

# SPARQL ENDPOINT

## 20분 만에 생성하기

허홍수

s u 4 6 2 0 @ g m a i l . c o m

# APACHE JENA

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# Apache Jena

A free and open source Java framework for building Semantic Web and Linked Data applications.

[Get started now!](#) [Download](#)

## RDF

### RDF API

Interact with the core API to create and read [Resource Description Framework \(RDF\)](#) graphs. Serialise your triples using popular formats such as [RDF/XML](#) or [Turtle](#).

### ARQ (SPARQL)

Query your RDF data using ARQ, a [SPARQL 1.1](#) compliant engine. ARQ supports remote federated queries and free text search.

## Triple store

### TDB

Persist your data using TDB, a native high performance triple store. TDB supports the full range of Jena APIs.

### Fuseki

Expose your triples as a SPARQL end-point accessible over HTTP. Fuseki provides REST-style interaction with your RDF data.

## OWL

### Ontology API

Work with models, RDFS and the [Web Ontology Language \(OWL\)](#) to add extra semantics to your RDF data.

### Inference API

Reason over your data to expand and check the content of your triple store. Configure your own inference rules or use the built-in OWL and RDFS [reasoners](#).

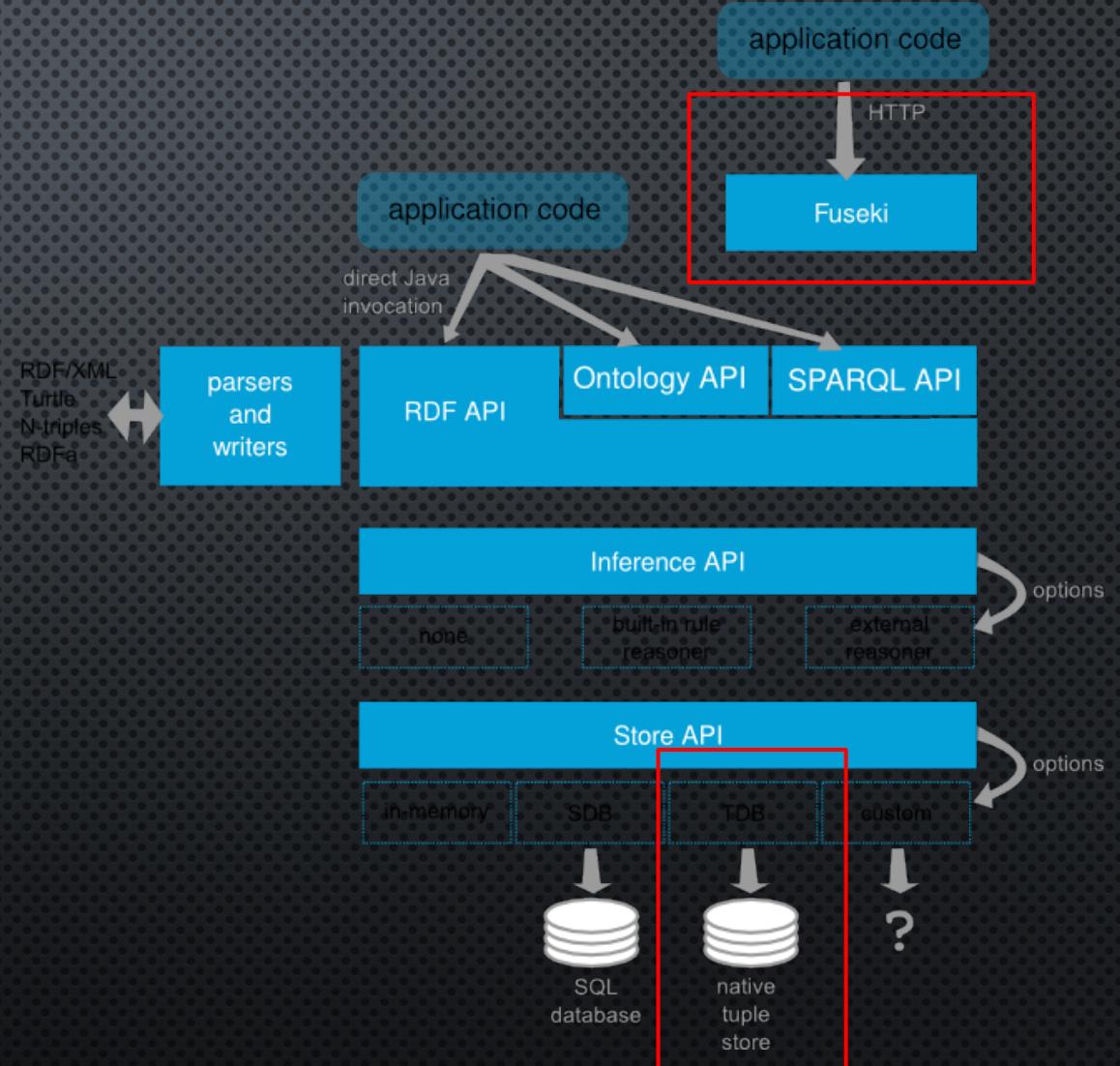
# FUSEKI & TDB

- FUSEKI

- SPARQL ENDPOINT을 제공함으로  
HTTP를 통해 트리플 접근을 가능케  
해줌
- 메모리 또는 TDB 기반으로  
영속성 유지

- TDB

- JENA FRAMEWORK에서 제공하는  
NATIVE 트리플 스토어



# FUSEKI

- 다운로드

[HTTPS://JENA.APACHE.ORG/DOWNLOAD/](https://jena.apache.org/download/)

현재 버전은 4.1.0 (2021년 9월 현재)

현재 버전은 자바 11 이상을 지원하고  
있음

자바 8을 사용하는 경우에는 3.x  
버전을 다운받아야 함

[HTTPS://REPO1.MAVEN.ORG/MAVEN2/ORG/APACHE/JENA/APACHE-JENA-FUSEKI/3.6.0/](https://repo1.maven.org/maven2/org/apache/jena/apache-jena-fuseki/3.6.0/)

The screenshot shows the Apache Jena Releases download page. The top navigation bar includes links for Home, Download, Learn, Javadoc, Ask, Get involved, and Edit this page. The main content area is titled "Apache Jena Releases" and states that Apache Jena is packaged as downloads containing the most commonly used portions of the system. It lists two main components: "apache-jena" (containing APIs, SPARQL engine, TDB native RDF database, and command line tools) and "apache-jena-fuseki" (the Jena SPARQL server). A note indicates that Jena4 requires Java 11. Below this, a section titled "Download Mirrors" shows the currently selected mirror as "https://dlcdn.apache.org/" and provides a link to change mirrors or view the complete list. Further down, sections for "Apache Jena" and "Apache Jena Fuseki" provide links to binary distributions and source distributions, each with SHA512 and PGP checksums.

Apache Jena

This distribution contains the APIs, SPARQL engine, the TDB native RDF database and a variety of command line scripts and tools for working with these systems.

The binary distribution may be downloaded at:

[apache-jena-4.1.0.tar.gz \(SHA512, PGP\)](#)  
[apache-jena-4.1.0.zip \(SHA512, PGP\)](#)

The source distribution, which includes the source for Fuseki and all modules in the release, may be downloaded at:

[jena-4.1.0-source-release.zip \(SHA512, PGP\)](#)

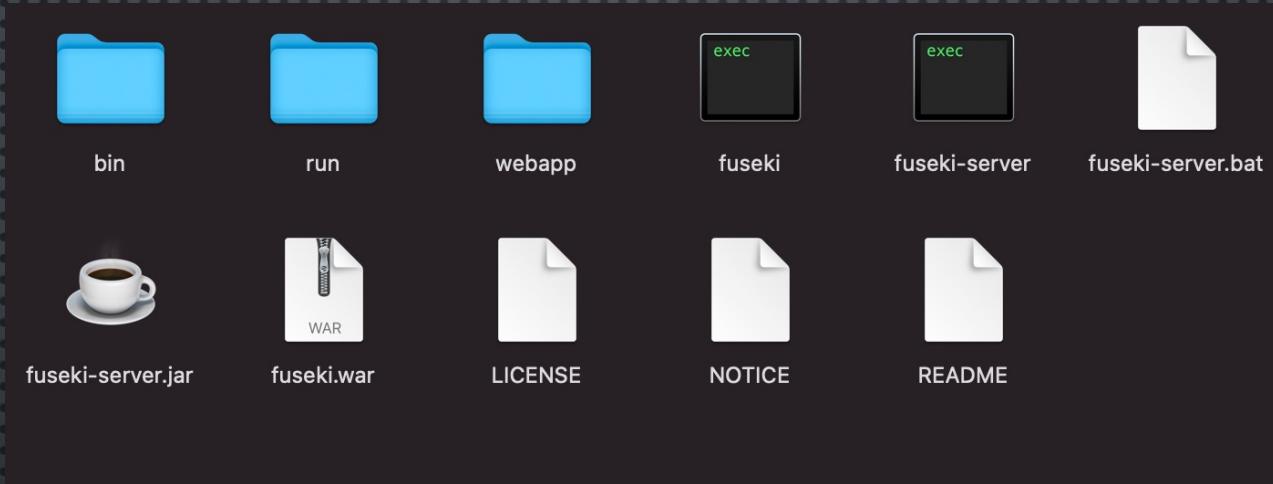
Apache Jena Fuseki

The binary distribution of Fuseki2 (this includes both the standalone and WAR file packaging) may be downloaded at:

[apache-jena-fuseki-4.1.0.tar.gz \(SHA512, PGP\)](#)  
[apache-jena-fuseki-4.1.0.zip \(SHA512, PGP\)](#)

# FUSEKI 구동

- 압축 풀기



- 실행

```
[→ apache-jena-fuseki-3.6.0 ll
total 99000
-rw-r--r--@ 1 joyhong staff 30K 12 13 2017 LICENSE
-rw-r--r--@ 1 joyhong staff 9.3K 12 13 2017 NOTICE
-rw-r--r--@ 1 joyhong staff 2.3K 12 13 2017 README
drwxr-xr-x 11 joyhong staff 352B 9 5 00:29 bin
-rwxr-xr-x@ 1 joyhong staff 12K 12 13 2017 fuseki
-rwxr-xr-x@ 1 joyhong staff 2.2K 12 13 2017 fuseki-server
-rw-r--r--@ 1 joyhong staff 1.2K 12 13 2017 fuseki-server.bat
-rw-r--r--@ 1 joyhong staff 25M 12 13 2017 fuseki-server.jar
-rw-r--r--@ 1 joyhong staff 23M 12 13 2017 fuseki.war
drwxr-xr-x 12 joyhong staff 384B 9 5 00:56 run
drwxr-xr-x 16 joyhong staff 512B 9 8 19:00 webapp
→ apache-jena-fuseki-3.6.0 ./fuseki-server]
```

# SPARQL ENDPOINT

- HTTP://LOCALHOST:3030/INDEX.HTML

The screenshot shows the Apache Jena Fuseki web interface. At the top, there is a navigation bar with the Apache Jena Fuseki logo, a home icon, a dataset icon, a manage datasets icon, and a help icon. To the right of the navigation bar is a green circular button labeled "Server status". Below the navigation bar, the title "Apache Jena Fuseki" is displayed, followed by "Version 3.6.0. Uptime: 0m 45s". The main content area is titled "Datasets on this server" and lists two datasets:

dataset name	actions
/dp	<a href="#">query</a> <a href="#">add data</a> <a href="#">info</a>
/path	<a href="#">query</a> <a href="#">add data</a> <a href="#">info</a>

Below the datasets, there is a light blue callout box with the text: "Use the following pages to perform actions or tasks on this server:" followed by three links: "Dataset", "Manage datasets", and "Help".

처음 구동시 DATASETS은 비어있는 상태이기 때문에  
MANAGE DATASETS 메뉴를 통해 데이터셋 생성

# 데이터셋 생성

- MANAGE DATASETS

Apache Jena Fuseki

dataset manage datasets help

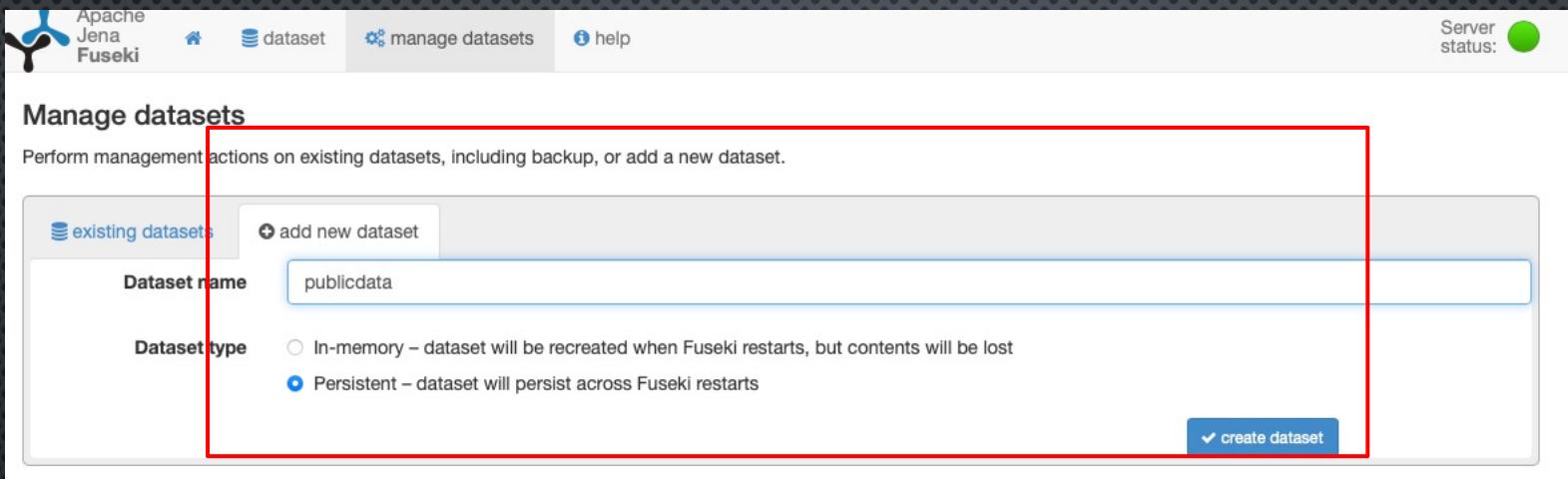
Server status: green

### Manage datasets

Perform management actions on existing datasets, including backup, or add a new dataset.

**Dataset name:** publicdata

**Dataset type:**  In-memory – dataset will be recreated when Fuseki restarts, but contents will be lost  
 Persistent – dataset will persist across Fuseki restarts



Apache Jena Fuseki

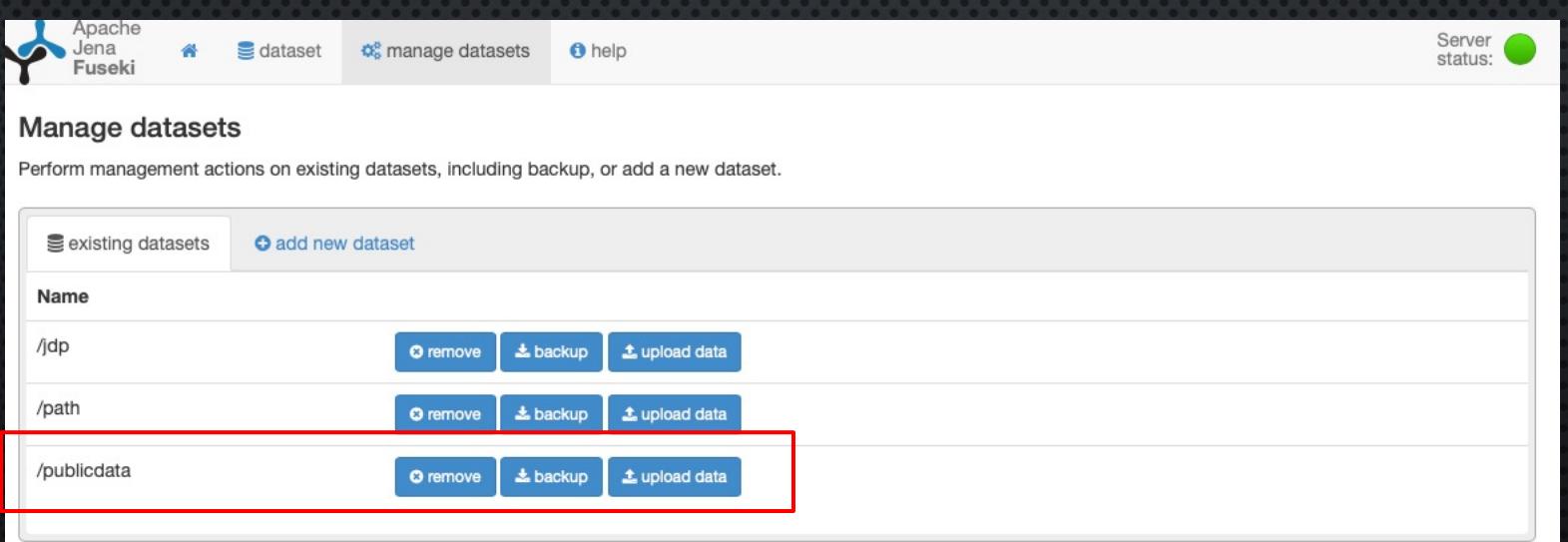
dataset manage datasets help

Server status: green

### Manage datasets

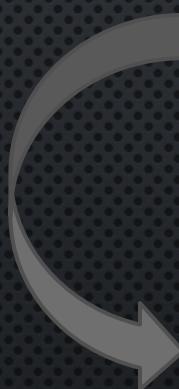
Perform management actions on existing datasets, including backup, or add a new dataset.

Name	Actions
/jdp	<input type="button" value="remove"/> <input type="button" value="backup"/> <input type="button" value="upload data"/>
/path	<input type="button" value="remove"/> <input type="button" value="backup"/> <input type="button" value="upload data"/>
<b>/publicdata</b>	<input type="button" value="remove"/> <input type="button" value="backup"/> <input type="button" value="upload data"/>



# 데이터 업로드

- UPLOAD DATA



Apache Jena Fuseki

dataset manage datasets help

Server status: ●

### Manage datasets

Perform management actions on existing datasets, including backup, or add a new dataset.

Name	remove	backup	upload data
/jdp	<span style="color: blue;">✖ remove</span>	<span style="color: blue;">⬇ backup</span>	<span style="color: blue;">⬆ upload data</span>
/path	<span style="color: blue;">✖ remove</span>	<span style="color: blue;">⬇ backup</span>	<span style="color: blue;">⬆ upload data</span>
/publicdata	<span style="color: blue;">✖ remove</span>	<span style="color: blue;">⬇ backup</span>	<span style="color: blue; border: 2px solid red;">⬆ upload data</span>

Apache Jena Fuseki

dataset manage datasets help

Server status: ●

Dataset: /publicdata

query upload files edit info

### Upload files

Load data into the default graph of the currently selected dataset, or the given named graph. You may upload any RDF format, such as Turtle, RDF/XML or TRIIG.

Destination graph name

Files to upload + select files... ⬆ upload all

**hospital.ttl** 54.3mb ⬆ upload now ✖ remove

Apache Jena Fuseki

dataset manage datasets help

Server status: ●

Dataset: /publicdata

query upload files edit info

### Upload files

Load data into the default graph of the currently selected dataset, or the given named graph. You may upload any RDF format, such as Turtle, RDF/XML or TRIIG.

Destination graph name

Files to upload + select files... ⬆ upload all

**hospital.ttl** 54.3mb ⬆ upload now ✖ remove

# 업로드 완료

- 업로드 완료

The screenshot shows the Apache Jena Fuseki web interface for managing datasets. The top navigation bar includes links for 'dataset', 'manage datasets', and 'help'. A 'Server status:' indicator shows a green signal icon. The main area is titled 'Upload files' and displays instructions: 'Load data into the default graph of the currently selected dataset, or the given named graph. You may upload any RDF format, such as Turtle, RDF/XML or TRIG.' A 'Destination graph name' input field is set to 'Leave blank for default graph'. Below this, there are buttons for 'select files...' and 'upload all'. A file entry for 'hospital.ttl' is shown with a size of '54.3mb'. At the bottom, a message indicates the result: 'Result: success. 1118003 triples'.

# QUERY

- SPARQL QUERY

The screenshot shows the Apache Jena Fuseki web interface for querying a dataset named "/publicdata". The top navigation bar includes links for "dataset", "manage datasets", and "help", along with a "Server status" indicator showing a green online icon.

The main area is titled "SPARQL query" and contains a text input field for entering SPARQL queries. Below the input field are "EXAMPLE QUERIES" buttons for "Selection of triples" and "Selection of classes".

Underneath the examples are "PREFIXES" buttons for "rdf", "rdfs", "owl", "xsd", and a plus sign for adding more. A red box highlights the "SPARQL ENDPOINT" input field, which contains the URL "http://localhost:3030/publicdata/query".

On the right side, there are "CONTENT TYPE (SELECT)" dropdown menus set to "JSON" and "CONTENT TYPE (GRAPH)" dropdown menus set to "Turtle".

At the bottom, there are "QUERY RESULTS" buttons for "Table" and "Raw Response", along with a download icon.

# SPARQL 생성

The screenshot shows the Apache Jena Fuseki interface for generating SPARQL queries. The top navigation bar includes links for Apache Jena, dataset, manage datasets, help, and server status (green). A dropdown menu for the dataset is set to /publicdata. Below the header is a toolbar with query, upload files, edit, and info buttons. The main area is titled "SPARQL query" with the sub-instruction: "To try out some SPARQL queries against the selected dataset, enter your query here." There are two example query buttons: "Selection of triples" and "Selection of classes". Under "PREFIXES", buttons for rdf, rdfs, owl, xsd, and a plus sign are available. The "SPARQL ENDPOINT" field contains the URL http://localhost:3030/publicdata/query. The "CONTENT TYPE (SELECT)" dropdown is set to JSON, and the "CONTENT TYPE (GRAPH)" dropdown is set to Turtle. The query editor contains the following SPARQL code:

```
1 PREFIX bif: <http://www.openlinksw.com/schemas/bif#>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
4 SELECT *
5 WHERE {
6   ?subject rdfs:label ?label.
7   ?subject foaf:homepage ?homepage.
8   filter(regex(?label, "성남", "i" ))
9 }
10 LIMIT 25
```

A red box highlights the first four lines of the query. At the bottom left, there are buttons for "Table" (selected), "Raw Response", and a download icon. At the bottom right, there are navigation icons for back, forward, and search.

PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>  
PREFIX foaf: <http://xmlns.com/foaf/0.1/>  
SELECT \*  
WHERE {  
?subject rdfs:label ?label.  
?subject foaf:homepage ?homepage.  
filter(regex(?label, "성남", "i" ))  
}  
LIMIT 25

# SPARQL 결과

SPARQL ENDPOINT  
http://localhost:3030/publicdata/query

CONTENT TYPE (SELECT)  
JSON

CONTENT TYPE (GRAPH)  
Turtle

```
2 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
3 SELECT *
4 WHERE {
5   ?subject rdfs:label ?label.
6   ?subject foaf:homepage ?homepage.
7   filter(regex(?label, "성남", "i" ))
8 }
9 LIMIT 25
```

QUERY RESULTS

Table Raw Response

Showing 1 to 8 of 8 entries

	subject	label	homepage
1	<http://joyhong.tistory.com/resource/h_168>	"성남중앙병원"	<http://www.schosp.co.kr>
2	<http://joyhong.tistory.com/resource/h_18295>	"성남속편한내과의원"	<http://www.soksn.co.kr/index.asp>
3	<http://joyhong.tistory.com/resource/h_18296>	"성남시노인보건센터의원"	<http://scsh.or.kr>
4	<http://joyhong.tistory.com/resource/h_45820>	"성남리더스치과의원"	<http://blog.naver.com/sungeu2>
5	<http://joyhong.tistory.com/resource/h_55939>	"성남시분당구보건소"	<http://www.bundanghealth.or.kr/>
6	<http://joyhong.tistory.com/resource/h_55940>	"성남시중원구보건소"	<http://jungwonhealth.or.kr>
7	<http://joyhong.tistory.com/resource/h_66805>	"성남의료소비자생활협동조합 우리한의원"	<http://blog.naver.com/sncoop0223>
8	<http://joyhong.tistory.com/resource/h_66806>	"성남청담한의원"	<http://www.yonghan.net/>

Showing 1 to 8 of 8 entries

# SPARQL ENDPOINT 주소

- URL
  - 이 예제에서는 디폴트 설정을 그대로 사용하여 LOCALHOST:3030 에 PUBLICDATA로 데이터셋을 생성하여 아래와 같이 URL에 SPARQL 질의를 요청할 수 있다.

`http://localhost:3030/publicdata/query`

# 감사합니다

<http://joyhong.tistory.com>