OpenSource and Cloud Computing
at Library of National Congress of Chile BCN
Agenda

- Objectives
- Who we are
- Software and licenses definition
- Open Source used at BCN
- Topics under research
Objetives

- To explain how we use OpenSource at BCN
- To explain the cloud computing model used at BCN
- Shows topics under research
- Practice some applications tools

Everything in 30 min!
Who we are

Library of National Congress of Chile Mission
• To support the Parliament in its constitutional functions.
• Provide products and information services
• Contribute to linking the National Congress of Chile with the citizenship

Information Technology Department at BCN
• We conduct research about the application of new technologies and standards to support the Library Mission
• We develop new systems and applications
• We align the technological projects with the strategic plan of the BCN
• We ensure the continuity of operations and services IT based.
What is SOFTWARE?

**Software:** Computer programs, procedures, possible associated documentation and data pertaining to the operation of a computer system.

This concept goes beyond the computer programs, involving:

- **Computer programs**
  - Source.
  - Executable

- **Documentation** (How to use the software)
- **The data** to be processed

Software is an intangible in contrast to the physical hardware. Software and hardware require each other for made useful applications.
What is Open Source?

Open source software: Is software that can be freely used, changed, and shared by anyone.

There is a community cooperating and collaborating to improve the software.

https://opensource.org/
The Open Source Definition

Open source software is made by many people, and distributed under licenses that comply with the Open Source Definition, in:

https://opensource.org/osd
Some popular Licenses

Open source software is distributed under licenses like License guarantees openness of the source code

1. Apache License
2. BSD license
3. GNU General Public License (GPL)
4. MIT license (MIT)
5. Mozilla Public License
6. Common Development and Distribution License
7. Eclipse Public License

https://opensource.org/
Advantages of Opensource

• Software is freely distributed (you don’t have to pay for it)
• A community of users/developers creating new versions
• Improved features
What’s about the contents?
The products and information services generated by the Library

We create a digital collection of documents, and publish in the Web many of them

Creative Commons licenses
• Permits legally share the knowledge and creativity
• Is a standardized way to give the public permission to share and use the creative work with few conditions

https://creativecommons.org/
What’s about the contents?

For example, the IFLA website says:

https://www.ifla.org/copyright

Copyright

Copyright in this website belongs to IFLA.

Unless otherwise indicated, content is licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0), which means you are free to:

- copy
- distribute
- transmit
- adapt
- and make commercial use of the work

...provided that any use is made with attribution to IFLA.
OpenSource used at BCN

- Ley Chile
- Parliamentary work
- Unified ordering system
- Portal BCN
- Wiki
- Data BCN
- History of Law
- Repositories
- News
- Databases
- Budget Transparency
- App Ley Fácil
- WDPL
## OpenSource used at BCN

<table>
<thead>
<tr>
<th>Classification</th>
<th>Function</th>
<th>Specific Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Systems</td>
<td>Basic component that permits computers to run</td>
<td>Red Hat, Centos, Debian, Ubuntu</td>
</tr>
<tr>
<td>Programming Languages</td>
<td>Permit build the programs and applications</td>
<td>Java, Python, Javascript, Php</td>
</tr>
<tr>
<td>Relational Databases</td>
<td>Allow storing and accessing data in a standard, structured, integrated and secure way</td>
<td>PostgreSQL, mysql</td>
</tr>
<tr>
<td>Repositories</td>
<td>Software for store digital archives(doc, xls, pdf, etc), focused on the indexation for long-term storage, access and preservation of digital collections</td>
<td>Dspace</td>
</tr>
<tr>
<td>IT Applications</td>
<td>Permit build and operate the applications according the user's requirements</td>
<td>Node.js, Apache, Owncloud, Filezilla, Solr, bootstrap, nginx, varnish</td>
</tr>
<tr>
<td>Finals Applications</td>
<td>Permit to users made their work</td>
<td>LibreOffice, Notepad++, Eclipse, Akoma Ntoso</td>
</tr>
<tr>
<td>Classification</td>
<td>Function</td>
<td>Specific Software</td>
</tr>
<tr>
<td>-----------------------------</td>
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</tr>
<tr>
<td>Bigdata</td>
<td>Build new applications focuses in big volumes of data for extract and to make inferences about new knowledge and recommendations</td>
<td>Hadoop, Mongoddb, Spark</td>
</tr>
<tr>
<td>Mobile Computing</td>
<td>Build applications for mobile devices. The objective is arrive to the hand of parliamentarians and their staff with information services from the library, like press clipping, prospective studies or answer to reference requests from MP</td>
<td>Angular, React</td>
</tr>
<tr>
<td>IOT</td>
<td>Internet of the Things, all kind of the devices are expected to be connected</td>
<td>Research</td>
</tr>
<tr>
<td>Virtualization</td>
<td>Allow share the hardware resources in several virtual machines optimizing the IT investment</td>
<td>Virtualbox, Docker</td>
</tr>
<tr>
<td>Code offloading and edge computing</td>
<td>New frontiers of the mobile computing moving the applications compute power needs from the mobile to the cloud</td>
<td>Firebase, android-sdk</td>
</tr>
</tbody>
</table>
Operating Systems by applications

- Autonomy index and search
- Press and clipping service
- Administrative ERP
- Former mail server

- Development
- Test

- Workstations
- Datos BCN (opendata)
- New mobile apps

- Ley Chile
- Law History
- Parliamentarian Labor
- Parliamentarian Portal
- Parliamentarian Observatory
- History of Law
- Budged Transparency
- Public Transparency
- Easy Law
- Civic Formation
- Project Management
- Unified ordering system
- Portal BCN
- Repositories
- Databases
- WDPL
# Relational Databases used at BCN

<table>
<thead>
<tr>
<th>PostgreSQL</th>
<th>MySQL</th>
<th>Oracle</th>
<th>Sybase</th>
</tr>
</thead>
<tbody>
<tr>
<td>An open source RDBMS used by</td>
<td>Is an open source RDBMS owned by oracle Inc. used by</td>
<td>A commercial RDBMS used by its XML capacity in ley Chile system and commercial ERP</td>
<td>A commercial RDBMS is a legacy used in the former horizon ILS system (20+ years)</td>
</tr>
<tr>
<td>• DSpace</td>
<td>• Datos BCN</td>
<td>• New ILS based in Koha</td>
<td>• Legacy DB Not Open Source</td>
</tr>
<tr>
<td>• Press</td>
<td>• Historia de la Ley</td>
<td>• Systems based in wiki model</td>
<td></td>
</tr>
<tr>
<td>• Standard for new applications development</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Languages used

- New Budget system for parliamentarian
- Historia de la Ley
- Labor Parlamentaria
- Opendata
- Web services

- Ley Chile
- Formación Cívica
- Sistema de Noticias
- SUP
- Delibera
- Ley Fácil
- SIIT

- All websites

- Systems based in Wiki
Basic Apps

- **Node.js**
  - Is a platform for producing more efficient Web applications, based in JavaScript
  - Simulador de escaños
  - New redesign for ley Chile

- **NGINX**
  - nginx [engine x] is an HTTP and reverse proxy server
  - Used for optimizing access and reverse to/from external sites

- **Apache**
  - A traditional Webserver for all applications

- **Solr**
  - An indexer and search engine
    - Ley Chile
    - Transparencia Presupuestaria
    - App Ley Fácil
    - Labor parlamentaria
    - Historia de la ley
# Basic Apps

<table>
<thead>
<tr>
<th>Platform</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ownCloud</td>
<td>Runs a institutional cloud file storage service. Used for store and share personal files like Dropbox.</td>
</tr>
<tr>
<td>Filezilla</td>
<td>Is an FTP utility, for transfer files between computers</td>
</tr>
<tr>
<td>DSpace</td>
<td>Is a repository software used for the digital collections</td>
</tr>
</tbody>
</table>
Apps for finals users

**LibreOffice**
The Document Foundation

Used in replace of MS Office suite

**Notepad++**

Is a text editor useful write plain text and source code programs

**eclipse**

Tool used by programmers in the applications development process,
Topics under research
Build new applications focuses in big volumes of data for extract information and to make inferences about new knowledge and recommendations.
BigData tools in research

Hadoop is a distributed processing software.
Support high-volume data service applications.

MongoDB is a NoSQL database.
Instead of using tables and rows as in relational databases, MongoDB uses an architecture of collections and documents.

Is a parallel processing framework for running large-scale data analytics applications.
Big Data Possibilities

PARLIAMENTARY KERNEL
Attributes:
- Political party, Parliamentary work
- Region, Province, Commune, votes
- Profession, studies, Circumscription,
  District, Date of Birth etc.
Big Data Possibilities

Data Sources

Big Data Process

Delivery

Information Services

Parliamentary

Parliamentary Staff
Mobile Computing Under research

AngularJS is a structural framework for dynamic web apps.

Bootstrap permits developing responsive projects.

An environment for developing software for Apple devices.
Virtualization

Is a software virtualization that permits installing several virtual machines in a single computer.

Docker is "containerization" software. It encapsulates an application, into a modular unit called a container. Each container works similar to a traditional virtualized OS.
Everything connected
The future: All kind of devices connected
Cloud Computing

The US National Institute of Standards and technology

Cloud Computing is a model that allows:
- Convenient and on-demand availability of shared and configurable computing resources

Advantages
- In a fast way, requiring minimal management efforts
- Scale Economy

NIST Special Publication 800-145

https://www.nist.gov
Cloud Computing

Five essential characteristics of cloud computing:
1. on-demand self-service,
2. broad network access,
3. resource pooling,
4. rapid elasticity or expansion
5. measured service.

Four "deployment models"
1. Private
2. Community
3. public
4. hybrid

Many Providers
Amazon web Service, Microsoft Azure, Gloople Cloud, Oracle cloud, etc.
Cloud Computing model used at BCN

The model implements two main aspects:

- **FrontEnd**: refers to the available displayed information, the webpage that public can see.
- **BackEnd**: it is the non visible place where the contents are administrated for their publication, here is where the library staff indexes, stores, assigns metada and publishes the digital collections, depending on the application.

There are three components:

- A production environment in BCN datacenter
- A replicated production environment in AWS (updated on line)
- A development environment in BCN for produce and maintain the applications programs
Cloud Computing model used at BCN

Load Balancer / caché

Public Internet

Opendata

EC2

APP Files

80%

20%

File

Software

Maintenance

Development Environment

Files

IT Staff

Production environment

Replicated Production environment

Online Replication

System

Backend

APP

Software

User management

content

BCN

User management content Backend

IT Staff

Content admin
Workshop