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Guest posting"Guest posting is a link building technique where you contribute articles to other reputable websites in your industry. In return, you often receive a backlink to your site, improving its visibility, authority, and traffic."

head terms"Head terms are short, generic keywords with high search volumes. While competitive, they often serve as a foundation for discovering long-tail variations that are easier to rank for."

header tags optimization"Header tags optimization ensures that headings and subheadings (H1, H2, H3, etc.) are used correctly and include relevant keywords."

SEO agency Sydney - Search engine results page (SERP)

- Domain authority
- Organic traffic
- Google Webmaster Guidelines

Best Search Engine Optimisation Services. This practice improves the pages readability and helps search engines understand the structure and hierarchy of the content."

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headline optimization"Optimizing headlines involves crafting compelling titles that capture user attention and include relevant keywords.

SEO agency Sydney - Google keyword planner

- Google keyword planner
- Keyword research

Best Local SEO Sydney. Strong headlines improve click-through rates, enhance readability, and help search engines understand your contents focus."

High DA link opportunitiesHigh DA link opportunities refer to backlink prospects from websites with high domain authority. Targeting these sources helps improve your own sites authority and enhances your overall search engine performance.

High-authority links"High-authority links come from websites with strong domain authority and trustworthiness. Obtaining these links can significantly boost your sites credibility, search visibility, and overall performance."

HOW SEARCH ENGINE MARKETING HELPS BUSINESS GROW OVER TIME

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TO THE NEXT LEVEL
WITH SEO SERVICES AUSTRALIA**

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high-converting keywords"High-converting keywords are terms that lead to a higher percentage of conversions. By identifying and targeting these keywords, you improve ROI and achieve better results from your SEO efforts."

high-quality image compressionHigh-quality image compression reduces file sizes while preserving visual clarity. Using advanced compression techniques helps maintain a professional appearance and ensures faster load times for a better user experience.

high-resolution images"High-resolution images provide a clearer, more detailed visual experience. Optimizing these images by compressing them appropriately and using the correct file formats ensures that quality remains high without slowing down page load times."

comprehensive [SEO Audit](#) services.

SEO company Sydney

high-volume keywords"High-volume keywords are search terms that receive a large number of monthly searches. While they're often more competitive, ranking for these keywords can result in significant traffic gains."

high-volume search terms"High-volume search terms are keywords that receive a significant number of monthly searches. While often more competitive, ranking for these terms can greatly increase your site's traffic."

how-to keywords"How-to keywords indicate that users are looking for step-by-step guidance. range of [SEO Packages Sydney](#) and Australia . By creating clear, actionable content around these terms, you attract traffic from users seeking practical solutions."

KEY ADVANTAGES LOCAL SEO





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CONTENT MARKETING TYPES FOR SMALL BUSINESS AND BRAND BUILDING



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HTML code optimization"HTML code optimization focuses on ensuring clean, efficient code that loads quickly and is easy for search engines to crawl.

SEO agency Sydney - Google keyword planner

- Search engine results page (SERP)
- Google search visibility
- Mobile search optimization

This includes removing unnecessary tags, compressing files, and using semantic HTML to improve performance and accessibility."

HTML improvements"HTML improvements focus on optimizing the code that structures your web pages. Clean, efficient HTML helps search engines crawl and index your site more effectively, improving page speed, usability, and search rankings."

image accessibility"Image accessibility ensures that all users, including those with visual impairments, can understand the content of your images. By using alt text, descriptive captions, and appropriate metadata, you enhance accessibility and improve search engine visibility."

SEO consultant Sydney

image alt tag optimization"Image alt tag optimization means creating descriptive, keyword-rich alt text for each image. This improves accessibility, helps search engines understand the image content, and increases the likelihood of appearing in image search results."

image alt text improvements"Image alt text improvements involve rewriting image descriptions to be more accurate, descriptive, and keyword-rich. Better alt text improves accessibility, helps search engines understand image content, and can increase traffic from image search results."

image aspect ratio"Maintaining a consistent aspect ratio for images ensures that they display correctly on various devices. Optimizing aspect ratios helps prevent distortion, enhances visual appeal, and improves the overall user experience."



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About Local search engine optimisation

- **v**
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Part of a series on

Internet marketing

- Search engine optimization
- Local search engine optimisation
- Social media marketing
- Email marketing
- Referral marketing
- Content marketing
- Native advertising

Search engine marketing

- Pay-per-click
- Cost per impression
- Search analytics
- Web analytics

Display advertising

- Ad blocking
- Contextual advertising
- Behavioral targeting

Affiliate marketing

- Cost per action
- Revenue sharing

Mobile advertising

Local search engine optimization (local SEO) is similar to **(national) SEO** in that it is also a process affecting the visibility of a **website** or a **web page** in a **web search engine's** unpaid results (known as its SERP, search engine results page) often referred to as "natural", "**organic**", or "earned" results.[1] In general, the higher ranked on the search results page and more frequently a site appears in the search results list, the more visitors it will receive from the search engine's users; these visitors can then be converted into customers.[2] Local SEO, however, differs in that it is focused on optimizing a business's online presence so that its web pages will be displayed by

search engines when users enter [local searches](#) for its products or services.^[3] Ranking for local search involves a similar process to general SEO but includes some specific elements to rank a business for local search.

For example, local SEO is all about 'optimizing' your online presence to attract more business from relevant local searches. The majority of these searches take place on [Google](#), [Yahoo](#), [Bing](#), [Yandex](#), [Baidu](#) and other [search engines](#) but for better optimization in your local area you should also use sites like [Yelp](#), [Angie's List](#), [LinkedIn](#), Local business directories, [social media](#) channels and others.^[4]

The birth of local SEO

[\[edit\]](#)

The origin of local SEO can be traced back^[5] to 2003-2005 when search engines tried to provide people with results in their vicinity as well as additional information such as opening times of a store, listings in maps, etc.

Local SEO has evolved over the years to provide a targeted [online marketing](#) approach that allows local businesses to appear based on a range of local search signals, providing a distinct difference from broader [organic SEO](#) which prioritises relevance of search over a distance of searcher.

Local search results

[\[edit\]](#)

Local searches trigger search engines to display two types of results on the [Search engine results page](#): local organic results and the 'Local Pack'.^[3] The local organic results include web pages related to the search query with local [relevance](#). These often include directories such as [Yelp](#), Yellow Pages, [Facebook](#), etc.^[3] The Local Pack displays businesses that have signed up with [Google](#) and taken ownership of their '[Google My Business](#)' (GMB) listing.

The information displayed in the GMB listing and hence in the Local Pack can come from different sources:^[6]

- The owner of the business. This information can include opening/closing times, description of products or services, etc.
- Information is taken from the business's website
- User-provided information such as reviews or uploaded photos
- Information from other sources such as social profiles etc.
- Structured Data taken from [Wikidata](#) and [Wikipedia](#). Data from these sources is part of the information that appears in Google's [Knowledge Panel](#) in the search results.

Depending on the searches, Google can show relevant local results in [Google Maps](#) or Search. This is true on both mobile and desktop devices.^[7]

Google Maps

[[edit](#)]

Google has added a new Q&A features to [Google Maps](#) allowing users to submit questions to owners and allowing these to respond.[8] This Q&A feature is tied to the associated Google My Business account.

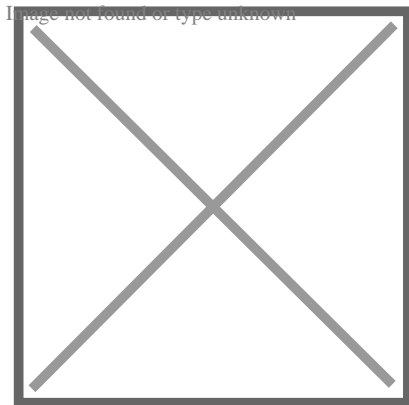
Google Business Profile

[[edit](#)]

Google Business Profile (GBP), formerly [Google My Business](#) (GMB) is a free tool that allows businesses to create and manage their Google Business listing. These listings must represent a physical location that a customer can visit. A Google Business listing appears when customers search for businesses either on Google Maps or in Google SERPs. The accuracy of these listings is a local ranking factor.

Ranking factors

[[edit](#)]



Local Online Marketing

Major search engines have algorithms that determine which local businesses rank in local search. Primary factors that impact a local business's chance of appearing in local search include proper categorization in business directories, a business's name, address, and phone number (NAP) being [crawlable](#) on the website, and citations (mentions of the local business on other relevant websites like a chamber of commerce website).[9]

In 2016, a study using statistical analysis assessed how and why businesses ranked in the Local Packs and identified positive correlations between local rankings and 100+ ranking factors.[10] Although the study cannot replicate Google's algorithm, it did deliver several interesting findings:

- **Backlinks** showed the most important correlation (and also Google's Toolbar **PageRank**, suggesting that older links are an advantage because the Toolbar has not been updated in a long time).
- Sites with more content (hence more **keywords**) tended to fare better (as expected).
- Reviews on GMB also were found to strongly correlate with high rankings.
- Other GMB factors, like the presence of photos and having a verified GMB page with opening hours, showed a **positive correlation** (with ranking) albeit not as important as reviews.
- The quality of **citations** such as a low number of duplicates, consistency and also a fair number of citations, mattered for a business to show in Local Packs. However, within the pack, citations did not influence their ranking: "citations appear to be foundational but not a competitive advantage."
- The authors were instead surprised that **geotargeting** elements (city & state) in the title of the GMB landing page did not have any impact on GMB rankings. Hence the authors suggest using such elements only if it makes sense for usability reasons.
- The presence of a keyword in the business name was found to be one of the most important factors (explaining the high incidence of **spam** in the Local Pack).
- Schema structured data is a ranking factor. The addition of the 'LocalBusiness' markup will enable you to display relevant information about your business to Google. This includes opening hours, address, founder, parent company information and much more.^[11]
- The number of reviews and overall star rating correlates with higher rankings in the Google map pack results.

Local ranking according to Google

[\[edit\]](#)

Prominence, relevance, and distance are the three main criteria Google claims to use in its **algorithms** to show results that best match a user's query.^[12]

- Prominence reflects how well-known is a place in the offline world. An important museum or store, for example, will be given more prominence. Google also uses information obtained on the web to assess prominence such as review counts, links, articles.
- Relevance refers to Google's algorithms attempt to surface the listings that best match the user's **query**.
- Distance refers to Google's attempt to return those listings that are the closest the location terms used in a user's query. If no location term is used then "Google will calculate distance based on what's known about their location".

Local ranking: 2017 survey from 40 local experts

[\[edit\]](#)

According to a group of local SEO experts who took part in a survey, links and reviews are more important than ever to rank locally.^[13]

Near Me Queries

[\[edit\]](#)

As a result of both Google as well as Apple offering "near me" as an option to users, some authors [\[14\]](#) report on how [Google Trends](#) shows very significant increases in "near me" queries. The same authors also report that the factors correlating the most with Local Pack ranking for "near me" queries include the presence of the "searched city and state in backlinks' anchor text" as well as the use of the " 'near me' in internal link anchor text"

Possum Update

[\[edit\]](#)

An important update to Google's local algorithm, rolled out on the 1st of September 2016.[\[15\]](#)
Summary of the update on local search results:

- Businesses based outside city physical limits showed a significant increase in ranking in the Google Local Pack
- A more restrictive filter is in place. Before the update, Google filtered listings linking to the same [website](#) and using the same phone number. After the update, listings get filtered if they have the same address and same categories though they belong to different businesses. So, if several dentists share the same address, Google will only show one of them.

Hawk update

[\[edit\]](#)

As previously explained (see above), the Possum update led similar listings, within the same building, or even located on the same street, to get filtered. As a result, only one listing "with greater organic ranking and stronger relevance to the keyword" would be shown.[\[16\]](#) After the Hawk update on 22 August 2017, this filtering seems to apply only to listings located within the same building or close by (e.g. 50 feet), but not to listings located further away (e.g. 325 feet away).
[\[16\]](#)

Fake reviews

[\[edit\]](#)

As previously explained (see above), reviews are deemed to be an important ranking factor. Joy Hawkins, a Google Top Contributor and local SEO expert, highlights the problems due to fake reviews:[\[17\]](#)

- Lack of an appropriate process for business owners to report fake reviews on competitors' sites. GMB support will not consider requests about businesses other than if they come from

- the business owners themselves. So if a **competitor** nearby has been collecting fake reviews, the only way to bring this to the attention of GMB is via the Google My Business Forum.
- Unlike Yelp, Google does not show a label warning users of abnormal review behavior for those businesses that buy reviews or that receive unnatural numbers of negative reviews because of media attention.
 - Current Google algorithms do not identify unnatural review patterns. Abnormal review patterns often do not need human gauging and should be easily identified by algorithms. As a result, both fake listings and rogue reviewer profiles should be suspended.

See also

[[edit](#)]

- [Local search \(optimization\)](#)

References

[[edit](#)]

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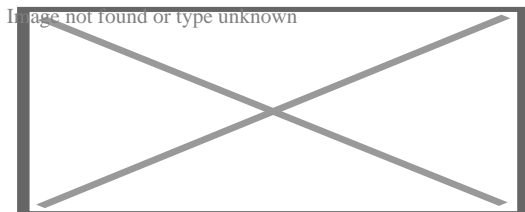
15. ^ *"Everything you need to know about Google's 'Possum' algorithm update". Search Engine Land. 2016-09-21. Retrieved 2017-05-18.*
16. ^ **a b** *"August 22, 2017: The day the 'Hawk' Google local algorithm update swooped in". Search Engine Land. 2017-09-08. Retrieved 2017-10-02.*
17. ^ *"Dear Google: 4 suggestions for fixing your massive problem with fake reviews". Search Engine Land. 2017-06-15. Retrieved 2017-07-16.*

External links

[[edit](#)]

- [Google Search Engine Optimization \(SEO\) Starter Guide](#)
- [Google Local Businesses Guide](#)

About Semantic Web



A **tag cloud** (a typical Web 3.0 phenomenon in itself) presenting Web 3.0 themes

- **v**
- **t**
- **e**

Semantics

- **Linguistic**
- **Logical**

Subfields

- Computational
- Lexical (lexis, lexicology)
- Statistical
- Structural

Topics

- Analysis
- Compositionality
- Context
 - Prototype theory
 - Force dynamics
- Semantic feature
- Semantic gap
- Theory of descriptions

Analysis

- Latent
- Computational
- Machine-learning

Applications

- Semantic file system
- Semantic desktop
- Semantic matching
- Semantic parsing
- Semantic similarity
- Semantic query
 - Semantic Web
 - Semantic wiki

**Semantics of
programming languages**

Types

- Action
- Algebraic
- Axiomatic
- Categorical
- Concurrency
- Denotational
- Game
- Operational
- Predicate transformational

Theory

- Abstract interpretation
- Abstract semantic graph

- Language
- Linguistics

The **Semantic Web**, sometimes known as **Web 3.0** (not to be confused with **Web3**), is an extension of the **World Wide Web** through standards[1] set by the **World Wide Web Consortium** (W3C). The goal of the Semantic Web is to make **Internet** data **machine-readable**.

To enable the encoding of **semantics** with the data, technologies such as **Resource Description Framework** (RDF)[2] and **Web Ontology Language** (OWL)[3] are used. These technologies are used to formally represent **metadata**. For example, **ontology** can describe **concepts**, relationships between **entities**, and categories of things. These embedded semantics offer significant advantages such as **reasoning** over data and operating with heterogeneous data sources.[4] These standards promote common data formats and exchange protocols on the Web, fundamentally the RDF. According to the W3C, "The Semantic Web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries." [5] The Semantic Web is therefore regarded as an integrator across different content and information applications and systems.

History

[edit]

The term was coined by **Tim Berners-Lee** for a web of data (or **data web**)[6] that can be processed by machines[7]—that is, one in which much of the **meaning** is **machine-readable**. While its critics have questioned its feasibility, proponents argue that applications in **library** and **information**

science, industry, biology and human sciences research have already proven the validity of the original concept.[8]

Berners-Lee originally expressed his vision of the Semantic Web in 1999 as follows:

I have a dream for the Web [in which computers] become capable of analyzing all the data on the Web – the content, links, and transactions between people and computers. A "Semantic Web", which makes this possible, has yet to emerge, but when it does, the day-to-day mechanisms of trade, bureaucracy and our daily lives will be handled by machines talking to machines. The "intelligent agents" people have touted for ages will finally materialize.[9]

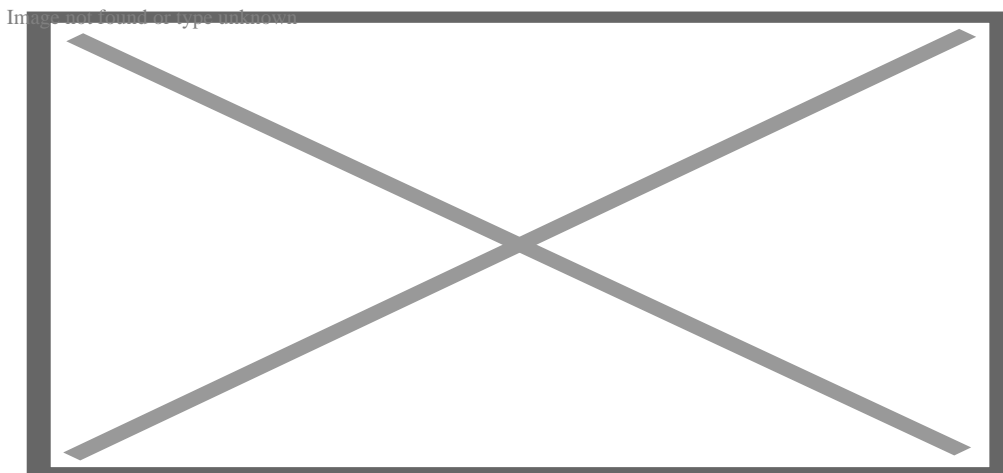
The 2001 *Scientific American* article by Berners-Lee, Hendler, and Lassila described an expected evolution of the existing Web to a Semantic Web.[10] In 2006, Berners-Lee and colleagues stated that: "This simple idea...remains largely unrealized".[11] In 2013, more than four million Web domains (out of roughly 250 million total) contained Semantic Web markup.[12]

Example

[edit]

In the following example, the text "Paul Schuster was born in Dresden" on a website will be annotated, connecting a person with their place of birth. The following HTML fragment shows how a small graph is being described, in RDFa-syntax using a schema.org vocabulary and a Wikidata ID:

```
<div vocab="https://schema.org/" typeof="Person">
  <span property="name">Paul Schuster</span> was born in
  <span property="birthPlace" typeof="Place" href="https://www.wikidata.org/entity/Q1731">
    <span property="name">Dresden</span>.
  </span>
</div>
```

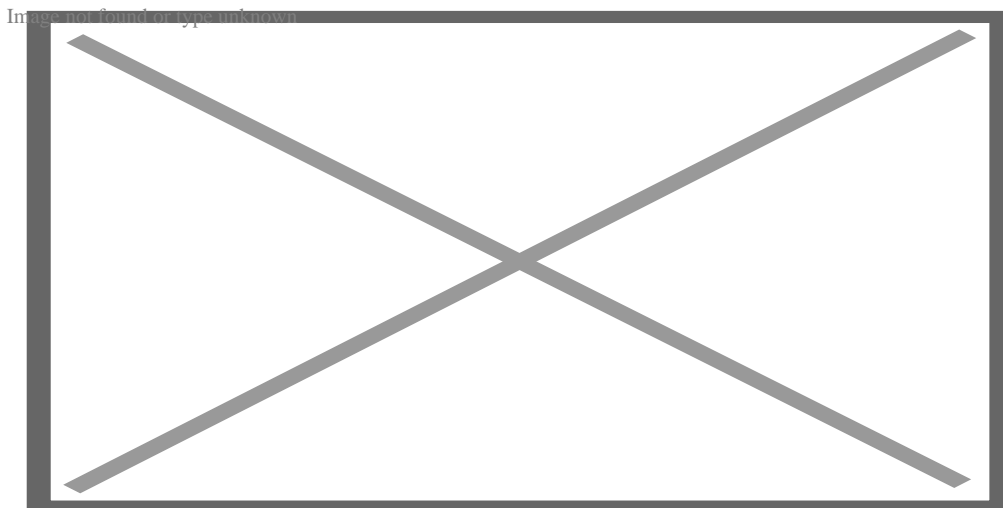


Graph resulting from the RDFa example

The example defines the following five **triples** (shown in **Turtle** syntax). Each triple represents one edge in the resulting graph: the first element of the triple (the *subject*) is the name of the node where the edge starts, the second element (the *predicate*) the type of the edge, and the last and third element (the *object*) either the name of the node where the edge ends or a literal value (e.g. a text, a number, etc.).

```
_:a <https://www.w3.org/1999/02/22-rdf-syntax-ns#type> <https://schema.org/Person> .  
_:a <https://schema.org/name> "Paul Schuster" .  
_:a <https://schema.org/birthPlace> <https://www.wikidata.org/entity/Q1731> .  
<https://www.wikidata.org/entity/Q1731> <https://schema.org/itemtype> <https://schema.org/Place> .  
<https://www.wikidata.org/entity/Q1731> <https://schema.org/name> "Dresden" .
```

The triples result in the graph shown in **the given figure**.



Graph resulting from the RDFa example, enriched with further data from the Web

One of the advantages of using **Uniform Resource Identifiers (URIs)** is that they can be dereferenced using the **HTTP** protocol. According to the so-called **Linked Open Data** principles, such a dereferenced URI should result in a document that offers further data about the given URI. In this example, all URIs, both for edges and nodes (e.g. <http://schema.org/Person>, <http://schema.org/birthPlace>, <http://www.wikidata.org/entity/Q1731>) can be dereferenced and will result in further RDF graphs, describing the URI, e.g. that Dresden is a city in Germany, or that a person, in the sense of that URI, can be fictional.

The second graph shows the previous example, but now enriched with a few of the triples from the documents that result from dereferencing <https://schema.org/Person> (green edge) and <https://www.wikidata.org/entity/Q1731> (blue edges).

Additionally to the edges given in the involved documents explicitly, edges can be automatically inferred: the triple

`_:a <https://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://schema.org/Person> .`

from the original RDFa fragment and the triple

`<https://schema.org/Person> <http://www.w3.org/2002/07/owl#equivalentClass> <http://xmlns.com/foaf/0.1/Person> .`

from the document at <https://schema.org/Person> (green edge in the figure) allow to infer the following triple, given **OWL** semantics (red dashed line in the second Figure):

`_:a <https://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://xmlns.com/foaf/0.1/Person> .`

Background

[[edit](#)]

Further information: [Semantic network § History](#)

The concept of the **semantic network** model was formed in the early 1960s by researchers such as the **cognitive scientist** [Allan M. Collins](#), **linguist** [Ross Quillian](#) and **psychologist** [Elizabeth F. Loftus](#) as a form to represent semantically structured knowledge. When applied in the context of the modern internet, it extends the network of **hyperlinked** human-readable **web pages** by inserting machine-readable metadata about pages and how they are related to each other. This enables **automated agents** to access the Web more intelligently and perform more tasks on behalf of users. The term "Semantic Web" was coined by [Tim Berners-Lee](#),^[7] the inventor of the World Wide Web and director of the World Wide Web Consortium ("**W3C**"), which oversees the development of proposed Semantic Web standards. He defines the Semantic Web as "a web of data that can be processed directly and indirectly by machines".

Many of the technologies proposed by the W3C already existed before they were positioned under the W3C umbrella. These are used in various contexts, particularly those dealing with information that encompasses a limited and defined domain, and where sharing data is a common necessity, such as scientific research or data exchange among businesses. In addition, other technologies with similar goals have emerged, such as **microformats**.

Limitations of HTML

[[edit](#)]

Many files on a typical computer can be loosely divided into either human-readable documents, or machine-readable data. Examples of human-readable document files are mail messages, reports, and brochures. Examples of machine-readable data files are calendars, address books, playlists, and spreadsheets, which are presented to a user using an application program that lets the files be viewed, searched, and combined.

Currently, the World Wide Web is based mainly on documents written in **Hypertext Markup Language** (HTML), a markup convention that is used for coding a body of text interspersed with multimedia objects such as images and interactive forms. Metadata tags provide a method by which computers can categorize the content of web pages. In the examples below, the field names "keywords", "description" and "author" are assigned values such as "computing", and "cheap widgets for sale" and "John Doe".

```
<meta name="keywords" content="computing, computer studies, computer" />
<meta name="description" content="Cheap widgets for sale" />
<meta name="author" content="John Doe" />
```

Because of this metadata tagging and categorization, other computer systems that want to access and share this data can easily identify the relevant values.

With HTML and a tool to render it (perhaps **web browser** software, perhaps another **user agent**), one can create and present a page that lists items for sale. The HTML of this catalog page can make simple, document-level assertions such as "this document's title is 'Widget Superstore'", but there is no capability within the HTML itself to assert unambiguously that, for example, item number X586172 is an Acme Gizmo with a retail price of €199, or that it is a consumer product. Rather, HTML can only say that the span of text "X586172" is something that should be positioned near "Acme Gizmo" and "€199", etc. There is no way to say "this is a catalog" or even to establish that "Acme Gizmo" is a kind of title or that "€199" is a price. There is also no way to express that these pieces of information are bound together in describing a discrete item, distinct from other items perhaps listed on the page.

Semantic HTML refers to the traditional HTML practice of markup following intention, rather than specifying layout details directly. For example, the use of denoting "emphasis" rather than <i>, which specifies **italics**. Layout details are left up to the browser, in combination with **Cascading Style Sheets**. But this practice falls short of specifying the semantics of objects such as items for sale or prices.

Microformats extend HTML syntax to create **machine-readable** semantic markup about objects including people, organizations, events and products.^[13] Similar initiatives include **RDFa**, **Microdata** and **Schema.org**.

Semantic Web solutions

[[edit](#)]

The Semantic Web takes the solution further. It involves publishing in languages specifically designed for data: **Resource Description Framework** (RDF), **Web Ontology Language** (OWL), and **Extensible Markup Language** (XML). HTML describes documents and the links between them. RDF, OWL, and XML, by contrast, can describe arbitrary things such as people, meetings, or airplane parts.

These technologies are combined in order to provide descriptions that supplement or replace the content of Web documents. Thus, content may manifest itself as descriptive data stored in Web-accessible **databases**,^[14] or as markup within documents (particularly, in Extensible HTML (**XHTML**) interspersed with XML, or, more often, purely in XML, with layout or rendering cues stored separately). The machine-readable descriptions enable content managers to add meaning to the content, i.e., to describe the structure of the knowledge we have about that content. In this way, a machine can process knowledge itself, instead of text, using processes similar to human **deductive reasoning** and **inference**, thereby obtaining more meaningful results and helping computers to perform automated information gathering and research.

An example of a tag that would be used in a non-semantic web page:

```
<item>blog</item>
```

Encoding similar information in a semantic web page might look like this:

```
<item rdf:about="https://example.org/semantic-web/">Semantic Web</item>
```

Tim Berners-Lee calls the resulting network of **Linked Data** the **Giant Global Graph**, in contrast to the HTML-based World Wide Web. Berners-Lee posits that if the past was document sharing, the future is **data sharing**. His answer to the question of "how" provides three points of instruction. One, a URL should point to the data. Two, anyone accessing the URL should get data back. Three, relationships in the data should point to additional URLs with data.

Tags and identifiers

[**edit**]

Tags, including hierarchical categories and tags that are collaboratively added and maintained (e.g. with **folksonomies**) can be considered part of, of potential use to or a step towards the semantic Web vision.^{[15][16][17]}

Unique **identifiers**, including hierarchical categories and collaboratively added ones, analysis tools and **metadata**, including tags, can be used to create forms of semantic webs – webs that are to a certain degree semantic.^[18] In particular, such has been used for structuring scientific research i.a. by research topics and **scientific fields** by the projects **OpenAlex**,^{[19][20][21]} **Wikidata** and

Scholia which are under development and provide **APIs**, Web-pages, feeds and graphs for various **semantic queries**.

Web 3.0

[[edit](#)]

Tim Berners-Lee has described the Semantic Web as a component of Web 3.0.[22]

People keep asking what Web 3.0 is. I think maybe when you've got an overlay of **scalable vector graphics** – everything rippling and folding and looking misty – on **Web 2.0** and access to a semantic Web integrated across a huge space of data, you'll have access to an unbelievable data resource ...

—*Tim Berners-Lee, 2006*

"Semantic Web" is sometimes used as a synonym for "Web 3.0",[23] though the definition of each term varies.

Beyond Web 3.0

[[edit](#)]

The next generation of the Web is often termed Web 4.0, but its definition is not clear. According to some sources, it is a Web that involves **artificial intelligence**,[24] the **internet of things**, **pervasive computing**, **ubiquitous computing** and the **Web of Things** among other concepts.[25] According to the European Union, Web 4.0 is "the expected fourth generation of the World Wide Web. Using advanced artificial and ambient intelligence, the internet of things, trusted blockchain transactions, virtual worlds and XR capabilities, digital and real objects and environments are fully integrated and communicate with each other, enabling truly intuitive, immersive experiences, seamlessly blending the physical and digital worlds".[26]

Challenges

[[edit](#)]

Some of the challenges for the Semantic Web include vastness, vagueness, uncertainty, inconsistency, and deceit. **Automated reasoning systems** will have to deal with all of these issues in order to deliver on the promise of the Semantic Web.

- Vastness: The World Wide Web contains many billions of pages. The **SNOMED CT medical terminology ontology** alone contains 370,000 **class** names, and existing technology has not yet been able to eliminate all semantically duplicated terms. Any automated reasoning system will have to deal with truly huge inputs.

- Vagueness: These are imprecise concepts like "young" or "tall". This arises from the vagueness of user queries, of concepts represented by content providers, of matching query terms to provider terms and of trying to combine different **knowledge bases** with overlapping but subtly different concepts. **Fuzzy logic** is the most common technique for dealing with vagueness.
- Uncertainty: These are precise concepts with uncertain values. For example, a patient might present a set of symptoms that correspond to a number of different distinct diagnoses each with a different probability. **Probabilistic** reasoning techniques are generally employed to address uncertainty.
- Inconsistency: These are logical contradictions that will inevitably arise during the development of large ontologies, and when ontologies from separate sources are combined. Deductive reasoning fails catastrophically when faced with inconsistency, because "**anything follows from a contradiction**". **Defeasible reasoning** and **paraconsistent reasoning** are two techniques that can be employed to deal with inconsistency.
- Deceit: This is when the producer of the information is intentionally misleading the consumer of the information. **Cryptography** techniques are currently utilized to alleviate this threat. By providing a means to determine the information's integrity, including that which relates to the identity of the entity that produced or published the information, however **credibility** issues still have to be addressed in cases of potential deceit.

This list of challenges is illustrative rather than exhaustive, and it focuses on the challenges to the "unifying logic" and "proof" layers of the Semantic Web. The World Wide Web Consortium (W3C) Incubator Group for Uncertainty Reasoning for the World Wide Web^[27] (URW3-XG) final report lumps these problems together under the single heading of "uncertainty"^[28] Many of the techniques mentioned here will require extensions to the Web Ontology Language (OWL) for example to annotate conditional probabilities. This is an area of active research.^[29]

Standards

[\[edit\]](#)

Standardization for Semantic Web in the context of Web 3.0 is under the care of W3C^[30]

Components

[\[edit\]](#)

The term "Semantic Web" is often used more specifically to refer to the formats and technologies that enable it.^[5] The collection, structuring and recovery of linked data are enabled by technologies that provide a **formal description** of concepts, terms, and relationships within a given **knowledge domain**. These technologies are specified as W3C standards and include:

- **Resource Description Framework** (RDF), a general method for describing information
- **RDF Schema** (RDFS)
- **Simple Knowledge Organization System** (SKOS)
- **SPARQL**, an RDF query language

- **Notation3** (N3), designed with human readability in mind
- **N-Triples**, a format for storing and transmitting data
- **Turtle** (Terse RDF Triple Language)
- **Web Ontology Language** (OWL), a family of **knowledge representation languages**
- **Rule Interchange Format** (RIF), a framework of web rule language dialects supporting rule interchange on the Web
- **JavaScript Object Notation for Linked Data** (JSON-LD), a JSON-based method to describe data
- **ActivityPub**, a generic way for client and server to communicate with each other. This is used by the popular decentralized social network **Mastodon**.

The **Semantic Web Stack** illustrates the architecture of the Semantic Web. The functions and relationships of the components can be summarized as follows:[31]

- XML provides an elemental syntax for content structure within documents, yet associates no semantics with the meaning of the content contained within. XML is not at present a necessary component of Semantic Web technologies in most cases, as alternative syntaxes exist, such as **Turtle**. Turtle is a de facto standard, but has not been through a formal standardization process.
- **XML Schema** is a language for providing and restricting the structure and content of elements contained within XML documents.
- RDF is a simple language for expressing **data models**, which refer to objects ("web resources") and their relationships. An RDF-based model can be represented in a variety of syntaxes, e.g., **RDF/XML**, N3, Turtle, and RDFa. RDF is a fundamental standard of the Semantic Web.[32][33]
- RDF Schema extends RDF and is a vocabulary for describing properties and classes of RDF-based resources, with semantics for generalized-hierarchies of such properties and classes.
- OWL adds more vocabulary for describing properties and classes: among others, relations between classes (e.g. disjointness), cardinality (e.g. "exactly one"), equality, richer typing of properties, characteristics of properties (e.g. symmetry), and enumerated classes.
- SPARQL is a protocol and query language for semantic web data sources.
- RIF is the W3C Rule Interchange Format. It is an XML language for expressing Web rules that computers can execute. RIF provides multiple versions, called dialects. It includes a RIF Basic Logic Dialect (RIF-BLD) and RIF Production Rules Dialect (RIF PRD).

Current state of standardization

[edit]

Well-established standards:

- **RDF - Resource Description Framework**
- **RDFS - Resource Description Framework Schema**
- **RIF - Rule Interchange Format**
- **SPARQL - 'SPARQL Protocol and RDF Query Language'**

- Unicode
- URI - Uniform Resource Identifier
- OWL - Web Ontology Language
- XML - Extensible Markup Language

Not yet fully realized:

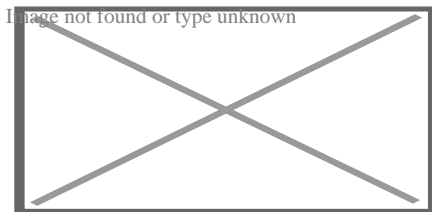
- Unifying Logic and Proof layers
- SWRL - Semantic Web Rule Language

Applications

[[edit](#)]

The intent is to enhance the **usability** and usefulness of the Web and its interconnected **resources** by creating **semantic web services**, such as:

- Servers that expose existing data systems using the RDF and SPARQL standards. Many converters to RDF exist from different applications.[34] **Relational databases** are an important source. The semantic web server attaches to the existing system without affecting its operation.
- Documents "marked up" with semantic information (an **extension** of the HTML <meta> **tags** used in today's Web pages to supply information for **Web search engines** using **web crawlers**). This could be **machine-understandable** information about the human-understandable content of the document (such as the creator, title, description, etc.) or it could be purely metadata representing a set of facts (such as resources and services elsewhere on the site). Note that *anything* that can be identified with a *Uniform Resource Identifier* (URI) can be described, so the semantic web can reason about animals, people, places, ideas, etc. There are four semantic annotation formats that can be used in HTML documents; Microformat, RDFa, Microdata and **JSON-LD**. [35] Semantic markup is often generated automatically, rather than manually.



Arguments as distinct semantic units with specified relations and version control on **Kialo**

- Common metadata vocabularies (**ontologies**) and maps between vocabularies that allow document creators to know how to mark up their documents so that agents can use the information in the supplied metadata (so that *Author* in the sense of 'the Author of the page' will not be confused with *Author* in the sense of a book that is the subject of a book review).
- Automated agents to perform tasks for users of the semantic web using this data.

- **Semantic translation.** An alternative or complementary approach are improvements to contextual and semantic understanding of texts – these could be aided via Semantic Web methods so that only increasingly small numbers of mistranslations need to be corrected **in manual or semi-automated post-editing.**
- Web-based services (often with agents of their own) to supply information specifically to agents, for example, a **Trust service** that an agent could ask if some online store has a history of poor service or **spamming.**
- Semantic Web ideas are implemented in collaborative structured **argument mapping** sites where their relations are organized semantically, arguments can be mirrored (linked) to multiple places, reused (copied), rated, and **changed** as semantic distinct units. Ideas for such, or a more widely adopted "World Wide Argument Web", go back to at least 2007[36] and have been implemented to some degree in **Argüman**[37] and **Kialo**. Further steps towards semantic web services may include enabling "Querying", argument search engines,[38] and "summarizing the contentious and agreed-upon points of a discussion".[39]

Such services could be useful to public search engines, or could be used for **knowledge management** within an organization. Business applications include:

- Facilitating the integration of information from mixed sources[40]
- Dissolving ambiguities in corporate terminology
- Improving **information retrieval** thereby reducing **information overload** and increasing the refinement and precision of the data retrieved[41][42][43][44]
- Identifying relevant information with respect to a given domain[45]
- Providing decision making support

In a corporation, there is a closed group of users and the management is able to enforce company guidelines like the adoption of specific ontologies and use of **semantic annotation**. Compared to the public Semantic Web there are lesser requirements on **scalability** and the information circulating within a company can be more trusted in general; privacy is less of an issue outside of handling of customer data.

Skeptical reactions

[edit]

Practical feasibility

[edit]

Critics question the basic feasibility of a complete or even partial fulfillment of the Semantic Web, pointing out both difficulties in setting it up and a lack of general-purpose usefulness that prevents the required effort from being invested. In a 2003 paper, Marshall and Shipman point out the cognitive overhead inherent in formalizing knowledge, compared to the authoring of traditional web **hypertext**:[46]

While learning the basics of HTML is relatively straightforward, learning a knowledge representation language or tool requires the author to learn about the representation's methods of abstraction and their effect on reasoning. For example, understanding the class-instance relationship, or the superclass-subclass relationship, is more than understanding that one concept is a "type of" another concept. [...] These abstractions are taught to computer scientists generally and knowledge engineers specifically but do not match the similar natural language meaning of being a "type of" something. Effective use of such a formal representation requires the author to become a skilled knowledge engineer in addition to any other skills required by the domain. [...] Once one has learned a formal representation language, it is still often much more effort to express ideas in that representation than in a less formal representation [...]. Indeed, this is a form of programming based on the declaration of semantic data and requires an understanding of how reasoning algorithms will interpret the authored structures.

According to Marshall and Shipman, the **tacit** and changing nature of much knowledge adds to the **knowledge engineering** problem, and limits the Semantic Web's applicability to specific domains. A further issue that they point out are domain- or organization-specific ways to express knowledge, which must be solved through community agreement rather than only technical means.[46] As it turns out, specialized communities and organizations for intra-company projects have tended to adopt semantic web technologies greater than peripheral and less-specialized communities.[47] The practical constraints toward adoption have appeared less challenging where domain and scope is more limited than that of the general public and the World-Wide Web.[47]

Finally, Marshall and Shipman see pragmatic problems in the idea of (**Knowledge Navigator**-style) intelligent agents working in the largely manually curated Semantic Web.[46]

In situations in which user needs are known and distributed information resources are well described, this approach can be highly effective; in situations that are not foreseen and that bring together an unanticipated array of information resources, the Google approach is more robust. Furthermore, the Semantic Web relies on inference chains that are more brittle; a missing element of the chain results in a failure to perform the desired action, while the human can supply missing pieces in a more Google-like approach. [...] cost-benefit tradeoffs can work in favor of specially-created Semantic Web metadata directed at weaving together sensible well-structured domain-specific information resources; close attention to user/customer needs will drive these federations if they are to be successful.

Cory Doctorow's critique ("**metacrap**") [48] is from the perspective of human behavior and personal preferences. For example, people may include spurious metadata into Web pages in an attempt to mislead Semantic Web engines that naively assume the metadata's veracity. This phenomenon was well known with metatags that fooled the **Altavista** ranking algorithm into elevating the ranking of certain Web pages: the Google indexing engine specifically looks for such attempts at manipulation. **Peter Gärdenfors** and **Timo Honkela** point out that logic-based semantic web technologies cover only a fraction of the relevant phenomena related to semantics.[49][50]

Censorship and privacy

[edit]

Enthusiasm about the semantic web could be tempered by concerns regarding **censorship** and **privacy**. For instance, **text-analyzing** techniques can now be easily bypassed by using other words, metaphors for instance, or by using images in place of words. An advanced implementation of the semantic web would make it much easier for governments to control the viewing and creation of online information, as this information would be much easier for an automated content-blocking machine to understand. In addition, the issue has also been raised that, with the use of **FOAF** files and geolocation **meta-data**, there would be very little anonymity associated with the authorship of articles on things such as a personal blog. Some of these concerns were addressed in the "Policy Aware Web" project[51] and is an active research and development topic.

Doubling output formats

[edit]

Another criticism of the semantic web is that it would be much more time-consuming to create and publish content because there would need to be two formats for one piece of data: one for human viewing and one for machines. However, many web applications in development are addressing this issue by creating a machine-readable format upon the publishing of data or the request of a machine for such data. The development of microformats has been one reaction to this kind of criticism. Another argument in defense of the feasibility of semantic web is the likely falling price of human intelligence tasks in digital labor markets, such as **Amazon's Mechanical Turk**.^[*citation needed*]

Specifications such as **eRDF** and **RDFa** allow arbitrary RDF data to be embedded in HTML pages. The **GRDDL** (Gleaning Resource Descriptions from Dialects of Language) mechanism allows existing material (including microformats) to be automatically interpreted as RDF, so publishers only need to use a single format, such as HTML.

Research activities on corporate applications

[edit]

The first research group explicitly focusing on the Corporate Semantic Web was the ACACIA team at **INRIA-Sophia-Antipolis**, founded in 2002. Results of their work include the **RDF(S)** based **Corese**[52] search engine, and the application of semantic web technology in the realm of **distributed artificial intelligence** for knowledge management (e.g. ontologies and **multi-agent systems** for corporate semantic Web) [53] and **E-learning**.^[54]

Since 2008, the Corporate Semantic Web research group, located at the **Free University of Berlin**, focuses on building blocks: Corporate Semantic Search, Corporate Semantic Collaboration, and Corporate Ontology Engineering.^[55]

Ontology engineering research includes the question of how to involve non-expert users in creating ontologies and semantically annotated content[56] and for extracting explicit knowledge from the interaction of users within enterprises.

Future of applications

[[edit](#)]

[Tim O'Reilly](#), who coined the term Web 2.0, proposed a long-term vision of the Semantic Web as a web of data, where sophisticated applications are navigating and manipulating it.[57] The data web transforms the World Wide Web from a [distributed file system](#) into a [distributed database](#).[\[58\]](#)

See also

[[edit](#)]

- [AGRIS](#)
- [Business semantics management](#)
- [Computational semantics](#)
- [Calais \(Reuters product\)](#)
- [DBpedia](#)
- [Entity–attribute–value model](#)
- [EU Open Data Portal](#)
- [History of the World Wide Web](#)
- [Hyperdata](#)
- [Internet of things](#)
- [Linked data](#)
- [List of emerging technologies](#)
- [Nextbio](#)
- [Ontology alignment](#)
- [Ontology learning](#)
- [RDF and OWL](#)
- [Semantic computing](#)
- [Semantic Geospatial Web](#)
- [Semantic heterogeneity](#)
- [Semantic integration](#)
- [Semantic matching](#)
- [Semantic MediaWiki](#)
- [Semantic Sensor Web](#)
- [Semantic social network](#)
- [Semantic technology](#)
- *[Semantic Web](#)*
- [Semantically-Interlinked Online Communities](#)
- [Smart-M3](#)
- [Social Semantic Web](#)

- Web engineering
- Web resource
- Web science

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Further reading




[[edit](#)]

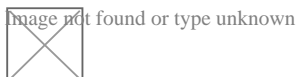
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-  [Media](#) from Commons
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Scholia has a *topic* profile for **Semantic Web**.

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Semantic Web

Background

- Databases
- Hypertext
- Internet
- Ontologies
- Semantics
- Semantic networks
- World Wide Web

Sub-topics

- Dataspaces
- Hyperdata
- Linked data
- Rule-based systems

Applications

- Semantic analytics
- Semantic broker
- Semantic computing
- Semantic mapper
- Semantic matching
- Semantic publishing
- Semantic reasoner
- Semantic search
- Semantic service-oriented architecture
- Semantic wiki
- Solid

Related topics

- Collective intelligence
- Description logic
- Folksonomy
- Geotagging
- Information architecture
- iXBRL
- Knowledge extraction
- Knowledge management
- Knowledge representation and reasoning
- Library 2.0
- Digital library
- Digital humanities
- Metadata
- References
- Topic map
- Web 2.0
- Web engineering
- Web Science Trust

Syntax and supporting technologies

- HTTP
- IRI
 - URI
- RDF
 - triples
 - RDF/XML
 - JSON-LD
 - Turtle
 - TriG
 - Notation3
 - N-Triples
 - TriX (no W3C standard)
- RRID
- SPARQL
- XML
- Semantic HTML

Schemas, ontologies and rules

- Common Logic
- OWL
- RDFS
- Rule Interchange Format
- Semantic Web Rule Language
- ALPS
- SHACL

Standards

Semantic annotation

- eRDF
- GRDDL
- Microdata
- Microformats
- RDFa
- SAWSDL
- Facebook Platform

Common vocabularies

- DOAP
- Dublin Core
- FOAF
- Schema.org
- SIOC
- SKOS

Microformat vocabularies

- hAtom
- hCalendar
- hCard
- hProduct
- hRecipe
- hReview

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Emerging technologies

Fields **Information and communications**

- Ambient intelligence
 - Internet of things
- Artificial intelligence
 - Applications of artificial intelligence
 - Machine translation
 - Machine vision
 - Mobile translation
 - Progress in artificial intelligence
 - Semantic Web
 - Speech recognition
- Atomtronics
- Carbon nanotube field-effect transistor
- Cybermethodology
- Extended reality
- Fourth-generation optical discs
 - 3D optical data storage
 - Holographic data storage
- GPGPU
- Memory
 - CBRAM
 - ECRAM
 - FRAM
 - Millipede
 - MRAM
 - NRAM
 - PRAM
 - Racetrack memory
 - RRAM
 - SONOS
 - UltraRAM
- Optical computing
- RFID
 - Chipless RFID
- Software-defined radio
- Three-dimensional integrated circuit

Topics

- Automation
- Collingridge dilemma
- Differential technological development
- Disruptive innovation
- Ephemeralization
- Ethics
 - Bioethics
 - Cyberethics
 - Neuroethics
 - Robot ethics
- Exploratory engineering
- Proactionary principle
- Technological change
 - Technological unemployment
- Technological convergence
- Technological evolution
- Technological paradigm
- Technology forecasting
 - Accelerating change
 - Future-oriented technology analysis
 - Horizon scanning
 - Moore's law
 - Technological singularity
 - Technology scouting
- Technology in science fiction
- Technology readiness level
- Technology roadmap
- Transhumanism

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Digital humanities

- Computational archaeology
- Computational philosophy
- Computational theory of mind
- Computers and writing
- Cultural analytics
- Cybertext
- Digital classics
- Digital history
- Digital library
- Digital Medievalist
- Digital ontology
- Digital physics
- Digital religion
- Digital rhetoric
- Digital scholarship
- Digital theology
- Digitization
- E-research
- Electronic literature
- Humanistic informatics
- New media
- Philosophy of computer science
- Semantic Web
- Systems theory
- Text Encoding Initiative
- Transliteracy

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International

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Frequently Asked Questions

Why is local SEO important for small businesses?

Local SEO helps small businesses attract customers from their immediate area, which is crucial for brick-and-mortar stores and service providers. By optimizing local listings, using location-based keywords, and maintaining accurate NAP information, you increase visibility, build trust, and drive more foot traffic.

How does content marketing impact SEO?

Content marketing and SEO work hand-in-hand. High-quality, relevant content attracts readers, earns backlinks, and encourages longer time spent on your site'factors that all contribute to better search engine rankings. Engaging, well-optimized content also improves user experience and helps convert visitors into customers.

How can search engine optimisation consultants help my business?

Search engine optimisation consultants analyze your website and its performance, identify issues, and recommend strategies to improve your search rankings. They provide guidance on keyword selection, on-page optimization, link building, and content strategy to increase visibility and attract more traffic.

What is a local SEO agency?

A local SEO agency specializes in improving a business's visibility within a specific geographic area. They focus on optimizing local citations, managing Google My Business profiles, and targeting location-based keywords to attract nearby customers.

How do I find the best SEO company in Sydney?

To find the best SEO company in Sydney, look for a provider with a proven track record of success, transparent reporting, and a clear understanding of your business's goals. Check reviews, case studies, and client testimonials to ensure you are choosing a reputable partner.

What is the difference between local SEO and general SEO?

General SEO focuses on improving a website's visibility on a broader scale, often targeting national or international audiences. Local SEO, on the other hand, zeroes in on geographic areas, helping businesses attract nearby customers through local keywords, directory listings, and Google My Business optimization.

SEO agency Sydney

SEO Sydney

Phone : 1300 684 339

City : Sydney

State : NSW

Zip : 2000

[Google Business Profile](#)

[Google Business Website](#)

Company Website : <https://sydney.website/seo-sydney/>

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