

# OPEN DATA TUTORIAL

Opening and promoting use of budget data

## What is open data?

# What is open data?

1/9

We live in an era in which we find ourselves surrounded by data. Our daily activities generate data: from paying for electricity or other services, to academic research that analyzes problems of our social environment.

The new technological developments, together with the massification of the access and use of digital media, as well as the daily dimension that the use of technologies has acquired for all human relationships, have led to the existence of a quantity of data of such magnitude and diversity, that forces countries to seek policies that capitalize it as a social good.

According to the McKinsey Global Institute, the estimated economic outflow of data opening, worldwide, is estimated at up to 5 billion dollars per year.<sup>1</sup> In this context, the openness of information and the open data concepts acquire particular importance.

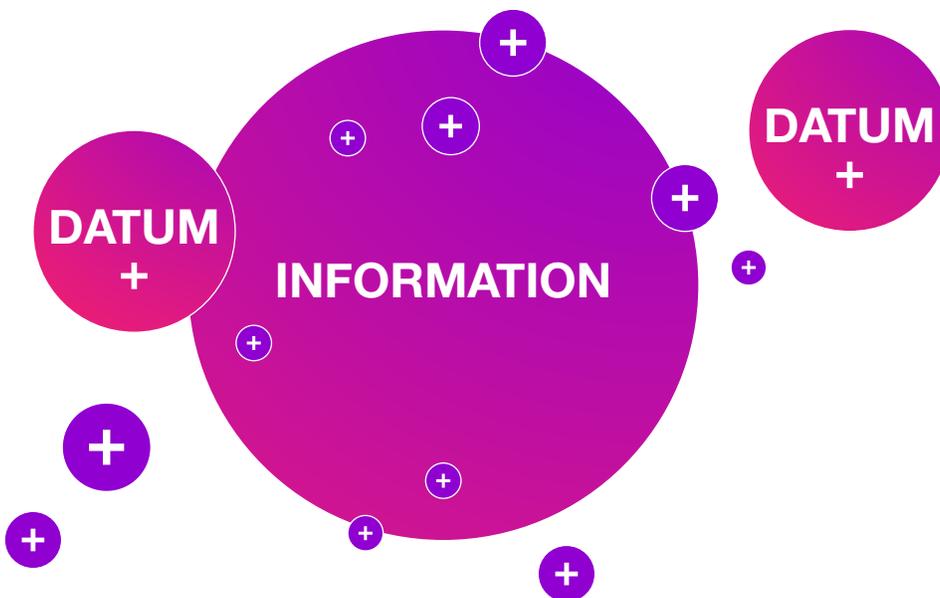
Before deepening into the subject, it is important to make some conceptual distinctions:

<sup>1</sup> McKinsey Global Institute (2013). Open data: Unlocking innovation and performance with liquid information. Available at: <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/open-data-unlocking-innovation-and-performance-with-liquid-information>.



## Datum vs. Information

- a) **Datum**, is the symbolic record of something we see in reality, through numbers or words without processing. Example: the record of a child's attendance at school or the record of a citizen who went to a hospital to receive a medical check.
- b) **Information**, takes the data and places it in a context where it becomes relevant and useful. Thus, the data generates knowledge that did not exist before. Example: the number of children attending public schools in the country, or the number of patients with respiratory diseases in the winter season.



## Open government vs. Transparency vs. Open data

a) **Open government**, can be defined as "a renewed paradigm of state reform and modernization of public administration, based on a new way of articulating initiatives of transparency, citizen participation and collaboration of various actors for the co-production of public value."<sup>2</sup>

Therefore, although in the context of open government, transparency is a concept often talked about, it is only as an enabler for open government's more general objectives.

b) **Transparency**, refers to an environment in which national objectives, the institutional, legal and economic framework, policy decisions and their justification, public data and information related to monetary and financial policies, and the way in which agencies perform their accountability, are provided to the public in an understandable, accessible and timely manner.<sup>3</sup>

Transparency can be done, among other ways, by publishing data in any format, even printed, as well as in open formats.

**Example of governmental public data from Mexico's Ministry of Finance and Public Credit:** press releases or specific reports on finances and public debt.

CUARTO TRIMESTRE DE 2017

INFORMES SOBRE LA SITUACIÓN  
ECONÓMICA, LAS FINANZAS PÚBLICAS Y  
LA DEUDA PÚBLICA

SITUACIÓN FINANCIERA DEL SECTOR PÚBLICO (Millones de pesos)					
Concepto	Enero-diciembre 2017			Diferencia nominal (3-2)	Variación % real (3/1)
	2016 (1)	Programa (2)	Observado P./ (3)		
<b>Balance Público</b>	<b>-503,808.4</b>	<b>-494,872.5</b>	<b>-238,472.4</b>	<b>256,400.2</b>	<b>n.s.</b>
<b>Balance Público sin inversión de alto impacto económico y social<sup>P./</sup></b>	<b>-4,657.5</b>	<b>12,634.7</b>	<b>99,875.0</b>	<b>87,240.3</b>	<b>n.s.</b>
Balance presupuestario	-502,224.2	-494,872.5	-230,436.6	264,435.9	n.s.
Ingreso presupuestario	4,845,530.3	4,360,913.8	4,947,160.2	586,246.5	-3.7
Gasto neto presupuestario	5,347,754.6	4,855,786.3	5,177,596.8	321,810.5	-8.7
Balance de entidades bajo control presupuestario indirecto	-1,584.2	0.0	-8,035.8	-8,035.8	n.s.
Balance primario	-24,986.9	78,190.5	310,151.1	231,960.6	n.s.
Partidas informativas					
RFSP	-559,393.9		-233,693.2		n.s.
RFSP primario	90,558.3		612,145.4		-0-

Nota: Las sumas parciales y las variaciones pueden no coincidir debido al redondeo.  
P./ Cifras preliminares.  
n.s.: no significativo: -0-: mayor de 500 por ciento.  
Fuente: SHCP.

Information about the financial situation of the public sector. 2017 quarterly reports about the public situation, public finance and public debt. Available at:

[http://finanzaspublicas.hacienda.gob.mx/work/models/Finanzas\\_Publicas/docs/congreso/infotrim/2017/ivt/01inf/tinfp\\_201704.pdf](http://finanzaspublicas.hacienda.gob.mx/work/models/Finanzas_Publicas/docs/congreso/infotrim/2017/ivt/01inf/tinfp_201704.pdf),  
pg. 51.

<sup>2</sup> Ramírez Alujas, Álvaro, and Nicolás Dassen. 2014. "Vientos de cambio: El avance de las políticas de gobierno abierto en América Latina y el Caribe". Publications.Iadb.Org. [https://publications.iadb.org/handle/11319/6400?scope=123456789/1&thumbnail=true&rpp=5&page=1&group\\_by=none&etal=0](https://publications.iadb.org/handle/11319/6400?scope=123456789/1&thumbnail=true&rpp=5&page=1&group_by=none&etal=0).

<sup>3</sup> The Organisation for Economic Co-operation and Development (OECD).

c) **Open Data**, is digital data of a public nature that is accessible online and that can be used, reused or redistributed by any person. Open data can be published either or both by private and public organizations.

Please note that public data is not necessarily open data; however, open data must always be public. Likewise, open data can come from many sources like the private, social or governmental sectors. Only the data that the government publishes in open formats, for example, the Ministries of Finance, can have the adjectives governmental and open at the same time.

It is important to consider that although open data is an important input to improve transparency and generate more open governments, it can also be an important input and trigger for innovation and productivity.

**Example of open governmental data:** Mexico’s budgetary data, published through the Budget Transparency Portal based using the [Open Fiscal Data Package](#).

Hacienda y Crédito Público

B	C	D	E	F	G	H	I	AB	AC	AD	AE	AF	AG	AH
DESC_RAMO	ID_UR	DESC_UR	ID_RAMO	GPO_FUN	DESC_GPC	ID_FUNCI	DESC_FUNCI	ID_FF	DESC_FF	ID_ENTID	ENTIDAD	ID_CLAVE	MONTO_APROBADO	MONTO_MODIFICADO
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	6912182	7007533
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	3979912	4906638
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	25005341	40702354
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	34800	48145
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	194681	177356
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	778723	11023374
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	901070	819216
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	303418	260973
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	348499	410980
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	137976	164392
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	207975	256726
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	444525	735921
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	538566	462103
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	3181805	4614991
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	40184	26569
Hacienda y Crédito Público	100	Secretaría	6	1	Gobierno	5	Asuntos Fina	1	Recursos fisc	9	Ciudad de M	0	115949	6243

Information obtained from the Budget Transparency Portal. Available at: [http://www.transparenciapresupuestaria.gob.mx/es/PTP/datos\\_presupuestarios\\_abiertos](http://www.transparenciapresupuestaria.gob.mx/es/PTP/datos_presupuestarios_abiertos)

**TIP**  
 The data in both examples is public and governmental; however, an important difference is that a non-open public data has format (color, subtotal, edges, etc.), while open data does not have it (it is readable by machines).

## 1.1 Characteristics of open data

For data to be considered open, it must comply with the following basic principles:

- ① **Non proprietary**, has no acquisition cost and is available in a format over which no entity has exclusive control.
- ② **Free use**, the only requirement to use it is to quote the source.
- ③ **Integral**, it must present information that explains what the data refers to and the metadata that allows to be interpreted.<sup>4</sup>
- ④ **Timely**, it is published and updated as it is generated.
- ⑤ **Non-discriminatory**, it is accessible without restrictions.
- ⑥ **Primary**, it comes from the original source, with the highest level of disaggregation.
- ⑦ **Permanent**, historical versions are preserved.
- ⑧ **Machine readable**, structured to allow automated processing.

<sup>4</sup> Metadata, is structured data that describes the characteristics of the information: its content, quality, condition and other aspects of the products or datasets.  
Source: Instituto Nacional de Estadística y Geografía de México. Available at:  
<http://www.inegi.org.mx/geo/contenidos/metadatos/default.aspx>.

## 1.2 Why is it important for public data to be open data?

An advantage of transparency based on open data is that it encourages the reuse of public information, thus triggering deeper actions of open government and, as mentioned above, can facilitate innovation and productivity.

For example, diverse actors, such as the public, private sectors or civil society organizations, can analyze data freely and give it an added value by linking it with their specific knowledge, guiding them towards the achievement of their objectives: whether they are decision-making or obtaining economic or social benefits, respectively.

In the video –What is the use of open data?– You can check out some use examples.



### 1.3 Levels of data openness

Data has different levels of openness. To identify them, Tim Berners-Lee<sup>5</sup>, the creator of the World Wide Web, suggested an upward scale to measure the level of data openness, ranging from 1 to 5 stars where 1 is the lowest level of openness.

**1 star - On the web** ★ ☆ ☆ ☆ ☆

As its name implies, it does not have the proper format for its agile consumption. **The data is published on the web in any format, under an open license** so it can be used freely.

An example of this, is the summary documents on public finances, published by the Ministries of Finance in PDF format.

En conjunto, se estima que los Requerimientos Financieros del Sector Público en 2017 serán equivalentes a 1.4 por ciento del PIB, con lo cual el SHRFSP se ubicaría en un nivel de 48.0 por ciento del PIB al cierre de 2017, nivel inferior en 2.1 puntos del PIB con respecto al cierre observado en 2016, lo que se debe tanto a la evolución de los RFSP como por efecto del tipo de cambio sobre el monto en pesos de la deuda denominada en moneda extranjera.

**Requerimientos financieros del sector público, 2016-2017**  
(Porcentajes del PIB)

	2016	2017		Diferencia
		Apróbad <sup>o</sup> */	Estimado	
<b>I. Déficit público tradicional</b>	<b>2.6</b>	<b>2.3</b>	<b>1.3</b>	<b>-1.1</b>
Sin inversión en proyectos de alto impacto	0.1	-0.1	-1.1	-1.1
<b>A. Ingresos presupuestarios</b>	<b>24.8</b>	<b>20.5</b>	<b>22.7</b>	<b>2.2</b>
Petroleros	4.0	3.7	3.9	0.2
Gobierno Federal	1.6	1.8	2.0	0.2
Pemex	2.5	1.9	1.9	0.0
No petroleros	20.8	16.8	18.8	2.0
Tributarios	13.9	12.9	13.0	0.1
No tributarios	2.8	0.6	2.4	1.7
Organismos y empresas v/	4.1	3.3	3.4	0.1
<b>B. Gasto neto presupuestario</b>	<b>27.4</b>	<b>22.8</b>	<b>24.0</b>	<b>1.2</b>
Programable pagado	21.3	16.5	17.6	1.1
No programable	6.1	6.3	6.4	0.1
Costo financiero	2.4	2.7	2.7	0.0
Participaciones	3.6	3.5	3.6	0.1
Adefas y otros	0.1	0.1	0.1	0.0
<b>C. Déficit no presupuestario</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>II. Ajustes</b>	<b>0.3</b>	<b>0.5</b>	<b>0.2</b>	<b>-0.3</b>
Requerimientos financieros por PIDREGAS	0.1	0.1	0.1	0.0
Requerimientos financieros del IPAB	0.0	0.1	0.2	0.1
Programa de deudores	0.0	-0.1	0.0	0.0
Banca de desarrollo y Fondos de fomento v/	0.1	-0.1	0.0	0.0
Adecuaciones a los registros presupuestarios v/	0.1	0.4	-0.1	-0.5

General Criteria of Economic Policy 2018. Available at:

[http://finanzaspublicas.hacienda.gob.mx/work/models/Finanzas\\_Publicas/docs/paquete\\_economico/cgpe/cgpe\\_2018.pdf](http://finanzaspublicas.hacienda.gob.mx/work/models/Finanzas_Publicas/docs/paquete_economico/cgpe/cgpe_2018.pdf).

<sup>5</sup> Tim Berners-Lee (S.F.) Five-Star Linked Open Data. Available at: <http://5stardata.info/es/>.

## 2 Stars - Machine-readable data ★★☆☆☆

Unlike the previous level, the **information is captured in a tabular or data set structure** and is available in formats that enable its processing. For example, data on public expenditures shown in an organized and structured manner in formats such as XLS.

AÑO	TRIM	Entidad	Municipio	Tipo de Registro	Cíclo Tipo de Recurso	Descripción Ramo
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2018	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	1-PROGRAMA PRESUPUESTARIO	2018	APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2018	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	1-PROGRAMA PRESUPUESTARIO	2017	APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	3-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS
2017	1	Agua Calientes	Gobierno de la Entidad	2-PARTIDA	2012	APORTACIONES FEDERALES - 2 APORTACIONES FEDERALES PARA ENTIDADES FEDERATIVAS Y MUNICIPIOS

Information obtained from the Budget Transparency Portal. Federal Entities expenditure by the Fourth Quarter of 2017. Available at: <http://transparenciapresupuestaria.gob.mx/es/PTP/EntidadesFederativas>.

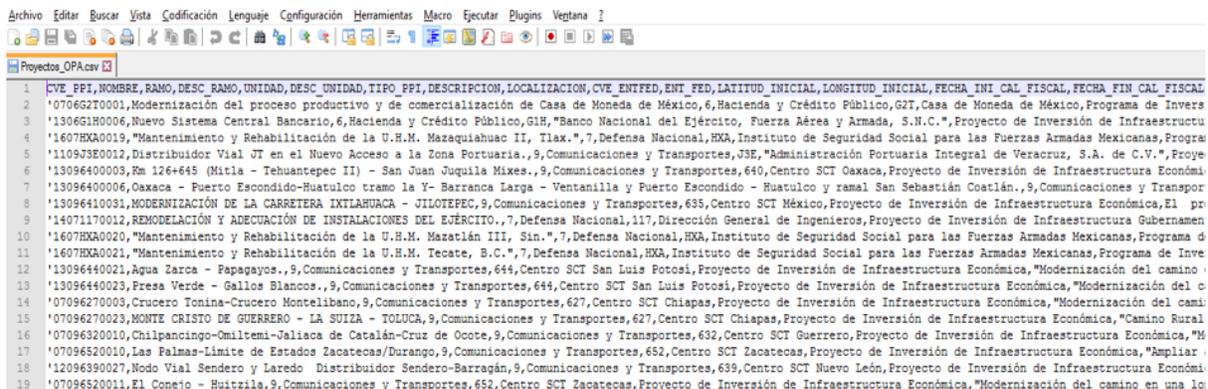
## 3 Stars - Open source formats ★★☆☆☆

In addition to complying with the abovementioned, **it is not necessary to purchase proprietary software** for analysis (such as Excel or another commercial spreadsheet processor), since its format can be read by open source software.

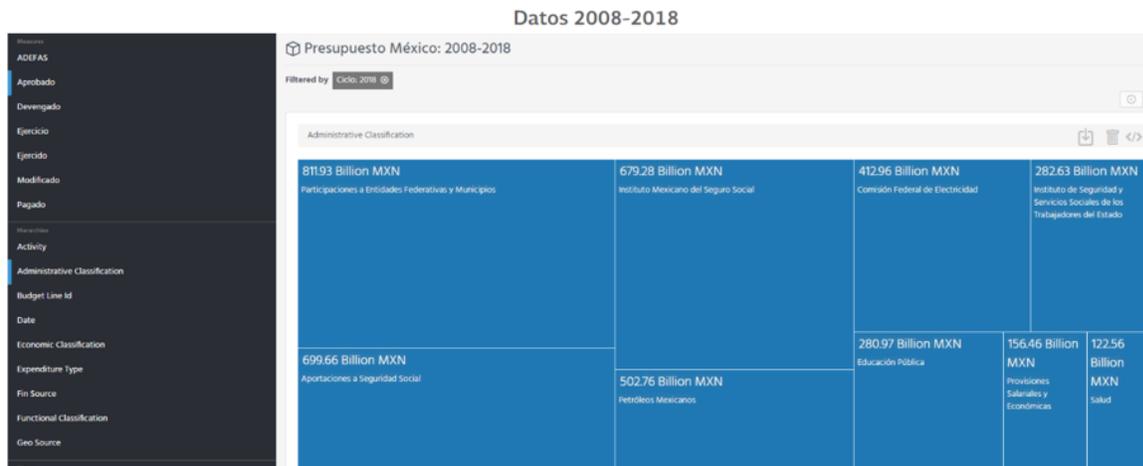
The CSV (Comma Separated Values), XML (Extensible Markup Language) or JSON (JavaScript Object Notation) formats fall into this classification.

To exemplify the use of CSV formats, in the following images you can see the file of the Budget Execution for the Mexican Federation opened in NotePad ++ and in Google Spreadsheets:

a) Visualization of a CSV file in NotePad ++

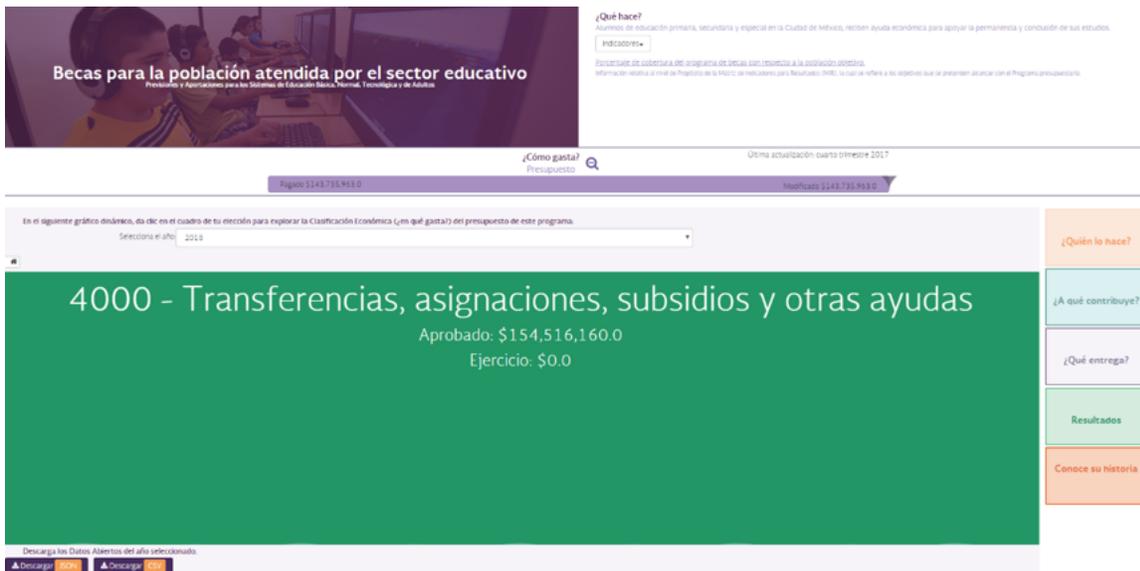






Approved budget and its expenditure on the Open Fiscal Data Package. More information at: [http://www.transparenciapresupuestaria.gob.mx/es/PTP/datos\\_presupuestarios\\_abiertos](http://www.transparenciapresupuestaria.gob.mx/es/PTP/datos_presupuestarios_abiertos).

One of the advantages of this format, is that part of the information can be linked, for example, with that of budget performance (outcome and results indicators, evaluations by independent experts, etc.) leading to a 5 star level.



Data on the expenditure of the program “Scholarships for the population served by the education sector” shown on the OFDP API. Program card available at: <http://nptp.hacienda.gob.mx/programas/jsp/programas/fichaPrograma.jsp?id=25U001>

**TIP**

Did you notice that the important difference between the previous level and this one is that you do not need to download the information to use it?

The fact that the information is integrated to the web (4 stars), does not mean loading a file that everyone can download and use on their computer, this corresponds to the previous level (3 stars).

## 5 Stars - Linking data to provide context ★ ★ ★ ★ ★

**Link the data, already integrated to the web, from different sources of information or publishers**, providing them with context. The data is at this level when it can be linked to data offered by different information sources.

If one considers as separate publishers the multiple governmental offices in possession of information on public procurement, like, on one hand the government institutions that manage the bids (Ministries of Administration or Public Function) and, on the other hand, institutions that transfer the funds to tenders (Finance Ministries); an example of this level of openness would be the linking of data for the publication of the [Open Contracting Data Standard](#) (OCDS), which considers such information in a comprehensive context.

Thus, in the Mexican case, the information structured in the format of the OCDS, found in the URI of the Ministry of Public Administration, can be linked to the API of the Ministry of Finance and Public Credit, to have the complete standard.

In the same way, the information published with the OCDS format, is linked to data and APIs of: 1) allocation and expenditures in the OFDP; 2) performance of the budgetary programs (programmatic structure) measured with indicators and specific set goals and 3) approval and progress of infrastructure projects of the Federal Government. For more details on this linkage in the Mexican case, check out this [Quick Guide](#).

### API de contrataciones abiertas de la APF

#### Datos y Recursos

 **API para consulta de los procedimientos de contratación de la APF**  
Servicio web para la consulta de los procedimientos de contratación de la administración pública federal a partir del 2017-01-01 a la fecha...  
[Descargar](#)  
[Más información](#)

#### Metadatos

Campo	Valor
Fuente	<a href="https://github.com/mxabierto/buda/tree/master/front">https://github.com/mxabierto/buda/tree/master/front</a>
Email del publicador	compranet@funcionpublica.gob.mx, trans_presupuestaria@hacienda.gob.mx
GUID	api-de-contrataciones-abiertas-de-la-apf
Idioma	es
Modificado	2017-11-07

The Open Contracting platform <https://www.gob.mx/contratacionesabiertas/> contains information on the procurement processes of the federal government of Mexico. This platform links data from different information sources through an API which can be accessed here: <https://datos.gob.mx/busca/organization/contrataciones-abiertas>.

The following image shows, as an example, the result of a visualization generated from the link between different open data sets, which in turn provides a greater context and facilitates the analysis of data to end users, even when said users are not experts in open data.

The image shows a screenshot of the 'Seguro Popular' program page on the website [npt.hacienda.gob.mx](http://npt.hacienda.gob.mx). The page is titled 'Seguro Popular' and includes several sections with callouts:

- Top Right Callout:** 'Link to information on performance indicators and goals, based on each program's matrix of performance indicators.' This points to the '¿Qué hace?' section.
- Middle Right Callout:** 'Allocation and expenditure budgetary data, linked from Open Fiscal Data Package's API.' This points to the '¿Cómo gasta?' section, which shows a budget of 'Presupuesto: Pícnob 35,127,952,844.0' and 'Mostré en: 581,329,349,282.0'.
- Bottom Left Callout:** 'Link with data on approval and execution progress of federal budget for investment projects.' This points to the 'Proyectos de inversión' section, which shows '55 Proyectos'.
- Bottom Right Callout:** 'Data linked to the Open Contracting Data Standard's API. This API on its own also links data from different ministries through URIs.' This points to the 'Contrataciones Abiertas' section, which shows '21 Expedientes'.

**TIP**  
 The maximum openness of information is only achieved by linking the published data with other sources of information, which can even be definitions of Wikipedia, and by structuring data so that anyone can link it with that from other publishers.

Now that you have a clearer picture of open data, its characteristics and formats, we can move forward to the benefits of using open data and why is it important to promote its use.

We invite you to continue,  
check the following document!

