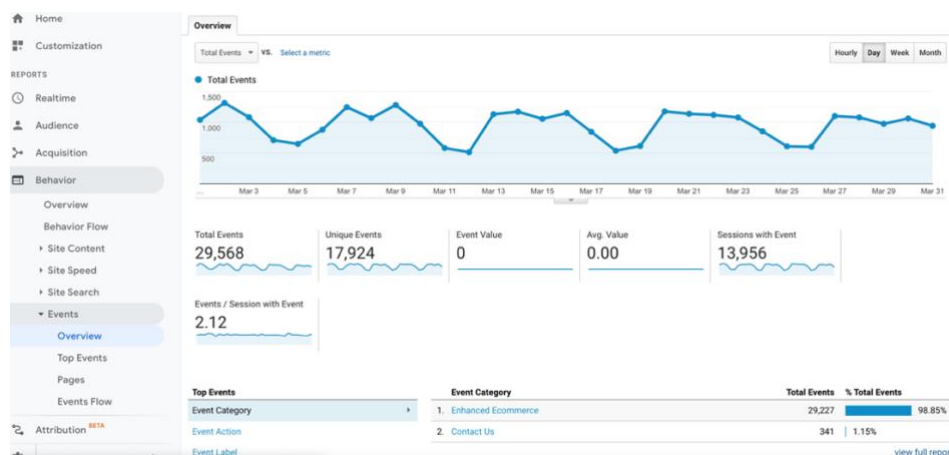


Figure 5. Behavior report example [Source: Google Analytics Demo Account]

2.6.7.5 Conversions Report Daniel

The set of reports related to conversions holds paramount importance when assessing digital branding, as it closely aligns with business objectives. A conversion signifies the fulfillment of an online goal by a user. To maximize the utility of the analytics package, it is essential to establish and define specific goals. Examples include completing a purchase, submitting a lead generation form, clicking on an advertisement, or engaging with multimedia content like podcasts. The process of setting up goals takes place within

the administrative features of the analytics platform, and it is beneficial to comprehend the various goal types available:

URL destination goals are achieved when a visitor reaches a specific page, typically a "thank you" page that follows a successful transaction or download. The presence of this page indicates that the user has taken a desired action, enabling effective tracking of goals. Visit duration goals are established based on the premise that the amount of time a user spends on the website reflects their engagement with the provided content. This type of goal is particularly valuable when the objective is to raise awareness. [16]

Pages per visit goals involve aiming for a predetermined number of pages viewed during a single visit. However, it is essential to acknowledge that users may explore multiple pages in their search for desired information, rather than immediately finding what they initially intended. [16]

Events encloses specific interactions within a page, such as clicking external links or completing form fields. Monitoring these events requires the inclusion of additional code in the corresponding web pages. Once goals are configured, corresponding goal reports become available. Key features of conversion report include tracking goal completions, measuring conversion rates, assigning values to goals, analyzing multi-channel funnels, segmenting data, and e-commerce tracking. It enables businesses to assess goal achievement, understand user behavior, optimize marketing strategies, and make data-driven decisions. [16]

2.6.8 Google Analytics 4

In consonance with Google analytics support page statement about Google Analytics 4:

“Google Analytics 4 is our next-generation measurement solution, and it's replacing Universal Analytics. On July 1, 2023, standard Universal Analytics properties will stop processing data.” [17]

Google Analytics 4 (GA 4) introduces a measurement framework based on the event principle, where an event represents any action performed by a tracked user on or off the website. Each user's timeline is constructed based on individual events, capturing their interactions such as website visits from different sources, page navigation, scrolling, form submissions, and purchases. Event tracking is applicable across multiple devices, provided the user consents to data collection and has a Google account with ad

personalization enabled. An advantage of GA 4 is the ability to integrate data from the company's CRM system or physical stores using the Measurement Protocol, which was also available in Universal version. However, GA 4 now allows measurement of data from mobile and web applications, expanding its capabilities. The user timeline enables long-term monitoring of user behavior, revealing the initial touchpoints and steps leading to their first purchase. By transitioning to events, GA 4 mitigates the impact of data gaps resulting from cookie restrictions, ensuring more accurate data representation. Additionally, GA 4 incorporates prediction and machine-learning models to analyze user behavior and make predictions based on a smaller volume of data specific to each company. User segments are created to facilitate predictions of future behavior. [7]

2.6.9 Main metrics of Google Analytics 4

Analogous to the information presented in section 2.6.6, significant metrics in GA4 will be systematically arranged in a table, accompanied by their corresponding descriptions.

Table 2. Main metrics Google Analytics 4 [Source: Custom processing according to 7]

Metric	Description
Users	Similar to Universal Analytics, a distinct user in Google Analytics 4 is defined as an individual who accessed the website during a specific timeframe. However, if the user is authenticated (by logging into their Google account), they are considered as a single user, regardless of the device or IP address used to access the website.
Sessions	It is the number of users who came to the website during the specified time period. Each unique user is counted multiple times according to the number of times they have accessed the website.
Engaged sessions	An engaged session refers to a session that extends beyond 10 seconds and includes a conversion event, or involves the viewing of at least 2 pages or screens. [18]
Average time per session	Average time of visit per one user.

Engagement rate	The engagement rate represents the proportion of sessions that are considered engaged sessions, indicating the level of active involvement and interaction with the website. [19]
Event count	The event count refers to the total number of user actions or events that occur on the website or within the application. An event can embrace various actions performed on a page. While some events are automatically tracked (page_view (when a page or screen is viewed), scroll (when a user scrolls through a page), click (when a user clicks on an element), video_start (when a video starts playing), video_complete (when a video is fully watched), and many others.), others can be customized and defined based on specific measurement requirements.
Conversions	A conversion is any action on the website or in the application that is considered a conversion.
Predictive metrics	GA4 offers predictive metrics that, based on the analysis of website data, can determine the future behavior of the website/application user with a certain degree of probability. <ul style="list-style-type: none"> • Purchase probability is the likelihood that a user, who has engaged with the website or application in the previous 28 days, will complete a specific conversion event within the subsequent 7 days. • Churn probability represents the probability that a user, who has been active on the app or site within the last 7 days, will not continue their activity in the following 7 days. • Predicted revenue refers to the estimated revenue anticipated from all purchase conversions made by users who were active within the previous 28 days, within the upcoming 28 days. [20]

2.6.10 Key updates of Google Analytics 4 interface

Google Analytics 4 introduces a redesigned reporting interface with updated navigation and visualization options. Situated on the left-hand side, the primary navigation presents access to fundamental functionalities. Within this section, users can find tabs for Home, Reports, Explore, and Advertising, each serving distinct purposes. In this section will be displayed key features of modernized tool.

2.6.10.1 Home Tab

GA4's home page provides a customizable overview of key metrics, audience insights, and important events. It offers a snapshot of essential information and allows users to quickly access relevant reports. [21]

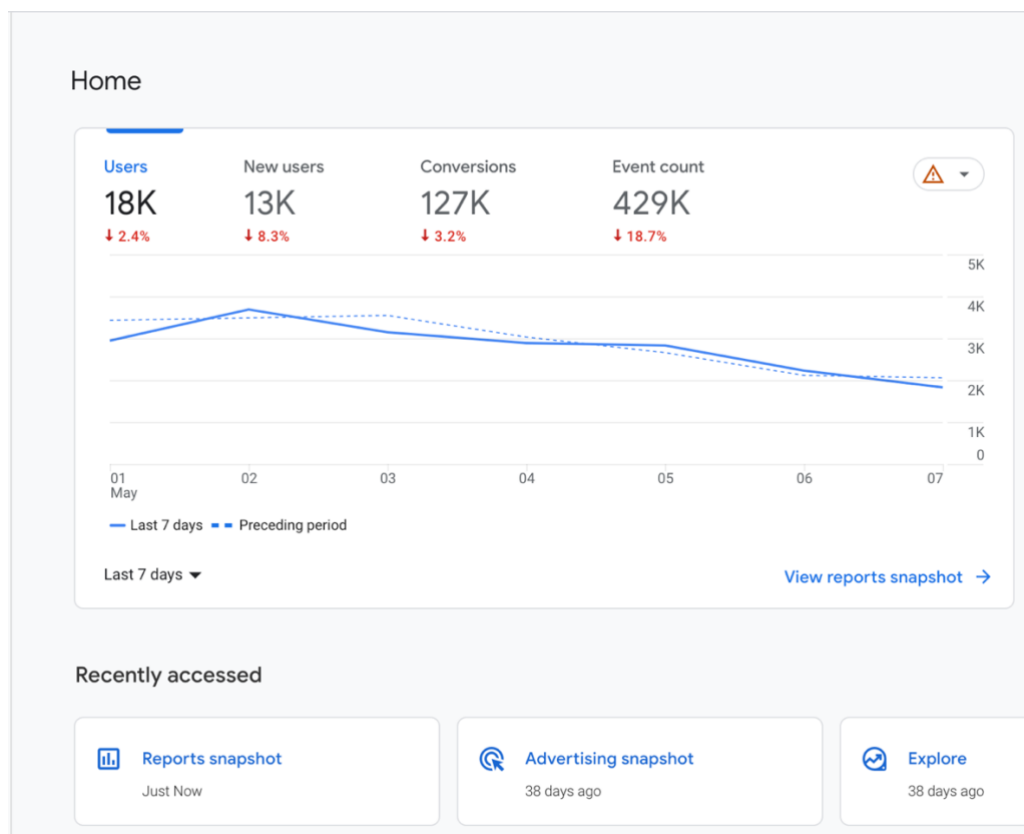


Figure 6. Home tab GA4 overview [Source: Google Analytics 4 Demo Account]

2.6.10.2 Reports Tab

The Reports section in GA4 suggests advanced reporting capabilities that enable users to gain valuable insights into their audience and their interactions with the platform. Upon

clicking on Reports, users are directed to the Reports Snapshot, which provides a high-level overview of the website's performance. The Reports Snapshot includes pre-defined metrics presented as "cards." Users have the flexibility to customize the report by setting any overview report as their Reports Snapshot and utilizing the report builder to add or remove cards according to their specific interests.

GA4 also offers the Realtime report, which allows users to monitor the performance of their website in real-time by providing information on the number and behavior of users who visited the site within the last 30 minutes.

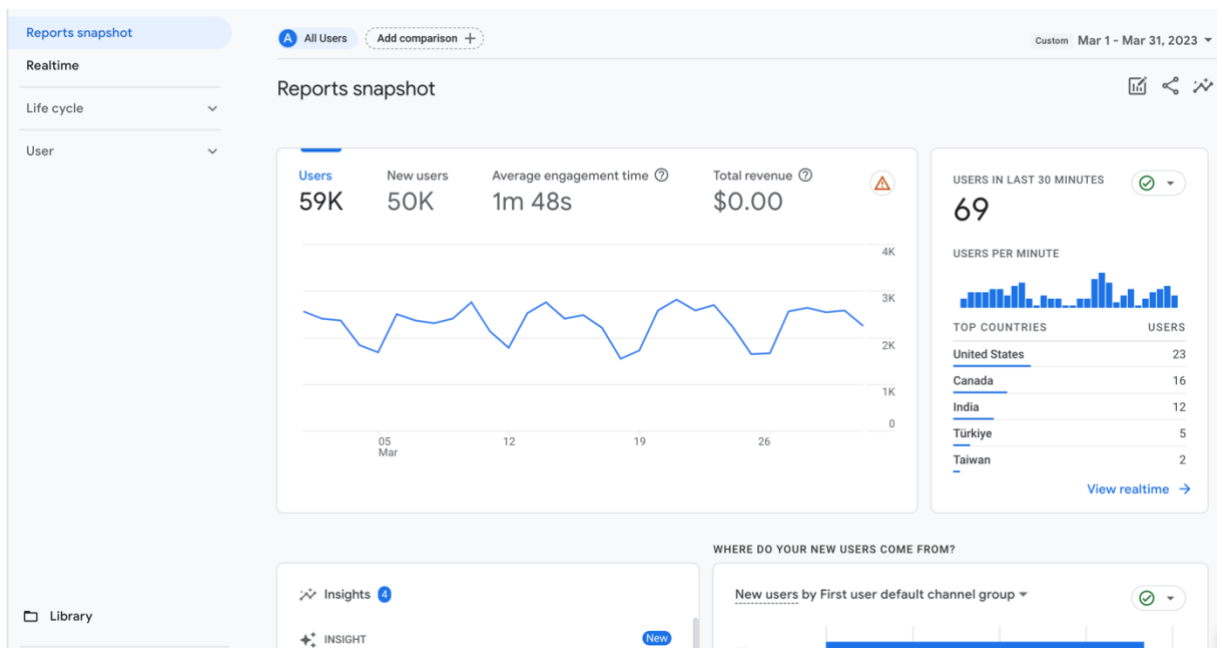


Figure 7. Reports snapshot GA4 [Source: Google Analytics 4 Demo Account]

The Life Cycle collection provides insights into the different stages of the customer journey, ranging from acquisition to retention. This collection focuses on understanding user behavior and interactions with the website or app, rather than providing information specifically about individual users, which can be found in the Users collection.

The Acquisition section reveals how users find the website and the channels they use to access it. Understanding the sources of traffic, such as organic search, referrals, and direct traffic, provides valuable information for building relationships, identifying loyal audiences, and driving traffic and conversions.

According to the Figure 8, the Engagement section within GA4 provides deeper insights into user interactions by supplying default reports as:

- The Events report presents data on the frequency of event triggers and the number of users who trigger each event.
- The Conversions report offers information about specific conversion events.
- The Pages and Screens report displays the pages visited and screens engaged with by users on your website or app.
- Lastly, the Landing Page report helps understand visitor interaction by showcasing the initial page where visitors land and the distribution of visitors across different landing pages. [22]

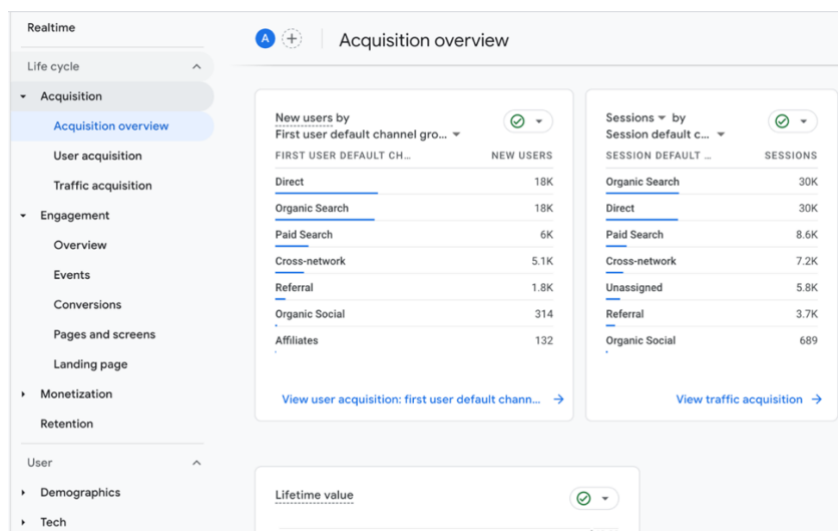


Figure 8. Acquisition overview GA4 [Source: Google analytics 4 Demo Account]

Monetization section deals with e-commerce, subscriptions, and ad revenues.

User Reports in GA4 (Fig. 8) offer comprehensive insights into the audience, including demographics, technology usage (browsers, operating systems, devices), and other relevant information.

2.6.10.3 Explore Tab

“Explorations is a collection of advanced techniques that go beyond standard reports to help you uncover deeper insights about your customers' behavior.”[23]

The gallery provides a diverse selection of templates, including critical analyses such as funnel analysis, path analysis, segment overlap, and cohort analysis. Alternatively, users

have the option to construct a report from the ground up, integrating a range of charts and tables to suit their specific needs. Through the application of filters, segments, and comparisons, users can undertake a comprehensive investigation into the finer details, unearthing significant insights. Explorations serve as a means to unravel a multitude of aspects, including user engagements with the website or app, executed actions, accomplished outcomes, and the variability of these factors across distinct attributes.

2.6.11 Universal Google Analytics vs Google Analytics 4

As stated in previous sections of the Master's thesis, the primary distinction between Universal Analytics (UA) and Google Analytics 4 (GA4) lies in their respective measurement models. In Universal Analytics, the measurement model is based on a session-centric approach. It primarily focuses on tracking user interactions within a session, which is defined as a series of actions performed by a user during a specific period of time. UA uses cookies to identify and associate user activities with specific sessions. This session-centric model provides valuable insights into user behavior within individual sessions and allows for analysis of metrics such as session duration, pageviews, and conversion rates.

On the other hand, Google Analytics 4 introduces an event-centric measurement model. This model shifts the focus from sessions to individual user actions or events. An event can be any user interaction, such as pageviews, clicks, form submissions, or other custom-defined actions. GA4 tracks and records each event separately, allowing for a more granular analysis of user behavior across multiple sessions and touchpoints. Furthermore, notable disparities in the interface were discussed previously. This section will elucidate further substantial distinctions that will serve as the cornerstone for the proposed section in the subsequent part of the thesis.

2.6.11.1 Event tracking

To capture user interactions in Universal Analytics, additional events need to be generated for various activities such as file downloads, or clicks to particular buttons. If event tracking is implemented in Universal Analytics, three descriptors are commonly used for an interaction, namely event category, event action, and event label, which provide detailed information about the nature of the interaction. The event category specifies the type of interaction, the event action represents the specific action performed,

and the event label provides additional details or context, such as button name or particular video.

Google Analytics 4 provides a more streamlined and automatic approach to event tracking. It applies an enhanced measurement model that captures certain events by default without requiring explicit event generation: page views, scrolling, clicks on outbound links, or form submissions, are tracked automatically without the need for additional configuration.

Moreover, it introduces concept of recommended events and custom events. Recommended events are pre-defined events with predefined names and parameters. These recommended events cover common user actions, such as video plays, purchases, or app installations. Implementing these recommended events unlocks existing and future reporting capabilities in GA4. The list of recommended events can be found on Google analytics support pages. Custom events are user-defined events that can be tailored to specific tracking requirements. Custom events provide flexibility in tracking unique or specialized interactions that may not be covered by the recommended events. However, custom events may not appear in most standard reports in GA4, so custom reports or explorations need to be set up for in-depth analysis of custom event data. [24]

2.6.11.2 Session

In Universal Analytics, a session represents the active engagement period of a user on a website. Various factors can end a session in UA, including 30 minutes of inactivity, the passing of midnight, or encountering new campaign parameters. According to Google Analytics 4, a session is initiated with the `session_start` event, which assigns a session ID to all subsequent events within that session. While GA4 also considers 30 minutes of inactivity as the session end, sessions can span across midnight and are not affected by new campaign parameters. This distinction between UA and GA4 sessions may lead to variations in session metrics, particularly for websites with a global audience. [25]

2.6.11.3 Engagement metrics

In the Universal Analytics platform, behavioral metrics such as bounce rate, number of pages per session, and average session duration were integral components of various reports, providing insights into user engagement.

Google Analytics 4 launched a paradigm shift by replacing these traditional metrics with a new set of "engagement" metrics. These metrics revolve around the concept of "engaged

sessions," as defined by Google. An engaged session is one that meets one or more of the following criteria: lasting longer than 10 seconds, resulting in a conversion, or involving two or more screen or page views. The new engagement metrics in GA4 imply the following measurements: Engaged sessions, Engagement rate, Engaged sessions per user, Average engagement time. [26]

2.6.11.4 Account settings

In Universal Analytics, the account structure comprises three fundamental components: account, property, and view. This structure establishes a hierarchical organization for data management and analysis. In contrast, Google Analytics 4 (GA4) introduces a revised account structure that consists of two elements: account and property. Notably, the concept of views, which existed in UA, is absent in GA4 properties. Additionally, GA4 introduces a novel concept known as data streams. A data stream represents the flow of data from a website or app to the Analytics platform. Unlike UA, which collects data at the property level using a tracking ID, GA4 collects data at the stream level through a unique data stream ID. Each GA4 property has the capacity to accommodate up to 50 data streams, with a specific limit of 30 app data streams. [25]

2.7 Google Tag Manager

„Google Tag Manager is a free tag management system that provides capabilities to manage, version, and publish tracking tags to your website. As with Google Analytics, you can log in to GTM using a Google login, and there are multiple levels of permissions that can be assigned to users.“ [27, s. 32]

A tag management system (TMS) is a tool that enables the management of tags. Tags are snippets of code that monitor and track the activities of website visitors. Their pursuit allows for an objective evaluation of the site's ability to fulfill user objectives, the effectiveness of advertising campaigns, and the measurement of conversion actions. Tags employed for analytical purposes differ from standard HTML tags like <body>, <div>, or <p>. including the insertion of JavaScript code, such as the tracking code used for Google Analytics.

It provides a web-based interface that facilitates the selection, modification, and administration of these tags within web pages. This approach offers several advantages:

- No need to modify the actual source code or templates of the website when adding or updating tags.
- Efficient organization and tracking of tags to prevent duplication and errors.
- Integrated debugging, testing, and preview functionalities for effective tag management.
- Version control capabilities to keep track of changes made to tags.
- Multiple levels of permissions to control access and editing rights for different individuals involved in managing tags.

Tag management tools provide a distinct workflow for incorporating and modifying tracking tags, separate from the task of modifying website templates and code.

Google Tag Manager consists of two interconnected components that facilitate the inclusion of tags on a website. Firstly, a web-based interface allows users to configure tracking tags for inclusion on their site. Secondly, a container script is inserted into the website's template, responsible for loading the specified tags during site execution. [27]

2.7.1 Account Structure

For accessing a Google Tag Manager (GTM) tool, user can use previously created Google Analytics account. GTM accounts are structured into containers, with each container corresponding to a container script that is incorporated into a website through GTM. Upon registering for a GTM account, a default container is created, and users have the ability to generate additional containers based on their requirements. In certain aspects, a parallel can be drawn between accounts and properties in GA and accounts and containers in GTM. At the account level, this analogy holds true, as an account typically represents a singular organization or business in both tools. [27]

2.7.2 Tag

In the context of Google Tag Manager, tags refer to concise HTML codes that streamline the integration of services and products into a project, such as the tracking code for

Google Analytics. GTM eliminates the need to manually insert such tags into the website's source code. Instead, they can be configured and published within the Tag Manager interface, eliminating the necessity for programming involvement in this process.

Tags within a Tag Manager system are designed to be executed or triggered in response to various events. These events encompass a wide range of actions, such as page loads, button clicks, or page scrolls. In order to facilitate this functionality, triggers are defined within Tag Manager to actively monitor and listen for these events. [28]

2.7.3 Trigger

Tags are activated in accordance with specific events. In the context of Google Tag Manager, triggers are responsible for monitoring web pages or mobile apps for particular types of events, such as form submissions, button clicks, or page views. When a trigger detects the specified event, it instructs the corresponding tag to execute. It is important to note that each tag must be associated with at least one trigger to be activated.

Triggers undergo evaluation when the code on the page or app is executed. Based on the fulfillment of trigger conditions, associated tags are either executed or prevented from firing.

Within GTM interface, it is possible to create and edit triggers. By default, newly created triggers in Google Tag Manager are set to activate for all events related to the associated event type. However, it is possible to define more specific firing conditions for triggers using trigger filters.

To apply a filter, navigate to the trigger configuration page and locate the section titled "This trigger fires on" at the bottom. From there, choose the option "Some <event>", where <event> represents the specific type of event you wish to customize. [29]

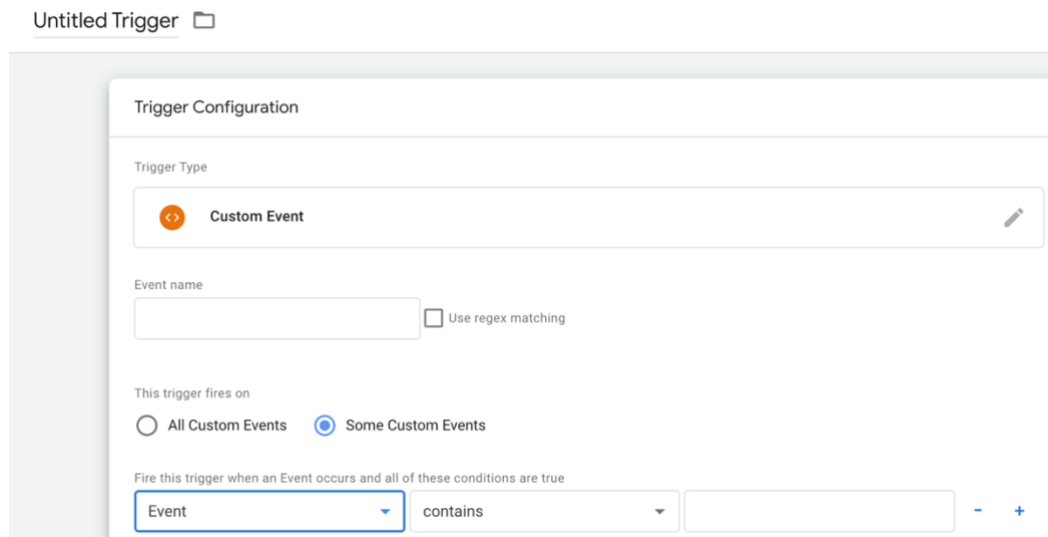


Figure 9. Trigger filter example GTM [Source: Custom processing]

2.7.4 Variables

Variables serve as the fundamental building blocks for triggers, which in turn form the basis for tags. Consequently, within GTM, a tag cannot exist without a corresponding trigger, and a trigger relies on the presence of a variable to be functional. GTM variables possess the ability to populate data and settings within tags and define criteria in rules. When encountering entry fields in GTM, a small building block icon is visible, granting access to a dropdown menu containing existing variables within the container. Additionally, variables can be directly entered into text entry fields or custom code by enclosing the variable name within double curly braces: `{{Variable Name}}`. GTM will automatically insert the corresponding variable value. The same format will be used when referring to variables in this book. Variables in GTM comprise a range of types, including basic page attributes such as URL and HTTP Referrer, data extracted from page content through DOM Element, JavaScript Variable, First-Party Cookie, Data Layer Variable, and Custom JavaScript, as well as user interactions captured via Custom Event and Auto-Event Variable. [27]

2.7.5 Data layer variable

The Data Layer is a JavaScript array, that acts as an invisible storage space for various types of data, such as user information and page content. This information can be accessed by GTM, allowing it to be utilized in tags, triggers, variables, and can even be passed on to other tools like Google Analytics, Google Ads, and Facebook Pixel.

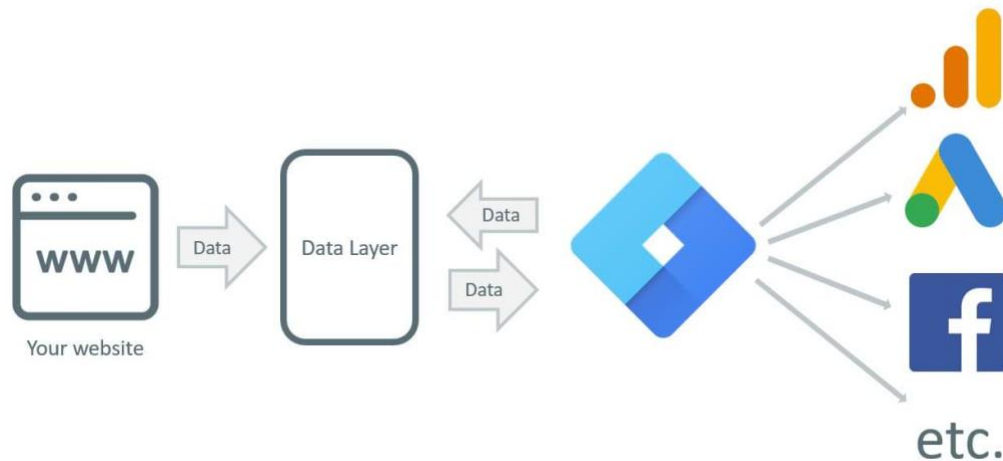


Figure 10.Data Layer and GTM [Source: 30]

Once the Google Tag Manager container's JavaScript Snippet is placed in the website's source code, the Data Layer is automatically created. [30]

The data layer in Google Tag Manager (GTM) serves as a means of communication to capture information not directly available on a web page. It acts as a centralized repository accessible to GTM, while remaining invisible to page viewers. As it was mentioned, the data layer is array structured containing objects with properties. These properties, represented by names and values, can be retrieved using variables. Examples of properties include "eventCategory" and "userId," although you have flexibility in naming them. Filling in the data layer with values typically involves server-side code within website templates, extracting information from appropriate sources such as a content management system or application server. This allows for the population of values, such as a events's category or a user's login ID, within the data layer. [27]

2.8 Data visualization

Data visualization plays a crucial role in web analytics by transforming raw data into meaningful and easily understandable visual representations. It involves presenting data

in the form of charts, graphs, maps, and other visual elements that allow analysts and stakeholders to gain insights and make informed decisions. Web analytics involves collecting large amounts of data from various sources such as web traffic, user behavior, and marketing campaigns. The data can be overwhelming and difficult to interpret without visualization.

Visualizations can provide a clear and concise representation of the data, making it easier to identify patterns, trends, and anomalies. With web analytics, visualizations can help businesses and website owners understand the performance of their website and marketing campaigns. For instance, visualizations can help to identify which pages on a website are performing well and which ones need improvement. They can also help to identify user behavior patterns, such as the most common paths users take through the website.

In addition, visualizations can help to communicate data-driven insights to stakeholders and decision-makers. Instead of presenting raw data, visualizations can simplify complex data sets into easily understandable charts, graphs, and dashboards. This can help to make data-driven decisions faster and more efficiently.

2.8.1 Looker studio



Figure 11. Looker Studio Logo [Source: 36]

Google Looker Studio, formerly known as Data Studio, facilitates the integration of various data sources into a unified reporting environment. It empowers users to construct

informative and visually compelling dashboards that are easily comprehensible, shareable, and customizable. Looker Studio extends beyond conventional data visualization capabilities, aiming to support marketers in making data-driven decisions for their clients and brands. At present, Looker Studio boasts compatibility with more than 800 distinct data sources and offers over 600 data connectors.

To ensure a successful initial Google Looker Studio report, several key areas warrant attention. Firstly, it is crucial to select an appropriate template or dashboard. Access to Looker Studio is granted through a Google Account, preferably the one associated with platforms such as Google Analytics, Search Console, and Google Ads. Looker Studio provides a diverse assortment of templates, serving as effective starting points for report

creation. It is advisable, particularly for newcomers to Looker Studio, to choose a template that aligns with the specific type of data to be portrayed.

The next step involves establishing connections with data sources. Looker Studio currently supports 24 Google connectors, including prominent platforms like Google Analytics, Google Ads, Google Sheets, and BigQuery. Additionally, Looker Studio offers compatibility with over 650 data sources through partner connectors. Another important aspect is the selection of relevant metrics that hold significance for the analysis at hand. Careful consideration should be given to identifying the key performance indicators (KPIs) or metrics that provide meaningful insights into the subject of interest. Lastly, effective sharing of reports is essential for effective collaboration and dissemination of findings. Looker Studio provides mechanisms for easy sharing and collaboration, allowing stakeholders to access and engage with the reports efficiently. [31]

3 ANALYSIS OF CURRENT STATE

The analytical part of the thesis will address the current state of the company's web analytics tool configuration, along with an overview of the website's performance prior to the complete redesign. The goal is to identify areas of weakness in the configuration and data visualization.

3.1 Company description

A digital agency called Adbros s.r.o. was established in 2006 in Brno and began by offering marketing services. However, it has since expanded its range of services to include digital marketing, web and software development, graphic design, data integration and interpretation. The company is growing rapidly and is continuously increasing its number of employees while also creating new products to increase its reputation in the market.

Currently, Adbros s.r.o. has two offices in Brno and Prague and employs 62 people. The company has a clientele comprising well-known organizations like Philip Morris, ČSOB, and McDonald's Cup.

The company's mission is: "We are a team with a passion for IT. Together with clients, we realize their ideas in the digital world: efficiently, reliably and with kind care."
[Internal source]

3.1.1 Departments

In order to efficiently process and manage the wide range of services offered by the company, there are 8 departments in place. These departments are responsible for overseeing specific areas of the company's operations and ensuring that all services are delivered effectively. By dividing responsibilities among the various departments, the company is better equipped to handle the needs of its clients and provide high-quality services across all areas of its business.

The Board department plays a crucial role in the success of a company. It is responsible for managing various aspects of the business, including finance, personnel, and the CEO's overall vision.

The Operations department is responsible for ensuring that the agency's resources, primarily personnel and equipment are properly allocated and utilized.

The Marketing Department stands for developing a strategic marketing plan for Adbros. It also develops and maintains the agency's brand identity, creates content for brand promoting.

The **IT Development team** focuses on collaboration between front-end and back-end teams ensures seamless communication and functionality in web and app development. the front-end development team focuses on creating user interfaces and enhancing user experience using HTML, CSS, and JavaScript. They work closely with designer team and digital marketing team to implement visual elements and optimize performance. The back-end development team handles server-side operations, developing algorithms, and database structures. They ensure data processing, security, and integration with external systems.

The **Digital Marketing department** offers a range of services to both the company and its customers. These services include search engine optimization (SEO), social media monitoring and listening, web analytics, and social media management. The department is equipped to handle various needs related to digital marketing and can help clients improve their online presence and engagement.

The **Designer team** at Adbros is responsible for creating a variety of graphic designs for their clients. This includes designing user interfaces (UI) and user experiences (UX), as well as creating 3D elements and visualizations. They also design communication materials for both online and print campaigns. Overall, the team handles a range of design projects for their clients.

The **IT support department** is tasked with several important responsibilities related to managing a company's internal IT systems. These responsibilities include administering internal servers and ensuring that the company's intranet is available to all users. The department is also responsible for managing the network infrastructure and ensuring that all company equipment runs smoothly.

The **Sales department's** primary responsibility is conducting market research, which is then used by both the sales team and management to determine which products to offer to which potential customers.

3.1.2 Organization structure

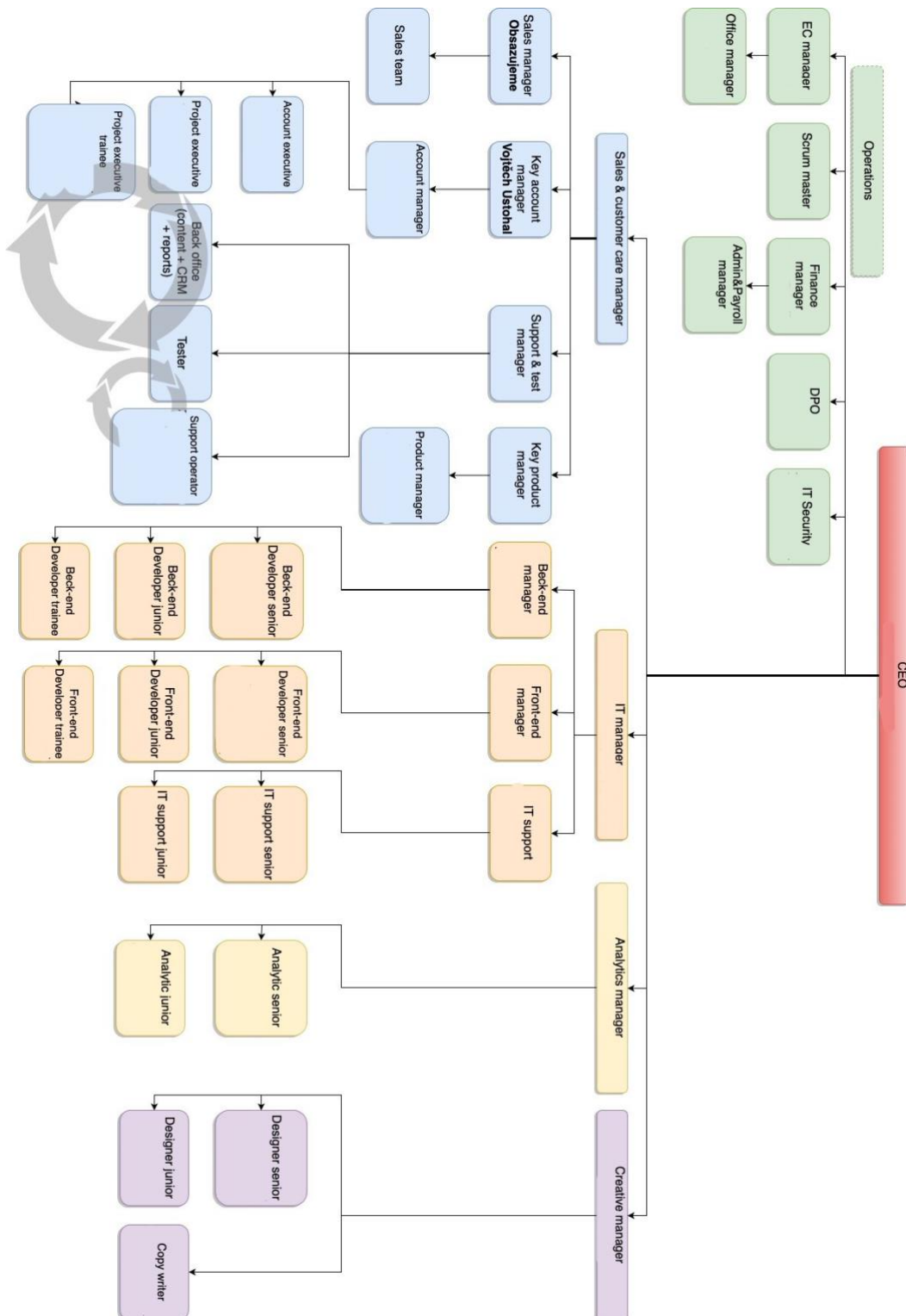


Figure 12. Adbros's orgchart 2022 [Source: Petr Sedlaček]

3.2 The description of the website of organization

3.2.1 Basic Information

In 2014, the IT department of Adbros s.r.o. created the company's corporate website. The website serves the purpose of informing visitors about the company, showcasing its products or services, and encouraging them to take action by calling the phone number, submitting requests, or visiting the office. Another goal of the website is to attract new employees to the company. The main modules of the website are:

About us – brief introduction of the company and its values.

Services – list of services that company provides.

Products – list of products and tools created by Adbros.

Clients – descriptions of clients the company was and is working, representation of case studies.

Career – the page consists of list with free positions.

Contact – the page with addresses, phone numbers, map visualization, a contact form.

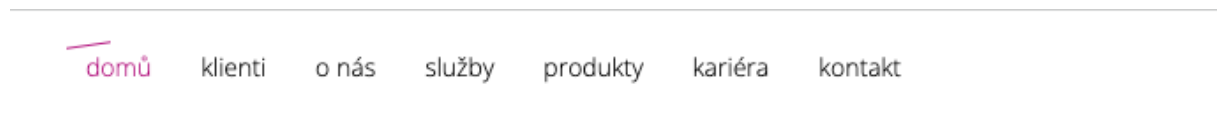


Figure 13. Menu pannel - current state [Source: adbros.cz before redesign]

The company recognizes the importance of having a website as a marketing tool and has installed web analytics tools to track visitor behavior. In 2019 the web analytics tools were implemented include Universal Google Analytics, Google Tag Manager, Hotjar, and Facebook Pixel. These tools allowed the company to gain insights into how visitors interact with the website in accordance with the need of the organization.

The web analytic of the corporative website is performed by the Digital Marketing department in cooperation with the IT department. The web analyst was responsible for configuration Google Analytic tools as creating account for the company, setting up tags, triggers and variables via Google Tag Manager, creating a list of Data layer definitions in accordance with event tracking anatomy in Universal Google Analytics.

The Front-end team is responsible for configuring GA and GTM script on the website, cookies set up and attaching definitions, made by web analyst, to specific buttons.

In the following paragraphs, a description of the configuration of Google Analytics tools set from web analyst side will be provided.

3.2.2 Configuration of Universal Google Analytics (Google Analytics 3)

For tracking the website statistics was set up a working space Google account connected to the Universal Google Analytic. As the Digital Marketing department provides web analytic service for different organizations, was created an internal company's account *adbros.cz* within Google Analytics.

To make testing and data analysis more convenient, were set up two properties for the website. The first property belongs to the production version of the website, while the second was created for the test version of the website. This enables testing of new features, such as page modifications, the addition of new buttons, and other changes. Each property is identified by a unique tracking ID.

The property of the production version consists of two views: "*All website data*" and "*Without Adbros IP*" (*orig. "Bez Adbros IP"*).



Properties & Apps	Views
adbros.cz UA-123456789-1 >	Bez Adbros IP 16.12 123456789 ☆
	Všechny údaje o webu 123456789 ☆

Figure 14. Production property and views [Source: Adbros's analytic account]

The "*All website data*" view in Google Analytics is a default view that streams all incoming data to the Google Analytics report without any specific configurations. However, for the second property that was created without Adbros IP, a filter was configured to exclude internal traffic from the company's IP address. This view is used by the Digital Marketing department for web analytics and data visualization purposes. By excluding internal traffic from the data analysis, the view provides a clearer picture of user behavior and more accurate insights into the performance of the website.

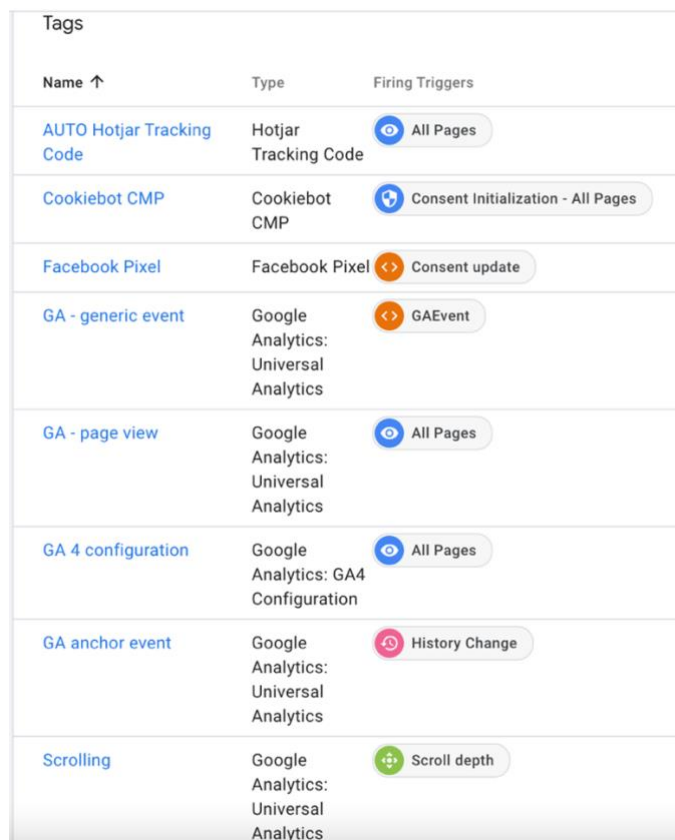
3.2.3 Google Tag Manager Configuration

Google Tag Manager is an essential part of web analytic tools implementation. First of all, was created corporate account in Google Tag Manager and adbros.cz container, that in future, would be containing of particular tags and triggers. Then the generated container ID was sent to developers to be inserted in the code of the webpage. The Digital Marketing department does not deal with placing the container ID to the website script.

The second step, setting up of tags, triggers, and custom variables. Based on information provided, a former employee created 8 tags, that were maintaining the website and Google Analytics connection. By the time of the website launching, the company did not have a proper measurement plan about which events to collect.

3.2.3.1 Google Tag Manager Configuration – Tags

In following picture will be represented tags, triggers and variables that were configured in year 2019.

A screenshot of the Google Tag Manager interface showing a list of configured tags. The table has three columns: Name, Type, and Firing Triggers. The tags listed are: AUTO Hotjar Tracking Code (Hotjar Tracking Code, All Pages), Cookiebot CMP (Cookiebot CMP, Consent Initialization - All Pages), Facebook Pixel (Facebook Pixel, Consent update), GA - generic event (Google Analytics: Universal Analytics, GAEvent), GA - page view (Google Analytics: Universal Analytics, All Pages), GA 4 configuration (Google Analytics: GA4 Configuration, All Pages), GA anchor event (Google Analytics: Universal Analytics, History Change), and Scrolling (Google Analytics: Universal Analytics, Scroll depth).

Name ↑	Type	Firing Triggers
AUTO Hotjar Tracking Code	Hotjar Tracking Code	All Pages
Cookiebot CMP	Cookiebot CMP	Consent Initialization - All Pages
Facebook Pixel	Facebook Pixel	Consent update
GA - generic event	Google Analytics: Universal Analytics	GAEvent
GA - page view	Google Analytics: Universal Analytics	All Pages
GA 4 configuration	Google Analytics: GA4 Configuration	All Pages
GA anchor event	Google Analytics: Universal Analytics	History Change
Scrolling	Google Analytics: Universal Analytics	Scroll depth

Figure 15. GTM Tags - current state [Source: Adbros's analytic account]

For better clarity, in the Table 3 below would be listed name of tags, triggers and tag's purpose.

Table 3. GTM Tag description current state [Source: Adbros's Analytics account]

Tag	Trigger	Purpose
AUTO Hotjar Tracking Code	All pages	Hotjar is analytical tool that helps to understand more user behavior - mouse moves of the user, clicks to empty spaces, records of user website journey. This tag consisted of html code that would connect Hotjar and the website. The tag fires on all pages of the website. [14]
Cookiebot CMP	Consent Initialization – All Pages	Cookiebot Consent Management Platform tag was created to manage all tags from external sources on your website in accordance with the consent status of the site visitors. The tag fires on all pages.[32]
Facebook Pixel	Consent Update	Facebook Pixel tag contained of html code that connects it with the website. Facebook Pixel allows to track user behavior, website conversions for advertising on Facebook platform. The tag fires in accordance with Consent Update trigger. [11]
GA – generic event	GA Event	The purpose of creating a tag was to monitor specific events, such as clicks on buttons that have been assigned Data layer variables like eventCategory, eventAction, and eventLabel. By clicking on these buttons, the tag will be fired and sending values of these parameters to Google Analytics interface.
GA – page view	All Pages	This tag was assembled to connect the website and Google Analytics. It stores the variable mentioned earlier, a GA constant with the unique Tracking ID number of the Google Analytics property that links to the website. The tag must fire on all pages.
GA4 configuration	All Pages	The tag was set up to connect the website and Google Analytics 4. This tag includes the Measurement ID, which is a unique identifier for the Google Analytics 4 property and allows data to be sent to the account for analysis.

GA anchor event	History Change	The tag was used for tracking History Changes as event. The tag fires due to History Change trigger - when the URL changes during the session it sends as a new event to Google Analytics.
Scrolling	Scroll Depth	The tag was created to track how far the page of the website was scrolled down. It was supposed to help to understand user engagement on pages. The tag fires when trigger Scroll Depth is activated – the user reached 20%, 50%, 75% or 100 % of the page by scrolling down.

3.2.3.2 Google Tag Manager Configuration – Triggers

In the picture below are shown triggers for firing tags.

Triggers

Name ↑	Type	Filter	Tags
Consent update	Custom Event		1
GAEvent	Custom Event		1
History Change	History Change		1
Scroll depth	Scroll Depth		1
Všechny prvky	All Elements		0

Figure 16. GTM Triggers - current state [Source: Adbros's GTM account]

Consent update trigger is used for cases when user have clicked on a button “Accept”. Trigger type set on custom event, that means user must take a particular action – in this case users must click on Consent button of the cookies bar to fulfill the criteria of the trigger.

GAEvent trigger is used for tracking custom events on the website. The IT department of the company had defined an identification value for tracking specific button clicks: GAEvent. By clicking on specified button, a data layer is updated with a custom event containing the GAEvent value.

History Change trigger is a type of trigger that fires when the browser's history changes. This trigger is used to track user behavior on a website, specifically when a user navigates between different pages on the site using the browser's back and forward buttons.

When a user navigates between pages using the browser's back and forward buttons, the URL in the browser's address bar changes, but the page does not fully reload. This is known as a "history change" event. By using a history change trigger, you can track these events and capture information about the user's behavior on the site.

A **scroll depth trigger** is utilized to monitor how much a user is engaged with a webpage by tracking the distance they scroll down the page. The parameters for this trigger were set on Vertical Scroll Depth and percentages were set on 20, 50, 75 and 100.

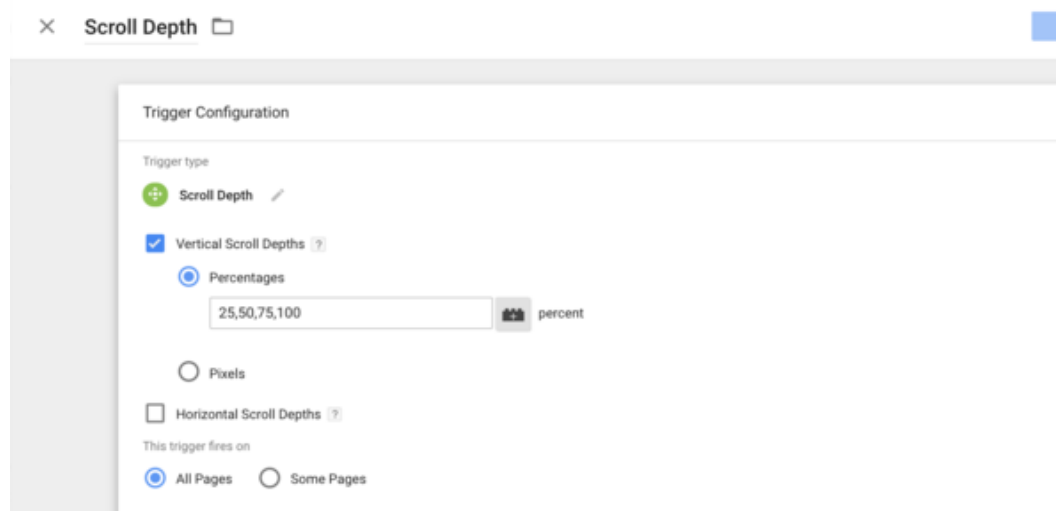


Figure 17. Scroll depth trigger [Source: Adbros's GTM account]

“Všechny prvky” trigger with the trigger type "all elements" is a type of trigger that fires whenever a user clicks on any element on a webpage. This includes clicks, form submissions, button presses, and any other type of user interaction.

3.2.3.3 Google Tag Manager Configuration – Variables

As it was mentioned in theoretical part, there are two types of variables in Google Tag Manager: Built-In Variables and User-Defined Variables. To each trigger should be related a variable.

As User-Defined Variables were configured “GA konstanta” with variable type Constant. This variable contains unique tracking identical number of Universal Google Analytics property. The variable type is constant.

In accordance with Universal Google Analytics requirements for event tracking and event structure, were created in cooperation with IT department three user-defined variables with

Data layer variable type: eventCategory, eventAction and eventLabel. Each of that variable will be set up for particular buttons by IT department and then the value of this variable will be sent to Google Analytics.

3.2.4 Data visualization

For data visualization the web analyst from Digital Marketing Department used Looker Studio platform. The Marketing department requests the report of website performance on a weekly basis.

As it was described in theoretical part, Looker studio allows users to create and share interactive data visualizations, reports, and dashboards. Before starting to create visualization, web analyst had to set up a data source. The data source in this case was Google Analytics account.

For demonstration analyzing website performance and Google Analytics configuration was chosen a date range from the 15-th of January 2022 to the 15-th of April 2022.

3.3 Analysis of website performance

For analysis of current state website performance will be used report created by web analyst of Adbros via Looker Studio platform. The report would consist of metrics, that the management of the company and the web analyst have defined as considerable to be followed. For analysis will be used screenshots from the report and then would be given a description.

1-st slide

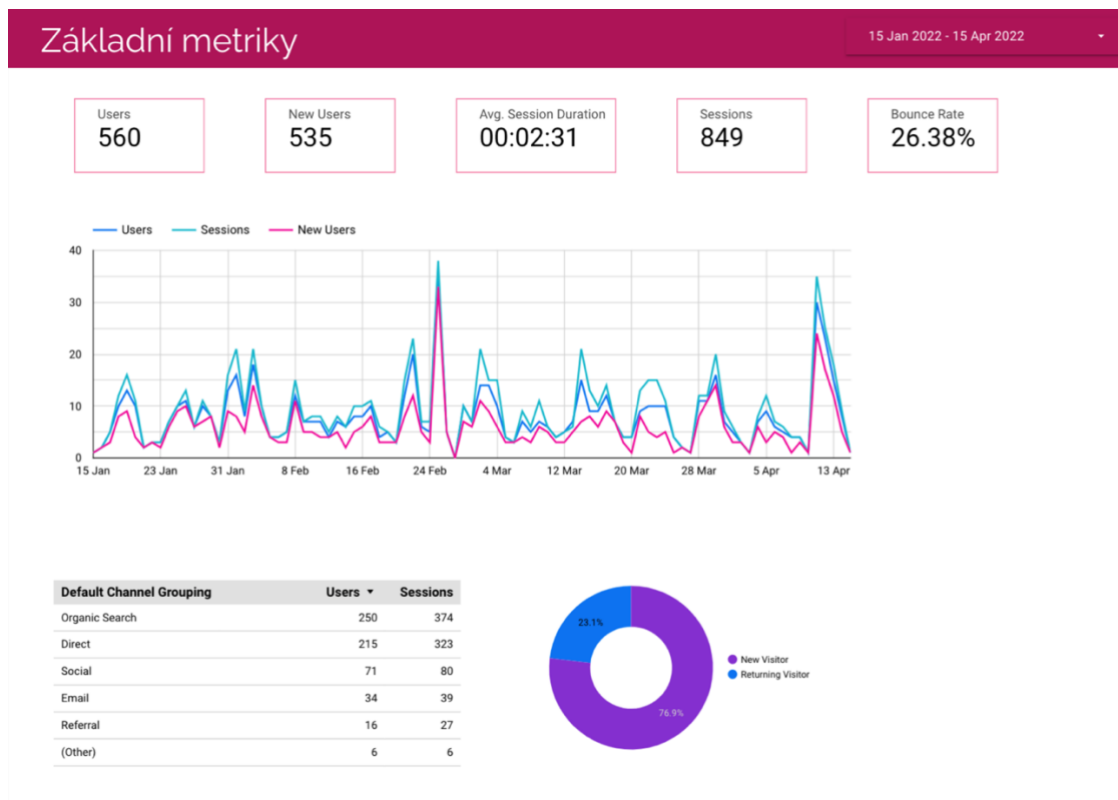


Figure 18. “Basic metrics” slide - current state [Source: Adbros's former web analyst]

This is the first slide of the report. On the top of the slide, there is a heading bar that contains the caption of the slide “Basic metrics” (orig. in cz. “Základní metriky”) and the date range control. Under the heading bar, there are scorecards with metric and their values. As important metrics to be followed were defined: user, new users, average session duration, sessions, and bounce rate.

The website had a total of 560 users during this period, out of which 535 were new users, indicating a high rate of acquisition – 96 % (New Users/Users). The average session duration was 2 minutes and 31 seconds, and there was a total of 849 sessions, suggesting that the website was able to engage users for a reasonable amount of time.

In accordance with the website purpose – to make user acquainted with a about-company information, the bounce rate of 26.38% was a quite positive value. The users were interested in the content and stayed on the website exploring other pages. The timeline graph located below the scorecards displays the number of users, new users, and sessions over the monitored period, and shows that the values fluctuated over time. On February 25th, 2020, the graph indicated a peak in activity, with 36 users and 33 new users visiting

the website. This is notably higher than the average number of users per day, which was 6.2, and the average number of new users per day, which was 5.9.

At the bottom part of the slide were placed a table named Default Channel Group and a pie-chart that indicated percentage of New vs Returning Visitors to the website.

Inspecting the default channel grouping table, organic search was the highest contributor with 250 users and 374 sessions, followed by direct with 215 users and 323 sessions. Social media and email channel groups were responsible for bringing in 71 and 34 users respectively, while only 16 users came through referrals.

The data on pie chart shows that a majority of the visitors (76.9%) were new, while the remaining 23.1% were returning visitors. Overall, the website has performed well in terms of acquiring new users and engaging them for a reasonable amount of time.

2-nd slide

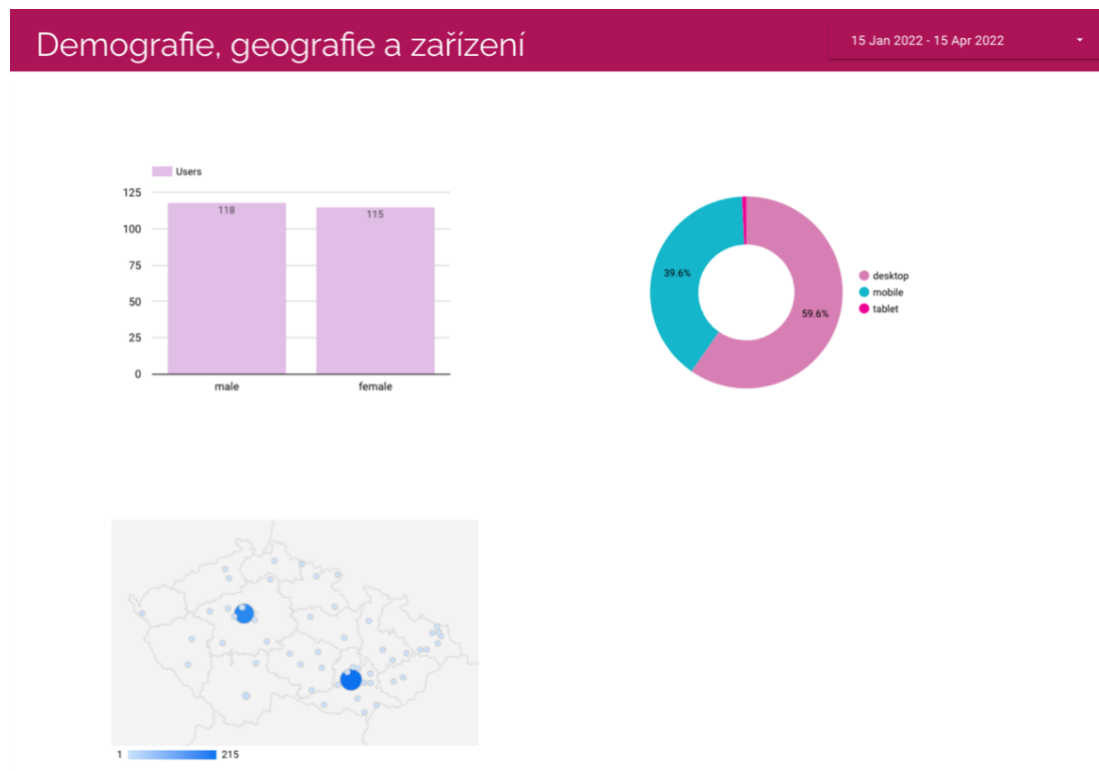


Figure 19. “Demography, geography and device” slide - current state [Source: Adbros's former web analyst]

A title of the slide is “Demography, geography and device” (orig. in cz. “Demografie, geografie a zařizení”). The slide consists of a column chart, pie chart and geo chart. The column chart depicts the number of users based on their gender – male and female.

The column chart shows that the website had 118 male users and 115 female users, indicating a relatively even split between genders.

The device pie chart shows that 59.6% of users accessed the website through desktop devices, while 39.6% used mobile devices. Tablet usage was minimal, accounting for only 0.7% of users. The geo charts show that the website had the most users in Brno and Prague, suggesting that these cities are the primary target audience for the website.

The manager of the website is interested in adding age information to the website after a redesign to form a target group. For proposal part of Master’s thesis this request will be considered. It can lead to valuable insights into the preferences and behaviors of the website’s users.

3-rd slide

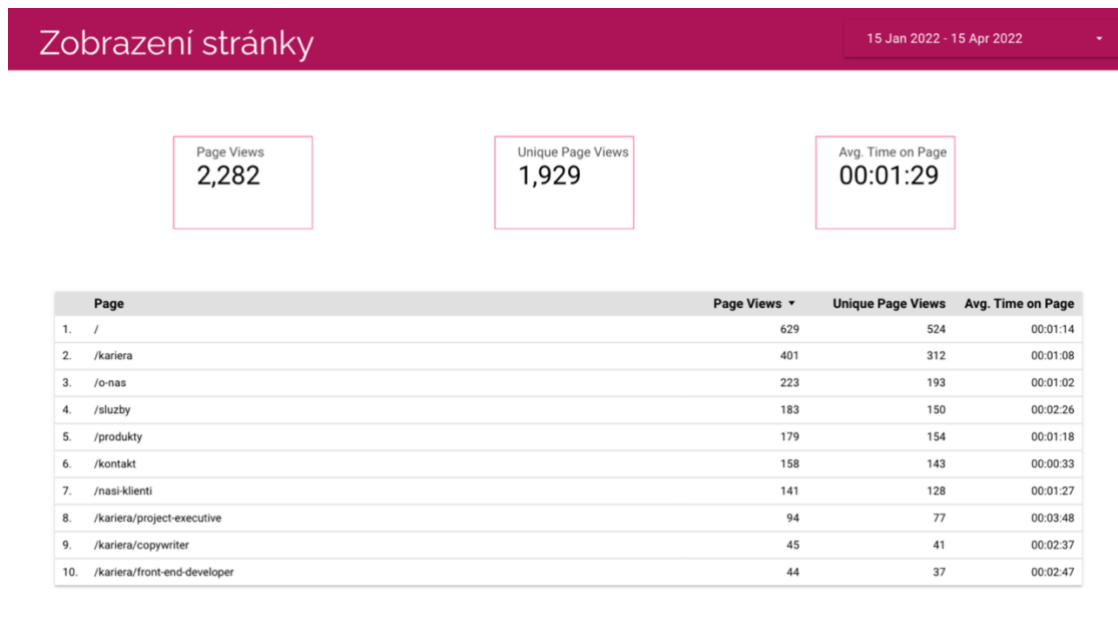


Figure 20. “Page views” - current state [Source: Adbros's former web analyst]

The slide had a caption “Page views” (orig. in cz. “Zobrazení stránky”). There are three significant scorecards with total values of Page Views, Unique Page Views and Average Time on Page. Below was placed a table of top 10 pages sorted by page views in descending order.

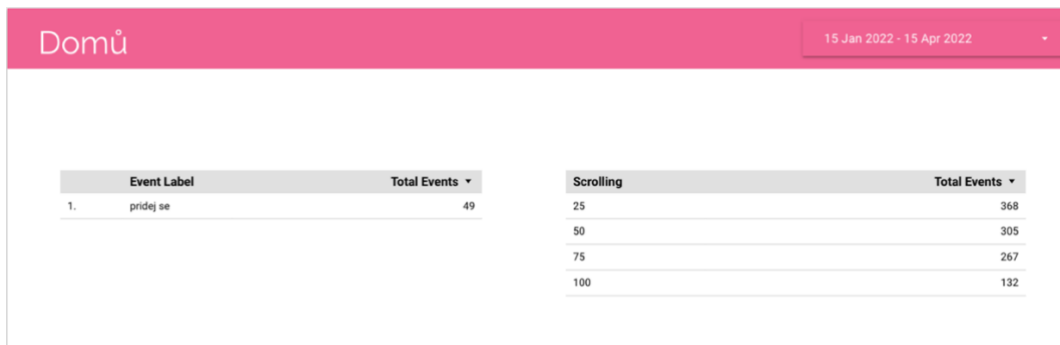
The website had 2 282 total page views and 1 929 total unique page views, with an average time on page of 1 minute and 29 seconds. A table with URLs of different pages and their corresponding values shows that the homepage (URL – ‘/’) had the highest

number of page views (629) and unique page views (524), followed by the career page (URL – ‘/kariera’) and the about us page (URL – ‘kontakt’).

The management of the company considered the number of page views for the service page (URL – ‘/sluzby’), product page (URL – ‘/produkty’), and contact page (URL – ‘/kontakt’) to be very important, because they are directly related to the agency's core business activities and revenue generation. However, the number of page views for these pages was relatively lower, with 183, 179, and 158 respectively, in comparison to the homepage, which had 629 page views. This suggests that the homepage is attracting the most traffic, and the other pages may require further optimization to increase their visibility and engagement. However, the average time spent on the service page (00:02:26) is higher than the overall average time on page (00:01:29) and is the highest among all the pages of the website. This indicates that users are spending a significant amount of time exploring the agency's services. On the other hand, the average time spent on the product page (00:01:18) is lower than the overall average time on page, which suggests that users are not spending much time exploring the agency's product offerings. This could be an indication that the product page needs improvement or that users are not interested in the products being offered. The contact page has the lowest average time on page (00:00:33), which is not astonishing since the main purpose of this page is to provide contact information as telephone number, email and addresses of the offices.

The page "Our Clients"(URL – ‘nasi-klienti’) with 141 page views suggests that users are interested in the agency's past work and success stories, which could be a positive sign for the agency's reputation and brand image. The top 10 ends with subpages of career page, containing the name of a position.

4-th slide



Event Label	Total Events
1. přidej se	49

Scrolling	Total Events
25	368
50	305
75	267
100	132

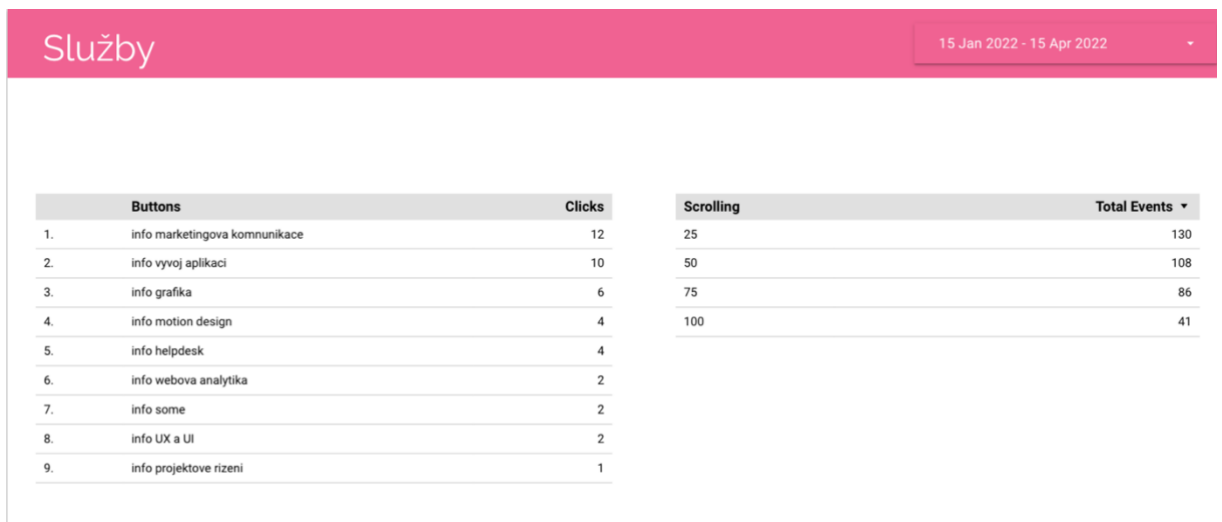
Figure 21. "Homepage" slide - current state [Source: Adbros's former web analyst]

The slide contains of two tables describing the events on Homepage of the website. The first table depicts a total number of “Join in” button clicks (orig. in cz. “Přidej se”). The button leads to fill in a form to apply for a free job position. During monitored period, the total number of clicks to that button was 49. This could suggest that there is not much interest in the job position being offered or the position of the button needs to be improved. This factor was taken into account for implemented redesign.

The second table shows the percentage of scrolling of the homepage. There was 368 events indicating scrolling 25% of the homepage, 305 events – scrolling 50 % of the homepage, 267 events – scrolling 75 % of the page, and 132 events – scrolling to the end of the page.

It is evident from the second table that the lowest number of events was recorded for 100% scroll depth. This is not negative factor, as the footer was located at the bottom of the page, and users did not scroll down all the way to access it. The majority of users scrolled down to 25% - 50% of the webpage, where the most information was placed. The content in this area most probably was interesting and engaging for users, and they wanted to learn more about the company.

5-th slide



Služby

15 Jan 2022 - 15 Apr 2022

Buttons	Clicks	Scrolling	Total Events
1. info marketingova komunikace	12	25	130
2. info vyvoj aplikaci	10	50	108
3. info grafika	6	75	86
4. info motion design	4	100	41
5. info helpdesk	4		
6. info webova analytika	2		
7. info some	2		
8. info UX a UI	2		
9. info projektove rizeni	1		

Figure 22. "Services" slide - current state [Source: Adbros's former web analyst]

The slide has a similar structure to previous one - two tables describing the events on Service page (orig. in cz. “Služby”). The table located on the left side displays the count of clicks on the button that provides additional details about the respective service. Upon clicking on the button, the article expands to present more information. The most clicks were to the information about the marketing communication (orig. in cz. “marketingová komunikace”) – 12 clicks and app development (orig. in cz. “vyvoj aplikace”) – 10 clicks. The table on the right shows the percentage of scrolling of the service page. There was 130 events indicating 25% scroll depth, 108 events - 50 % scroll depth, 86 events – scrolling 75 % of the page, and 41 events – scrolling to the end of the page. Based on the data, the least number of events were recorded for scrolling to the end of the page.

The page consists of articles describing the services provided by the company, therefore it is important for visitors to scroll through the entire page to gain a comprehensive understanding of the services.

6-th slide

The screenshot shows a slide titled 'Produkty' with a date range of '15 Jan 2022 - 15 Apr 2022'. It contains two tables. The first table, 'Button Clicks', lists six buttons and their respective click counts. The second table, 'Scrolling Total Events', lists four scrolling percentages and their total event counts.

Button	Clicks
1. survey info	8
2. posmio info	6
3. generator info	3
4. MGM info	3
5. SMS brana info	2
6. planner info	1

Scrolling	Total Events
25	132
50	104
75	82
100	26

Figure 23. "Products" slide - current state [Source: Adbros's former web analyst]

The slide represents interaction with events on the Product page (orig. in cz. "Produkty"). Repeatedly, the structure is similar to two previous slides.

The table situated on the left-hand side shows the number of clicks on the button that offers further information about the specific product. Clicking on the button causes the article to expand, revealing additional details.

Referring to the data, the most clicks gained button corresponding to Survey product of the company – 8 clicks, followed by clicking to information about Posmio product – 6 clicks.

Concerning the second table, 25 % of the page was reached 132 times, 50 % of the page was reached 104 times, 75 % - 82 times, 100 % - 26 times. The product page also consists of articles, it is important for the company to encourage visitors to read through the entire page to fully understand the products being offered.

7-th slide

The screenshot shows a slide titled 'Kariéra' with a date range of '15 Jan 2022 - 15 Apr 2022'. It contains two tables. The first table, 'Button Clicks', shows one button with 106 clicks. The second table, 'Form Clicks', shows one form with 10 clicks.

Button	Clicks
1. vice k pozici	106

Form	Clicks
1. Kariéra	10

Figure 24. "Career" slide - current state [Source: Adbros's former web analyst]

The slide corresponds to career page (orig. in cz. "Kariéra"). There are two tables on the slide. The first table displays the number of clicks to the button, that gives more

information about current position. The other table shows, how many times was clicked form submission button.

There was a form that needed to be fill in to apply for existed positions. After filling in the form, the user must have clicked the button to submit personal information and attached CV.

According to the data, there were 106 clicks to expand the information about specific position and 10 clicks to submission button.

The number of clicks to the form submission button is relatively low compared to the total number of users who visited the website during the monitored period, which was 560.

3.4 Analysis summary

The analysis of the Adbros's website revealed several insights that can be used to improve the website's performance. The website is currently undergoing a redesign, and the management of the company is looking for more detailed information on custom events.

The analysis found that the number of clicks to the "Join in" button was relatively low, with only 49 clicks during the monitored period. Similarly, the number of clicks to the submission button on the career page was also relatively low, with only 10 clicks compared to the 560 total users on the website during the same period. These findings suggest that the website could benefit from clearer calls to action or more enticing job descriptions to encourage users to apply.

The analysis also revealed that the majority of users accessed the website from desktop devices, with mobile usage at 39.6% and tablet usage at only 0.7%. The most active regions for website usage were Brno and Prague.

On the service and product pages, users were most likely to scroll to the 25% to 50% mark of the page, suggesting that the most important information should be placed in this section. However, it is also important to note that there were still a significant number of users who scrolled to the end of these pages, which suggests that users are interested in reading the detailed articles about the company's services and products.

The analysis did not include information about tracking menu navigation, which could be useful for the company to understand which menu tabs are being clicked on the most frequently.

Additionally, the current analytics configuration is using Universal Analytics, which is set to shut down soon. To avoid losing current data, it is important to change analytics configuration to the newest version Google Analytics 4 before the deadline of July 1st.

Finally, it is important to note that the design of the report might be improved, as lack of certain metrics described may impact the accuracy and reliability of the conclusions drawn from the analysis.

4 PROPOSAL PART

Due to the recent redesign of the website that was launched on January 13th, 2023, the management of the company is interested in gaining a better view of the website performance to form probable insights for future web optimization and business. Therefore, will be proposed the configuration of GA4, particularly creating new tags and triggers, as well as the setting up of new data layer values for new buttons to observe website performance.

The new data layer definitions will allow for the tracking of custom events, such as the number of clicks on new buttons, that appeared in accordance with redesign, containing on the service and product pages, and the submission button on the career page. This data will provide valuable insights into user behavior and engagement with the website. By tracking these custom events, will be possible to gain a better understanding of user needs and optimize the website accordingly.

In addition, will be compared the new possibilities of GA4 with Universal Google Analytics to provide the management with a better understanding of the benefits of upgrading to GA4. The new metrics available in GA4 will provide more in-depth insights into user behavior. This will enable the management to have a new view on the web performance and even might be helpful for business strategy.

As a part of proposal, will be provided a sample report that can be used by the management to analyze website performance and create insights for future web optimization. The report will include new metrics provided by Google Analytics 4. Also, will be included a comparison of the metrics that were set up in the current report to analyze the progress of the redesign.

It is important to note that this proposal does not include setting up the GA4 script on the website or setting up the data layer for buttons.

4.1 Introduction of redesigned web

The company's management decided to redesign their website in the summer of 2023. They believed that a digital company's website should serve as a testament to the level and capabilities of their team, and therefore wanted to showcase their skills through an updated design.

“To achieve this, all departments involved in the development process contributed to creating the individual details that make up the new website. From the graphic side, the goal was to create a website that draws inspiration from the latest UX and design trends, while also maintaining a trendy look in the future. From the development side, the new website was built using modern technologies such as Strapi.js for content management, Nuxt 3 for fast loading, and Tailwind CSS for a user-friendly design”. [Source: internal company’s magazine]

The new version of the website was launched on 13-th of January 2023. Not only the main modules of the website were remained the same: *About us, Services, Products, Clients, Career, Contact*, but also were created two more sections as: *For media* and *Blog*. In *For media* section, there are provided press releases of the company and logo manual for downloading. In *Blog* section provided articles about company’s life and discussions on various global topics that showcase the company's perspective.

In following section will be explored individual pages to design a proposition for creating definitions for data layers values. According to the management requirement, the data layers values should be given in Czech language. In Master’s thesis the values will be presented in English with translation. The values will be sent to IT department of the company to be set up. Designed values might be helpful to track specific buttons according to company’s requirements.

4.1.1 Menu navigation

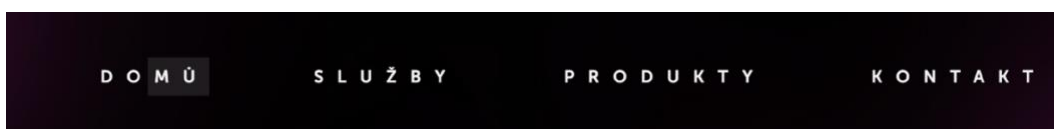


Figure 25. Menu pannel - redesigned website [Source: 34]

The requirement of the management was to follow how users exploring the website and to identify, in terms of clicks, what the menu tab is clicked the most.

The upper menu bar contains of 4 tabs as: Homepage, Services, Products and Contacts. As it was outlined in analytical part, these pages are the most valuable to be followed in terms of web analysis.

Also, there is a burger button that reveals other tabs of the website.

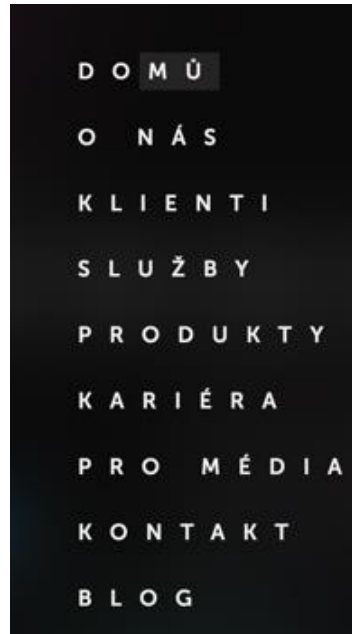


Figure 26. Expanded menu - redesigned web [Source: 34]

For better understanding, how user explore the website and how many clicks were on particular menu buttons, will be proposed to create data layers:

eventCategory:"Menu","eventAction":"Click","eventLabel":"name of the button"

eventCategory:"BrgrMenu","eventAction":"Click","eventLabel":"name of the button"

Where eventCategory is **Menu** or **BrgrMenu** depending on whether a user clicks on a button placed in upper menu tab or in expanded menu (by clicking on a burger button). The eventAction will indicate that the action is a click. The eventLabel will contain the name of the button, such as "Homepage" or "About Us".

4.1.2 Homepage

The image displayed below showcases a snapshot of the website's homepage. To comply with privacy regulations, certain information has been hidden.

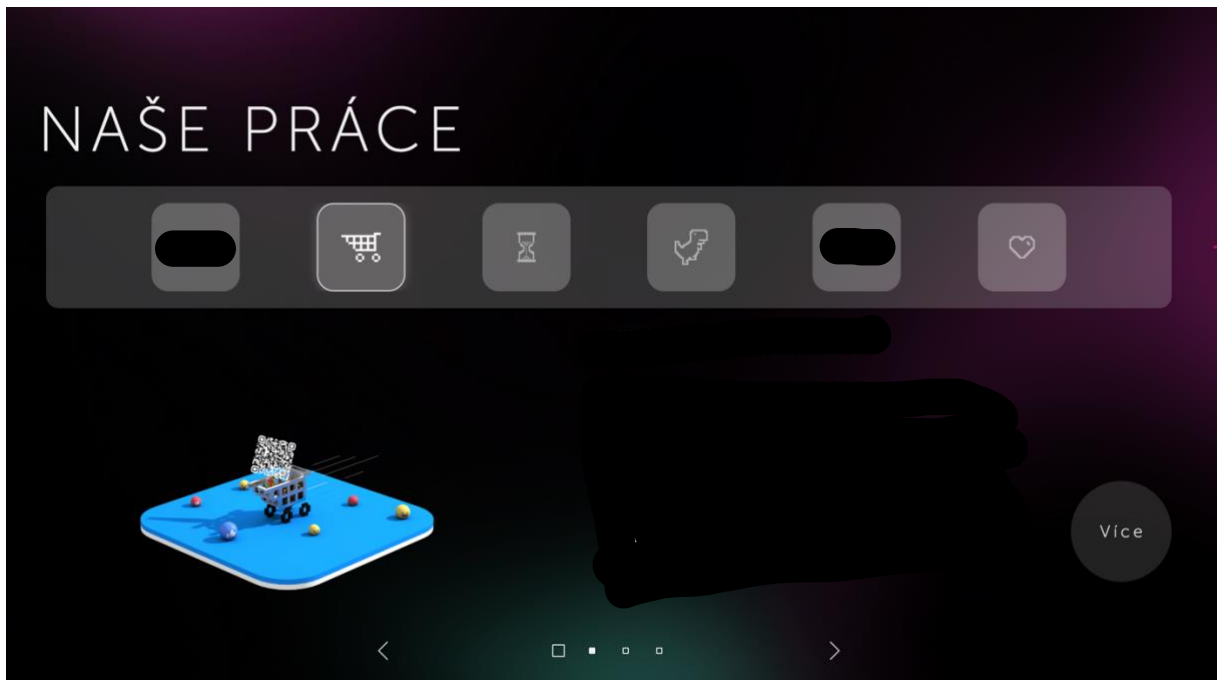


Figure 27. Homepage - redesigned web [Source: 34]

The homepage features a slider design that allows the user to navigate through different sections by clicking on arrows. These sections include the introduction slide, “Our work” (orig. in Czech: “Naše práce”) slide, “Our clients” (orig. in Czech: “Naše klienti”) slide, and join us slide, each of which is accompanied by corresponding icons and text descriptions. Additionally, a round button labeled "More" (orig. in Czech: “Více”) is located in the bottom right corner of the screen, which directs the user to a page related to the content of the icon.

To explore user navigation on a homepage will be suggested this data layer:

eventCategory": "Button", "eventAction": "Click", "eventLabel": "Homepage our work: icon label"

eventCategory": "Button", "eventAction": "Click", "eventLabel": "Homepage our clients: icon label"

eventCategory": "Button", "eventAction": "Click", "eventLabel": "Homepage: join us"

eventCategory": "Button", "eventAction": "Click", "eventLabel": "More: icon label"

The eventCategory will be Button corresponding to the type of event. The eventAction will be Click. The eventLabel is used to indicate the current page Homepage (orig. in Czech: "Domů") where the user is located and the slide name on which the icon was clicked. For the button "More" (orig. in Czech: "Více") will be proposed the eventLabel, that will start from the word "More" to identify how many users clicked to expand the information about specific service or client. The label of the icon specifies the individual service, client or join us button that was clicked by the user.

4.1.3 Service page

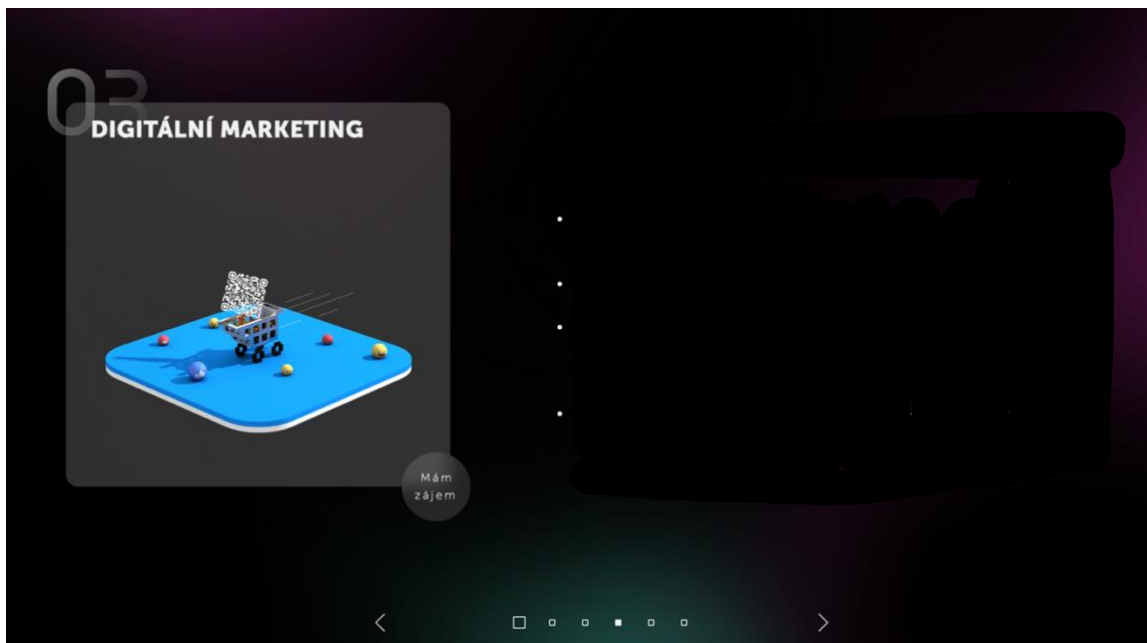


Figure 28. Service page - redesigned web [Source: 34]

On the picture is presented a screenshot of service page of the website. In terms of privacy reason, some of information is concealed. The layout of the services page is reminiscent of the homepage, featuring a slider that guides the user through the company's offered services. The first slide displays icons corresponding to a specific service, and clicking on an icon will redirect the user to the relevant service page. The image presented pertains to the digital marketing service. The information about each service is provided on the right side of the page. Additionally, there is a logo featuring a button labeled "I am interested in" (orig. in Czech: "Mám zájem"), which leads to a pop-up window with a

form to fill out. By filling out the form and providing personal information, the user may express interest in a particular service and allow for contact in the future.

To track how many clicks were on particular icon, how many times was clicked button "I am interested in" (orig. in Czech: "Mám zájem") and how many times was form submitted events, will be designated the following Data layers:

eventCategory":"Button","eventAction":"Click","eventLabel":"Service: icon label"

This Data layer will be referring to the icons that placed on the first slide of the page. The eventLabel will be containing of page name Service and the icon name respectively to the service.

eventCategory":"Button","eventAction":"Click","eventLabel":"Interest: service name"

The Data layer corresponds to the button "I am interested in" (orig. in Czech: "Mám zájem"). The eventLabel will be carrying the shorten label of the button Interest and the name of particular service.

eventCategory":"Form","eventAction":"Submitted","eventLabel":" Question Service"

For this scenario, the eventCategory will be Form, which corresponds to the type of event. The eventAction will be Submitted, indicating that the user clicked on the submission button to complete the form. The eventLabel will be named Question (orig. from Czech: "Dotaz"), as the form is used to send a question, and will also include the name of the current Service page

4.1.4 Product page

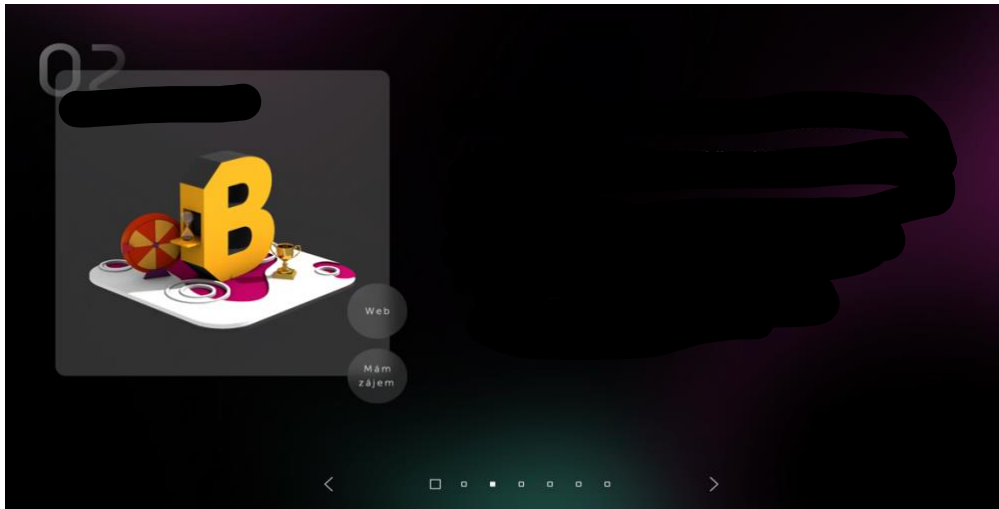


Figure 29. Product page - redesigned web [Source: 34]

The product page depicted in the image bears a resemblance to the service page, featuring a slider that enables users to browse through various products showcased on the page. The right side of the page presents the product description, while the left side features the product logo along with two buttons: "I am interested in" (orig. Czech: "Mám zájem") and "Web". The "I am interested in" button directs the user to a form, which was explained in the previous section about the service page. Clicking the "Web" button redirects the user to the website related to the specific product.

To monitor clicks related to the product page, it is recommended to create the following Data layers:

eventCategory":"Button","eventAction":"Click","eventLabel":"Product: icon label"

eventCategory":"Button","eventAction":"Click","eventLabel":"Interest: product name"

eventCategory":"Button","eventAction":"Click","eventLabel":"Web: product name"

eventCategory":"Form","eventAction":"Submitted","eventLabel":" Question Product"

The Data layers for tracking clicks on the product page will have a structure analogous to that of the service page, with the exception of the Web button. The eventLabel value for the Web button will include the name of the specific product preceded by the word "Web".

4.1.5 Career page

On a screenshot below represented a career page.

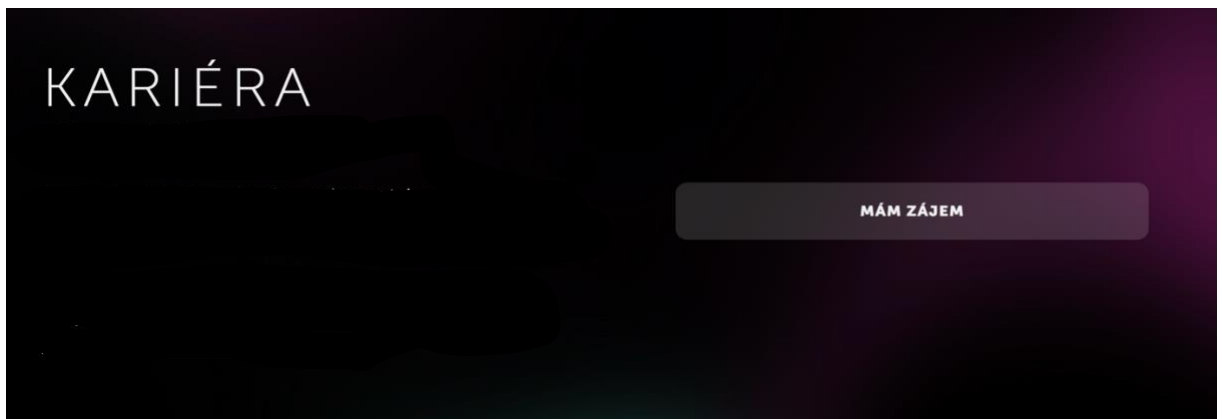


Figure 30. Career page - redesigned web [Source: 34]

There is a single button labeled "I am interested in" (originally in Czech: "Mám zájem"). When clicked, it leads the user to a job application form. After filling out the form, the user must click on the send button to submit their application. By tracking these clicks, the company can gain insights into the number of potential employees who are interested in the job opportunities offered by the company. Additionally, by calculating the ratio of users who clicked on the "I am interested" button to those who clicked on the submission button, valuable insights can be gained on whether the job application form is challenging to complete or whether the job positions offered are appealing to users.

To identify these buttons will be suggested these Data layers values:

eventCategory": "Button", "eventAction": "Click", "eventLabel": "Interest career"
eventCategory": "Form", "eventAction": "Submitted", "eventLabel": "Send Career"

The word "Send" will be "Odeslat" in Czech.

4.1.6 Blog page

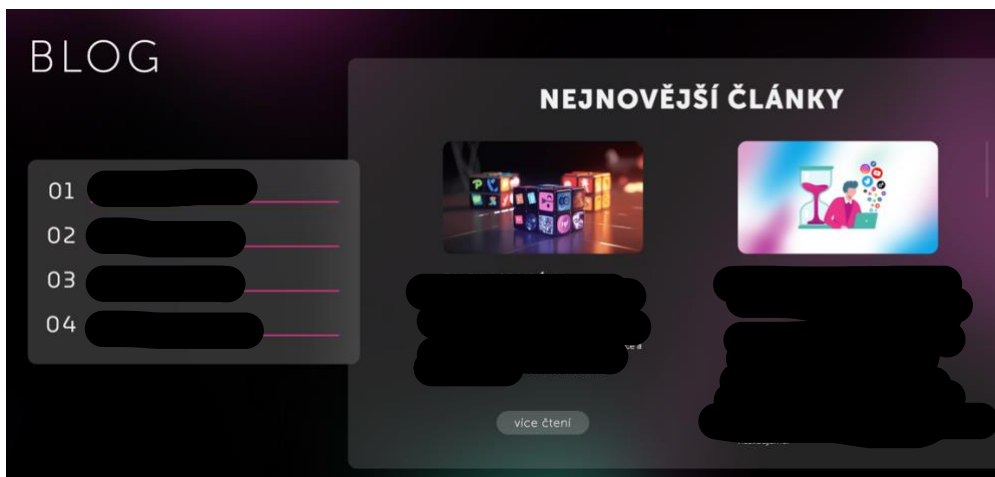


Figure 31. Blog page - redesigned web [Source: 34]

The Blog page contains multiple articles categorized into 4 topics displayed on the left side of the screen. Each article is briefly presented on the right side, including a logo and the "Read more" button (originally in Czech: "Více čtení"), which directs the user to a page with the complete version of the article. The company's management is interested in tracking whether the Blog page is a valuable addition to the website and whether the users are interested in reading about the company's news. To track these events, will be proposed the Data layer to individual category:

eventCategory": "Button", "eventAction": "Click", "eventLabel": "category title"

And the Data layer for button "Read More" (originally in Czech: "Více čtení"), that is going to contain the article name as well.

eventCategory": "Button", "eventAction": "Click", "eventLabel": "Read more: article name"

4.1.7 For media page

To showcase press releases and downloadable logo manuals, the media page is utilized. The company's leadership desires to monitor the traffic and engagement with the downloadable files. To accomplish this, an advanced functionality of Google Analytics 4 will be recommended, which can automatically track the downloading of files.

4.1.8 Contact page

The Contact page contains of different information about where the offices are located, the phone number, email and a form, in case the user have a question. By tracking this

metric, the company can gauge how useful and effective the upgraded Contact page is in facilitating communication between the users and the company. To track the number of clicks, will be designed this Data layer:

```
eventCategory":"Form","eventAction":"Submitted","eventLabel":"Question Contact"
```

4.1.9 Summarization

Once the Data layers are designed and given to the IT department, they will be implemented into the website using Google Tag Manager. To track the events using the Data layers, specific triggers will be set up for each event category and action. The trigger will be associated with the corresponding Data layer, which will provide additional information about the button clicked. By implementing recommended values for Data layer variables and triggers, the company will be able to track and analyze user behavior on the website, gaining insights into which pages and features are most popular,

4.2 Proposal for Google Analytics 4 configuration

How it was mentioned in theoretical part of the Master's thesis, Google Analytics 4 is the latest iteration of Google's popular analytics platform, offering a new and more comprehensive approach to tracking and analyzing user behavior on websites and mobile apps. In the following section, will be outlined a proposal for configuring GA4 to help meet the business needs of the company.

4.2.1 Creating Google Analytics 4 property

As the beginning of configuration, will be created Google Analytics 4 property. First of all, it is important to sign up to the company's Google Analytics account.

By clicking on "Admin" in the bottom left corner of the screen, will be opened an admin section.

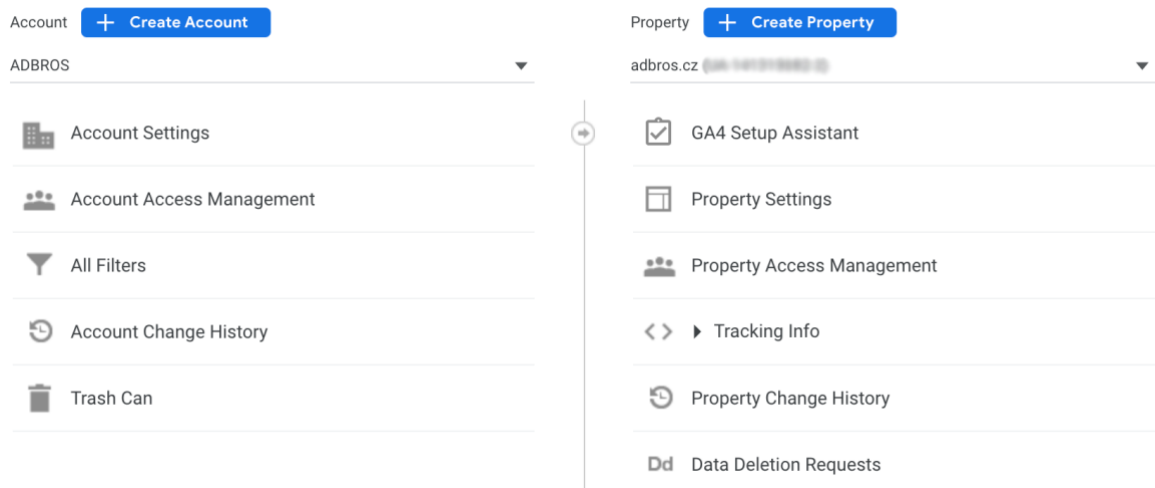


Figure 32. Admin section in Google Analytics [Source: Adbros's Analytics account]

Due to privacy reason, a unique tracking ID was blurred. There is a blue button "Create Property". By clicking on it, will be opened a section where the user follow the prompts to set up the property and provide the necessary information. For better view, the name of the property will be *adbros.cz GA4*. After providing the information will be revealed a popup window with web stream details.

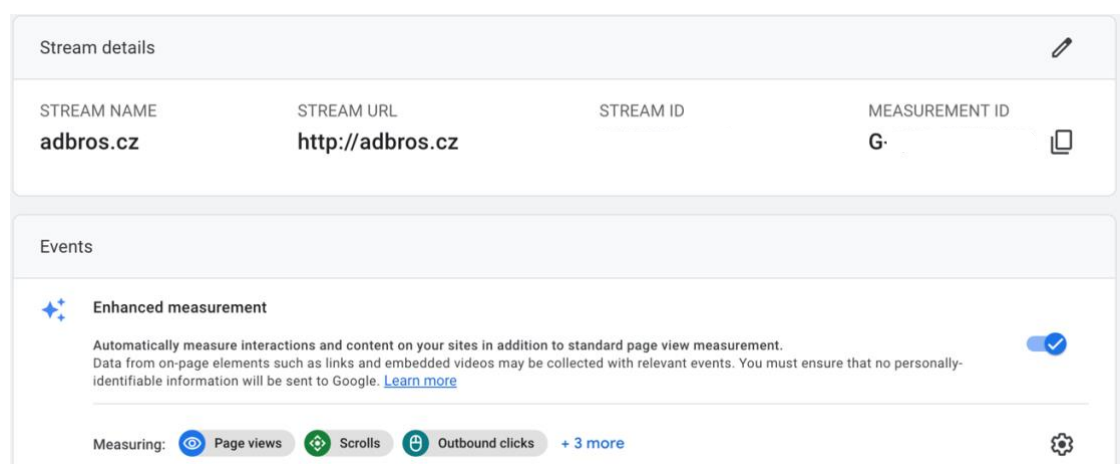


Figure 33. Property stream details [Source: Adbros's Analytics account]

Due to privacy reason, stream ID and measurement ID are hidden. For following configuration will be needed a measurement ID for GA4 configuration tag. In order to discover and utilize the new capabilities of GA4, the enhanced measurement functionality had been activated.

Once the property is created and the measurement ID is provided, in next section will be designed tags and triggers in Google Tag Manager.

4.2.2 Proposal for creating triggers

As mentioned earlier in the theory section, the event tracking structure for GA4 is different from before. The event tracking for GA4 has changed, as every hit is now considered an event and the previous categorization into category, action, and label is no longer used. To differentiate between events in GA4, custom triggers will be created to track specific button or form clicks.

In this section will be designed a proposition of triggers that will be established on the suggested data layers, which will produce custom events that can help in comprehending user behavior more effectively. The triggers will be aligned with the structure of data layers corresponding to Universal GA to make it easier for the IT department to understand and manage them. To provide a clearer understanding, a description of each trigger and their relative filters will be provided.

The triggers will be given Czech language names as requested by the management.

1) Homepage click trigger

The first trigger will be developed to track clicks on the homepage of the website.

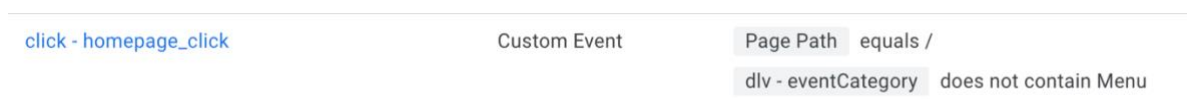



Figure 34. Homepage clicks trigger [Source: Custom processing in company's GTM account]

The event type of trigger will be custom event. Filters were established to gather clicks specifically related to the homepage. The page path will be matched to the URL of the homepage, which is "/", and the data layer variable eventCategory must not contain word "Menu", as the trigger will also be activated when the user clicks on the menu navigation. Therefore, events are excluded that contain menu clicks, and the trigger will only be activated when the user clicks on icons and buttons labeled "More".

2) Menu trigger

The trigger click_menu will be firing, when the user clicks on menu navigation buttons.



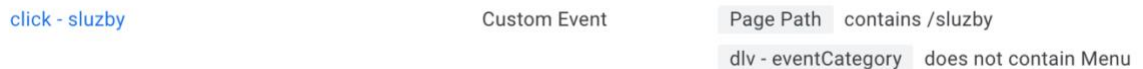
A screenshot of a trigger configuration in a software interface. The trigger name is 'click - menu'. The event type is 'Custom Event'. There are two conditions: 'div - eventCategory' contains 'Menu'.

Figure 35. Menu clicks trigger [Source: Custom processing in company's GTM account]

The trigger condition is set to track the data layer variable eventCategory that contains the word "Menu". This will allow tracking of both the menu buttons located in the upper menu tab, as well as the menu categories that are located in the expanded version of the menu when clicking on the burger menu button.

3) Service page clicks trigger

The trigger will be named click-sluzby, where sluzby means service in Czech.



A screenshot of a trigger configuration in a software interface. The trigger name is 'click - sluzby'. The event type is 'Custom Event'. There are two conditions: 'Page Path' contains '/sluzby' and 'div - eventCategory' does not contain 'Menu'.

Figure 36. Service page clicks trigger [Source: Custom processing in company's GTM account]

To exclude clicks on menu buttons, a condition will be set up for this and other triggers. The trigger will track all interactions with the button located on the service page, which has a page path containing the URL "/sluzby".

4) Products page clicks trigger

The trigger for the product page will be created in a similar way, but the page path will contain the URL "/produkty," which means "products" in English.

5) Career page clicks trigger

The trigger named click-kariera for the career page will be constructed similarly. The page path must be containing the URL "/kariera," which translates to "career" in English.

6) Blog page clicks trigger

The trigger for the Blog page will be developed based on a page path URL that contains the "/blog".

7) Form tracking trigger

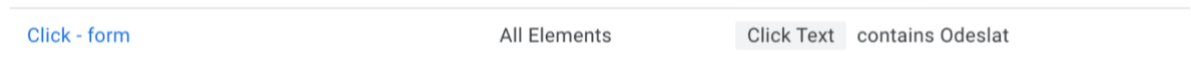


Figure 37. Form clicks trigger [Source: Custom processing in company's GTM account]

To monitor user interactions with submission buttons located on almost every page of the website, a trigger called "click-form" will be created. The trigger will be set to all clickable elements where the built-in variable Click Text contains the word "Send" (in Czech: "Odeslat"). This will enable tracking of form submissions throughout the website. The next section will focus on proposition configuring the tags and setting up the recommended triggers, following the trigger configuration outlined.

4.2.3 Proposal for tag configuration

Similar to Universal Google Analytics, Google Tag Manager plays a crucial role in configuring and controlling custom events for GA4. The installation of the GTM container on the company's website by the IT department eliminates the need for additional code modification. The proposed data layer values and triggers were presented in earlier sections to enhance website performance analysis. Now, the next step is to develop a tag proposal to finalize the setup for accurate data collection.

The following image will display a screenshot of the part of suggested tags.

<input type="checkbox"/>	Name ↑	Type	Firing Triggers
<input type="checkbox"/>	AUTO Hotjar Tracking Code	Hotjar Tracking Code	Performance cookies active
<input type="checkbox"/>	Facebook Pixel	Facebook Pixel	Performance cookies active
<input type="checkbox"/>	GA - generic event	Google Analytics: Universal Analytics	GAEvent Exceptions: Performance cookies blocked
<input type="checkbox"/>	GA - page view	Google Analytics: Universal Analytics	Performance cookies active
<input type="checkbox"/>	GA 4 configuration	Google Analytics: GA4 Configuration	Performance cookies active
<input type="checkbox"/>	GA4 Event - blog_click	Google Analytics: GA4 Event	click - blog Exceptions: Performance cookies blocked
<input type="checkbox"/>	GA4 Event - homepage_click	Google Analytics: GA4 Event	click - homepage_click Exceptions: Performance cookies blocked
<input type="checkbox"/>	GA4 Event - kariera_click	Google Analytics: GA4 Event	click - kariera Exceptions: Performance cookies blocked
<input type="checkbox"/>	GA4 Event - produkty_click	Google Analytics: GA4 Event	click - produkty Exceptions: Performance cookies blocked

Figure 38. Proposition of tags [Source: Custom processing in company's GTM account]

In analytical part of the Master's thesis were presented tags that were responsible for functioning within Universal Analytics. Not to confuse the digital marketing department employee, who is responsible for tag and triggers creation, these tags will not be deleted.

Instead, new tags will be added with the prefix "GA4 Event -" in their names.

The "GA 4 configuration" tag is the first step in setting up a GA4 property in Google Tag Manager. This tag is responsible for initializing the GA4 tracking code and sending data to the GA4 property. It contains important information such as the measurement ID, which must be entered correctly for the tag to function properly.

Also, with the complete redesign, the IT department has changed the cookie bar to the custom one. Therefore, trigger that is responsible for data collection due to cookies

acceptance has been changed in accordance with new cookie bar (the Master’s thesis does not deal with these changes).

Once the “Configuration GA 4” tag is set up and firing correctly, other tags will be added to track specific events and interactions on the website.

As example of event tag configuration will be described the tag “GA 4 Event – homepage-click”.

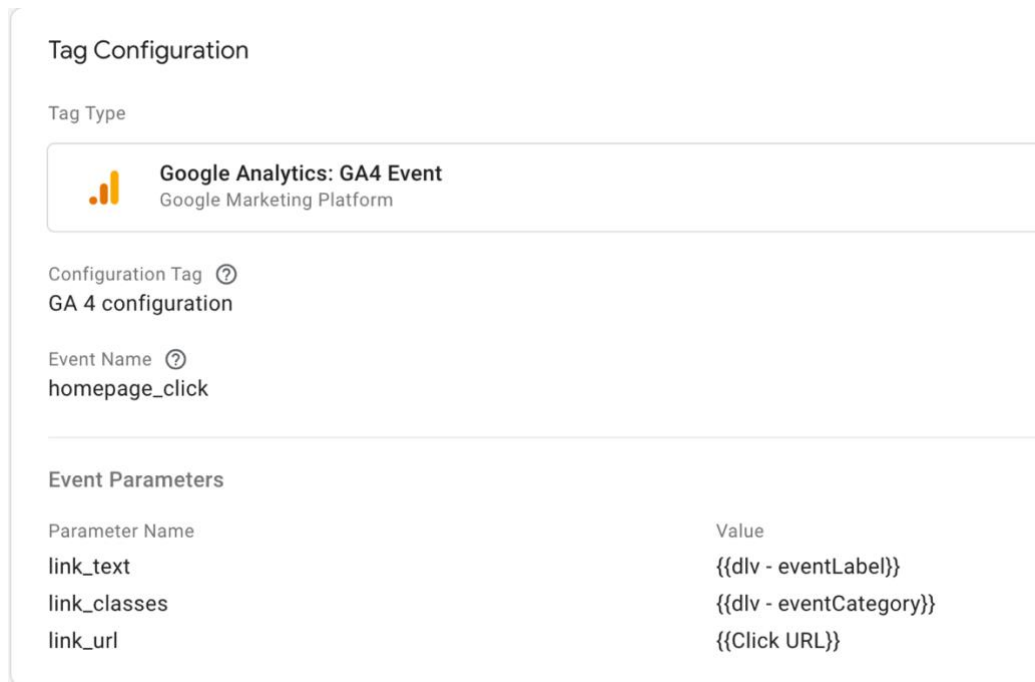


Figure 39. Example of the tag configuration Homepage clicks trigger [Source: Custom processing in company's GTM account]

The tag type is GA 4 event, that means this tag will be displaying events occurred on the homepage. The tag configuration will be in accordance with GA4 configuration tag, that will be streaming an event in the GA 4 property.

To gain more insights into user behavior, event parameters will be utilized to gather detailed information about the event. Three recommended parameters will be used, including link_text, link_classes, and link_url. The link_text parameter will retrieve a value from the data layer variable eventLabel. When the user clicks on icons on the slider or on the "More" button on the homepage, the tag will fire a custom event named "homepage_click" in the GA4 property interface. This will allow the event parameters to be visualized in GA4, enabling the identification of specific eventLabels.

The `link_classes` parameter will be set up similarly, except it will retrieve a value from the `eventCategory` data layer variable. The final parameter, `link_url`, will retrieve the URL value to which the user will be redirected after clicking on the button.

The firing tag will be `click-homepage`, that was proposed to be created in previous section.

The same configuration for tags will be applied to other tags as *produkty_click*, *sluzby_click*, *kariera_click*, *menu_click*, *blog_click* and *form_click*. These tags will also have event parameters for detailed data collection. The *form_click* event tag will have a similar setup, but the `link_classes` parameter will return the value of the `eventAction` data layer variable as "Submitted".

As for triggers, each tag will have a corresponding firing trigger set up. With the custom data layer variables such as `eventCategory` and `eventLabel`, and the definition of their values, more specific information about the event will be obtained.

The file downloading event on the "For media" page will be automatically tracked in GA4 without the need for tag configuration in GTM.

After the data layer variables, tags, and triggers are set up and tested according to the proposal, the collected data can be visualized. The following section will present a report that is based on the proposed GA4 configuration.

4.3 Proposal for data visualization

In this section, will be examined the performance of the website following its complete redesign. The report will be created using Looker Data Studio and will be based on the company's existing report, the proposed GA4 configuration, and management requirements. It will compare some of metrics from the current period to those from the previous period, that were presented in analytical part, to provide a fair comparison. As the redesign was launched on January 13th, we will analyze data from January 15th to April 15th, 2023.

This report will be valuable to the digital marketing department and company management, as it will provide insights for future web optimization and help evaluate the success of the redesign. The report will analyze the number of clicks on individual pages

and buttons, form submissions, and activity on new pages to help assess the effectiveness of the redesign.

1-st slide

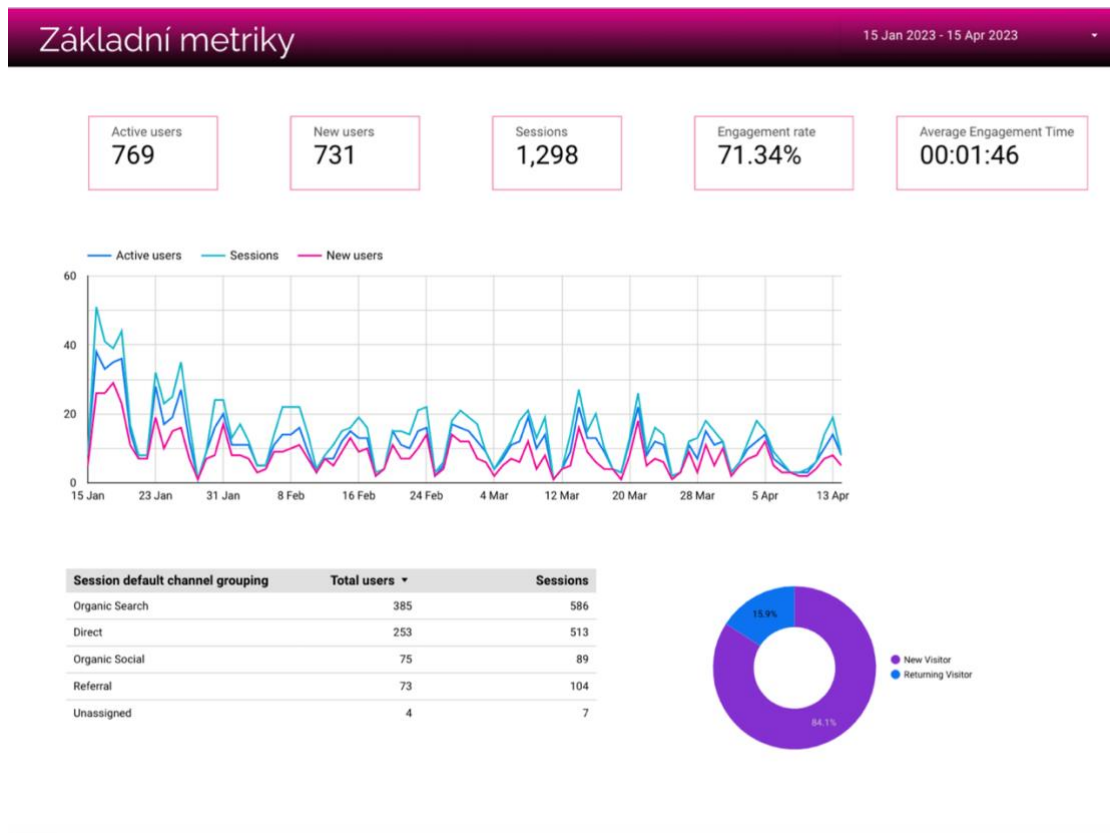


Figure 40. "Basic metrics" slide - proposed report [Source: Custom processing]

The new report's design will not deviate significantly from the existing one. The initial slide will focus on fundamental metrics related to the website's audience.

In terms of audience, the website has a total of 769 users during the monitored period, where 731 are new users, in the recommended report, while in the previous report it had 560 users and 535 of new users. Overall, the number of users and new users increased by 37 % in comparison to the previous period. This increase in users can likely be attributed to the launch of the new website design in January, which likely generated more interest and traffic to the website. This is supported by the timeline graph, which shows an increase in users immediately following the launch of the redesign on January 13th. However, even when looking at the average number of users per day, which is 8.1 in the current example compared to 6.2 in the previous period, there is still a noticeable increase. Overall, it seems that the redesign has a positive impact on user acquisition, as evidenced

by the higher number of new users and the higher percentage of acquisition compared to the second example.

Looking at engagement metrics, the suggested report shows an engagement rate of 71.34%, which is a new metric presented by GA4, and an average engagement time of 00:01:46. On the other hand, the previous report shows an average session duration of 2 minutes and 31 seconds, suggesting a longer engagement time compared to the GA4 report. However, it is important to mention that GA4 uses completely different measurement model, that is why it complicated to compare these metrics. According to article [33], the engagement rate for websites is above 63 %, that means that the Adbros's website is on a good position. Average engagement time is counted as User Engagement (refers to the duration of time that an individual spends with a webpage in focus or an app screen in the foreground [19]) divided by Total users.

The timeline graph in both reports shows fluctuations in the number of users, new users, and sessions over the monitored period.

When it comes to traffic sources, the two reports differ in the contributions of each channel. In the recommended report, organic search was the highest contributor with 385 users and 586 sessions, followed by direct with 253 users and 513 sessions. In the previous report, organic search was also the highest contributor, but with 250 users and 374 sessions, followed by direct with 215 users and 323 sessions. The previous report also showed social media and email channel groups bringing in 71 and 34 users respectively, while in the suggested report, there is a new channel group called organic social that brought 75 users and made up 89 sessions. Referrals brought in 73 users and 104 sessions in the proposed report, while only 16 users came through referrals in the previous report.

In terms of audience behavior, both reports show positive results in terms of bounce rate and engagement. The bounce rate in the previous report was 26.38%, indicating that users were interested in the content and stayed on the website exploring other pages. The recommended report does not mention bounce rate, but the high engagement rate and average engagement time suggest that users were engaged more with the website's content.

Finally, the two reports show different percentages of new vs returning visitors. In the current report, a majority of visitors (84.1%) were new, while in the previous report, a

majority (76.9%) were also new. The percentage of returning visitors is 15.9% is in given report and 23.1% in the previous report. It is beneficial for the company that the number of returning visitors has increased, as it indicates that visitors found the website useful and interesting enough to come back. Therefore, it is important for the company to monitor this metric closely and work on maintaining a good user experience to encourage more returning visitors.

2-nd slide

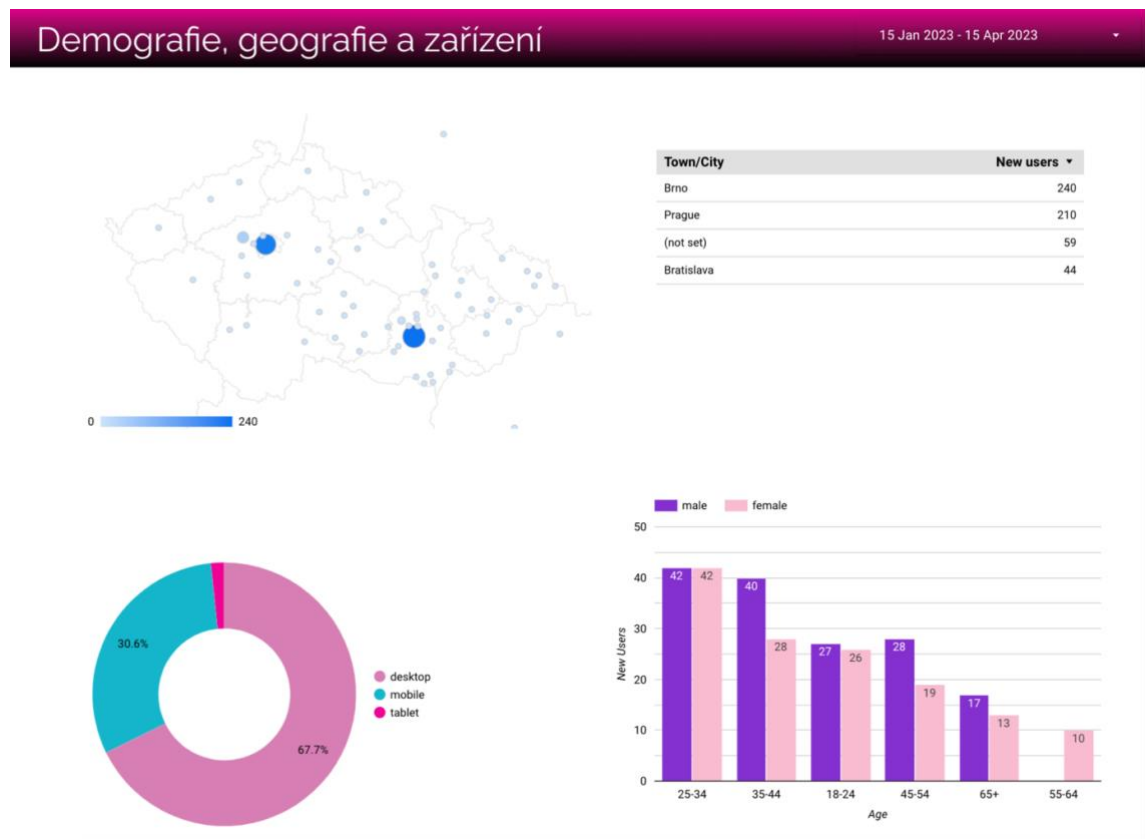


Figure 41. "Demography, geography and devices" slide – proposed report [Source: Custom processing]

This slide will be dedicated to represent “Demography, geography and devices” on the website (orig. in cz. “Demografie, geografie a zařizení”).

The geo charts indicate that the website's target audience is primarily located in Brno and Prague, which could be useful information for targeted marketing efforts. The table next to the geo chart confirms that the most new users are still coming from these two cities.

The manager's request to add age information to the website after a redesign could help further refine the website's target audience and tailor its content and design to meet their

specific needs and preferences. The column chart breaks down new users by age group and gender, providing further insight into the website's target audience. The chart shows that the age group of 25-34 years is the largest, both for male and female users. The next age group, 35-44 years, also has a significant number of male users (40) and female users (28).

The device pie chart shows that the majority of users (67.7%) accessed the website through desktop devices, with mobile devices (30.6%) being the next most common option. Tablet usage was the same minimal as in the previous report, made up only 1.7% of users. This information could be used to the website's design and functionality optimization for desktop and mobile users, maintaining a positive user experience across all devices considered.

3-rd slide

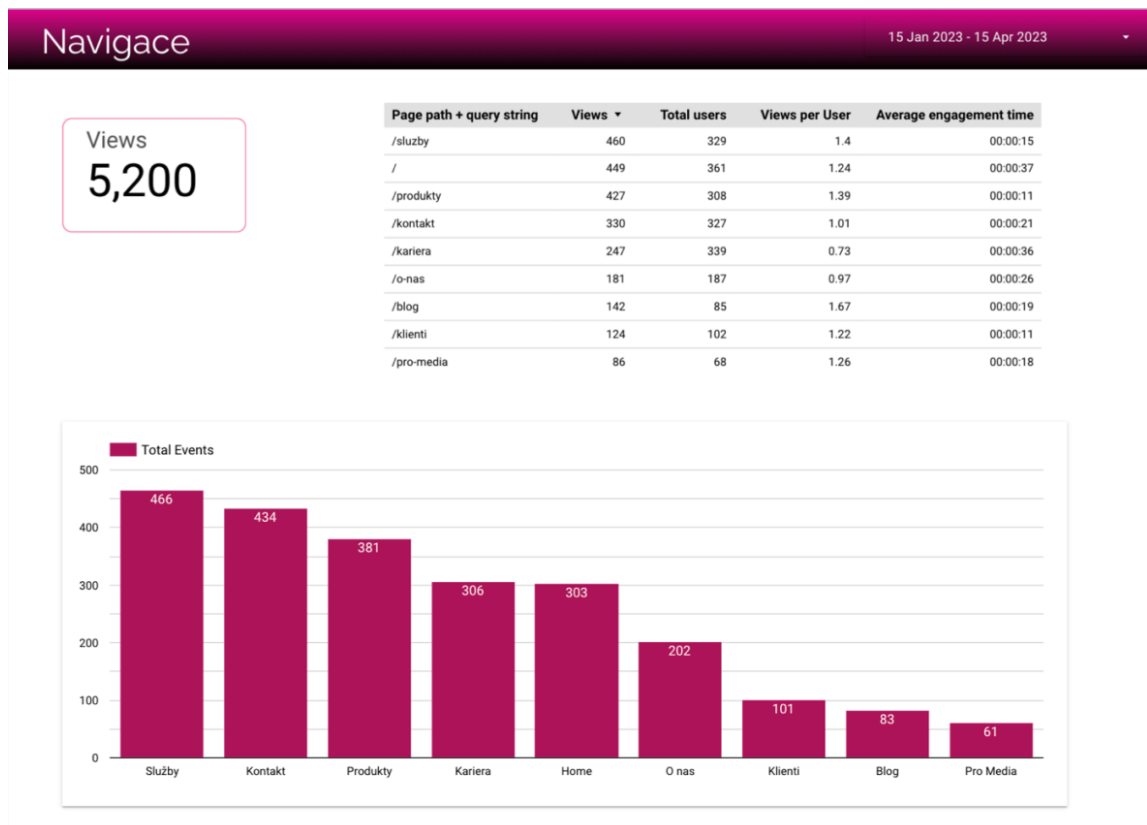


Figure 42. "Navigation" slide - proposed report [Source: Custom processing]

The third slide of the suggested report will display how users navigated through the website. It will provide details such as the overall number of page views and a table that lists specific pages along with their corresponding metrics like the number of views, total

users, views per user, and average engagement time. Additionally, a bar chart will illustrate the total number of clicks on each menu button during the monitored period. This information will be useful in determining which pages are the most viewed and visited on the website.

During monitored period the total page views have significantly increased from the previous period, with a total of 5200. It should be noted that GA4 no longer includes the metric of unique page views. The table on the right provides further insight into the individual main pages of the website and their performance. The service page had the most views with 460, followed closely by the homepage with 449 views and the product page with 427 views. The contact page had 330 views, while the career page had 247 views. The newly added blog page had 142 views, and the media page had 86 views. It is interesting to note that the service page had a low average engagement time of 00:00:15, but this could be due to the fact that the table only includes the URL for the service page without the page path level 2, which is where the individual services are located. The same applies to the product page, which also had a low average engagement time of 00:00:11. The homepage had a slightly higher average engagement time of 00:00:37, while the contact page had an average engagement time of 00:00:21. The career page had the highest average engagement time of 00:00:36, because has only fill out application form. The newly added blog page had a low average engagement time of 00:00:19, but this could be due to the fact that users need to choose a particular article and are then redirected to a URL with page path level 2, which is not included in the table. The media page also had a low average engagement time of 00:00:18, as users can only download files from this page.

The column chart presents information on the number of clicks for each menu button on the company website. It reveals that the service button was the most popular with 466 clicks, followed by the contact button with 434 clicks, and the products button with 381 clicks. On the other hand, the buttons for Clients, Blog, and For media received the fewest clicks.

4-th slide

The focus of the fourth slide will be to demonstrate the users' interaction with buttons located on the homepage.

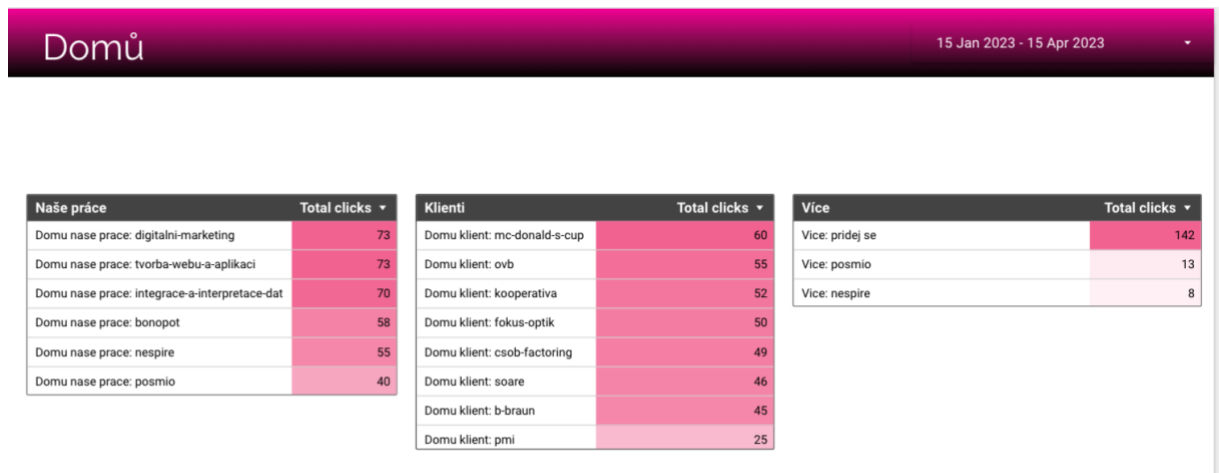


Figure 43. "Homepage" slide - proposed report [Source: Custom processing]

The first table presents the number of clicks on the "Our Work" (orig. in Czech: "Naše práce") slide. The data layer values show the value of the button through the link text parameter, which should return that value. When a user clicks on a specific icon, they can view detailed information about that particular service. It appears that the majority of users were interested in digital marketing and web development services, with 73 clicks, followed by data interpretation and integration services with 70 clicks. On the other hand, the least number of clicks were for the Posmio service, with only 40 clicks.

The second table depicts interaction with slide "Our clients" (orig. in Czech: "Naše klienti"). In general, there is not a significant difference in the number of clicks on each client icon, with approximately 60-40 clicks on each. However, the client with the lowest number of clicks is PMI, with only 25 clicks.

The third table illustrates user interactions with the "More" button on the homepage. The button "Join us" receives the highest number of clicks with 142 clicks. It appears to be popular among the total number of users who visited the website. Also, users were clicking on the "More" button of Posmio service, as according to the first table the users clicked on it the least times. Users may not be initially interested in the Posmio service based on the number of clicks on its icon in the "Our Work" section, but they may still want to learn more about it by clicking on the "More" button on the homepage. This could indicate that the Posmio service will need more prominent positioning on the website or

more compelling content to encourage users to engage with it. Additionally, the fact that the “Join Us” button is the most clicked “More” button on the homepage suggests that the website may be effectively attracting potential job candidates or generating interest in career opportunities.

5-th slide

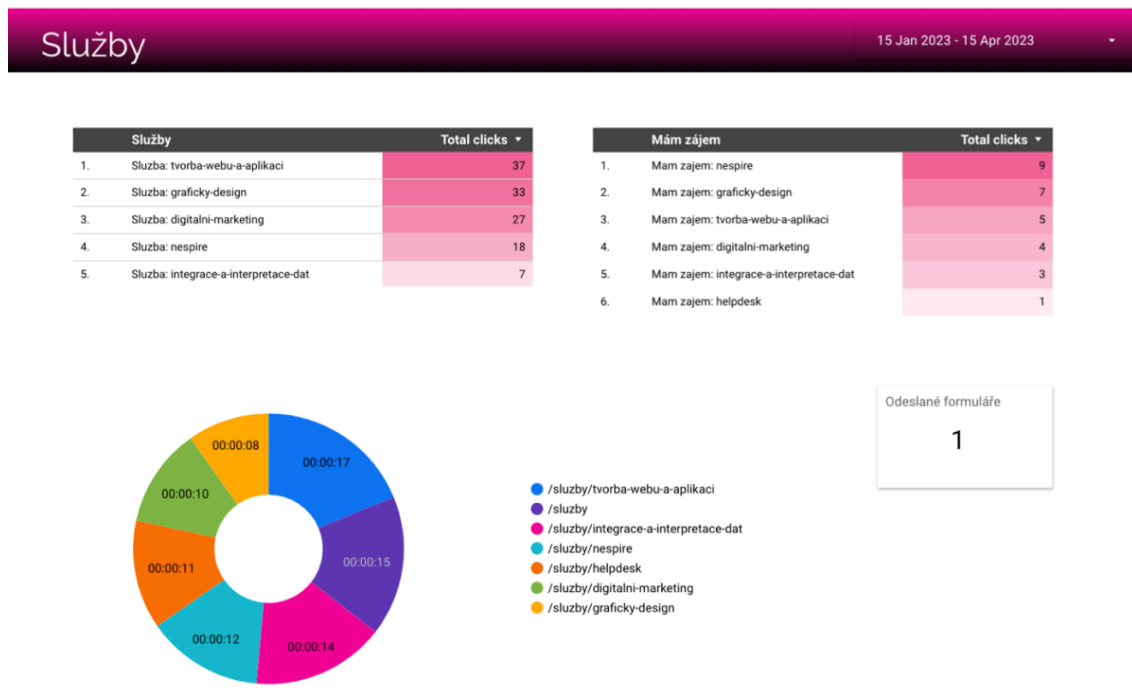


Figure 44. "Services" slide - proposed report [Source: Custom processing]

The service page slide displays information about users' interactions with the service page. The first table shows the number of clicks on the navigation icons, which direct users to the relevant service. Web development and application had the most clicks with 37, followed by graphic design with 33, digital marketing with 27, Nespire with 18, and data integration and interpretation with 7 clicks.

The second table presents clicks on the "I am interested" button for each service, which opens a form for users to ask questions about the service. The Nespire service had the most clicks with 9, followed by graphic design with 7, and web development and application with 5 clicks. However, the scorecard indicates that only one user sent a question during the monitored period. It is interesting to note that although the "I'm interested" button was clicked on the Nespire service the most and only one user sent a question about the service. This could suggest that users were interested in learning more about the service but did not necessarily have any specific questions.

The pie chart shows the average engagement time of users for each service. The web and application development service had the highest engagement time of 17 seconds, followed by the other services with an engagement time of over 10 seconds. This suggests that the users found the information on this service particularly relevant and interesting. Only the graphic design service had the lowest engagement time with 8 seconds. This could imply that users were not as interested in this service or did not find the information on the page as engaging.

By analyzing this slide, gained insights will help improve the website by providing valuable information on which services are most in demand and what type of content is resonating with users. The data can be used to optimize the service pages, making them more engaging and informative to the users, leading to a better user experience and ultimately, increased conversion rates.

6-th slide

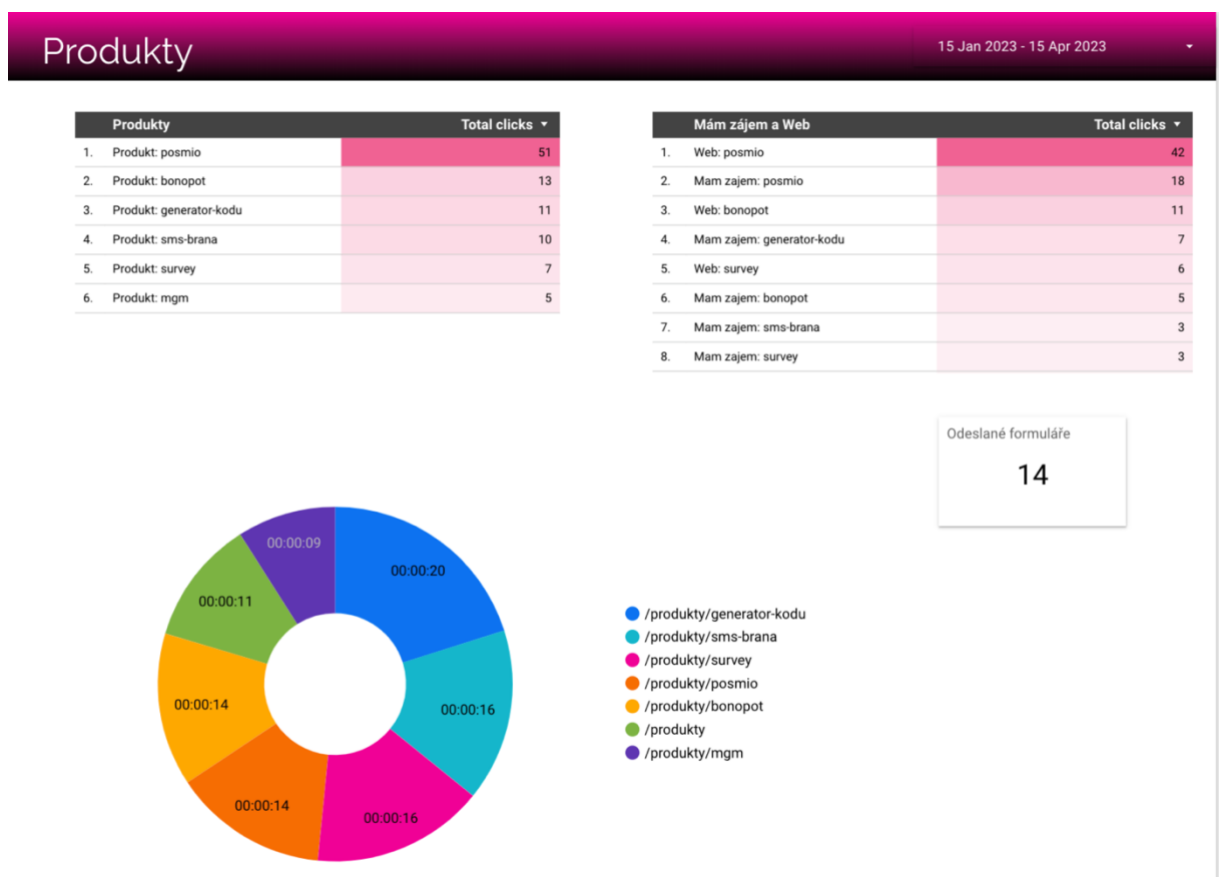


Figure 45. "Products" slide - proposed report [Source: Custom processing]

The slide for the product page displays data on how users are interacting with the product pages. The design of the slide will be similar to the slide of service page, as the structure

of pages, in terms of design, is identical. The first table shows the number of clicks on the navigation icons, which redirect users to the particular product. Posmio has the most clicks with 51, while the other products have a relatively low number of clicks ranging from 13 to 5.

The second table shows clicks on the "I am interested" button for each product, which opens a form for users in case they have a question, and the "Web" button that redirects to the product website. Posmio receives the most clicks, with 42 clicks on the web button and 18 clicks on the "I am interested" button. Other products receive a relatively low number of clicks, ranging from 11 to 3. The total number of clicks on the form submission is 14, which is higher than the number on the service page.

The pie chart shows the average engagement time of users for each product. The product Generator Kodu has the highest engagement time of 20 seconds, followed by SMS Brana and Survey, each with an average engagement time of 16 seconds. The least popular product, according to average engagement time, is MGM, with a 9-second engagement time.

Based on the data, it can be concluded that Posmio is the most popular product, followed by Generator Kodu, SMS Brana, and Survey. MGM seems to be the least popular product among the users. Additionally, the low number of clicks on the "I am interested" button suggests that there may be room for improvement in terms of incentivizing users to interact with the form and ask questions about the products.

7-th slide

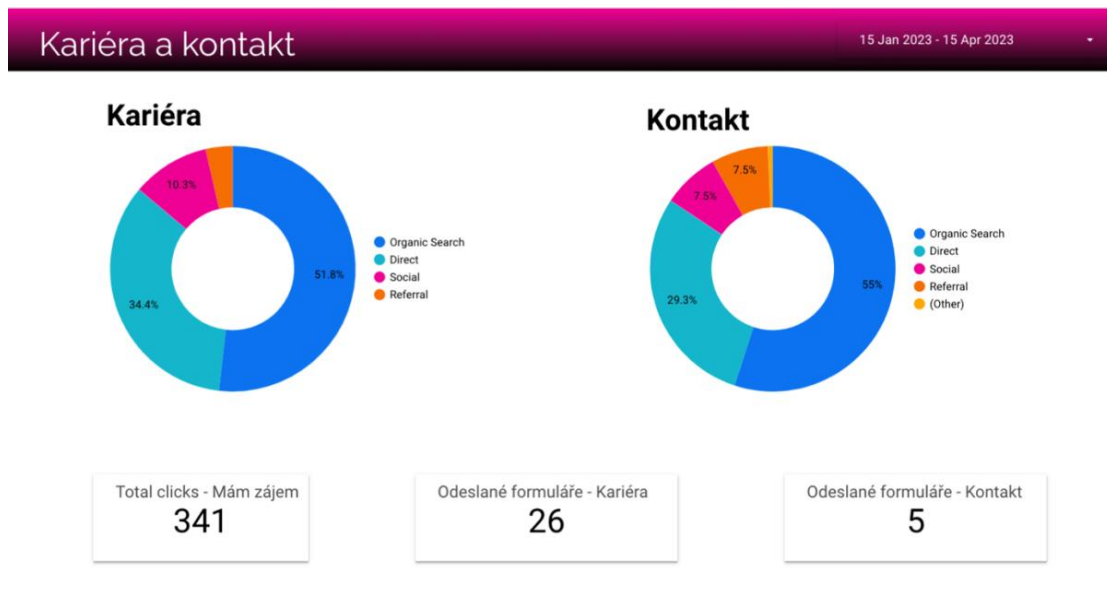


Figure 46. "Career and Contact" slide - proposed report [Source: Custom processing]

The slide provides information on the user interaction with the career and contact page. According to the request of the management, there are two pie charts show how users arrived at each page through different channels on the slide. For both pages, organic search is the most dominant channel group, accounting for more than 50%, followed by direct visits, which makes up an average of 32%. This information might be helpful for future in terms of search engine optimization.

The scorecards below display the number of clicks on the "I am interested" button for the career page, which is 341, and the number of form submissions for the career and contact pages, which are 26 and 5 respectively.

Since there are high click rates on the "I am interested" button, it may be beneficial to optimize the career page's content to increase user engagement and ultimately lead to more form submissions. On the contact page, it may be useful to evaluate the form submission process and improve it to encourage users to submit their queries.

8-th slide

The 8-th slide will be the last of the report depicting the activeness on pages Blog and For media.

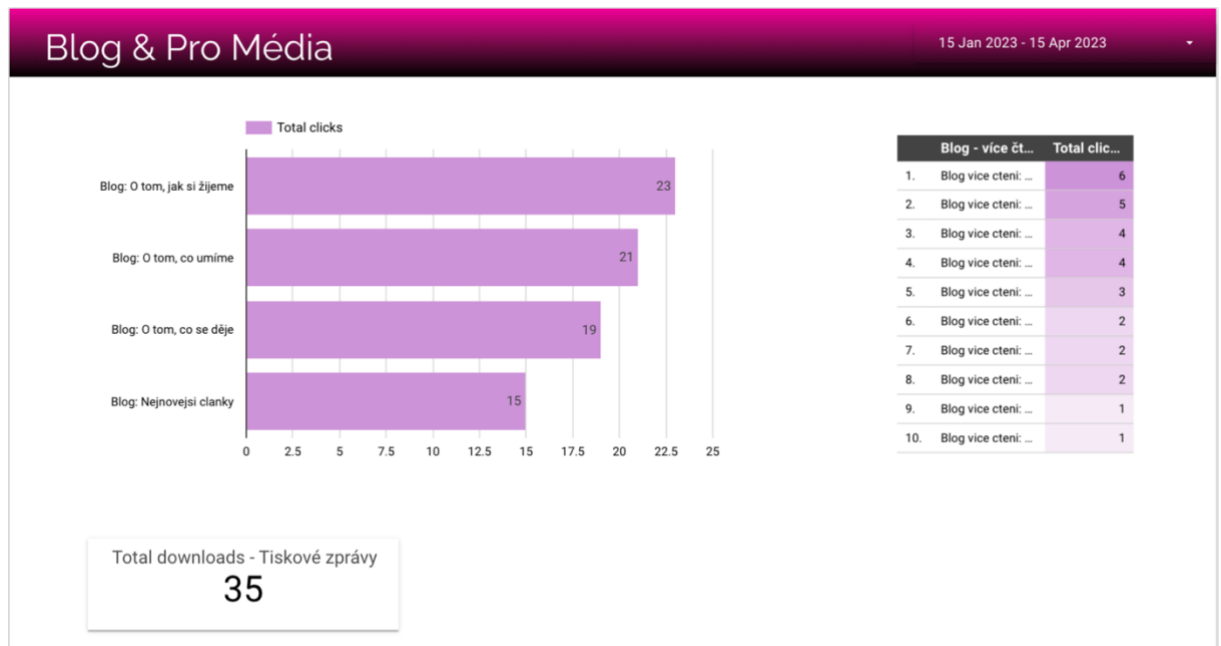


Figure 47. "Blog & For media" slide - proposed report [Source: Custom processing]

In terms of privacy reason, the name of the articles located on the Blog page are hidden. In the bar chart, the data reveals that the "About how we live" category is the most popular among users, with 23 clicks. The next most popular category is "Company Skills," which received 20 clicks. The remaining categories received 18 and 15 clicks, respectively. The table on the right side shows the user interactions with individual articles, with the highest number of clicks being only 6. This information can be used to create more content related to these topics in order to engage users and keep them on the website. Additionally, it seems that the number of clicks on the "More" button for individual articles is relatively low. This could indicate that users are not finding the content particularly compelling or that the button is not prominent enough on the page.

The scorecard below indicates the total number of downloads from the "For Media" page, with a total of 35 downloads of various press releases and logo manual.

4.4 Summarization of proposal

To sum everything up, from the perspective of the digital marketing and IT departments, implementing GA4 and using definitions for data layers variables will be a valuable tool

for gaining insights into user behavior on the website. Fortunately, setting up GA4 will not be challenging, especially for a company that already has experience with Universal Google Analytics. Moreover, GA4 is completely free to use, making it a cost-effective option for the company.

The recommended report will provide valuable information that can be used by the digital marketing department to make informed decisions about how to optimize the website for better engagement. The report can also supply perceptions for the graphic design department. For instance, by analyzing user engagement time for each service, the department can determine which services are most appealing to users and adjust their designs to better showcase those services. Additionally, by following examination the number of clicks on the "I am interested" button and form submissions, the department can gain an understanding of which services users are most likely to inquire about and tailor their designs to better highlight those services.

By analyzing the data in the report, the digital marketing team can identify trends and patterns that can help them make informed decisions about which pages to optimize, which products and services to promote, and which acquisition channels to focus on.

The report provides insights into users' interactions with the company's website, including which pages are most popular, how users acquire the website, which products and services are most in demand, and how engaged users are with different pages.

According to the complete redesign of the website, the report demonstrates that the website has improved significantly after the redesign, resulting in an increase in both the average number of daily visitors and the total number of users. Additionally, the report indicates that the redesign has resulted in an increase in the rate of new users, which is crucial for the company to attract new visitors. The rate of new users has gone up to 84.1% from 76.9%. Furthermore, the report provides valuable insights, such as the fact that the majority of users are aged between 25-34 years and that the most users are interested in the services of digital marketing and web development. The report also highlights the most clicked menu buttons, indicating which sections of the website users are most interested in. Additionally, the report identifies the buttons that perform the best on the homepage, service, product, career, blog and for media pages providing understanding into the content that users find most engaging. Overall, the report

provides valuable insights into the website's target audience and user behavior, which can be used to inform future web optimization and digital marketing strategies

5 CONCLUSION

The Master's thesis aimed to analyze and propose solutions for the company's redesigned website using web analysis techniques based on the Google Analytics platform.

The theoretical part of the thesis provided an overview of web analysis, including its processes, types, and significant tools. Chapter 2 focused on web analytics terminologies, Google Analytics tools, specifically Universal Analytics (UA) and Google Analytics 4, as the primary tools for processing proposals and analysis. In Chapter 2.6. explored main reports in both tools, metrics, account hierarchy and provided main distinctions between tools.

Chapter 3 delved into the current state of web analytics within the company before its complete redesign. This involved analyzing the configuration of Universal Analytics, as well as examining the triggers and variables that were previously set up by a former employee. Furthermore, a comprehensive analysis of web performance was conducted within the data range of January 15, 2022, to April 15, 2022. This analysis aimed to outline the existing web analytics configuration and identify any gaps or deficiencies.

The last fourth chapter of the thesis presented proposals to fulfill the goal of the Master's thesis. This included suggesting a configuration for GA4, defining data layer variables in accordance with new design of the Adbros's website, and creating a new report based on the updated configurations. The recommended report will provide a detailed view on a web performance of redesigned web.

Overall, this Master's thesis contributed to the field of web analytics and to the digital department of the company by providing practical recommendations and solutions for improving data analysis and optimization processes. The proposed Google Analytics 4 configuration and the utilization of advanced features such as data layers, tags and triggers can significantly enhance the company's web analytics capabilities, enabling informed decision-making and driving improved performance.

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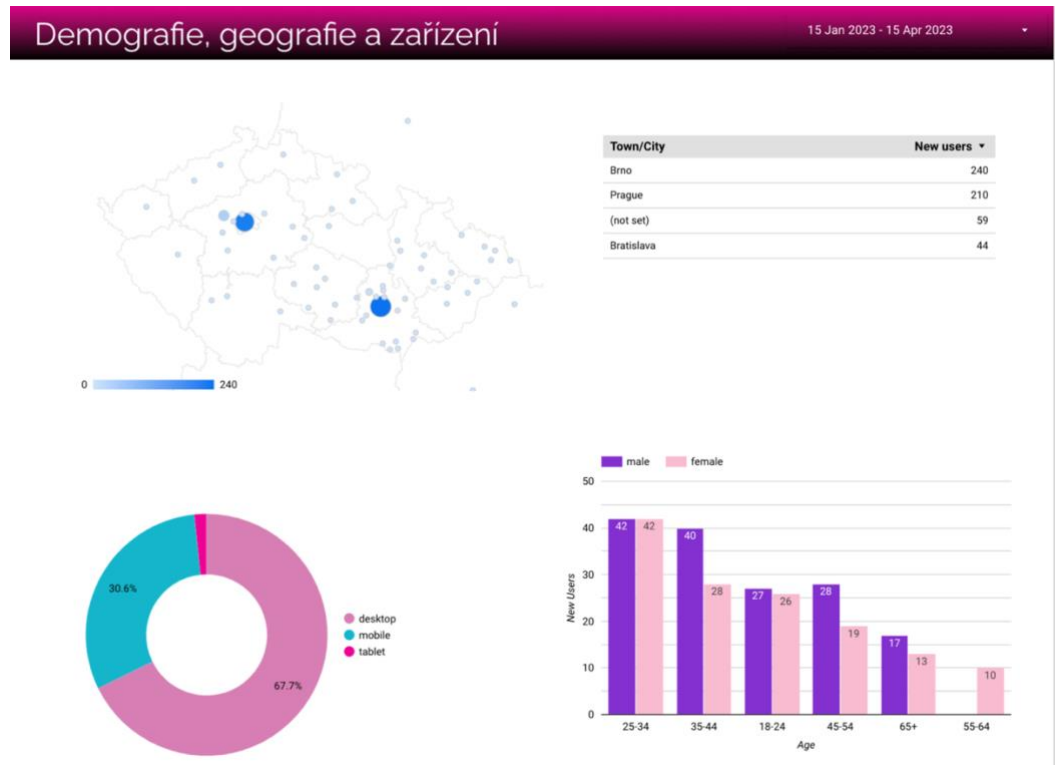
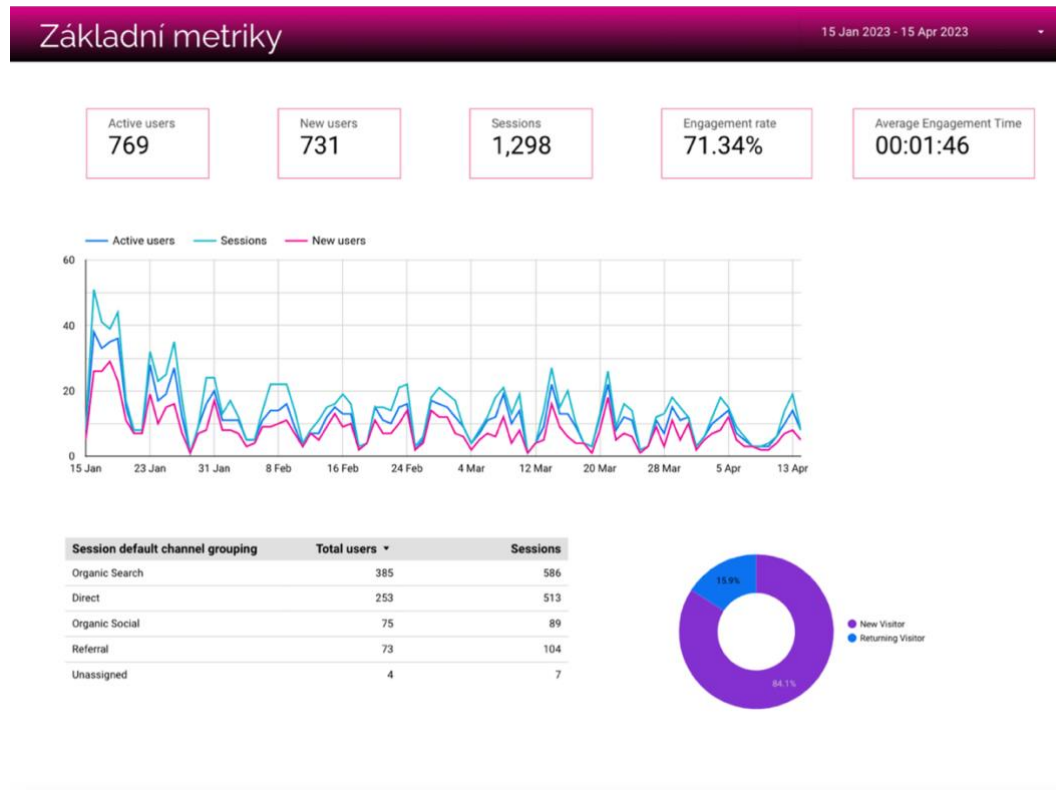
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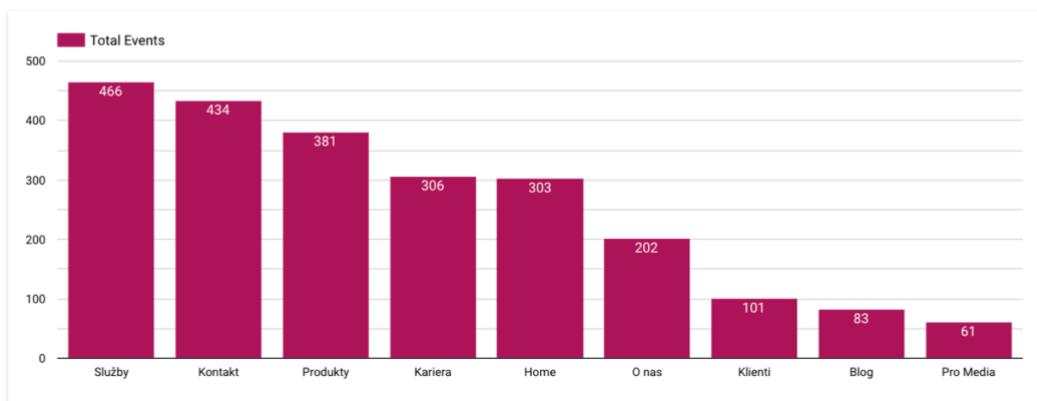
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Appendix – Recommended report



Views
5,200

Page path + query string	Views	Total users	Views per User	Average engagement time
/sluzby	460	329	1.4	00:00:15
/	449	361	1.24	00:00:37
/produkty	427	308	1.39	00:00:11
/kontakt	330	327	1.01	00:00:21
/kariera	247	339	0.73	00:00:36
/o-nas	181	187	0.97	00:00:26
/blog	142	85	1.67	00:00:19
/klienti	124	102	1.22	00:00:11
/pro-media	86	68	1.26	00:00:18



Naše práce	Total clicks
Domu naše práce: digitalni-marketing	73
Domu naše práce: tvorba-webu-a-aplikaci	73
Domu naše práce: integrace-a-interpretace-dat	70
Domu naše práce: bonopot	58
Domu naše práce: nespire	55
Domu naše práce: posmio	40

Klienti	Total clicks
Domu klient: mc-donald-s-cup	60
Domu klient: ovb	55
Domu klient: kooperativa	52
Domu klient: fokus-optik	50
Domu klient: csob-factoring	49
Domu klient: soare	46
Domu klient: b-braun	45
Domu klient: pmi	25

Vice	Total clicks
Vice: pridej se	142
Vice: posmio	13
Vice: nespire	8

Služby	Total clicks
1. Sluzba: tvorba-webu-a-aplikaci	37
2. Sluzba: graficky-design	33
3. Sluzba: digitalni-marketing	27
4. Sluzba: nespire	18
5. Sluzba: integrace-a-interpretace-dat	7

Mám zájem	Total clicks
1. Mam zajem: nespire	9
2. Mam zajem: graficky-design	7
3. Mam zajem: tvorba-webu-a-aplikaci	5
4. Mam zajem: digitalni-marketing	4
5. Mam zajem: integrace-a-interpretace-dat	3
6. Mam zajem: helpdesk	1



- /sluzby/ tvorba-webu-a-aplikaci
- /sluzby/ graficky-design
- /sluzby/ integrace-a-interpretace-dat
- /sluzby/ nespire
- /sluzby/ helpdesk
- /sluzby/ digitalni-marketing
- /sluzby/ graficky-design

Odeslané formuláře

1

Produkty	Total clicks
1. Produkt: posmio	51
2. Produkt: bonopot	13
3. Produkt: generator-kodu	11
4. Produkt: sms-brana	10
5. Produkt: survey	7
6. Produkt: mgm	5

Mám zájem a Web	Total clicks
1. Web: posmio	42
2. Mam zajem: posmio	18
3. Web: bonopot	11
4. Mam zajem: generator-kodu	7
5. Web: survey	6
6. Mam zajem: bonopot	5
7. Mam zajem: sms-brana	3
8. Mam zajem: survey	3

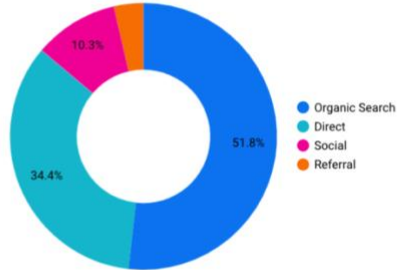


- /produkty/ generator-kodu
- /produkty/ sms-brana
- /produkty/ survey
- /produkty/ posmio
- /produkty/ bonopot
- /produkty/ mgm

Odeslané formuláře

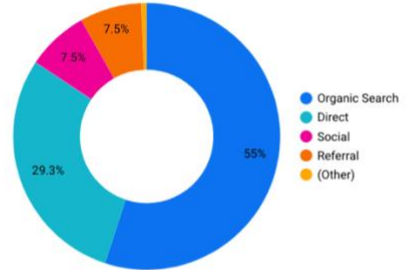
14

Kariéra



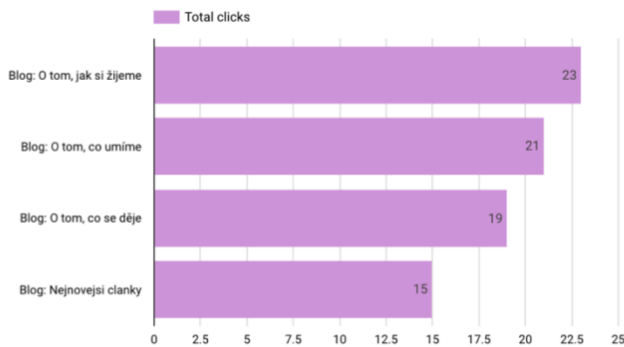
Total clicks - Mám zájem
341

Kontakt



Odeslané formuláře - Kariéra
26

Odeslané formuláře - Kontakt
5



Blog - více čt...	Total clic...
1. Blog více ctení: ...	6
2. Blog více ctení: ...	5
3. Blog více ctení: ...	4
4. Blog více ctení: ...	4
5. Blog více ctení: ...	3
6. Blog více ctení: ...	2
7. Blog více ctení: ...	2
8. Blog více ctení: ...	2
9. Blog více ctení: ...	1
10. Blog více ctení: ...	1

Total downloads - Tiskové zprávy
35