

## openlaws.eu – Building Your Personal Legal Network

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**Abstract.** openlaws is building an international online legal information platform. Users can organize legislation, case law and private legal data (e.g. contracts) in a personalized legal network. Data is linked, analyzed and visualized for increased productivity. The service makes legal research easier for experts and helps businesses to fulfill legal and contractual obligations. Citizens benefit from free access to legislation and case law.

**Keywords:** openlaws, legal technology, legal tech, open data, open innovation, big data, linked data, network, graph database, visualization, collaboration, personalization, mass-customization, legislation, case law, contract management, compliance, cloud, semantics, natural language processing, NLP, EU, justice, access to law.

### 1. Introduction

openlaws makes access to legal information easier, international and personal. Users can search, organize and share legislation, case law and contracts. Data is organized as linked data in an interactive network graph, which can be visualized.

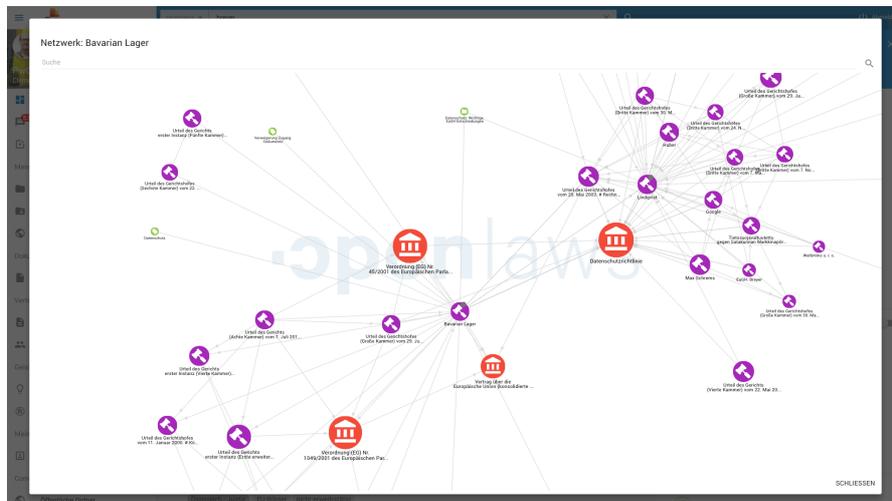


Figure 1. openlaws network graph, example 1, ECJ judgment “Bavarian Lager”

Legal experts like lawyers, judges, notaries and public administrations benefit from increased productivity and new ways to retrieve information in

an ever-increasing world of legal data (“hyper regulation”). Businesses and their departments (legal, compliance, HR, tax departments, IT) use the service to manage legislation that is relevant for their activities as well as contracts and contract partners. Larger organizations can even use the platform to manage compliance obligations. In the network, legal experts can be linked to their clients; businesses can collaborate internally and can even exchange information with contract partners.

openlaws.eu was co-funded by the European Commission (DG Justice).<sup>1</sup> The outcome of this research project was taken to market-readiness by the legal tech startup openlaws gmbh. The Austrian venture also received support from the Open Data Incubator (ODINE)<sup>2</sup>, the Open Data Institute<sup>3</sup>, and the Austrian AWS.<sup>4</sup>

## 2. Background

### 2.1 OPEN DATA

openlaws is built on open data. Open data is “data that anyone can access, use or share”, according to the definition of the ODI.<sup>5</sup> The European Directive 2003/98/EC on the re-use of public sector information (amended by Directive 2013/37/EU) provides a common legislative framework for making public sector information available for re-use at no or at marginal costs. Legislation and case law are good examples for such public sector information. The intention of open data and public sector information is that third-parties can create new and innovative solution on top of data, which is often referred to as the “new oil”.

The “raw material” that drives openlaws comes from European institutions and national governments. This raw material is “enhanced” to create new insights, to increase productivity and to enable users to manage regulatory obligations. openlaws also empowers users to crosslink open data with private data. The Legal Spectrum (figure 2) is derived from the

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<sup>1</sup> openlaws.eu was co-funded by the European Union / DG Justice under Civil Justice Action Grant JUST/2013/JCIV/AG. An introduction video is available on YouTube: <https://youtu.be/SWN00jZaXK0>.

<sup>2</sup> ODINE, <https://opendataincubator.eu/category/openlaws/>; see also The Guardian, openlaws is demystifying the legal world for businesses and citizens, <https://www.theguardian.com/odine-partner-zone/2016/mar/22/startup-openlaws-legal-access-odine-open-data>.

<sup>3</sup> Open Data Institute, <http://theodi.org/start-ups/openlaws>.

<sup>4</sup> Austrian Wirtschaftsservice GmbH, an Austrian federal funding agency for promoting innovative businesses, <https://www.aws.at/en/>.

<sup>5</sup> Open Data Institute, <https://theodi.org/what-is-open-data>.

ODI Data Spectrum<sup>6</sup> and illustrates the levels of access to legal information. While information like legislation and case law are available as open data, other legal information is intended to be kept in a shared or closed environment. For example, a company's terms and conditions are shared with the public, while specific contracts are only shared between the two contractual parties.

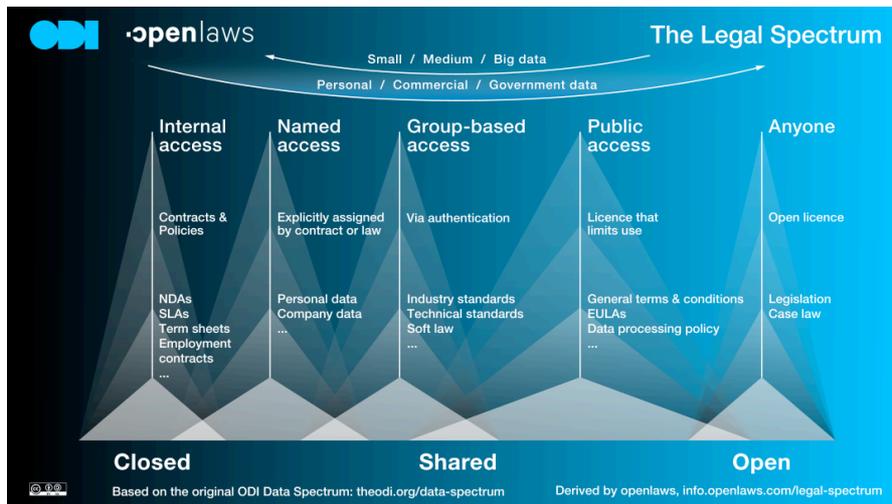


Figure 2. The Legal Spectrum

The 4<sup>th</sup> Global Open Data Index by Open Knowledge International was published on May 2<sup>nd</sup>. The index provides an overview on the state of open government and data publication and includes a ranking for the availability of national laws (figure 3).<sup>7</sup> The ranking depends of the following factors:

- Openly licensed
- In an open and machine-readable format
- Downloadable at once
- Up-to-date
- Publically available
- Available free of charge

<sup>6</sup> Open Data Institute, <https://theodi.org/data-spectrum>.

<sup>7</sup> Open Knowledge International, 4th Global Open Data Index, <https://index.okfn.org/dataset/law/>. Please note that the methodology changed compared to the previous reports.

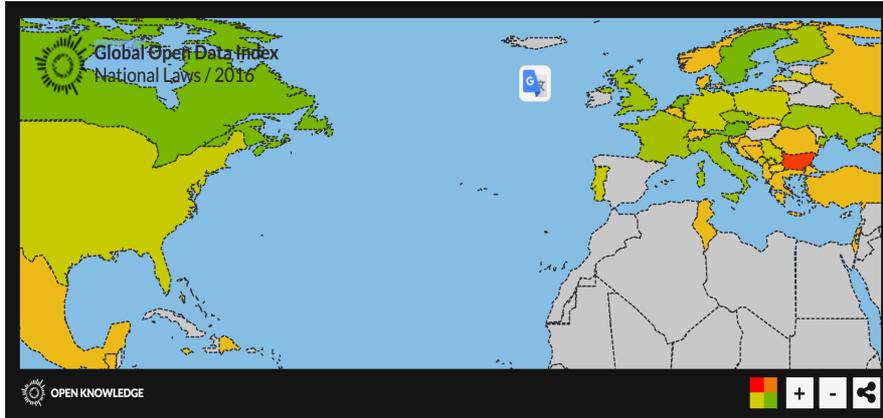


Figure 3. 4<sup>th</sup> Openness of National Laws

## 2.2 LINKED DATA

A network of legal information can only emerge when nodes are linked. Only with links it is possible to see how one element belongs to another. For example, a lawyer may have a strong relation to data protection law, because he/she appears in many cases, which are again linked to the data protection act. Or a company is linked to a specific industry, which is linked to specific relevant regulations, which are again linked to new case law, and so on.

Sir Tim Berners-Lee, the inventor of the World Wide Web, introduced the 5-star-deployment scheme for open data, stressing the importance of linked data. While it is a good first step to make data available, the aim is to provide context. The recommendation is: 1. Make your stuff available on the Web (whatever format) under an open license; 2. Make it available as structured data (e.g., Excel instead of image scan of a table); 3. Make it available in a non-proprietary open format (e.g., CSV as well as of Excel); 4. Use URIs to denote things, so that people can point at your stuff; 5. Link your data to other data to provide context (figure 4).<sup>8</sup>

<sup>8</sup> 5-star-open-data, Sir Tim Berners-Lee, <http://5stardata.info/en/>

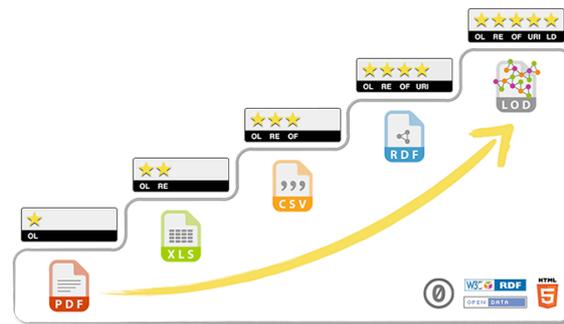


Figure 4. 5-star deployment scheme for open data by Sir Tim Berners-Lee

openlaws provides such context by creating a network of legislation, case law, private legal content and users and organizations. The platform imports and stores the aggregated data from public sources, extracts existing link structure and creates additional links by semantic analysis.

However, full reliance on the machine and on algorithms is not sufficient. openlaws also involves users to structure information – either in the closed, shared or open setting; the project applies open innovation principles.

### 2.3 OPEN INNOVATION

Open innovation is a paradigm that assumes that firms can and should use external as well as internal knowledge (information-in) and to provide solutions to its own user-base as well as to third parties (information-out), who can then build again solutions. Such third-party solutions might address the customer needs even better or in another segment (figure 5). The concept has become more and more popular in recent years to create solutions that are closer to the market.

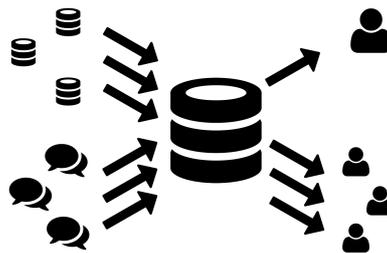


Figure 5. Open innovation

openlaws benefits from open data as “information-in” (legislation, case law, and other legal data from the public sector). On top of such “institutional data” from public bodies, openlaws includes information and knowledge from the community in a “social layer” (figure 6). Again, private information in the social layer can be kept closed, shared or made available to the public. The private data can be linked with public data to provide the necessary legal and regulatory context.

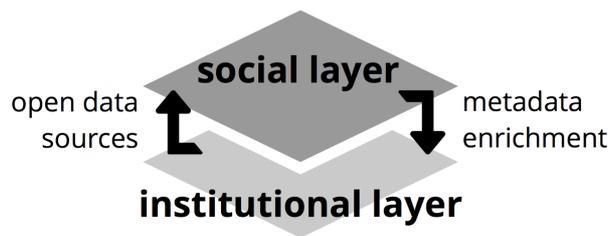


Figure 6. Social layer on top of institutional layer

### 3. Personal Legal Network

Legal technology is at the rise and the number of innovative legal solutions is steadily growing.<sup>9</sup> While other industries benefit from personalized and data-driven services since many years, the broad adoption of technology in law is still in its infancy, but has a large growth potential.<sup>10</sup> Stanford CodeX maintains a curated list of legal tech companies.<sup>11</sup>

Legal tech startups are active in several areas, such as legal research, online legal services, lawyer search services, contract creation and management tools, practice management, IP management, e-discovery and artificial intelligence, to name only a few specializations. openlaws combines the following aspects in a coherent service to manage legislation, case law and contracts:

<sup>9</sup> Roland Vogl, The Coming of Age of Legal Technology, <https://law.stanford.edu/2016/09/26/184188/>; see CodeX Legal Technology Techindex: <https://techindex.law.stanford.edu/>.

<sup>10</sup> TechCrunch, Legaltech set to bail out legal services, <https://techcrunch.com/2016/03/17/is-legal-tech-catching-up-to-fintech/> (March 2016), Legal Tech Startups Have A Short History And A Bright Future, <https://techcrunch.com/2014/12/06/legal-tech-startups-have-a-short-history-and-a-bright-future/> (December 2014).

<sup>11</sup> CodeX Legal Technology Techindex: <https://techindex.law.stanford.edu/>.

- a) Search and discovery
- b) Personalization
- c) Networking and collaboration
- d) Analytics

### 3.1 SEARCH AND DISCOVERY

#### 3.1.1 Search

openlaws already contains over 1.9 million legal text documents (over 2 billion words) from the EU, Austria and Germany. Further connections to databases, such as from the UK, the Netherlands and Italy are currently under development. The challenge with such a large aggregated legal database is to reduce the number of search results to a limited, yet relevant amount.

Typically, legal databases use filters and expert search features. While openlaws provides these filters as well, the most effective filter is personalization. Users can limit their search to the legal content that is already in their personal legal portfolio – or at least close or related to it. So rather than searching 1.6 million documents, the search can be limited to those 10,000 acts and cases, which have been collected and bookmarked previously, and optionally to the next level of linked data. For easier understanding: The approach can be compared to a music service, where users can either search for content in the entire music database or only within the music, which has been added to the personal music library before.

#### 3.1.2 Visual Discovery

openlaws is built on the same technology which was used to analyze the Panama Papers, where 11.5 million financial and legal documents were leaked and processed by investigative journalists.<sup>12</sup> To uncover the structure and relations of the Panama Papers, the data was stored in a Neo4J graph database, which allows for analytics, recommendations and visualization (figure 7).<sup>13</sup> Traditional text search was not sufficient to master this task. With this new approach, patterns and relations were recognized; text was converted to knowledge and intelligence.

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<sup>12</sup> Organized Crime and Corruption Reporting Project (OCCRP), <https://www.occrp.org/en/panamapapers/overview/intro/>.

<sup>13</sup> Neo4J, <https://neo4j.com/blog/icij-neo4j-unravel-panama-papers/>.

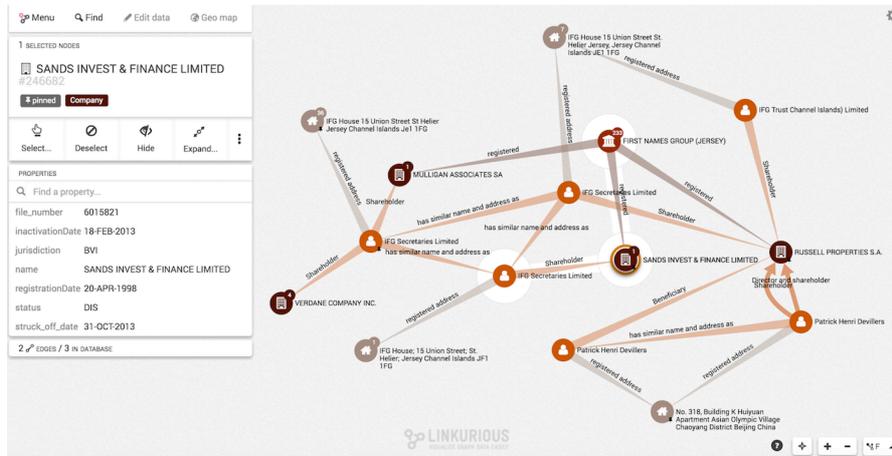


Figure 7. Panama Papers visualization with Neo4J and Linkurious

Visualization of legal data can be a powerful tool for navigation and enable users to find relevant information and correlations much faster. Just like in the example of the Panama Papers, legislation, case law, legal experts and other (public or private) legal documents are logically linked. One of the most prominent examples to “unravel” the law is the US startup Ravel Law.<sup>14</sup> Just like Ravel visualizes relations in US case law, openlaws visualizes the connections between European case law and legislation (figure 8).

The beta version of this feature was introduced at the International Legal Informatics Symposium (IRIS) in February 2017, which is the largest and most important academic conference on computers and law in Austria and Central Europe.<sup>15</sup>

<sup>14</sup> Ravel Law, <http://ravellaw.com/>.

<sup>15</sup> IRIS 2017, <https://www.univie.ac.at/RI/IRIS17/>.

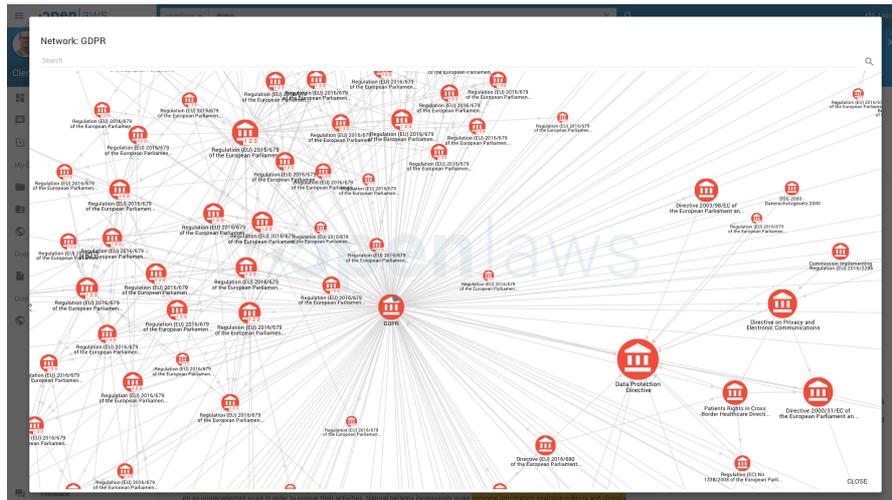


Figure 8. openlaws network graph, example 2, GDPR

### 3.1.3 Find a Lawyer

Lawyer directories or lawyer rating platforms often depend on (subjective) input by users. openlaws contains information about lawyers as well, namely the (objective) connections to specific cases. This means information about a lawyer or a judge are backed-up by real data and therefore are more reliant and more significant. Lawyers can be included into the openlaws network graph, always subject to data protection regulations.

## 3.2 PERSONALIZATION

openlaws is centered around personalization and legal data. Registration is not required, basic openlaws features like search and browsing can be used free of charge and without submitting personal information. However, customization is only possible if users create an account. Premium functionality is offered as a paid service, to sustain the venture. Users can adjust basic settings like language or preferred jurisdictions, databases and filters. Personal statistics and activity reports are provided as well.

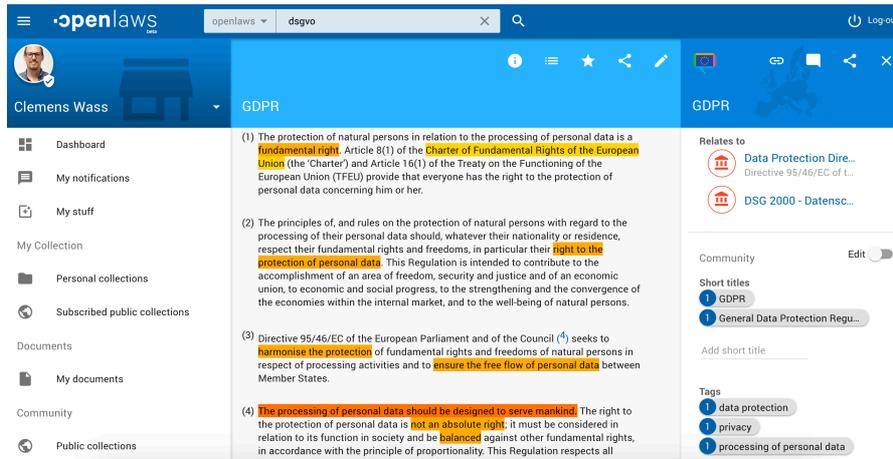


Figure 9. openlaws personalized user account and personal highlights

### 3.2.1 Personal portfolio and bookmarks

Bookmarks are nothing new and they are an early feature of personalization. They exist since the early days of the Internet and every browser supports them. In the Netherlands, the government provides thematic collections of the law as an innovative service.<sup>16</sup>

In combination with structured and linked data, bookmarks become active. openlaws informs registered user automatically whenever there are changes to the bookmarked object. In combination with linked data and data analytics, this feature actively supports users. First, the organization in a folder generates a personal cluster of legislation and case law. If clusters of the same legislation and case law appear several times, it is likely that those users did not accidentally combine such legal information, but that there is probably some kind of relation between those objects. This can be used for recommendations and collaborative filtering. The machine can learn.

### 3.2.2 Personal and community highlights

Highlighting legal text is very common. It is an easy yet effective way to structure information and to spot important text elements swiftly. It is a simple form of visualization. Thus, many printed legal text books are quite colorful. Legal publishers offer this feature in apps and a few legal tech start-ups have introduced highlighting in their solutions. Personal highlights can also be created in openlaws (figure 9).

<sup>16</sup> Marc Van Opijnen, Hayo Schreijer, Ilja Andreas, Maarten Kroon, Specialised Government Publishing: the Law Pocket and Linked Legal Data in the Netherlands, Journal of Open Access to Law, <https://ojs.law.cornell.edu/index.php/joal/article/view/48>.

In addition to personal highlights, openlaws supports “community highlighting”, similar to the functionality which is Amazon is offering for ebooks: Users can see what qualified legal experts have highlighted. This functionality also works in closed groups, where team members automatically see what their colleagues have highlighted, saving time and increasing productivity.

### 3.2.3 Tagging

Tags are commonly used to describe content and to find information more easily. The problem with creating tags and keywords by a central editorial board is that resources and knowledge are limited.

One possible solution to this is open innovation, where users in the system can collaborate as a crowd. Just like users can add tags to users in LinkedIn (“endorsements”), openlaws users can add tags to legal information. To make the tagging processes easier, openlaws automatically suggests tags based on semantic text analysis. Accordingly, the effort to add a tag is reduced to a simple click. Like all open innovation mechanisms, the community based creation of tags is related to Linus’ Law: “Given enough eyes, all bugs are shallow.”<sup>17</sup>

### 3.2.4 Alerts

Receiving actively information about legal and regulatory changes saves a lot of time and effort for legal experts, businesses and public administrations. As of today, many experts read news, journals, e-mail newsletters, the official gazettes etc. to keep track. However, such information channels are often rather general. Mass-customization makes it possible that a user receives personal updates, based on the users’ specific portfolio.

In addition to such notifications, openlaws provides a diff-view for amended documents. This helps users to identify the changes of the text immediately (figure 10).

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<sup>17</sup> Raymond, Eric S. "The Cathedral and the Bazaar",  
<http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/ar01s04.html>.

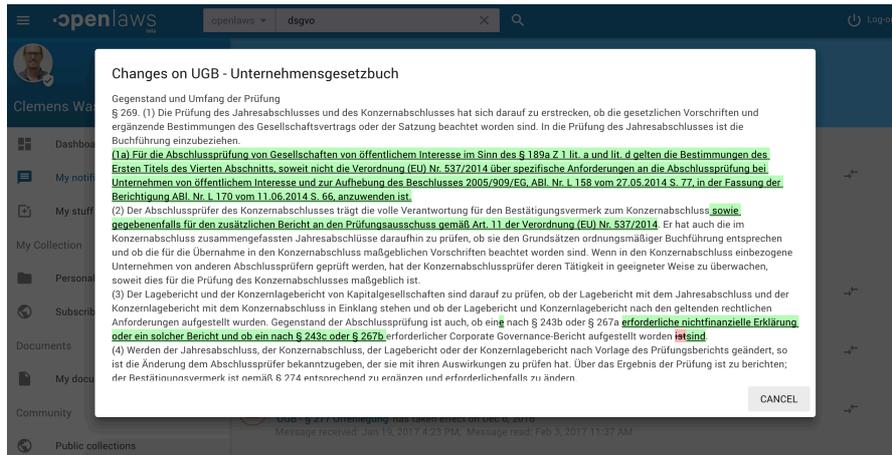


Figure 10. Diff-view to identify amended legislation

### 3.2.5 Comments and document uploads

Users can create comments and share their knowledge with others in openlaws. Users can decide whether to keep such comments private, to share them with colleagues in an organization (for example within a law firm or within a legal or compliance department), or even with the public.

In addition, users can upload their own private legal documents, which then can be integrated and interlinked with public legal content. For example, a user can build a personal archive with papers or contract templates on data protection law and connect it to the General Data Protection Regulation (GDPR). The monitoring and alerting tools can then notify the user when related amendments or new cases in this area are published.

## 3.3 COLLABORATION AND NETWORKING

openlaws is designed around collaboration and networking. Users can extend their personal closed portfolio to a shared or open environment. Thus, openlaws provides a knowledge management system for law firms, a lean legislation and contract management tool for small and medium companies, and a compliance management system for large organizations. Ideally, the law firm's knowledge base (or parts of it) and the company's system are linked as well.

The law firm's knowledge base contains the personalized legislation and case law collection of all lawyers within the organization. The knowledge base grows over time and the lawyers are automatically kept up-to-date with respect to regulatory changes or new case law in their specific domain. Contract templates, boilerplate text elements or legal literature can also be

part of the knowledge base. Such advanced information systems are usually only affordable for large law firms. openlaws uses economies of scale and makes this technology available even for medium and small law firms.

Small and medium sized companies use openlaws as a simple yet powerful solution to replace traditional legal text books and spreadsheet lists. Rather than having books and contracts which rest in silence in a shelf, users have digital access to information and are notified when needed.

Large companies on the other side can extend and customize openlaws for their entire organization so that the HR team has access to labor law, the finance team to tax law, the IT team to data protection law, the production team to environmental regulations, while the legal or compliance team acts as the administrator and keeps the overview. The integrated contract-management tool helps to monitor contract deadlines and contract partners in addition to changes in the regulatory framework. Employees are informed on a need-to-know basis, a link to external lawyer(s) is available, processes are documented, reports and statistics are available, risk and liability of directors and officers are reduced. Consequently, openlaws is also used for ISO certifications.

Finally, legal information can be shared with the public. For example, universities can publish comments and entire papers (open access) or make thematic selections of legislation and case law available.

### 3.4 ANALYTICS

Machines are much better than humans at processing large amounts of data. The openlaws database with its 1.9 million documents (and growing) is well-posed for analytics. Even though the amount of data cannot be considered big data under today's definitions (volume, velocity, variety), the sheer number of documents is way too big to be read or to be manually monitored. Content recommendation is very popular in electronic market places, such as for example Amazon, and are also introduced in legal platforms.<sup>18</sup>

openlaws uses the Neo4J graph database for pattern analysis and content recommendation. The system will inform the user which legislation, case law, literature or even legal experts are relevant for her or him, based on the

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<sup>18</sup> See for example, Winkels, Boer, Vredereg, van Someren, Towards a Legal Recommender System, Conference Paper, 27th International Conference on Legal knowledge and information systems (JURIX 2014), At Krakow, Poland, Volume: Volume: 271. *Frontiers in artificial intelligence and applications*, DOI: 10.3233/978-1-61499-468-8-169, [https://www.researchgate.net/publication/269702976\\_Towards\\_a\\_Legal\\_Recommender\\_System](https://www.researchgate.net/publication/269702976_Towards_a_Legal_Recommender_System).

user's personal profile. This enables users to spot relevant information, which the user otherwise might have missed. The system also benefits from natural language processing (NLP)/semantic text analysis, which structures the database and suggests tags to users (see above).

#### 4. Technology

The openlaws platform was built on the latest state-of-the-art software (figure 11). The core element is a Neo4J graph database, which includes the aggregated legislation and case law, as well as user content and input as linked data. This enables interlinking across different languages and jurisdictions and allows for recommendation and analytics. Links are created based on the available metadata, automated reference recognition and crowd-sourcing to legal experts. Automated semantic text analysis is performed by Poolparty, a tool for multilingual natural language processing. The search engine is powered by Elastic Search. The system is built on Java and OpenShift. Accordingly, the platform is highly scalable and can be used as one or in several installations. This means several openlaws platforms can be operated in different countries, each connected to different (open) legal datasets.

The database has a direct connection to the integrated public databases, checks for updates and changes are being made daily, so that the monitoring and alerting functionalities are up-to-date. It goes without saying that the quality of openlaws is only as good as the data provided by the open government sources. For this reason openlaws is in constant contact with governmental institutions.

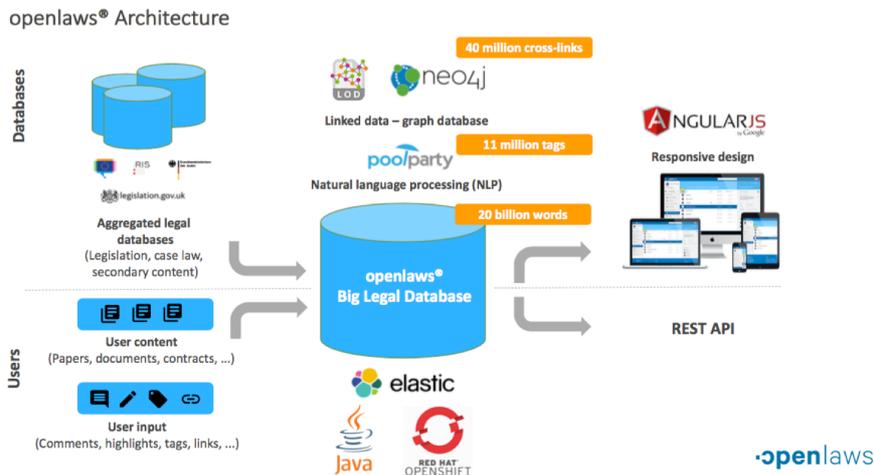


Figure 11. openlaws architecture

## 5. Sustainability

openlaws is built around a) a freemium business model and b) a dual licensing concept. Revenue streams are needed in order to make the openlaws project sustainable over the long run.

While access to fundamental legal information is provided free of charge, especially to citizens and the general public, advanced premium (paid) services and features are provided for professional users, such as law firms and large corporates users. The main applications are compliance management, knowledge management and legal research.

In addition, the data and the technology are licensed to third parties in line with the open innovation approach. With the data and/or the technology, third parties can build additional or new services based on the openlaws platform. While openlaws is available to governments and non-profit-organizations free of charge (service/consultancy based model), commercial operators can obtain a license for the technology and/or for aggregated linked legal data.

## 6. Acknowledgements

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<sup>19</sup> The full document is available at Zenodo, <https://zenodo.org/record/158999>, DOI/10.5281/zenodo.158999, CC-BY license 4.0.