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About Web directory

A **web directory** or **link directory** is an online list or catalog of websites. That is, it is a directory on the World Wide Web of (all or part of) the World Wide Web. Historically, directories typically listed entries on people or businesses, and their contact information; such directories are still in use today. A web directory includes entries about websites, including links to those websites, organized into categories and subcategories.[1][2][3] Besides a link, each entry may include the title of the website, and a description of its contents. In most web directories, the entries are about whole websites, rather than individual pages within them (called "deep links"). Websites are often limited to inclusion in only a few categories.

There are two ways to find information on the Web: by searching or browsing. Web directories provide links in a structured list to make browsing easier. Many web directories combine searching and browsing by providing a search engine to search the directory. Unlike search engines, which base results on a database of entries gathered automatically by web crawler, most web directories are built manually by human editors. Many web directories allow site owners to submit their site for inclusion, and have editors review submissions for fitness.

Web directories may be general in scope, or limited to particular subjects or fields. Entries may be listed for free, or by paid submission (meaning the site owner must pay to have his or her website listed).

RSS directories are similar to web directories, but contain collections of RSS feeds, instead of links to websites.

History

[edit]

During the early development of the web, there was a list of web servers edited by Tim Berners-Lee and hosted on the CERN webserver. One historical snapshot from 1992 remains.[4] He also created the World Wide Web Virtual Library, which is the oldest web directory.[5]

Scope of listing

[edit]

Most of the directories are general in on scope and list websites across a wide range of categories, regions and languages. But some niche directories focus on restricted regions, single languages, or specialist sectors. For example, there are shopping directories that specialize in the listing of retail e-commerce sites.

Examples of well-known general web directories are Yahoo! Directory (shut down at the end of 2014) and DMOZ (shut down on March 14, 2017). DMOZ was significant due to its extensive categorization and large number of listings and its free availability for use by other directories and search engines.[6]

However, a debate over the quality of directories and databases still continues, as search engines use DMOZ's content without real integration, and some experiment using clustering.

Development

[edit]

 This section **does not cite** any **sources**. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. *(April 2019) (Learn how and when to remove this message)*

There have been many attempts to make building web directories easier, such as using automated submission of related links by script, or any number of available PHP portals and programs. Recently, social software techniques have spawned new efforts of categorization, with Amazon.com adding tagging to their product pages.

Monetizing

[edit]

Directories have various features in their listings, often depending upon the price paid for inclusion:

- Cost
  - Free submission – there is no charge for the review and listing of the site
  - Paid submission – a one-time or recurring fee is charged for reviewing/listing the submitted link
- No follow – there is a rel="nofollow" attribute associated with the link, meaning search engines will give no weight to the link
- Featured listing – the link is given a premium position in a category (or multiple categories) or other sections of the directory, such as the homepage. Sometimes called sponsored listing.

- ○ Bid for position – where sites are ordered based on bids
- ○ Affiliate links – where the directory earns commission for referred customers from the listed websites
- ○ Reciprocity
    - ○ Reciprocal link – a link back to the directory must be added somewhere on the submitted site in order to get listed in the directory. This strategy has decreased in popularity due to changes in SEO algorithms which can make it less valuable or counterproductive.[7]
    - ○ No Reciprocal link – a web directory where you will submit your links for free and no need to add link back to your website

Human-edited web directories

[edit]

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A human-edited directory is created and maintained by editors who add links based on the policies particular to that directory. Human-edited directories are often targeted by SEOs on the basis that links from reputable sources will improve rankings in the major search engines. Some directories may prevent search engines from rating a displayed link by using redirects, nofollow attributes, or other techniques. Many human-edited directories, including DMOZ, World Wide Web Virtual Library, Business.com and Jasmine Directory, are edited by volunteers, who are often experts in particular categories. These directories are sometimes criticized due to long delays in approving submissions, or for rigid organizational structures and disputes among volunteer editors.

In response to these criticisms, some volunteer-edited directories have adopted wiki technology, to allow broader community participation in editing the directory (at the risk of introducing lower-quality, less objective entries).

Another direction taken by some web directories is the paid for inclusion model. This method enables the directory to offer timely inclusion for submissions and generally fewer listings as a result of the paid model. They often offer additional listing options to further enhance listings, including features listings and additional links to inner pages of the listed website. These options typically have an additional fee associated but offer significant help and visibility to sites and/or their inside pages.

Today submission of websites to web directories is considered a common SEO (search engine optimization) technique to get back-links for the submitted website. One distinctive feature of 'directory submission' is that it cannot be fully automated like search engine submissions. Manual directory submission is a tedious and time-consuming job and is often

outsourced by webmasters.

Bid for Position directories

[edit]

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Bid for Position directories, also known as bidding web directories, are paid-for-inclusion web directories where the listings of websites in the directory are ordered according to their bid amount. They are special in that the more a person pays, the higher up the list of websites in the directory they go. With the higher listing, the website becomes more visible and increases the chances that visitors who browse the directory will click on the listing.

Propagation

[edit]

Web directories will often make themselves accessing by more and more URLs by acquiring the domain registrations of defunct websites as soon as they expire, a practice known as Domain drop catching.

See also

[edit]

- List of web directories
- Lists of websites – this itself is a web directory
- Web portal

Link destinations

- Deep links
- Home pages

Types of web directory

- Business directory

Other link organization and presentation systems

- Webring
- Bookmark manager

- - Enterprise bookmarking
    - Social bookmarking
  - Search engine
    - Search engine results page (SERP)

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[edit]

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5. **^** *Aaron Wall. "History of Search Engines: From 1945 to Google Today". Search Engine History. Retrieved 2017-05-16.*
6. **^** Paul Festa (December 27, 1999), Web search results still have human touch, *CNET News.com*, retrieved September 18, 2007
7. **^** *Schmitz, Tom (August 2, 2012). "What Everyone Needs To Know About Good, Bad & Bland Links". searchengineland.com. Third Door Media. Retrieved April 21, 2017. " Reciprocal links may not help with competitive keyword rankings, but that does not mean you should avoid them when they make sound business sense. What you should definitely avoid are manipulative reciprocal linking schemes like automated link trading programs and three-way links or four-way links."*

External links

[edit]

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

    Web syndication

  History
    Blogging
    Podcasting
    Vlogging
    Web syndication technology

Types

- Art
- Bloggernacle
- Classical music
- Corporate
- Dream diary
- Edublog
- Electronic journal
- Fake
- Family
- Fashion
- Food
- Health
- Law
- Lifelog
- MP3
- News
- Photoblog
- Police
- Political
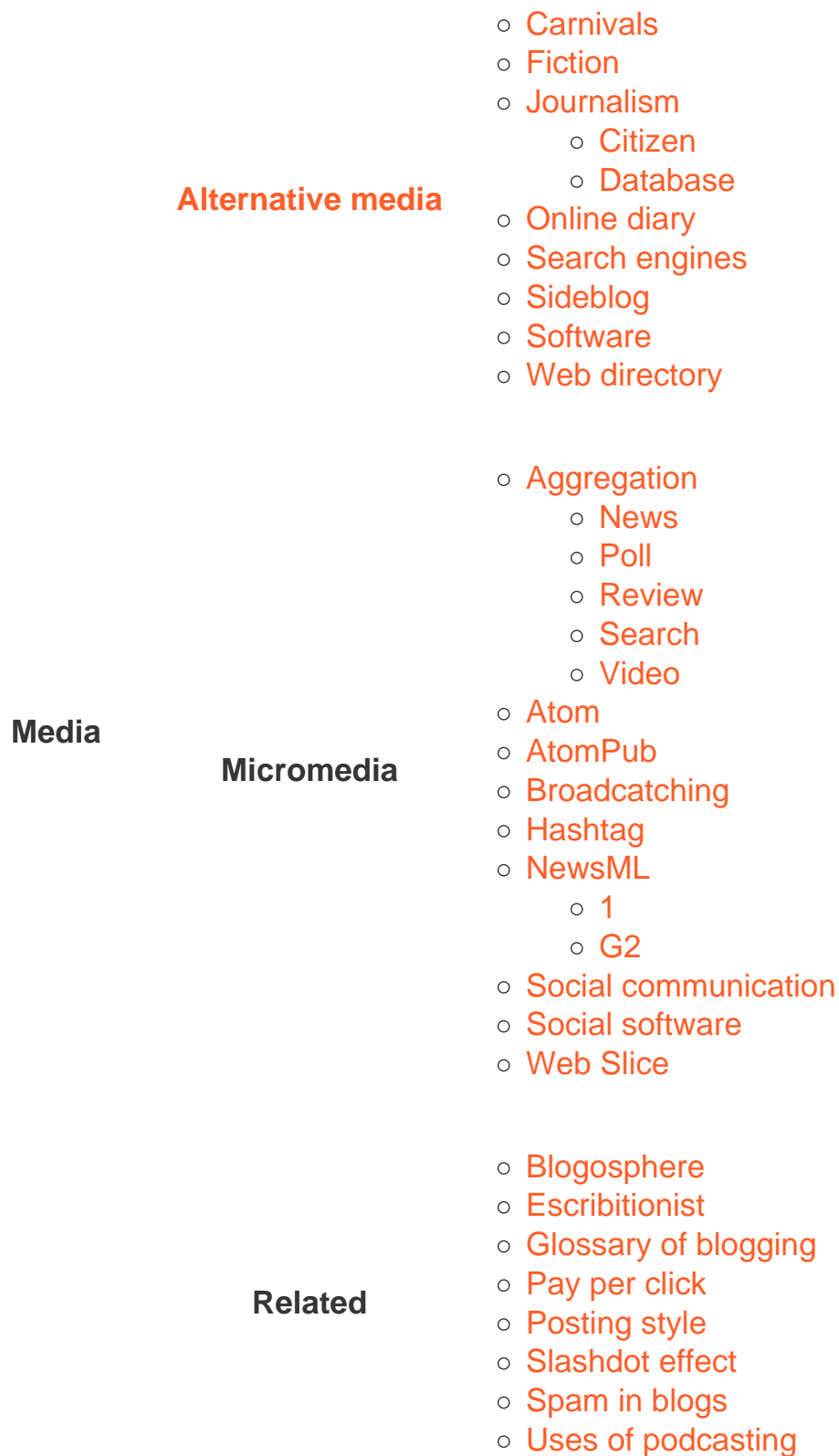- Project
- Reverse
- Travel
- Warblog

Technology	**General**	○ BitTorrent ○ Feed URI scheme
	Features	○ Linkback ○ Permalink ○ Ping ○ Pingback ○ Reblogging ○ Refback ○ Rollback ○ Trackback
	Mechanism	○ Thread ○ Geotagging ○ RSS enclosure ○ Synchronization
	Memetics	○ Atom feed ○ Data feed ○ Photofeed ○ Product feed ○ RDF feed ○ Web feed
	RSS	○ GeoRSS ○ MRSS ○ RSS TV
	Social	○ Inter-process communication ○ Mashup ○ Referencing ○ RSS editor ○ RSS tracking ○ Streaming media
	Standard	○ OPML ○ RSS Advisory Board ○ Usenet ○ World Wide Web ○ XBEL ○ XOXO

- Audio podcast
- Enhanced podcast
- Mobilecast
- Narrowcasting
- Peercasting
- Screencast
- Slidecasting
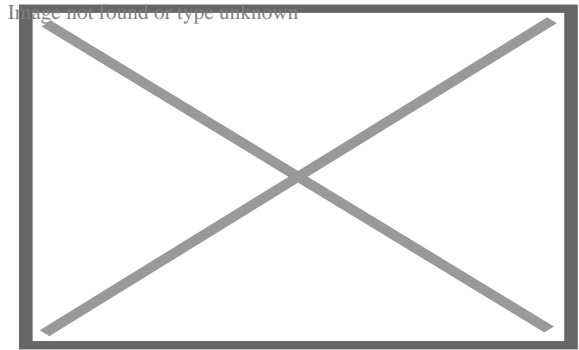- Videocast
- Webcomic
- Webtoon
- Web series

Form

- Anonymous blogging
- Collaborative blog
- Columnist
- Instant messaging
- Liveblogging
- Microblog
- Mobile blogging
- Spam blog
- Video blogging
- Motovlogging

Media

Alternative media

- Carnivals
- Fiction
- Journalism
  - Citizen
  - Database
- Online diary
- Search engines
- Sideblog
- Software
- Web directory

Micromedia

- Aggregation
  - News
  - Poll
  - Review
  - Search
  - Video
- Atom
- AtomPub
- Broadcatching
- Hashtag
- NewsML
  - 1
  - G2
- Social communication
- Social software
- Web Slice

Related

- Blogosphere
- Escribitionist
- Glossary of blogging
- Pay per click
- Posting style
- Slashdot effect
- Spam in blogs
- Uses of podcasting

About Parramatta

This article is about the Australian metropolis. For the local government area, see City of Parramatta. For the rugby league club, see Parramatta Eels. For other uses, see Parramatta (disambiguation).

Parramatta viewed from the south in 2022

Image not found or type unknown

Coordinates	33°49?S 151°00?E ÃƒÆ’Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ’Ã¢â‚¬Â ÃƒÂ¢Ã¢â€šÂ¬Ã¢â€žÂ¢ÃƒÆ’Ã†â€™Ãƒâ€¢ / ÃƒÆ’Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ’Ã¢â‚¬Â ÃƒÂ¢Ã¢â€šÂ¬Ã¢â€žÂ¢ÃƒÆ’Ã†â€™Ãƒâ€¢ 33.817°S 151.000°E
Population	30,211 (2021 census)[1]
• Density	5,700/km^2 (14,760/sq mi)
Established	1788
Postcode(s)	2150
Elevation	18 m (59 ft)
Area	5.3 km^2 (2.0 sq mi)
Location	24 km (15 mi) west of Sydney CBD (Central Sydney)
LGA(s)	City of Parramatta
Region	Greater Western Sydney Metropolitan area
County	Cumberland[2]
Parish	St John[2]
State electorate(s)	○ Parramatta[3] ○ Baulkham Hills[4] ○ Granville[5]
Federal division(s)	Parramatta[6]

Parramatta (/

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/; Dharuk: *Burramatta*) is a suburb and major commercial centre in Greater Western Sydney.[7][8] Parramatta is located approximately 24 kilometres (15 mi) west of the Sydney CBD, on the banks of the Parramatta River.[2] It is commonly regarded as the secondary central business district of metropolitan Sydney.

Parramatta is the municipal seat of the local government area of the City of Parramatta and is often regarded as one of the primary centres of the Greater Sydney metropolitan region, along with the Sydney CBD, Penrith, Campbelltown, and Liverpool.[9] Parramatta also has a long history as a second administrative centre in the Sydney metropolitan region, playing host to a number of government departments,[10] as well as state and federal courts. It is often colloquially referred to as "Parra".

Parramatta, which was founded as a British settlement in 1788, the same year as Sydney, is the oldest inland European settlement in Australia and serves as the economic centre of Greater Western Sydney.[11] Since 2000, state government agencies such as the New South Wales Police Force and Sydney Water[12] have relocated to Parramatta from Central Sydney. The 151st meridian east runs directly through the suburb.

History

[edit]

Aboriginal

[edit]

Radiocarbon dating suggests human activity occurred in Parramatta from around 30,000 years ago.[13] The Darug people who lived in the area before European settlement regarded the area as rich in food from the river and forests. They named the area Baramada or Burramatta ('Parramatta') which means Eel ("Burra") Place ("matta"), with the resident Indigenous people being called the Burramattagal. Similar Darug words include Cabramatta (Grub place) and Wianamatta (Mother place).[14] Other references[*which?*] are derived from the words of Captain Watkin Tench, a white British man with a poor understanding of the Darug language, and are incorrect.[*citation needed*] To this day many eels and other sea creatures are attracted to nutrients that are concentrated where the saltwater of Port Jackson
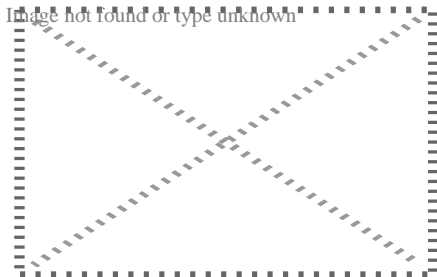
meets the freshwater of the Parramatta River. The Parramatta Eels rugby league club chose their symbol as a result of this phenomenon.
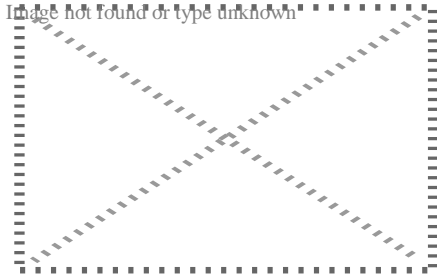
View of Parramatta in 1812
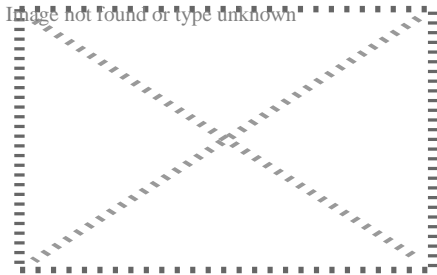
Parramatta from May's Hill by Joseph Lycett (c. 1824)

Parramatta in 1886

British colonisation

[edit]

Parramatta was colonised by the British in 1788, the same year as Sydney. As such, Parramatta is the second oldest city in Australia, being only 10 months younger than Sydney. The British colonists, who had arrived in January 1788 on the First Fleet at Sydney Cove, had only enough food to support themselves for a short time and the soil around Sydney Cove proved too poor to grow the amount of food that 1,000 convicts, soldiers and administrators needed to survive. During 1788, Governor Arthur Phillip had reconnoitred several places before choosing Parramatta as the most likely place for a successful large farm.[15] Parramatta was the furthest navigable point inland on the Parramatta River (i.e. furthest from the thin, sandy coastal soil) and also the point at which the river became freshwater and

therefore useful for farming.

On Sunday 2 November 1788, Governor Phillip took a detachment of marines along with a surveyor and, in boats, made his way upriver to a location that he called The Crescent, a defensible hill curved round a river bend, now in Parramatta Park. The Burramattagal were rapidly displaced with notable residents Maugoran, Boorong and Baludarri being forced from their lands.[16]

As a settlement developed, Governor Phillip gave it the name "Rose Hill" after British politician George Rose.[17] On 4 June 1791 Phillip changed the name of the township to Parramatta, approximating the term used by the local Aboriginal people.[18] A neighbouring suburb acquired the name "Rose Hill", which today is spelt "Rosehill".
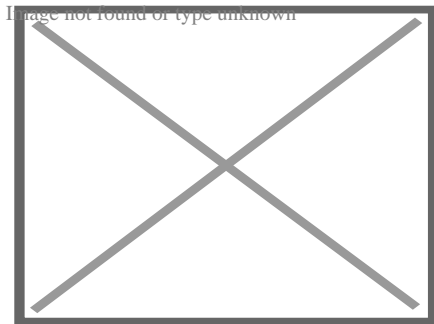
The former Female Orphan School was one of the first schools in the area

In an attempt to deal with the food crisis, Phillip in 1789 granted a convict named James Ruse the land of Experiment Farm at Parramatta on the condition that he develop a viable agriculture. There, Ruse became the first European to successfully grow grain in Australia. The Parramatta area was also the site of the pioneering of the Australian wool industry by John Macarthur's Elizabeth Farm in the 1790s. Philip Gidley King's account of his visit to Parramatta on 9 April 1790 is one of the earliest descriptions of the area. Walking four miles with Governor Phillip to Prospect, he saw undulating grassland interspersed with magnificent trees and a great number of kangaroos and emus.[19]

The Battle of Parramatta, a major battle of the Australian frontier wars, occurred in March 1797 where Eora leader Pemulwuy led a group of Bidjigal warriors, estimated to be at least 100, in an attack on the town of Parramatta. The local garrison withdrew to their barracks and Pemulwuy held the town until he was eventually shot and wounded. A year later, a government farm at Toongabbie was attacked by Pemulwuy, who challenged the New South Wales Corps to a fight.[20][21]

Governor Arthur Phillip built a small house for himself on the hill of The Crescent. In 1799 this was replaced by a larger residence which, substantially improved by Governor Lachlan Macquarie from 1815 to 1818, has survived to the present day, making it the oldest surviving Government House anywhere in Australia. It was used as a retreat by Governors until the 1850s, with one Governor (Governor Brisbane) making it his principal home for a short period

in the 1820s.

In 1803, another famous incident occurred in Parramatta, involving a convicted criminal named Joseph Samuel, originally from England. Samuel was convicted of murder and sentenced to death by hanging, but the rope broke. In the second attempt, the noose slipped off his neck. In the third attempt, the new rope broke. Governor King was summoned and pardoned Samuel, as the incident appeared to him to be divine intervention.[22]

In 1814, Macquarie opened a school for Aboriginal children at Parramatta as part of a policy of improving relations between Aboriginal and European communities. This school was later relocated to "Black Town".[23]

Parramatta was gazetted as a city on 19 November 1976, and later, a suburb on 10 June 1994.

The first significant skyscrapers began to emerge in Parramatta in the late 1990s and the suburb transformed into a major business and residential hub in the early 2000s. Since then, the suburb's growth has accelerated in the past decade.

On 20 December 2024, the first stage of the Parramatta Light Rail was completed.

Climate

[edit]
Further information: Climate of Sydney

Parramatta has a humid subtropical climate (Köppen climate classification: *Cfa*) with mild to cool, somewhat short winters and warm to usually hot summers, alongside moderate rainfall spread throughout the year.

Summer maximum temperatures are quite variable, often reaching above 35 °C (95 °F), on average 13.1 days in the summer season, and sometimes remaining in the low 20s, especially after a cold front or a sea breeze, such as the southerly buster. Northwesterlies can occasionally bring hot winds from the desert that can raise temperatures higher than 40 °C (104 °F) mostly from November to February, and sometimes above 44 °C (111 °F) in January severe heatwaves. The record highest temperature (since 1967) was 47.0 °C (116.6 °F) on 4 January 2020. Parramatta is warmer than Sydney CBD in the summer due to the urban heat island effect and its inland location. In extreme cases though, it can be 5–10 °C (9–18 °F) warmer than Sydney, especially when sea breezes do not penetrate inland on hot summer and spring days. For example, on 28 November 2009, the city reached 29.3 °C (84.7 °F),[24] while Parramatta reached 39.0 °C (102.2 °F),[25] almost 10 °C (18 °F) higher. In the summer, Parramatta, among other places in western Sydney, can often be the hottest place in the world because of the Blue Mountains trapping hot air in the region, in addition to the UHI effect.[26]

Rainfall is slightly higher during the first three months of the year because the anticlockwise-rotating subtropical high is to the south of the country, thereby allowing moist easterlies from the Tasman Sea to penetrate the city.[27][28] The second half of the year tends to be drier (late winter/spring) since the subtropical high is to the north of the city, thus permitting dry westerlies from the interior to dominate.[29] Drier winters are also owed to its position on the leeward side of the Great Dividing Range, which block westerly cold fronts (that are more common in late winter) and thus would become foehn winds, whereby allowing decent amount of sunny days and relatively low precipitation in that period.[30] Thunderstorms are common in the months from early spring to early autumn, occasionally quite severe thunderstorms can occur. Snow is virtually unknown, having been recorded only in 1836 and 1896[31] Parrammatta gets 106.6 days of clear skies annually.

Depending on the wind direction, summer weather may be humid or dry, though the humidity is mostly in the comfortable range, with the late summer/autumn period having a higher average humidity than late winter/early spring.

Climate data for Parramatta North (1991–2020 averages, 1967–present extremes)												
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Record high °C (°F)	47.0 (116.6)	44.5 (112.1)	40.5 (104.9)	37.0 (98.6)	29.2 (84.6)	25.5 (77.9)	26.8 (80.2)	30.6 (87.1)	36.5 (97.7)	40.1 (104.2)	42.7 (108.9)	44.0 (111.2)
Mean maximum °C (°F)	40.1 (104.2)	37.5 (99.5)	33.9 (93.0)	30.3 (86.5)	26.2 (79.2)	22.3 (72.1)	22.7 (72.9)	25.7 (78.3)	30.8 (87.4)	34.3 (93.7)	36.6 (97.9)	37.6 (99.7)
Mean daily maximum °C (°F)	29.1 (84.4)	28.3 (82.9)	26.5 (79.7)	23.9 (75.0)	20.9 (69.6)	18.2 (64.8)	17.8 (64.0)	19.5 (67.1)	22.3 (72.1)	24.5 (76.1)	25.8 (78.4)	27.7 (81.9)
Mean daily minimum °C (°F)	17.9 (64.2)	17.7 (63.9)	15.9 (60.6)	12.6 (54.7)	9.6 (49.3)	7.5 (45.5)	6.3 (43.3)	6.9 (44.4)	9.4 (48.9)	12.0 (53.6)	14.3 (57.7)	16.4 (61.5)
Mean minimum °C (°F)	12.9 (55.2)	12.7 (54.9)	10.9 (51.6)	7.8 (46.0)	4.5 (40.1)	2.9 (37.2)	1.7 (35.1)	2.4 (36.3)	4.5 (40.1)	6.5 (43.7)	8.6 (47.5)	10.9 (51.6)
Record low °C (°F)	10.1 (50.2)	9.2 (48.6)	6.8 (44.2)	4.0 (39.2)	1.4 (34.5)	0.8 (33.4)	?1.0 (30.2)	0.7 (33.3)	0.7 (33.3)	3.6 (38.5)	4.0 (39.2)	7.7 (45.9)
Average precipitation mm (inches)	89.9 (3.54)	130.3 (5.13)	99.1 (3.90)	78.3 (3.08)	61.3 (2.41)	99.0 (3.90)	48.0 (1.89)	47.4 (1.87)	48.5 (1.91)	61.3 (2.41)	82.0 (3.23)	78.5 (3.09)
Average precipitation days (? 1 mm)	8.6	9.0	9.9	7.0	6.3	7.9	6.0	4.8	5.7	7.0	8.7	8.3

| Average afternoon **relative humidity** (%)	56	59	58	56	59	58	55	45	46	50	54	55
Average **dew point** °C (°F)	16.2 (61.2)	16.8 (62.2)	15.5 (59.9)	12.7 (54.9)	9.9 (49.8)	7.6 (45.7)	5.6 (42.1)	5.5 (41.9)	7.7 (45.9)	9.9 (49.8)	12.3 (54.1)	14.3 (57.7)

Source: Bureau of Meteorology[32]

Commercial area

[edit]
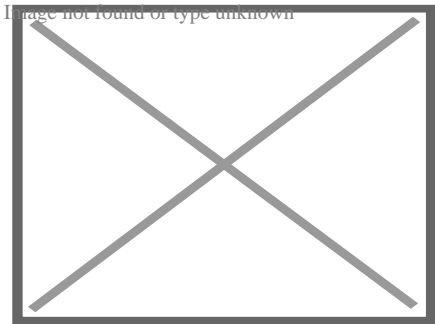
Church Street

Church Street is home to many shops and restaurants. The northern end of Church Street, close to Lennox Bridge, features *al fresco* dining with a diverse range of cuisines. Immediately south of the CBD Church Street is known across Sydney as 'Auto Alley' for the many car dealerships lining both sides of the street as far as the M4 Motorway.[33]
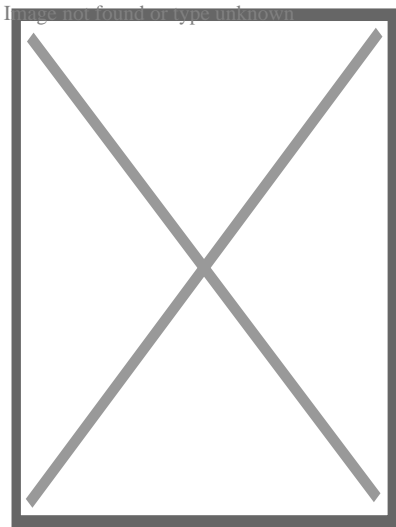
6 & 8 Parramatta Square, Parramatta's tallest building

Since 2000, Parramatta has seen the consolidation of its role as a government centre, with the relocation of agencies such as the New South Wales Police Force Headquarters and the Sydney Water Corporation[12] from Sydney CBD. At the same time, major construction work occurred around the railway station with the expansion of Westfield Shoppingtown and the creation of a new transport interchange. The western part of the Parramatta CBD is known as the Parramatta Justice Precinct and houses the corporate headquarters of the Department of Communities and Justice. Other legal offices include the Children's Court of New South Wales and the Sydney West Trial Courts, Legal Aid Commission of NSW, Office of Trustee and Guardian (formerly the Office of the Protective Commissioner), NSW Registry of Births, Deaths and Marriages, and the Office of the Director of Public Prosecutions. Nearby on Marsden Street is the Parramatta Courthouse and the Drug Court of New South Wales. The Garfield Barwick Commonwealth Law Courts Building (named in honour of Sir Garfield Barwick), houses courts of the Federal Magistrates Court and the Family Court of Australia. The NSW Government has also announced plans to secure up to 45,000 m^2 of new A-grade leased office space in Parramatta to relocate a further 4,000 workers from the Sydney CBD.[34]
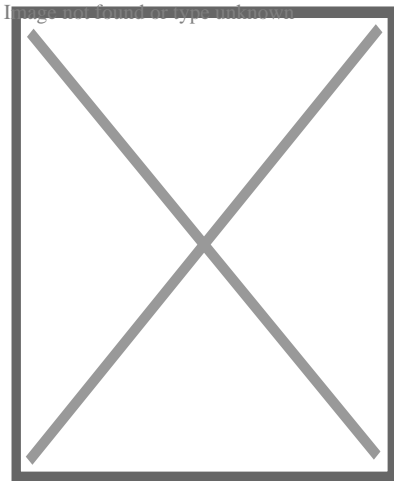
Eclipse Tower

Parramatta Square (previously known as Civic Place) is a civic precinct located in the heart of the city, adjacent to Parramatta Town Hall. The Parramatta Square construction works included a redevelopment of the Parramatta Civic Centre, construction of a new culture and arts centre, and the construction of a new plaza. The designs of the first two projects, a 65-storey residential skyscraper and an office building were announced on 20 July 2012.[35] Concerns from CASA about infringements into controlled airspace from the height of the residential tower resulted in 8 Parramatta Square being turned into a 55-story commercial building, rather than the originally proposed 65-storey residential tower.[36] Parramatta Square became home to 3,000 National Australia Bank employees, relocated from the Sydney CBD.[37] Other notable commercial tenants who have established a presence at Parramatta Square include Westpac, Endeavour Energy, KPMG and Deloitte.[38]

Centenary Square, formerly known as Centenary Plaza, was created in 1975 when the then Parramatta City Council closed a section of the main street to traffic to create a pedestrian plaza. It features an 1888 Centennial Memorial Fountain and adjoins the 1883 Parramatta Town Hall and St John's Cathedral.[39]

A hospital known as The Colonial Hospital was established in Parramatta in 1818.[40] This then became Parramatta District Hospital. Jeffery House was built in the 1940s. With the construction of the nearby Westmead Hospital complex public hospital services in Parramatta were reduced but after refurbishment Jeffery House again provides clinical health services. Nearby, Brislington House has had a long history with health services. It is the oldest colonial building in Parramatta, dating to 1821.[41] It became a doctors residence before being incorporated into the Parramatta Hospital in 1949.

Parramatta is a major business and commercial centre, and home to Westfield Parramatta, the tenth largest shopping centre in Australia.[42] Parramatta is also the major transport hub for Western Sydney, servicing trains and buses, as well as having a ferry wharf and future light rail and metro services. Major upgrades have occurred around Parramatta railway station with the creation of a new transport interchange, and the ongoing development of the Parramatta Square local government precinct.[43]

Places of worship

[edit]
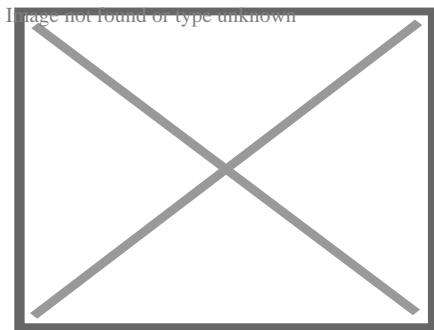
St John's Cathedral was completed in 1802

Church Street takes its name from St John's Cathedral (Anglican), which was built in 1802 and is the oldest church in Parramatta. While the present building is not the first on the site, the towers were built during the time of Governor Macquarie, and were based on those of the church at Reculver, England, at the suggestion of his wife, Elizabeth.[44] The historic St John's Cemetery is located nearby on O'Connell Street.[45]
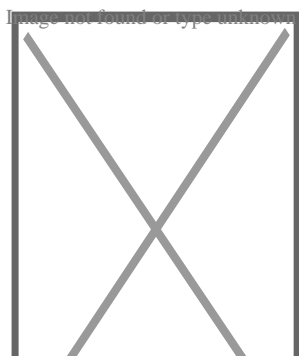
St Patrick's Cathedral
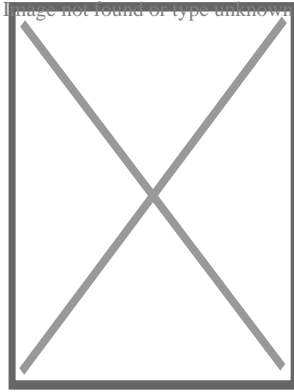
Congregational Church (1871)

St Patrick's Cathedral (Roman Catholic) is one of the oldest Catholic churches in Australia. Construction commenced in 1836, but it wasn't officially complete until 1837. In 1854 a new church was commissioned, although the tower was not completed until 1880, with the spire following in 1883.[46] It was built on the site to meet the needs of a growing congregation. It was destroyed by fire in 1996, with only the stone walls remaining.

On 29 November 2003, the new St Patrick's Cathedral was dedicated.[47] The historic St Patrick's Cemetery is located in North Parramatta. The Uniting Church is represented by Leigh Memorial Church.[48] Parramatta Salvation Army is one of the oldest active Salvation Army Corps in Australia. Parramatta is also home to the Parramatta and Districts Synagogue, which services the Jewish community of western Sydney.[49]

The Greek Orthodox Parish and Community of St Ioannis (St John The Frontrunner) Greek Orthodox Church was established in Parramatta in May 1960 under the ecumenical jurisdiction of the Greek Orthodox Archdiocese of Australia to serve the predominantly emigrating Greek population of Greater Western Sydney. Originally, the liturgies were held in the hall of St John's Ambulance Brigade in Harris Park until the completion of the church in December 1966 located in Hassall Street Parramatta. The parish sold this property in 2014 and is now located at the corner of George and Purchase Streets.[50] The Parish Community of St Ioannis continues to serve over 5,000 Greek parishioners.[51]
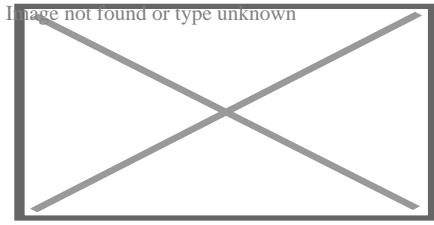
A Buddhist temple is located in Cowper Street, Parramatta.[52] Parramatta's Mosque is in an apartment building on Marsden Street, Parramatta.[53] The district is served by BAPS Swaminarayan Hindu temple located on Eleanor St, Rosehill,[54] and a Murugan Hindu temple in Mays Hill, off Great Western Highway.[55]

Parks

[edit]
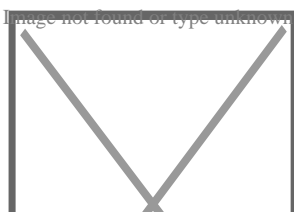
Victorian Gazebo at the Prince Alfred Square

The Old Government House is a major site of significance in Parramatta Park

Parramatta Park is a large park adjacent to Western Sydney Stadium that is a popular venue for walking, jogging and bike riding. It was formerly the Governor's Domain, being land set aside for the Governor to supply his farming needs, until it was gazetted as a public park in 1858.[56] As the Governor's Domain, the grounds were considerably larger than the current 85 hectare Parramatta Park, extending from Parramatta Road in the south as evident by a small gatehouse adjacent to Parramatta High School. For a time Parramatta Park housed a zoo[57] until 1951 when the animals were transferred to Taronga Zoo.

Parramatta is known as the 'River City' as the Parramatta River flows through the Parramatta CBD.[58] Its foreshore features a playground, seating, picnic tables and pathways that are increasingly popular with residents, visitors and CBD workers.[59]

Prince Alfred Square is a Victorian era park located within the CBD on the northern side of the Parramatta River. It is one of the oldest public parks in New South Wales with trees dating from c. 1869. Prior to being a public park, it was the site of Parramatta's second gaol from 1804 until 1841 and the first female factory in Australia between 1804 and 1821.

Transport

[edit]

In contrast to the high level of car dependency throughout Sydney, a greater proportion of Parramatta's workers travelled to work on public transport (45.2%) than by car (36.2%) in 2016.[60]
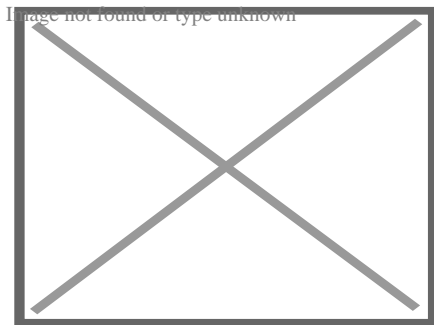
Parramatta railway station

Rail

Heavy rail

Parramatta railway station is served by Sydney Trains' Cumberland Line, Leppington & Inner West Line and North Shore & Western Line services.[61] NSW TrainLink operates intercity services on the Blue Mountains Line as well as services to rural New South Wales. The station was originally opened in 1855, located in what is now Granville, and known as Parramatta Junction. The station was moved to its current location and opened on 4 July 1860, five years after the first railway line in Sydney was opened, running from Sydney to Parramatta Junction.[62] It was upgraded in the 2000s, with work beginning in late 2003 and the new interchange opening on 19 February 2006.[63]

Light rail

Main article: Parramatta Light Rail

The light rail Westmead & Carlingford Line runs from Westmead to Carlingford via the Parramatta city centre. A future branch will run to Sydney Olympic Park.[64]

Metro

Main article: Sydney Metro West

The under construction Sydney Metro West will be a metro line run between the Sydney central business district and Westmead. Announced in 2016,[65] the line is set to open in 2032 with a station in Parramatta.[66]

Bus

Parramatta is also serviced by a major bus interchange located on the south eastern side of the railway station. The interchange is served by buses utilising the North-West T-way to Rouse Hill and the Liverpool–Parramatta T-way to Liverpool. Parramatta is also serviced by one high frequency Metrobus service:

- M91 – Parramatta to Hurstville via Granville, Bankstown and Peakhurst

A free bus Route 900 is operated by Transit Systems in conjunction with the state government. Route 900 circles Parramatta CBD.[67] A free bus also links Western Sydney Stadium to Parramatta railway station during major sporting events.
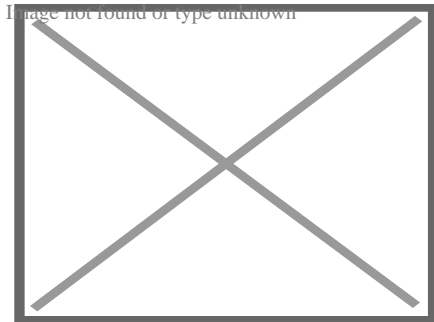
Parramatta ferry wharf

Ferry

The Parramatta ferry wharf is at the Charles Street Weir, which divides the tidal saltwater from the freshwater of the upper river, on the eastern boundary of the Central Business District. The wharf is the westernmost destination of Sydney Ferries' Parramatta River ferry services.[68]

Road

Parramatta Road has always been an important thoroughfare for Sydney from its earliest days. From Parramatta the major western road for the state is the Great Western Highway. The M4 Western Motorway, running parallel to the Great Western Highway has taken much of the traffic away from these roads, with entrance and exit ramps close to Parramatta.
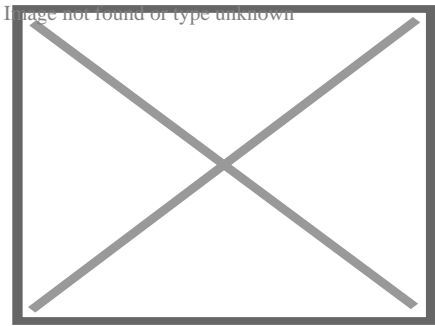
James Ruse Drive serves as a partial ring-road circling around the eastern part of Parramatta to join with the Cumberland Highway to the north west of the city.

The main north-south route through Parramatta is Church Street. To the north it becomes Windsor Road, and to the south it becomes Woodville Road.

Demographics

[edit]

Historical population

Parramatta Town Hall in 2023

Year	Pop.	±%
2001	17,982	—
2006	18,448	+2.6%
2011	19,745	+7.0%
2016	25,798	+30.7%
2021	30,211	+17.1%

According to the 2016 census conducted by the Australian Bureau of Statistics, the suburb of Parramatta had a population of 30,211. Of these:[69]

Ethnic diversity
>   The most common country of birth in Parramatta is India representing 30.9% of the population, outnumbering Australian born residents at 24.8%. The next most common are China 8.9%, Nepal 5.5%, Philippines 2.5% and Iran 1.3%. However, only 6.8% identify their ancestry as Australian; the other common self-identified ancestries were Indian 27.3%, Chinese 15.3%, English 8.5% and Nepali 5.5%. About one quarter (24.4%) of people spoke English at home; other languages spoken at home included Hindi 10.4%, Mandarin 8.8%, Nepali 5.3%, Tamil 5.0% and Telugu 4.3%.

Religion
>   This question is optional in the Census. Of the people who answered it, the most common response was Hinduism 33.6%; the next most common responses were "No Religion" 21.6%, Catholic 12.1%, Not stated 7.7% and Islam 7.5%.

Age distribution
>   Parramatta has an over-representation of young adults when compared to the country as a whole. Parramatta residents' median age was 32 years, compared to the national median of 38. Children aged under 15 years made up 16.3% of the population (national average is 18.2%) and people aged 65 years and over made up 6.6% of the population (national average is 17.2%).

Income

The average weekly household income was $2,092, compared to the national average of $1,746.

Housing

The majority of dwellings in Parramatta (85.6%) were flats, units or apartments; 7.7% were separate houses, and 5.7% were semi-detached (mostly townhouses). The average household size was 2.4 people. In 2021, 2.2% of households were public housing, compared to 6.3% in 2016.[70]

Notable residents

[edit]

- Keith Agget (1931–2017), rugby league player
- Bernie Banton (1946–2007), builder and social justice campaigner
- Richie Benaud (1930–2015), cricketer and commentator
- Allan Cunningham (1791–1839), explorer and botanist
- Greg Dyer (born 1959), cricketer
- Gerry Hazlitt (1888–1915), cricketer
- Paul Hogan (born 1939), comedian and actor
- Harry Hopman (1906–1985), tennis player
- David Lennox (1788–1873), colonial bridge builder
- John Lewin (1770–1819), first professional artist in New South Wales
- Bruce Mann (1926–2007), rugby league player
- George McIver (1859–1945), science fiction writer
- Rev. Samuel Marsden (1765–1838), known as the "flogging parson"
- Mary Cover Hassall (1799–1825), Methodist missionary to Tonga Island
- Dowell Philip O'Reilly (1865–1923), poet and politician
- Todd Payten (born 1979), rugby league player and coach
- "Jock" Ross (born 1943), outlaw biker.
- Nora Kate Weston (1880-1965), artisan
- J. C. Wharton (1853–1929), editor of *Parramatta Times* (defunct) and a local history[71]

Education

[edit]
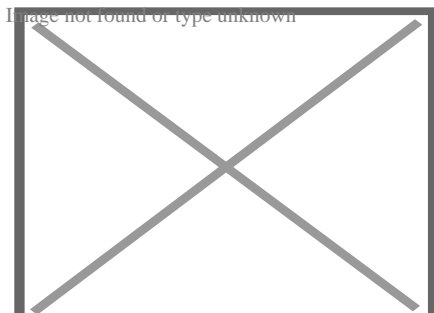
Macarthur Girls High School

Parramatta is home to several primary and secondary schools. Arthur Phillip High School was established in 1960 in its own right, in buildings which had been used continuously as a school since 1875 is the oldest continuously operating public school in Parramatta. Parramatta High School was the first coeducational school in the Sydney metropolitan area established in 1913. Our Lady of Mercy College is one of the oldest Catholic schools in Australia. Macarthur Girls High School is successor to an earlier school 'Parramatta Commercial and Household Arts School'. Others schools include Parramatta Public School, Parramatta East Public School, Parramatta West Public School, and St Patrick's Primary Parramatta.
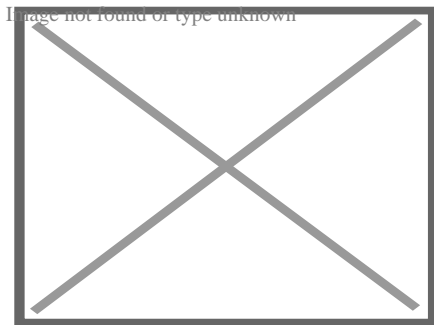
Old King's School

Several tertiary education facilities are also located within Parramatta. A University of New England study centre and two Western Sydney University campuses are situated in Parramatta. The Western Sydney University Parramatta Campus consists of two sites: Parramatta South (the primary site) which occupies the site of the historic Female Orphan School[72] and Parramatta North (the secondary site) which includes the adjacent Western Sydney University Village Parramatta (formerly UWS Village Parramatta) an on campus student village accommodation. Whereby, the flagship Parramatta City Campus Precinct consists of two buildings: the Engineering Innovation Hub located at 6 Hassall Street and the Peter Shergold Building located at 1 Parramatta Square (169 Macquarie Street).[73] Alphacrucis University College is a Christian liberal arts college with a campus in Parramatta located at 30 Cowper Street.[74] The University of Sydney has also announced that it intends to establish a new campus in Parramatta.[75]

Media

[edit]

The *Parramatta Advertiser* is the local newspaper serving Parramatta and surrounding suburbs.

On 16 March 2020, the Australian Broadcasting Corporation opened a new Western Sydney newsroom in Horwood Place at Parramatta incorporating space for 12 staff and news

production equipment with the capacity to broadcast live radio programs.[76] According to the ABC, the opening formed part of its strategic goal to improve its presence in outer metropolitan areas.[76] Additionally, the ABC announced on 16 June 2021 its intention to relocate approximately 300 employees to Parramatta, which is part of a five-year plan which aims to have 75% of its content makers based away from the network's Ultimo headquarters by 2025.[77][78]

Culture and sport

[edit]
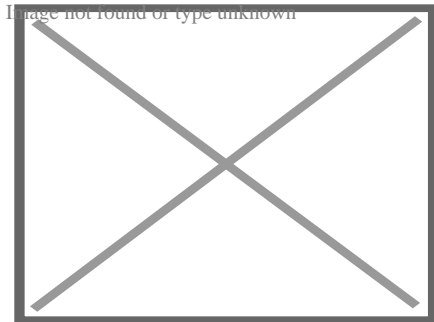
CommBank Stadium
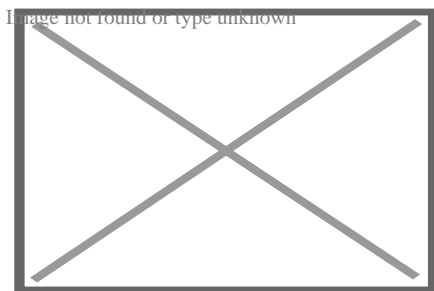
Various events are held on the Parramatta River

As the centre of the City of Parramatta, as well as the centre and second largest business district of Sydney, Parramatta hosts many festivals and events.[79] Riverside Theatres is a performing arts centre located on the northern bank of Parramatta River. The city hosts the following events:

- January – Sydney Festival and Australia Day[80]
- February – Lunar New Year and Tropfest[81]
- April – Anzac Day
- July – Winterlight and Burramatta Day (Naidoc)
- October – Parramasala and Parramatta Lanes[82]
- November – Loy Krathong, Christmas in Parramatta and Foundation Day
- December – New Year's Eve

Parramatta Park contains Old Government House and thus Parramatta was once the capital of the colony of New South Wales until Governors returned to residing in Sydney in 1846.[83] Another feature is the natural amphitheatre located on one of the bends of the river, named by Governor Philip as "the Crescent", which is used to stage concerts. It is home to the Dairy Cottage, built from 1798 to 1805, originally a single-room cottage and is one of the earliest surviving cottages in Australia.

The remains of Governor Brisbane's private astronomical observatory, constructed in 1822, are visible. Astronomers who worked at the observatory, discovering thousands of new stars and deep sky objects, include James Dunlop and Carl Rümker. In 1822, the architect S. L. Harris designed the Bath House for Governor Brisbane and built it in 1823. Water was pumped to the building through lead pipes from the river. In 1886, it was converted into a pavilion.[84]

Cultural events

[edit]

- ○ The Rosehill Race Course holds various race meets throughout the year, including: Derby Day, Golden Rose Day, and Rosehill Gardens Race Day.
- ○ The Parramatta Farmers Markets[85] occurs every Friday, and has local produce.

Sporting teams

[edit]

Parramatta is the home of several professional sports teams. These teams include the Parramatta Eels of the National Rugby League and Western Sydney Wanderers of the A-League. Both teams formerly played matches at Parramatta Stadium that has since been demolished, and replaced with the 30,000-seat Western Sydney Stadium.[86] Parramatta Stadium was also home to the now dissolved Sydney Wave of the former Australian Baseball League and Parramatta Power of the former National Soccer League. The newly built Bankwest Stadium opened its gates for the community on 14 April 2019 with free entry for all fans. Located on O'Connell Street, the stadium is in proximity of the Parramatta CBD. The opening sporting event was the 2019 Round 6 NRL clash between Western Sydney rivals the Parramatta Eels and Wests Tigers on Easter Monday 22 April. The Eels won the match by a score of 51–6. It is being predicted that the new stadium will boost Western Sydney economy by contributing millions of dollars to it.[87]

Entertainment

[edit]

Duran Duran's "Union of the Snake" music video with Russell Mulcahy was filmed in 1983 at Parramatta using 35mm film.[88]

The 2013 superhero film *The Wolverine* used the intersection of George Street and Smith Street as a filming location to depict Tokyo, Japan.[89]

Heritage listings

[edit]

Parramatta has a number of heritage-listed sites, including:

- 1 and 3 Barrack Lane: Warders Cottages[90]
- 39 Campbell Street: Lennox House[91]
- 195 Church Street: St John's Cathedral[92]
- 349–351 (adj) Church Street: Lennox Bridge[93]
- 353 Church Street: Prince Alfred Square[94]
- 541 Church Street: Oddfellows Arms Inn[95]
- Fleet Street: Parramatta Female Factory and Institutions Precinct[96][97]
- 10 George Street: Brislington[98]
- 65–69 George Street: Roxy Theatre[99]
- 85 George Street: Perth House[100]
- 88–92 George Street: 88–92 George Street[101]
- 182 George Street: Harrisford[102]
- Great Western railway: Parramatta railway station[103]
- Horwood Place: Redcoats Mess House[104]
- Linden House, 2 Smith Street: New South Wales Lancers Memorial Museum Collection[105]
- 1 Marist Place: Murphy House[106]
- 45 Macquarie Street: Parramatta Archaeological Site[107]
- Marsden Street: Parramatta Hospital Archaeological Site[108]
- 8 Melville Street: Macarthur House[109]
- O'Connell Street: Old King's School[110][111]
- O'Connell Street: Old Government House[112]
- 1 O'Connell Street: St John's Anglican Cemetery[113]
- 12, 14, 16 O'Connell Street: Travellers Rest Inn[114]
- 25 O'Connell Street: Avondale[115]
- 40–42 O'Connell Street: Roseneath Cottage[116]

- Corner O'Connell Street and Dunlop Street, North Parramatta: Parramatta Correctional Centre[117]
- 54 Sorrell Street: Endrim[118]
- 43a Thomas Street: Broughton House[119]

See also

[edit]

- List of tallest buildings in Parramatta
- Parramatta cloth
- Story Factory

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External links

[edit]

Wikivoyage has a travel guide for *Parramatta*.

Wikimedia Commons has media related to *Parramatta, New South Wales*.

Wikisource has the text of the 1911 *Encyclopædia Britannica* article "**Parramatta**".

- Parramatta City Council website
- Parramatta Park website
- Parramatta & District Historical Society Inc website

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

Suburbs and localities within the City of Parramatta, Western Sydney, Sydney

- Camellia
- Carlingford
- Clyde
- Constitution Hill
- Dundas
- Dundas Valley
- Eastwood
- Epping
- Ermington
- Granville
- Harris Park
- Model Farms
- Newington
- Northmead
- North Rocks
- Oatlands
- Old Toongabbie
- Parramatta
- North Parramatta
- Pendle Hill
- Rosehill
- Rydalmere
- Seven Hills
- Silverwater
- South Granville
- Sydney Olympic Park
- Telopea
- Toongabbie
- Wentworth Point
- Wentworthville
- Winston Hills
- Westmead

List of Sydney suburbs

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

Geography of Parramatta River

Sources	○ *Toongabbie Creek* ○ *Darling Mills Creek*
Tributaries: left	○ *Vineyard Creek* ○ *Subiaco Creek* ○ *Archer Creek* ○ *Smalls Creek* ○ *Charity Creek* ○ Lane Cove River
Tributaries: right	○ Duck River ○ *Haslams Creek* ○ *Powells Creek* ○ *Iron Cove Creek* ○ *Hawthorne Canal*
Islands	○ Rodd Island ○ Snapper Island ○ Spectacle Island ○ Cockatoo Island
Parramatta River ferry services	○ Parramatta ○ Rydalmere ○ Sydney Olympic Park ○ Meadowbank ○ Kissing Point ○ Cabarita ○ Abbotsford ○ Chiswick ○ Huntleys Point

River crossings	○ Rings Bridge ○ Bernie Banton Bridge ○ Lennox Bridge ○ Barry Wilde Bridge ○ Elizabeth Street Footbridge ○ Macarthur Bridge ○ Clyde-Carlingford railway bridge ○ Thackeray Bridge (footbridge) ○ Silverwater Bridge ○ James Ruse Drive bridge ○ John Whitton Bridge ○ Meadowbank Railway Bridge ○ Ryde Bridge ○ Mortlake Ferry ○ Gladesville Bridge
River inlets and bays	○ Homebush Bay ○ Kissing Point Bay ○ Morrisons Bay ○ Kendall Bay ○ Glades Bay ○ France Bay ○ Exile Bay ○ Canada Bay ○ Kings Bay ○ Hen and Chicken Bay ○ Looking Glass Bay ○ Abbotsford Bay ○ Wallumatta Bay ○ Five Dock Bay ○ Lukes Bay ○ Drummoyne Bay ○ Iron Cove

Suburbs: north

- North Parramatta
- Rydalmere
- Ermington
- Melrose Park
- Meadowbank
- Putney
- Tennyson Point
- Gladesville
- Henley
- Huntleys Point
- Huntleys Cove
- Hunters Hill
- Woolwich
- Greenwich

Suburbs: south

- Parramatta
- Camellia
- Silverwater
- Newington
- Wentworth Point
- Sydney Olympic Park
- Liberty Grove
- Rhodes
- Concord
- Mortlake
- Breakfast Point
- Cabarita
- Canada Bay
- Five Dock
- Wareemba
- Abbotsford
- Chiswick
- Drummoyne
- Russell Lea
- Rodd Point
- Haberfield
- Lilyfield
- Rozelle
- Birchgrove

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

Convicts in Australia

- Assignment
- Australia Day
- Emancipation
- Female factories
- Freedom
- History of Australia (1788–1850)
- New Holland
- Women

Penal colonies

- Cockatoo Island
- Rosehill
- Sydney Cove
- Moreton Bay
- Redcliffe
- Maria Island
- Port Arthur
- Richmond
- Risdon Cove
- Macquarie Harbour (History)
- Norfolk Island (History)
- Saltwater River
- Sullivans Cove
- Western Australia

Events	○ First Fleet (1788) ○ Second Fleet (1789) ○ Third Fleet (1791) ○ *Lady Shore* mutiny (1797) ○ Castle Hill Rebellion (1804) ○ Rum Rebellion (1808) ○ Capture of the brig *Emu* (1813) ○ *Argo* disappearance (1814) ○ Norfolk Island mutinies (1826–1846) ○ *Cyprus* mutiny (1829) ○ Bathurst Rebellion (1830) ○ *Badger* escape (1833) ○ *Frederick* escape (1834) ○ Wreck of the *George III* (1835) ○ Wreck of the *Hive* (1835) ○ Wreck of the *Neva* (1835) ○ Cooking Pot Uprising (1846) ○ Catalpa rescue (1876) ○ Anti-Transportation League
Convict ships	○ First Fleet ○ Second Fleet ○ Third Fleet ○ New South Wales ○ Norfolk Island ○ Tasmania ○ Western Australia

Governors and **commandants**

- Arthur
- Bligh
- Bourke
- Brisbane
- Collins
- Darling
- Davey
- Denison
- Eardley-Wilmot
- Franklin
- Gipps
- Hunter
- Johnston
- King
- Logan
- Macquarie
- Paterson
- Phillip
- Sorell

Surgeons

- William Bland
- *Arthur Bowes Smyth*
- William Redfern
- *D'Arcy Wentworth*

Entrepreneurs

- Enoch Barratt
- Daniel Connor
- Daniel Cooper
- John Davies
- William Field
- William Hutchinson
- Mary Hyde
- Henry Kable
- Solomon Levey
- Simeon Lord
- Mary Reibey
- Robert Sidaway
- James Squire
- John Tawell
- Samuel Terry

Architects

- James Blackburn
- Francis Greenway

Bushrangers and escapees

- Charlotte Badger
- Matthew Brady
- Mary Bryant
- William Bryant
- William Buckley
- Moondyne Joe
- John Caesar
- Martin Cash
- William Chopin
- Michael Howe
- Lawrence Kavenagh
- John Mitchel
- Thomas Muir
- John Boyle O'Reilly
- Alexander Pearce
- William Westwood

Notable convicts

- Joseph Backler
- Thomas Bock

Popular culture

Music
- Transportation ballads
- "Botany Bay"
- "Moreton Bay"
- "Jim Jones at Botany Bay"
- "Van Diemen's Land"

Film
- *For the Term of His Natural Life* (1908)
- *The Assigned Servant* (1911)
- *It Is Never Too Late to Mend* (1911)
- *The Lady Outlaw* (1911)
- *The Life of Rufus Dawes* (1911)
- *The Mark of the Lash* (1911)
- *One Hundred Years Ago* (1911)
- *The Romantic Story of Margaret Catchpole* (1911)
- *Sentenced for Life* (1911)
- *Moondyne* (1913)
- *Transported* (1913)
- *The Tenth Straw* (1926)
- *For the Term of His Natural Life* (1927)
- *To New Shores* (1937)
- *Red Sky at Morning* (1944)
- *Under Capricorn* (1949)
- *Botany Bay* (1953)
- *Adam's Woman* (1970)
- *Journey Among Women* (1977)
- *The Last Confession of Alexander Pearce* (2008)
- *Van Diemen's Land* (2009)
- *The Nightingale* (2017)

Television
- *The Devil Makes Sunday* (1961)
- *The Devil Makes Sunday* (1962)
- *Against the Wind* (1978)
- *Sara Dane* (1982)
- *For the Term of His Natural Life* (1983)
- *The Incredible Journey of Mary Bryant* (2005)
- *Banished* (2015)
- *The Secret River* (2015)

- Journals of the First Fleet
- *It's Never Too Late to Mend* (1856)
- *The Broad Arrow* (1859)
- *Great Expectations* (1861)
- *The Wild Goose* (1867)
- *For the Term of His Natural Life* (1872)

- Brickendon Estate
- Cadmans Cottage
- Cascades Female Factory
- Coal Mines
- Commissariat Store, Brisbane
- Darlington Probation Station
- Elizabeth Farm
- Experiment Farm Cottage
- Fremantle Prison
- Great North Road
- Hyde Park Barracks
- Kingston and Arthur's Vale
- Lennox Bridge
- Old Government House
- Parramatta Female Factory
- Port Arthur
- Richmond Bridge
- Richmond Gaol
- Ross Female Factory
- The Old Windmill, Brisbane
- Vaucluse House
- Woolmers Estate

About Semantic Web

Image not found or type unknown
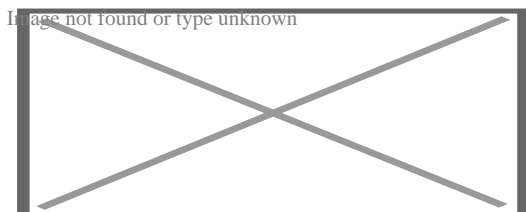
A tag cloud (a typical Web 3.0 phenomenon in itself) presenting Web 3.0 themes

- 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>
```


Image not found or type unknown

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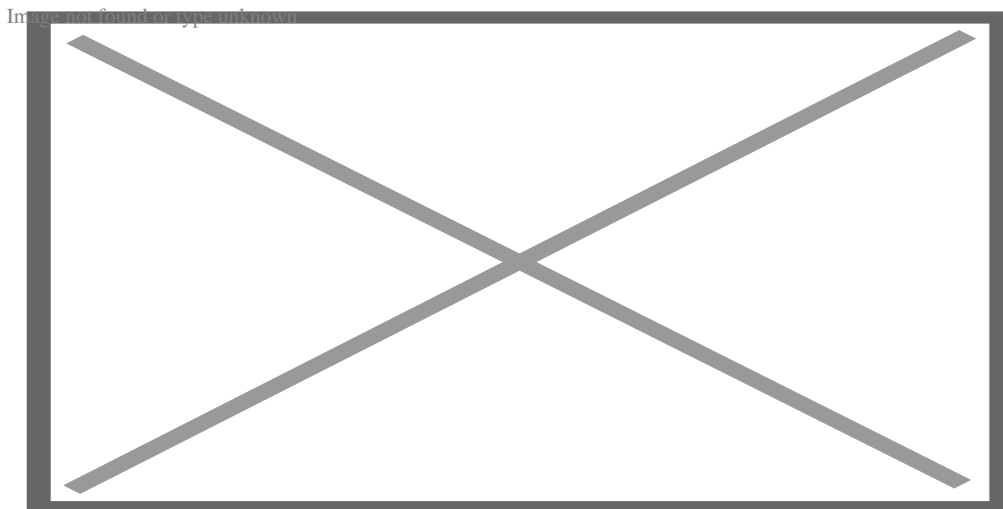
Graph resulting from the RDFa example, enriched with further data from the Web

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/

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 <em> 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 …
>
> —ÃƒÆ'Ã†â€™Ãƒâ€ Ã¢â‚¬â„¢ÃƒÆ'Ã¢â‚¬Â ÃƒÂ¢Ã¢â€šÂ¬Ã¢â€žÂ¢ÃƒÆ'Ã†â€™ÃƒÂ¢Ã¢â€šÂ 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.
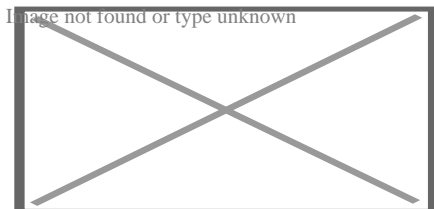
Arguments as distinct semantic units with specified relations and version control on Kialo

- 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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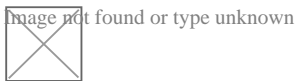
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  Semantic Web

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

Standards

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

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

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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

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- Computational archaeology
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