

# Knowledge Graph

The **Knowledge Graph** is a knowledge base used by [Google](#) and its services to enhance its [search engine](#)'s results with information gathered from a variety of sources. The information is presented to users in an [infobox](#) next to the search results. Knowledge Graph infoboxes were added to Google's search engine in May 2012, starting in the United States, with international expansion by the end of the year. The Knowledge Graph was powered in part by [Freebase](#).<sup>[1]</sup> The information covered by the Knowledge Graph grew significantly after launch, tripling its original size within seven months, and being able to answer "roughly one-third" of the 100 billion monthly searches Google processed in May 2016. The information is often used as a spoken answer in [Google Assistant](#) and [Google Home](#) searches. The Knowledge Graph has been criticized for providing answers without source attribution.

## Contents

### History

### Description

### Criticism

- Lack of source attribution
- Declining Wikipedia article readerships

### See also

### References

### External links

## History

Google announced Knowledge Graph on May 16, 2012, as a way to significantly enhance the value of information returned by Google searches.<sup>[2]</sup> Initially only available in English, the Knowledge Graph was expanded to Spanish, French, German, Portuguese, Japanese, Russian, and Italian in December 2012.<sup>[3]</sup> Support for [Bengali](#) was added in March, 2017.<sup>[4]</sup>

In August 2014, *New Scientist* reported that Google had launched **Knowledge Vault**, a new initiative to succeed the capabilities of the Knowledge Graph. Contrary to a database, which deals with numbers, the Knowledge Vault was meant to deal with facts, automatically gathering and merging information from across the Internet into a knowledge base capable of answering direct questions, such as "Where was [Madonna](#) born". It was reported that its main function over the Knowledge Graph was its ability to gather information automatically rather than relying on crowdsourced facts compiled by humans, having collected over 1.6 billion facts by the time of the 2014 report; 271 million of those facts were considered "confident facts", a term for information deemed of having more than 90% chance of being true.<sup>[5]</sup> However, after publication, Google reached out to *Search Engine Land* to explain that Knowledge Vault was a research paper, not an active Google service, and in its report, *Search Engine Land* referenced indications by the company that "numerous models" were being experimented with to examine the possibility of automatically gathering meaning from text.<sup>[6]</sup>

## Description



**Thomas Jefferson**  
3rd U.S. President

Thomas Jefferson was an American Founding Father, the principal author of the Declaration of Independence, and the third President of the United States. [Wikipedia](#)

Born: April 13, 1743, Shadwell, VA  
Died: July 4, 1826, Charlottesville, VA  
Presidential term: March 4, 1801 – March 4, 1809  
Spouse: Martha Jefferson (m. 1772–1782)  
Party: Democratic-Republican Party  
Awards: AIA Gold Medal

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Feedback

Knowledge Graph data about Thomas Jefferson displayed on Google Search, as of January 2015

Information from the Knowledge Graph is presented as a box to the right or top on mobile of search results.<sup>[7]</sup> According to Google, this information is retrieved from many sources, including the *CIA World Factbook*, *Wikidata*, and *Wikipedia*.<sup>[2][8]</sup> The knowledge base grew quickly in size, having tripled its original size within seven months of being announced to the public, covering 570 million entities and 18 billion facts.<sup>[9]</sup> In October 2016, Google announced that the Knowledge Graph held over 70 billion facts.<sup>[10]</sup> There is no official documentation on the technology used for the Knowledge Graph implementation.<sup>[11]</sup>

Information from the Knowledge Graph is used to answer direct spoken questions in *Google Assistant*<sup>[12][13]</sup> and *Google Home* voice queries.<sup>[14]</sup>

## Criticism

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### Lack of source attribution

By May 2016, knowledge boxes were appearing for "roughly one-third" of the estimated 100 billion monthly searches the company processed. Dario Taraborelli, head of research at the *Wikimedia Foundation*, told *The Washington Post* that Google's omission of sources in its knowledge boxes "undermines people's ability to verify information and, ultimately, to develop well-informed opinions". The publication also reported that the boxes are "frequently unattributed", such as a knowledge box on the age of actress *Betty White*, which is "as unsourced and absolute as if handed down by God"<sup>[4.5]</sup>

### Declining Wikipedia article readerships

According to *The Register*, the implementation of direct answers in Google search results has caused significant readership declines for the online encyclopedia *Wikipedia*, from which the Knowledge Graph obtains some of its information.<sup>[16]</sup> *The Daily Dot* noted that "Wikipedia still has no real competitor as far as actual content is concerned. All that's up for grabs are traffic stats. And as a nonprofit, traffic numbers don't equate into revenue in the same way they do for a commercial media site". After the article's publication, a spokesperson for the *Wikimedia Foundation*, which owns *Wikipedia*, reached out to state that it "welcomes" the Knowledge Graph functionality, that it was "looking into" the traffic drops, and that "We've also not noticed a significant drop in search engine referrals. We also have a continuing dialog with staf from Google working on the Knowledge Panel"<sup>[17]</sup>

## See also

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- *DBpedia*
- *Google Assistant*
- *Graphiq*
- *Linked data*
- *Ontology (information science)*– also called knowledge graphs
- *Semantic integration*
- *Wikidata*

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## External links

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- Official website
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