



Aalto University
School of Science



Linkitetyn datan julkaisumalli, standardit ja käytännöt

**Laki ja oikeus avoimena datana:
Semanttinen Finlex -palvelun julkistustilaisuus, 10.3.2016**

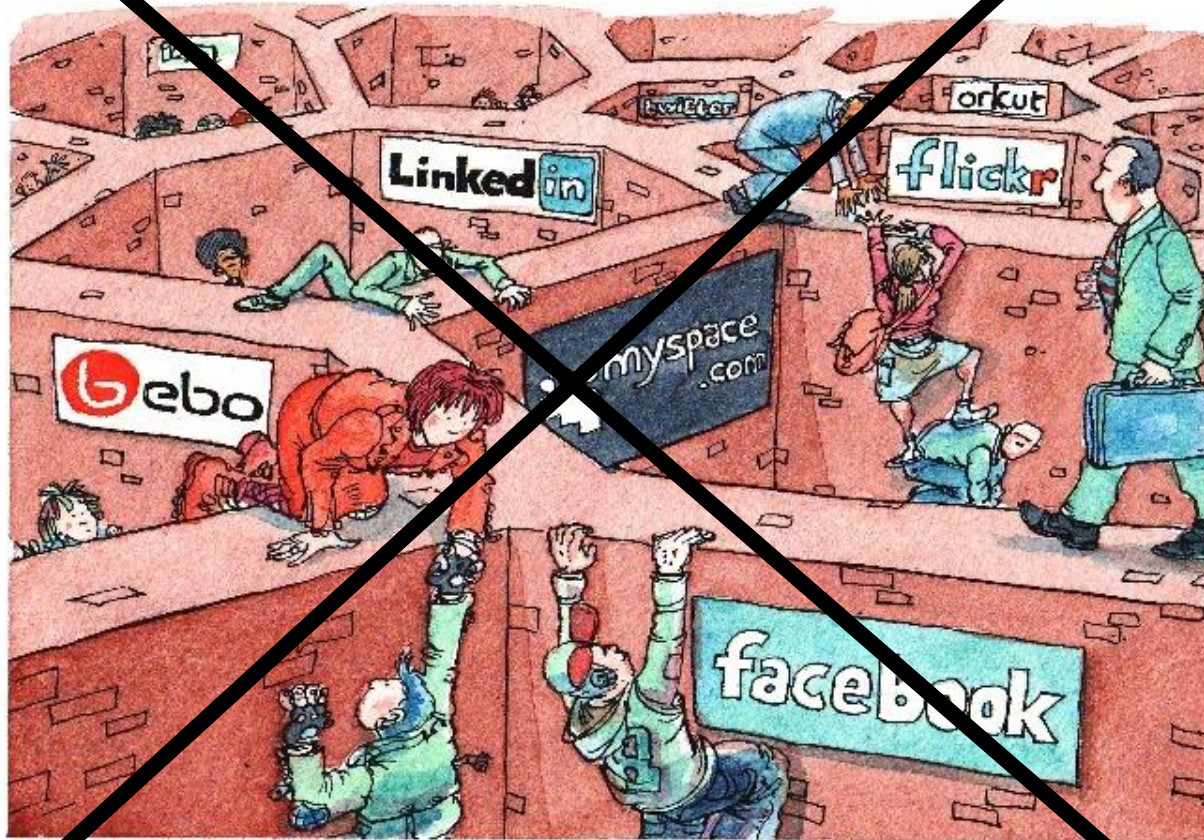
Jouni Tuominen

Department of Computer Science

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jouni.tuominen@aalto.fi

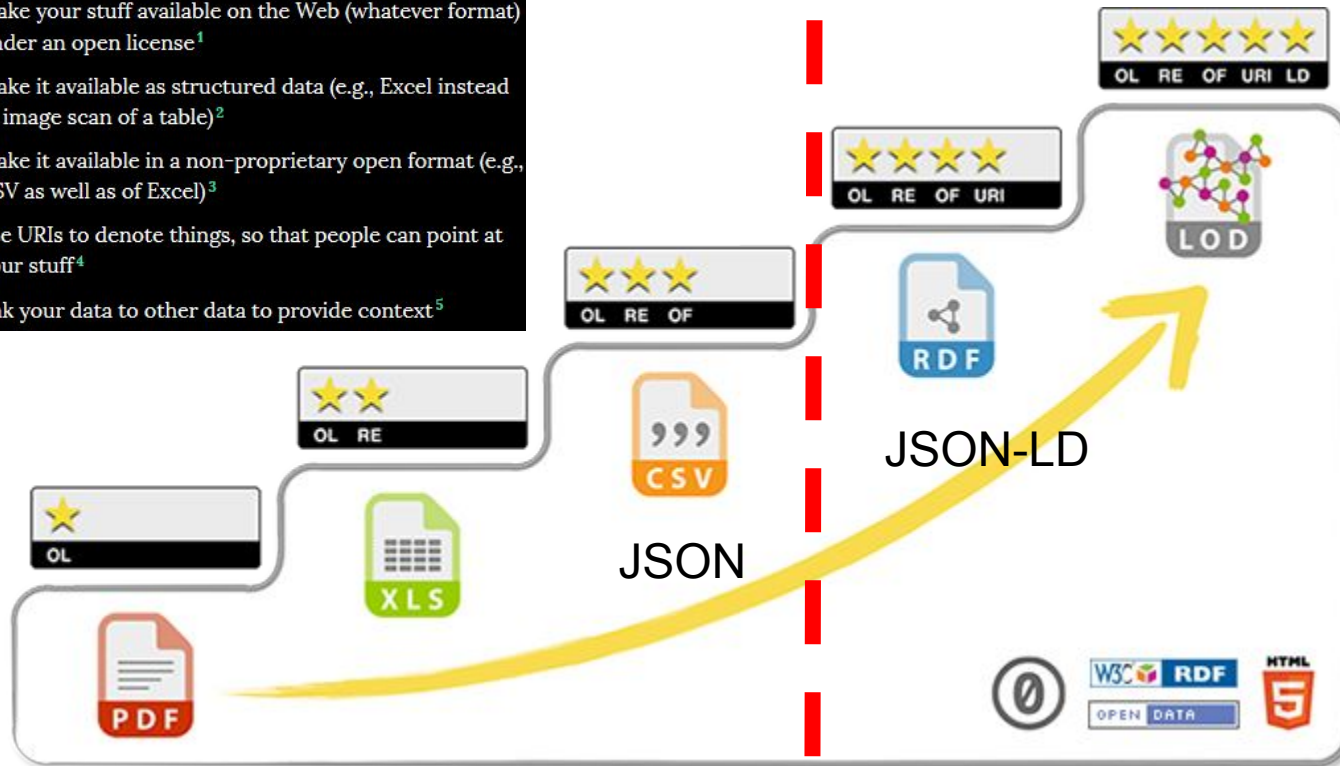
Traditional publishing model: data silos + difficult to use



How to publish Linked Data?

5-star Linked Data model

- ★ make your stuff available on the Web (whatever format) under an open license¹
- ★★ make it available as structured data (e.g., Excel instead of image scan of a table)²
- ★★★ make it available in a non-proprietary open format (e.g., CSV as well as of Excel)³
- ★★★★ use URIs to denote things, so that people can point at your stuff⁴
- ★★★★★ link your data to other data to provide context⁵



“Traditional” Open Data

Linked Open Data

(Tim Berners-Lee)
<http://5stardata.info>

”Linked Data principles” (Tim Berners-Lee)

1. Use URIs as names for things
2. Use HTTP URIs, so that people can look up those names
3. When someone looks up a URI, provide useful information, using the standards (RDF, SPARQL)
4. Include links to other URIs, so that they can discover more things

= Globally unique, resolvable identifiers: global linking

- **Other organizations (e.g., news sites) → Finlex (the 4th star)**
- **Finlex → EU legislation (5th star; EU fulfills the 4th star)**

URI dereferencing

Return user-friendly content about a URI using HTTP

- As specified by HTTP header request fields
 - *For humans: HTML*
 - *For machines: JSON-LD, Turtle, RDF/XML, N-Triples, ...*



Rikoslaki

2016-01-01

Content

Metadata

Rikoslaki

Me Aleksander Kolmas, Jumalan Armosta, koko Venäjänmaan Keisari ja Itsevaltias, Puolanmaan Zsaari, Suomen Suuriruhtinas, y.m., y.m., y.m. Teemme tiettäväksi: Suomenmaan Valtiosäätyjen alamaisesta esityksestä tahdomme Me täten armosta vahvistaa seuraavan rikoslain Suomen Suuriruhtinaanmaalle, jonka voimaanpanemisesta, niinkuin myöskin rangaistusten täytäntöönpanosta erityinen asetus annetaan:

1 luku

(16.8.1996/626)

Suomen rikosoikeuden soveltamisalasta

1 §

(16.8.1996/626)

Suomessa tehty rikos

Suomessa tehtyyn rikokseen sovelletaan Suomen lakia.

Suomen lain soveltamisesta Suomen talousvyöhykkeellä tehtyyn rikokseen säädetään Suomen talousvyöhykkeestä annetussa laissa (1058/2004) ja merenkulun ympäristönsuojelulaissa (1672/2009).

(29.12.2009/1680)

8

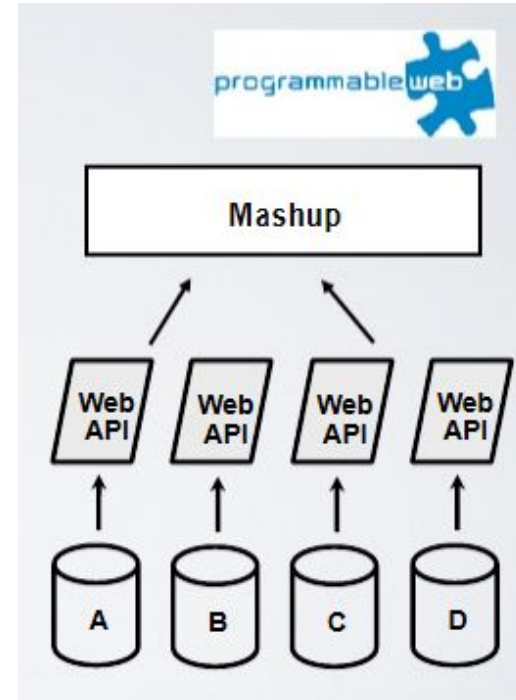
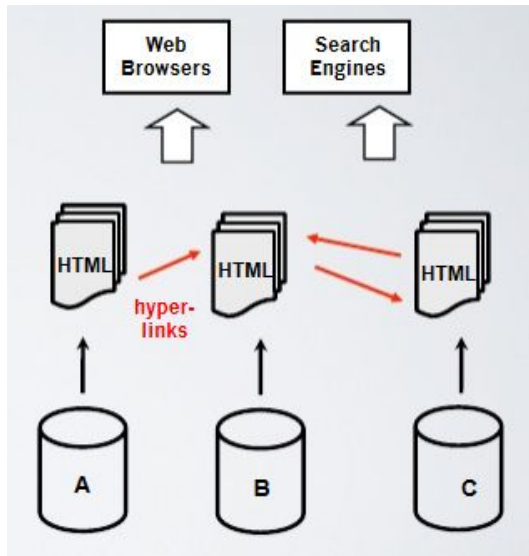
Muutossäädökset

- Laki rikoslain muuttamisesta
- Laki rikoslain 11 luvun muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain 11 luvun 11 §:n ja 47 luvun 3 §:n muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain 32 luvun 11 ja 12 §:n muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain 32 luvun 6 ja 14 §:n muuttamisesta
- Laki rikoslain muuttamisesta
- Laki rikoslain 48 a luvun muuttamisesta
- Laki rikoslain 48 a luvun muuttamisesta
- Laki rikoslain 48 a luvun muuttamisesta
- Laki rikoslain 48 a luvun 2 §:n muuttamisesta
- Laki rikoslain muuttamisesta

Linked Data interfaces for developers

- **Linked Data browsing.** For inspecting the data based on URI dereferencing
 - *Browsing based on RDF properties, rendered in HTML*
- **Reading RDF data of a URI.** Based on URI dereferencing
- **SPARQL endpoint.** For querying the data in a standard way for, e.g., mash-up applications
- **Download.** Downloading the data as an RDF data dump

Using Web of Data as a service



Linked Data Finland Living Lab

<http://ldf.fi>



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[Schemas](#)

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[Policies](#)

[Documentation](#)

[Validation](#)

[Applications](#)

[Your Data?](#)

Linked Data Finland

Living Laboratory Data Service for the Semantic Web

This site is the Living Laboratory of the [Linked Data Finland](#) research initiative, conducted by the [Semantic Computing Research Group](#) at [Aalto University](#) in collaboration with University of Helsinki and a large consortium of Finnish public organizations and companies.

Our goal is to make life easier for both publishers as well as consumers of structured data on the Web. We base our work on the [Linked Data](#) paradigm and stack of standards, which combines an expressive, semantic data model ([RDF](#)) with standardized access mechanisms ([SPARQL](#) and [live HTTP URIs](#)).

5-star Linked Data

The baseline of our work is the [5-star Linked Data model](#), proposed [originally](#) by Tim Berners-Lee.

- ★ Make data available on the Web in whatever format.
- ★★ Make data available as structured data (e.g., Excel instead of an image scan of a table).
- ★★★ Use non-proprietary formats (e.g., CSV instead of Excel format).
- ★★★★ Use URIs to denote things, so that people can point at your data.
- ★★★★★ Link your data to other data to provide context.

7-star Linked Data Service

However, in our opinion, providing 5-star Linked Data is just the beginning. To actually make use of the datasets, consumers need more support in getting to know and access them, as well as a better grasp of their quality and provenance. To this end, we extend the model with two additional stars:

- ★★★★★ Provide your data with a schema and documentation so that people can *understand and re-use* your data easily.
- ★★★★★★ Validate your data and denote its provenance so that people can *trust the quality* of your data.

This added support should come with as little extra work as possible to the data publisher. Our hypothesis is that a lot of this can be done automatically, basing on the Linked Data core. A data publisher needs only to provide

Our "7-star" model and LDF.fi data hotel

Goals: enhance re-usability and data quality

7-star Linked Data Service

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Validate your data and denote its provenance so that people can *trust the quality* of your data.

This added support should come with as little extra work as possible to the data publisher. Our hypothesis is that a lot of this can be done automatically, basing on the Linked Data core. A data publisher needs only to provide their data in the RDF format, and the LDF.fi portal will do the rest automatically. See the [overview paper](#) (in ESWC 2014 Proceedings, Springer-Verlag) for some more details about the underlying ideas.



Burj Al Arab



LDF.fi services

- 5-star Linked Data Services
 - *Viewing and browsing RDF*
 - *SPARQL endpoint services (using Fuseki)*
- Documentation
- Validation
- Visualization
- Data curation
 - *Automatic annotation, RDF editing, data linking*
- Sharing policies
 - *URI minting*
 - *Licensing*
- Your data?
 - *Open service for publishing useful Linked Data*

Example applications of Linked Data

Sotasampo

Talvi- ja jatkosota semanttisessa webissä

Sotasammon avulla voi hakea, selata ja visualisoida laajoja tietoaineistoja Suomen viime sodista [\(ohje\)](#).

Valitse hakunäkymä Sotasammon aineistoihin:

Tapahtumat

Talvi- ja jatkosodan tapahtumat kartalla ja aikajanalla muihin aineistoihin linkitettynä

Henkilöt

Aineistoissa esiintyviä henkilöitä ja heihin eri tavoin liittyviä tietoja

Joukko-osastot

Joukko-osastoihin liittyviä tapahtumia ym. tietoa mm. kartoilla visualisoituna

Paikat

Selaa ja hae viime sotien aikaisia paikkoja, kartoja sekä paikkoihin liittyviä muita aineistoja

Kansa taisteli

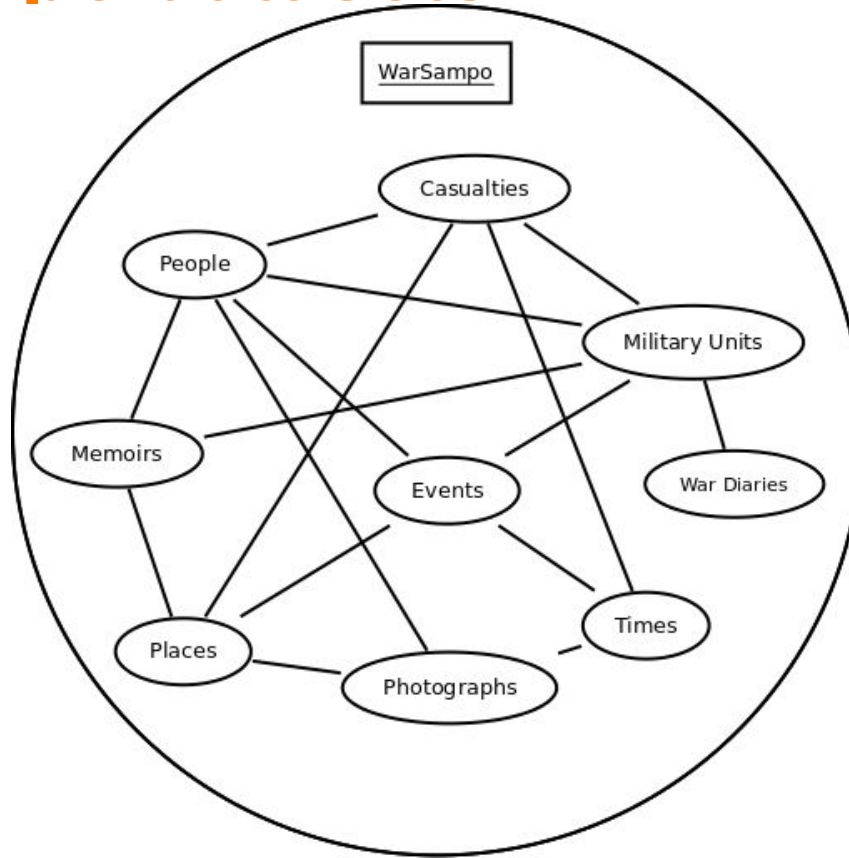
Kansa taisteli -lehtien artikkelien haku ja kontekstuaalinen linkitys täydentäviin aineistoihin

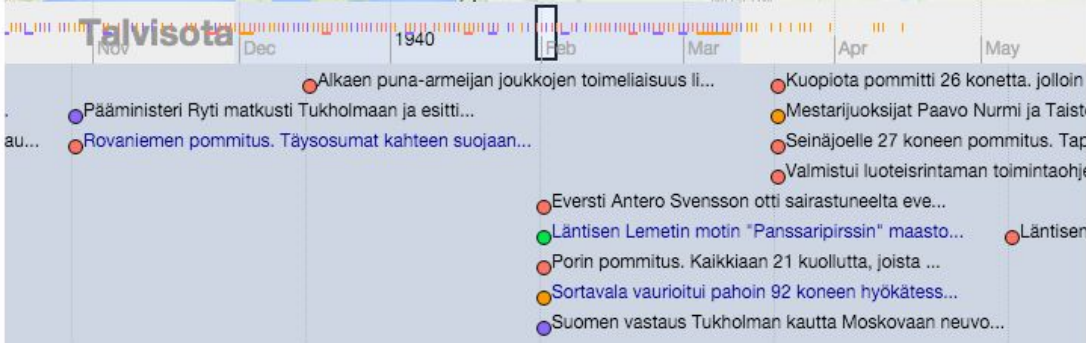
Menehtyneet

Sotasurmatietokannan sankarivainajien etsiminen ja datan tutkiminen fasettihaun avulla

Kuvat: SA-kuva

WarSampo datasets





Lemetti 2/2/1940 - Sotatoimi

Läntisen Lemetin motin "Panssaripirssin" maasto vallattiin.

[Näytä tietosivu](#)

8 kuvaa | [Näytä kaikki kuvat](#)



Menehtyneitä ajanjaksolla 30.1.1940 - 4.2.1940: 771 | [Näytä lisätietoja](#)

Using Linked Data to integrate cross-domain contents on BBC's websites

- Give URI to every item of interest
- Create metadata of contents using these URIs
- An item URI becomes an identifier for a web page that aggregates information about the item, e.g., place, person, TV program

Create mappings to external datasets and ontologies, e.g., DBpedia, MusicBrainz

- Enrich data with background information
- Give users semantic content recommendations

Publish Linked Open Data to application developers



Sign in

- News
- Sport
- Weather
- Shop
- Earth
- Travel
- More

Search

MUSIC

Search Music

- Audio & Video -
- BBC Playlists -
- Artists -
- Tracks -
- More -



Jarvis Cocker

Born 19 September 1963

Audio/Video (4)

Tracks (32)

Events

News

Similar Artists

LATEST CLIP
 "He was like an umbrella for people who felt a bit different"

LAST PLAYED ON BBC
 Aqua Marina (feat. Victoria Oruwari & Jarvis Cocker)

Find events near you

BBC News - BBC Rewind:
 When Britpop ruled the Brit Awards in 1996



BIOGRAPHY

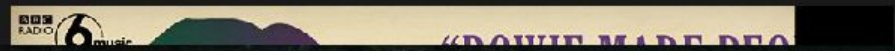
Jarvis Branson Cocker (born 19 September 1963) is an English musician, singer-songwriter, actor, voice actor, radio presenter and music video director. He is known...

[Read more](#)

+ Add to My Artists

< Share this page

Jarvis Cocker Audio & Video



BBC Things



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Search



THINGS BETA

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Welcome

BBC Things provides a single reference for a growing collection of the things that matter to the BBC and our audiences.

It uses [Semantic Web](#) technologies that allow open access to our data and is built on top of our [Linked Data Platform](#). The types of data we maintain about things can be found in our [Ontologies](#).

On BBC Things, we publish the data we use to build new experiences for our audiences, and we link to more complete, authoritative or canonical open data sources wherever possible.

See [the blogpost](#) for more information.

Find a thing

Type a person, place, organisation or concept

Search

Stuck for ideas? Why not try one of these suggestions?

- [Council](#)
- [Sussex](#)
- [Peter](#)

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Earth

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Enhancing web search engine access

Embedding structured metadata on web pages

- Formats: RDFa, JSON-LD
- Vocabularies: Schema.org, Good Relations (e-commerce)

Contents can be indexed better

- E.g., the retailer Best Buy reported 30 % increase in search traffic after adding RDFa markup using Good Relations [1]

Ranking and structuring search results

- E.g., Google's Rich Snippets based on Schema.org markup

“A sample of 10 billion pages from a combination of the Google index and Web Data: 31.3 % of pages have Schema.org markup in 2015, up from 22 % in 2014” (Guha et al., 2015)

Knowledge Graph utilized in Google search results




[All](#) [Images](#) [Videos](#) [News](#) [Maps](#) [More ▾](#) [Search tools](#)

About 177 000 000 results (0,87 seconds)

Barack Obama - Wikipedia, the free encyclopedia
https://en.wikipedia.org/wiki/Barack_Obama
"Barack" and "Obama" redirect here. For his father, see Barack Obama, Sr. For other uses of "Barack", see Barack (disambiguation). For other uses of "Obama", ...
[Michelle Obama](#) - [Barack Obama, Sr.](#) - [Ann Dunham](#) - [Early life and career of Barack](#)

In the news



Exclusive: Obama on Iowa, Clinton, Sanders and 2016
[Politico](#) - 23 hours ago
Barack Obama, that prematurely gray elder statesman, is laboring mightily to remain neutral ...

Barack Obama: Why we must rethink solitary confinement
[Washington Post](#) - 9 hours ago

Obama's Tortured Love Affair With Gadgets | MIT Technology Review
[MIT Technology Review](#) - 13 hours ago

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<https://twitter.com/BarackObama>


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Time's running out to #GetCovered before the January 31 deadline. Check out your options: [ofa.bo/g9gW](https://t.co/g9gW)

13 hours ago - [View on Twitter](#)

Take a look at President Obama's latest common-sense step to help fight climate change: [ofa.bo/h9qt](https://t.co/foa) #ActOnClimate





Barack Obama
44th U.S. President - barackobama.com

Barack Hussein Obama II is an American politician currently serving as the 44th President of the United States, the first African American to hold the office. [Wikipedia](#)

Born: August 4, 1961 (age 54), Honolulu, Hawaii, United States
Spouse: Michelle Obama (m. 1992)
Office: President of the United States since 2009
Parents: Ann Dunham, Barack Obama, Sr.
Education: Harvard Law School (1988–1991), more
Children: Malia Ann Obama, Natasha Obama

Profiles

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What will be the killer app for law and justice?