



Data Layer Cheat Sheet

Created by



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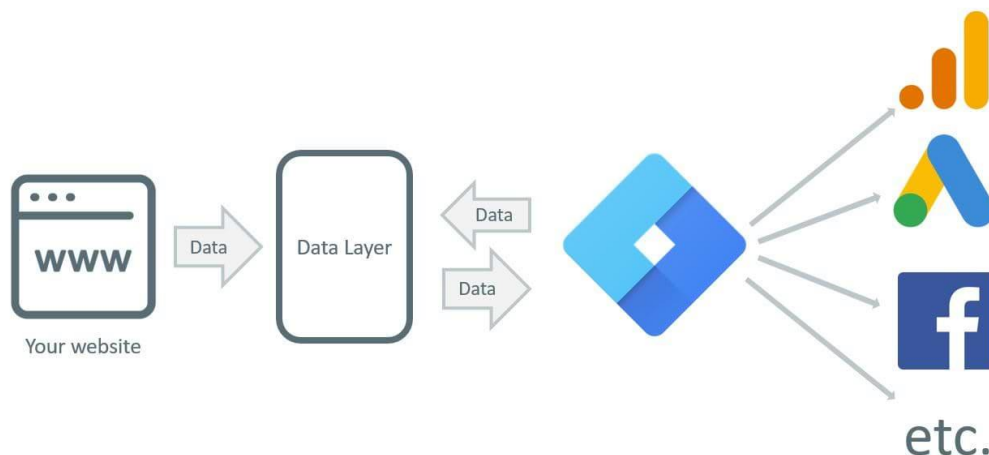


Before you continue

It is [recommended to read this guide](#) before you use this cheat sheet. Otherwise, some bullet points might be too confusing. If you have any questions about the Data Layer, just post a comment under that [very same blog post](#).

#1 What is Data Layer?

It is like an intermediary layer between your website and Google Tag Manager. If you want to have some information sent to Google Tag Manager (e.g. purchase data), it first must be sent to the Data Layer. From there, GTM will take the info and process it based on your configuration.



Data Layer is not some standard/default part of the website. It is usually bound to Google Tag Manager. Websites without GTM usually don't have the Data Layer. When GTM loads, it automatically initiates the Data Layer. Also, a developer/plugin can create set one up.

#2 Why should I use Data Layer?



Google Tag Manager uses Data Layer by default. Once GTM is loaded on a page, it creates a Data Layer (or uses the existing one if a developer configured one).

If you want to send some custom data about a user, product, event, etc. to other tracking tools, Data Layer is your best option.

For example, if you want to track an Ecommerce transaction and send its info to Google Analytics (via GTM), you'll have to ask a developer to push the transaction information to the Data Layer. Then you will have to configure GTM to catch that info in the Data Layer and transfer further to Google Analytics ([here's a guide on how to do that](#)).

#3 How can I send data to the Data Layer?

That is possible with the `.push()` method. With help of `dataLayer.push()`, events and data points can be sent to the Data Layer. From there, GTM can take that information and use it in tags, triggers, and variables.

Code example of an event →

```
<script>
dataLayer.push({
  'event' : 'formSubmission'
});
</script>
```

Code example of a data point →

```
<script>
dataLayer.push({
  'userId' : '123abc'
});
</script>
```

Code example of an event + data point →

```
<script>
dataLayer.push({
  'event' : 'formSubmission',
  'formName' : 'contact us'
});
</script>
```



For developers

In a nutshell, Data layer is a global JavaScript variable. Its type is array. Every time some data is pushed to the Data Layer, Google Tag Manager updates its internal data model (and those changes are visible in GTM's Preview and Debug mode). Therefore, you can think of the Data Layer as a message bus from an application/web to GTM.

Data Layer is not a regular JavaScript array. It supports only the `.push()` method. If you try to interact with the Data Layer by using other array methods, (e.g. `splice()`), GTM will ignore that.

If you want to learn more about the `dataLayer.push()` and see its example, [visit this blog post](#).



Important!

Data Layer's name is case-sensitive. This means that ONLY `dataLayer.push()` will work (with the uppercase L). `DataLayer.push`, `dataLayer.push` and other variations are not supported.

#4 Who/what can push data to the Data Layer?

1. A GTM plugin installed on a website/online store (for example [GTM4WP](#) for WordPress)
2. Some function on a website (coded by a developer) that uses the `dataLayer.push()`
3. Even you can push the information from GTM to the Data Layer and later take it from there.



Important!

Data Layer resets (and all data is wiped out) every time a page reloads. If you want some data to persist across multiple pages, use [cookies](#) or [browser storage API](#).

#5 Always push, never declare

In the official Google Tag Manager documentation, you might see these code examples (Google advises developers to place such codes (with or without data) above the GTM container):

```
<script>
  dataLayer = [];
</script>
```

or this

```
<script>
  dataLayer = [{
    'pageCategory': 'signup',
    'visitorType': 'high-value'
  }];
</script>
```

NEVER USER THEM!

If implemented incorrectly (placed below the GTM container snippet), these codes will break the Data Layer and GTM event tracking will stop working.

The way Data Layer is configured in the aforementioned screenshots is called **Data Layer Declaration**.

The reason why you should not use declaration is because there is another option, that is much more robust and is not sensitive to the position where that code is implemented.

Instead of declaration, always use the following combination (which is much more robust and universal):

Use *dataLayer.push()*

+

But before it, add this line:

```
window.dataLayer = window.dataLayer || [];
```

It will either generate a new Data Layer or will continue using the existing one (thus will not overwrite and break it)

=

Final result

```
window.dataLayer = window.dataLayer || [];  
dataLayer.push({  
    'event' : 'someEventName',  
    'sampleKey' : 'sampleValue'  
});
```

To sum up, always `.push()`, and never declare (`dataLayer = []`)



Good practice

It is also a good practice to add a *window* prefix to the *dataLayer.push*.
The final result (example):

```
window.dataLayer = window.dataLayer || [];  
window.dataLayer.push({  
    'event' : 'someEventName',  
    'sampleKey' : 'sampleValue'  
});
```


#6 Reading data from the Data Layer

If some custom data is pushed to the Data Layer, Google Tag Manager does not recognize it by default. I mean, you will not be able to use it out of the box.

Your Data Layer might contain various information about a user, page, or whatever...

Data Layer values after this Message:

```
1 {
2   userId: '123abc',
3   pagePostType: 'post',
4   pagePostType2: 'single-post',
5   pageCategory: ['google-tag-manager-tips'],
6   pageAttributes: ['gtm-intermediate'],
7   pagePostAuthor: 'Julius Fedorovicius'
8 }
```

...but by default, it will not be visible in the Preview and Debug tab's Variables section, therefore, you cannot use them in your tag management.

Tag Manager

Tags Variables Data Layer Errors (0)

Message

Variable	Variable Type	Return Type	Value
<input type="text" value="_event"/>	Custom Event	string	'undefined'
<input type="text" value="Page Hostname"/>	URL	string	'www.analyticsmania.com'
<input type="text" value="Page Path"/>	URL	string	'/post/cookies-with-google-tag-manager/'
<input type="text" value="Page URL"/>	URL	string	'https://www.analyticsmania.com/post/coo'
<input type="text" value="Referrer"/>	HTTP Referrer	string	''


No userId or other custom variables

That's why you need to create a **Data Layer Variable** for each data point you want to access from the Data Layer. Create a new **Data Layer Variable** and enter the name of the key that you want to access in the Data Layer



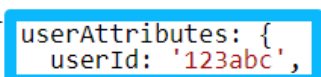

Variable Type

Data Layer Variable

Data Layer Variable Name ?

userId 

However, data can be stored in different structures, therefore, there are some additional rules you need to keep in mind.

Data in the Data Layer	Data Layer Variable Configuration
<p>If key in the Data Layer is a primitive value (regular text (string) or number)</p> <p>Data Layer values after this Message:</p> <pre>1 {userId: '123abc'}</pre> 	<p>Just enter its name in this field</p> <p>Variable Type</p> <p><input type="radio"/> Data Layer Variable</p> <p>Data Layer Variable Name ?</p> <p>userId </p>
<p>If data is nested in the Data Layer</p> <p>Data Layer values after this Message:</p> <pre>1 { 2 userAttributes: { 3 userId: '123abc', 4 pricingPlan: 'premium', 5 country: 'united states', 6 netPromoterScore: 9 7 } 8 }</pre> 	<p>You need to separate every level with a dot (also, this is case-sensitive)</p> <p>Variable Type</p> <p><input type="radio"/> Data Layer Variable</p> <p>Data Layer Variable Name ?</p> <p>userAttributes.userId </p>

If you're working with an array (list of items)

Data Layer values after this Message:

```
1 {  
2   products: [  
3     {id: '123abc', price: '12.00'},  
4     {id: '222mds', price: '34.00'},  
5     {id: '24395d', price: '31.00'}  
6   ]  
7 }
```

You need to also define the index number of the item wish to access. P.S. in JS, the index starts not from 1, but from 0. As a result, with the variable below, I'll get the 1st product's id.

Variable Type



Data Layer Variable

Data Layer Variable Name [?](#)

products.0.id



You can learn more about these different data types and how to access them [here](#).

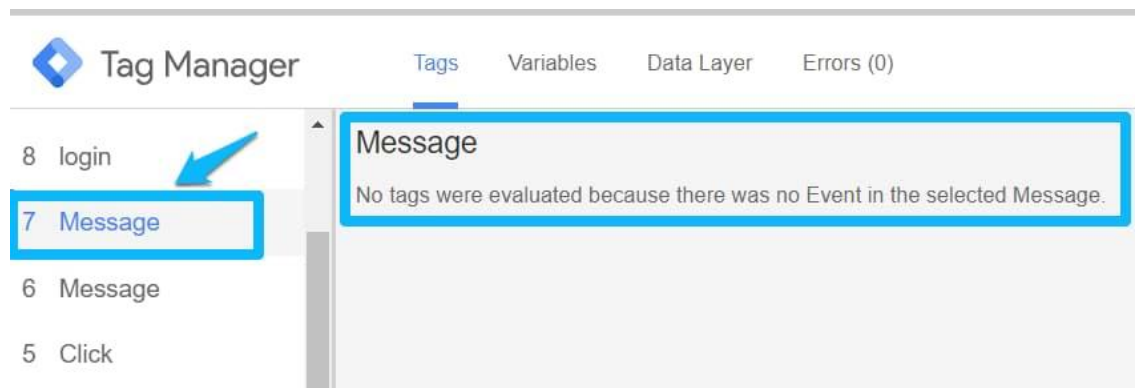
#7 You can access only the latest value of a particular key in the DL

If someone/something pushes same data point to the Data Layer twice (but with each `.push()`, its value is different), Data Layer Variable will act this way:

<p>1st <code>dataLayer.push</code></p> <div data-bbox="235 737 821 968"><p>Data Layer values after this Message:</p><pre>1 { 2 event: 'buttonClick', 3 buttonText: 'upgrade to premium', 4 gtm: {uniqueEventId: 0} 5 }</pre></div>	<p>Let's say that we have created a Data Layer Variable (DLV) for <code>buttonText</code>. DLV can access the <code>buttonText</code> key and will return the value <code>"upgrade to premium"</code></p>
<p>2nd <code>dataLayer.push</code> pushes a bit different data but the name of the key is the same, <code>buttonText</code></p> <div data-bbox="235 1140 821 1350"><p>Data Layer values after this Message:</p><pre>1 { 2 event: 'buttonClick', 3 buttonText: 'learn more about this', 4 gtm: {uniqueEventId: 0} 5 }</pre></div>	<p>Data Layer Variable can access the <code>buttonText</code> key but this time, will return a different value, <code>"learn more about this"</code>. The <code>"upgrade to premium"</code> value is now a history</p>

#8 Catching and using Data Layer events

If you want to fire a tag when a certain `dataLayer.push()` occurs on a page, that `.push()` MUST include an “event” key. Without it, you’ll just see a *Message* in the Preview and Debug mode and no tag will fire at that moment.



Now, how can you turn that “event” into an actual trigger that fires a tag? With the help of [Custom Event Trigger](#).

- Create a trigger
- Choose type: Custom Event
- Enter the exact value (case-sensitive) of the “event” key.

dataLayer.push with the 'event' key	Custom Event Trigger
<pre><script> dataLayer.push({ 'event' : 'formSubmission' 'formName' : 'contact us' }); </script></pre>	<p>Trigger Configuration</p> <p>Trigger Type</p> <p>Custom Event</p> <p>Event name</p> <p>formSubmission</p>



Best practice

Always ask a developer to include the “event” key in the *dataLayer.push()*. Even if you don’t need to fire a tag today, you might need to do that after 6 months.

#9 Built-in GTM triggers and variables depend on the Data Layer

As for the built-in variables, this rule (mentioned above) applies to the majority of them. Without the Data Layer, GTM event tracking would not be possible. When you enable a certain trigger in GTM (e.g. *Just Links*), an auto-event listener is also enabled somewhere in the background (in this case, it's *Link click listener*).

In a nutshell, a listener is a function (or a combination of functions) that runs somewhere in the background of a website and is waiting for certain user interactions.

When that listener spots an interaction (link click), it uses the *dataLayer.push()* and pushes the click-related data to the Data Layer (e.g. Click ID, Click Classes, etc.). A code example could look like this:

```
<script>
dataLayer.push({
  'event' : 'gtm.click',
  'gtm.element' : [object HTMLDivElement],
  'gtm.elementClasses' : 'something',
  'gtm.elementId' : 'something',
  'gtm.elementTarget' : 'something',
  'gtm.elementUrl' : 'something'
});
</script>
```

If you want those Click-related data points to appear in your GTM as variables, you need to enable the built-in click variables (by clicking checkboxes in *Variables > Built-in Variables > Customize*).

Once you enable these built-in variables, they will start accessing click data from the Data Layer (e.g. **Click Classes** variable accesses `gtm.elementClasses` Data Layer key)

Those variables will be visible in the GTM Preview and Debug mode

The screenshot shows the GTM interface with the 'Variables' tab selected. On the left, a list of 'Clicks' variables is shown with checkboxes: Click Element, Click Classes, Click ID, Click Target, Click URL, and Click Text, all of which are checked. On the right, the 'Variables' list in the preview shows: Click Classes (Data Layer Variable), Click Element (Data Layer Variable), Click ID (Data Layer Variable), Click Target (Data Layer Variable), Click Text (Auto-Event Variable), and Click URL (Data Layer Variable). Blue arrows point from the variable names to their respective Data Layer Variable labels.

Variable Name	Variable Type
Click Classes	Data Layer Variable
Click Element	Data Layer Variable
Click ID	Data Layer Variable
Click Target	Data Layer Variable
Click Text	Auto-Event Variable
Click URL	Data Layer Variable

After that, those built-in GTM variables will access the corresponding keys in the Data Layer (for example, Click ID accesses `gtm.elementId` key in the Data Layer). Therefore, those variables are nothing else rather than predefined Data Layer Variables.

#10 I'm not a developer, what is my role in this Data Layer thing?

There are three main options. Choose one that fits you the best:

Option

A

If you don't need any custom data about the page, user, product, etc., custom interactions that cannot be tracked by the default GTM functionality, then there isn't much you need to do. Just be aware that a *mysterious called Data Layer exists* and don't forget that you need to have **both built-in variables and triggers** enabled in order to track events with GTM. But you're totally underutilizing GTM.

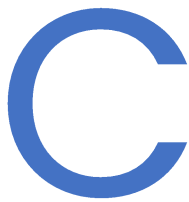
Option

B

In your projects, you actually need some custom data in your tag management. But you're afraid that you're not technical enough. That's why you just forward emails with links to large documentations and guides to your developer (like [this](#), [this](#), and [this](#)) and hope that he/she will figure this out and implement things properly.

In that case, you at least **MUST** know how to use the **Data Layer Variable and Custom Event trigger**. And of course, you need to know how to check whether a developer properly implemented those codes (You can do that by checking the [GTM Preview and Debug mode](#). If you see those custom pushes there, that's good).

Option Recommended. You actually need some custom data in your tag management and you're not afraid of learning new (more technical) things. That's the best approach because you will get a better understanding of what is happening in the background.



Then:

- You would need to learn how to prepare *dataLayer.push()* code snippets and instruct a developer when those codes should be fired (e.g. *when XX form is submitted*). Here's a [related resource with examples](#).
- Once a developer implements those codes, you need to check them (do that by using the GTM preview and debug mode)
- Finally, create Data Layer Variables and Custom Event Triggers you need.

#11

Examples of what kind of data can be added to the Data Layer

If you are asking yourself “What kind of data should be added to the Data Layer?”, the answer depends on what kind of things do you want to measure.

If you want to measure sales, then things like order id, order total, shipping costs, taxes, coupons are definitely valuable. If you think about tracking things like login, then user id, login method might be useful as well.

When it comes to Data Layer, there are no standard names for events. If you want, you can name event “login”, “log in”, “log_in”, etc. When it comes to parameters that are also sent to the Data Layer, sometimes, they might depend on where are you going to send the data. For example, if you want to implement Enhanced Ecommerce via GTM, there are strict rules of how the parameters should be named (I teach all of that in my [Intermediate/Advanced GTM course](#)). But in majority of other situations, parameter names can be whatever you want.

Nevertheless, here are some ideas for the data that you could ask your developers to add to the Data Layer (this is just a list of ideas, not the actual parameter names).

User login status (loggedin/not_loggedin)	Pricing plan	User id
IP address (to exclude internal traffic)	Registration country, city	Number of purchases
Number of sessions	Total spend	User preferences
Transaction ID	Transaction total	Affiliate ID
Currency code	Product ID (SKU)	Product price
Product quantity	Tax and shipping	Product name
Product category	Product brand	Product variant
Product position in a list	Coupon code	Promotion name/id
Article author	Original publish date of the article	“Updated” date of the article
Number of comments	Number of upvotes/downvotes	Article category
Article tags	Number of words in the article (in ranges, like 0-500, 501-1000)	Search term

Data Layer Cheat Sheet Final words

This was a quick run through the key concepts of the Data Layer. In fact, there are even more, but they go into more technical zone (I've explained them in my [Intermediate GTM course](#)). When you fully understand/master the things I've mentioned/listed in this cheat sheet, this will open you new horizon in web tracking.

This Data Layer cheat sheet was delivered to you by



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