

## JUMPSTART: THE BASICS FOR GETTING STARTED WITH MARKLOGIC<sub>O</sub>

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## So we know that MarkLogic...

- Is an enterprise NoSQL database
- Can be used for storing and searching data in a wide variety of structures and types
- Can be used for all sorts of applications
- Can be used to integrate data from silos

## Let's get started with MarkLogic as we go through...

- Deciding on a project
- Thinking about your application code
- Creating a database
- Bringing your data in
- Querying your data
- Using your data in an application



Yell.com

Small business directory

SLIDE: 5

Aetna Large health insurer with 35,000 employees, integrating more than 140 data feeds









**MLU** 

### Organization for Economic Cooperation and Development

34 country organization that promotes policies for improving the economic and social well-being of people around the world

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## Deciding on a project

- Have a clear vision for it
- Ideal would be to spec it out
- Perhaps start with a small project



#### News

Source articles from BBC





### News

Source articles from BBC





## Steps

- $\checkmark$  Deciding on a project
  - Think about your application code
  - Creating a database
  - Bringing your data in
  - Querying your data
  - Using your data in an application

## Think about your application code

- Data will be in a MarkLogic database
- Application code can be inside or outside of MarkLogic



XQuery or JavaScript code





## Steps

- $\checkmark$  Deciding on a project
- $\checkmark$  Think about your application code
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### Install MarkLogic and start it running

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### Install MarkLogic and start it running

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ArrayNode (ArrayNode.)	Contains procedures for i	installing and	upgrading MarkL	ogic Server.	on all platfo	orms.		



### Create a database

Can do through graphical interface or programmatically

### Create a database

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### Where data is stored

- The data for a database is stored on the file system in a compressed format in one or more forests
- A database must have at least one forest attached to it, to be able to load data into the database
- Database is logical
- Forests are physical (a forest is a directory, or folder, on the file system)





### Create a forest

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### Attaching a forest to a database

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## Steps

- $\checkmark$  Deciding on a project
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# Bringing your data in

- Data is modeled/stored as a document
- Document types are JSON, XML, text, binary, and RDF triple
- Different types can all be in the same database
- Documents can be loaded into a database through a variety of MarkLogic interfaces

### **Example: JSON document**

```
"article":
```

"title": "Angelina Jolie mobbed by media on Greece migrant trip", "date": "2016-03-16",

"content": "Angelina Jolie was mobbed by the media while visiting a migrant reception center in Piraeus, near Athens, Greece. The actor was there in her role as Special Envoy of the UN High Commissioner for Refugees, highlighting the migrant crisis."

### Example: XML document

<article>

<title>Angelina Jolie mobbed by media on Greece migrant trip</title> <date>2016-03-16</date>

<content>Angelina Jolie was mobbed by the media while visiting a
 migrant reception centre in Piraeus, near Athens, Greece.
 The actor was there in her role as Special Envoy of the UN
 High Commissioner for Refugees, highlighting the migrant
 crisis.</content>

</article>



### Text documents

- Have no structure
- But can be searched

## **Binary documents**

- Includes most other types (e.g. images, video, etc.)
- Cannot be searched
- But any properties (e.g. metadata) included with the document can be searched
- Documents in some binary formats (e.g. PDF or Word) can be converted to an XML document while being loaded into a MarkLogic database by using the Content Processing Framework

## Example: RDF triple (for semantics)

<sem:triple>

```
<sem:subject>
    http://dbpedia.org/resource/Greece
</sem:subject>
```

```
<sem:predicate>
    http://www.w3.org/1999/02/22-rdf-syntax-ns#type
</sem:predicate>
```

```
<sem:object>
    http://dbpedia.org/ontology/Country
</sem:object>
```

</sem:triple>



















### Source documents to load

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### Loading documents

Can be done through a variety of MarkLogic interfaces, including:

- MarkLogic Content Pump
- Query Console (XQuery or JavaScript)
- RESTAPI
- Node.js API or Java API
- Content Processing Framework

## Using MarkLogic Content Pump

- Java-based command line tool
- Requires:
  - JRE 1.6 or later
  - MLCP files (can be downloaded from <u>developer.marklogic.com/products/mlcp</u>)
  - A port for connecting to the database

## Creating a REST API Instance

- Basically, setting up a port for being able to connect to a MarkLogic database
- Benefits of a REST API instance:
  - Can load documents through it
  - Can read documents
  - Can search the database
  - And more...
- To create a REST API instance, need to send a configuration file to MarkLogic that specifies a port to set up

## Creating a REST API Instance

Example configuration file:

```
<rest-api xmlns="http://marklogic.com/rest-api">
        <name>8011-news-rest</name>
        <database>news</database>
        <port>8011</port>
        </rest-api>
        </rest-api
```



## Creating a REST API Instance

Example of sending the configuration file to MarkLogic:



curl --anyauth --user admin:admin
-X POST -d@"../mls-projects/news/rest-config.xml" -i -H
"Content-type: application/xml" http://localhost:8002/v1/rest-apis



### Seeing that a REST API Instance has been set up

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<ul> <li>Search example - /v1/search?q=&amp;start=10&amp;pageLength=5</li> </ul>	
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<ul> <li>View XML document: <u>/v1/documents?uri=/docs/person.xml</u></li> </ul>	



### Loading documents with MLCP



mlcp.bat import -host localhost -port 8011 -username admin -password admin -input\_file\_path C:\\mls-projects\\news\\docs\_to\_load -mode local -input\_file\_type documents -output\_collections "http://www.bbc.co.uk/news/content" output\_uri\_replace "C:/mls-projects/news/docs\_to\_load,'content/news'"

### Viewing database documents

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## Steps

- $\checkmark$  Deciding on a project
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## Searching a database

Can be done through any of the programming interfaces, including:

- Query Console (XQuery or JavaScript, or SPARQL for triples)
- RESTAPI
- Node.js API or Java API
- Hosted XQuery or JavaScript application

## Using XQuery cts:search()

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<pre>xmlns:c="http://www.w3.org/ns/xproc-step" xmlns:es="http://www.marklogic.com/enhanced-search#"&gt;</pre>					
<pre>wkhead profile="http://dublincore.org/documents/dcq-html/" resource="http://www.bbc.co.uk/news/business-23204346" typeof=""""""""""""""""""""""""""""""""""""</pre>					
<pre>rnews:NewsItem &gt;</pre>					
If you had 15 seconds warning an earthquake was coming - could that save your life? The BBC's Fiona Graham app that could warn you the 'big one' was on the way	finds out about the				

## Using XQuery cts:search() in a for loop

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3	<pre>for \$doc in cts:search(fn:doc(), "earthquake")[1 to 10]</pre>	JS Query 4
4	return \$doc//ns:title/text()	JS Query 5
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## Using XQuery cts:search()

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## Using JavaScript cts.search()

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<pre>rnews:NewsItem "&gt;</pre>				
<pre>meta property="rnews:description" content="</pre>				
If you had 15 seconds warning an earthquake was coming - could that save your life? The BBC's Fiona Graham finds out about the app that could warn you the 'big one' was on the way				

## Using JavaScript cts.search()

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4 for (var document of documents) {	Js Query 5	Ê
<pre>5 Var node = document.root; 6 var title = node.xpath("//ns:title/text()", {ns:namespace}).toString().replace(/\r?\n \r/g, " ");</pre>	O Query 6	
<pre>7 results.push(title);</pre>	te Query 7	ш е
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## Using XQuery search:search()

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## Snippets and highlighting in use

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### Using JavaScript search.search()

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▼ <search:snippet></search:snippet>					
▼ <search:match *:head="" *:html="" *:title"="" business-23204346.xml")="" content="" news="" path="fn:doc(">BBC News - Predicting▼</search:match>					
<pre><search:highlight>earthquakes</search:highlight> and saving lives - with smartphones</pre>					



## JSearch

- Designed for JavaScript developers searching JSON documents
- Features:
  - Input and output is in the form of JavaScript objects
  - A fluent call chain pattern that is natural for JavaScript
  - Powerful convenience methods for operations such as snippet generation and faceting

```
var sr = require('/MarkLogic/jsearch.sjs');
var output =
    sr.documents()
    .where(cts.jsonPropertyValueQuery('city', 'london'))
    .result();
output;
```

### Using the REST API for search

Command Prompt	- 0 <b>X</b>
<pre>c:\curl&gt;curlanyauthuser admin:admin -X GET "http://localhost:8011 h?q=earthquake" <search:response page-leng<br="" snippet-format="snippet" start="1" total="8">mlns:search="http://marklogic.com/appservices/search"&gt;</search:response></pre>	1/v1/searc yth="10" x = ath="fn:do fidence="0 s%2Fbusine .xml" quakes
smartphones	

curl --anyauth --user admin:admin -X GET
"http://localhost:8011/v1/search?q=earthquake"



## Steps

- $\checkmark$  Deciding on a project
- $\checkmark$  Think about your application code
- $\checkmark$  Creating a database
- $\checkmark$  Bringing your data in
- $\checkmark$  Querying your data
- Using your data in an application

## Using your data in an application

- Understanding the application programming interfaces
- Example: Standing up an XQuery application
- Seeing the full-feature application

## Understanding the application programming interfaces

- If you write your application in XQuery or JavaScript, the application code can be hosted by MarkLogic
- If you write your application in Java or Node.js, it can communicate with your MarkLogic database through the Java API or Node.js API
- If you write your application in any other language (that can make HTTP requests, such as C#, Python, PHP, etc.), it can communicate with your MarkLogic database through the REST API

## Example: Setting up an XQuery application

- Have a location for your XQuery application code
- Create an HTTP App Server that:
  - Has a port
  - References the location of the application code
  - References the database

## Have a location for your XQuery application code

Good and the computer → Local Disk (C:) → mls-	projects > news > app - fg Search app P
Organize  Include in library  Share with	C:\mls-projects\news\app\tryout.xqy - Notepad++
Name Date	File Edit Search View Encoding Language Settings Macro Run Plugins Window ?
Tryout.xqy 3/22/.	
	E tryout xqy 🗵
	<pre>1 declare namespace ns = "http://www.w3.org/1999/xhtml";</pre>
	2
	3 for \$title in
	4 cts:search(fn:doc()//ns:title, "earthquake") [1 to 10]
	5 return \$title/text()

Can be on the file system,

or in a second MarkLogic database (a.k.a. a 'modules' database)



## Create an HTTP App Server

	Summary	Create HTTP	Create WebDAV	Create XDBC	Create ODBC	Help		
Configure								
Groups						ok	cancel	
🖻 🐻 Default								
🕀 🌍 Hosts	http server	http server A HTTP server specification.						
🗄 🕕 App Servers								
🗄 🌍 8011-news-rest [HTTP]								
🕀 🏐 Admin [HTTP]	server name		8012-news	8012-news				
🕀 🌍 App-Services [HTTP]			The server nan Required, You	The server name. Required, You must supply a value for http-server-name.				
🗄 🏐 EnhancedSearch [HTTP]								
🕀 🌍 EnhancedSearchAPI [HTTP]	root		C:\mls_projects	C:\mls-projects\news\app The root document directory pathname.				
⊞ 🏐 EnhancedSearchMaintenance [HTTP]			The root docun					
🗄 🏐 HealthCheck [HTTP]			Required. You	Required. You must supply a value for root.				
🖽 🌍 Manage [HTTP]				_				
EnhancedSearchXDBC [XDBC]	port		8012	8012				
NewServer			Required. You	Required. You must supply a value for port.				
🕀 🌍 Task Server								
🗄 🌍 Scheduled Tasks	modules (file system)							
🕀 🌍 Schemas	The database that contains application modules.							
🕀 🌍 Namespaces								
H S Module Locations	database news <b>v</b>							
⊡ 🏐 Diagnostics			The database r	iame.				

### See that the application page displays



### Add the rest of the application files

News ×					
← → C Discalhost:8012/index.xqy?term=earthquake&submitbtn=search	☆ 〓				
🔛 Apps 💥 Wiki 🧕 OWA 🔁 NetSuite	📋 Other bookmarks				
News	*				
earthquake search					
<b>Predicting earthquakes and saving lives - with smartphones</b> BBC News - Predicting <mark>earthquakes</mark> and saving lives - with smartphones Predicting <mark>earthquakes</mark> and saving lives - with smartphones, meaning it is prone to <mark>earthquakes</mark> . In 1989, the strongest 2013-07-09T01:22:25					
<b>Distant quakes 'can trigger wastewater-site temblors'</b> Earthquakes can be triggered at the sites of wastewater injection by quakes on the other sideof natural earthquake triggering is not new; in hydrothermal and volcanic areas, tremors can be 2013-07-12T02:38:35					

### Use the application



#### Distant quakes 'can trigger wastewater-site temblors'

Earthquakes can be triggered at the sites of wastewater injection by quakes on the other side of the world, research suggests.

The injection of wastewater from underground operations such as oil drilling is known to increase local seismic activity.



### Understand the application with semantics















### Can access the project files on GitHub

• Simple project:

github.com/mlruthstryker/simple-news-app

Advanced project (with semantics functionality):

github.com/marklogic/semantic-news-search



## Steps

- $\checkmark$  Deciding on a project
- ✓ Thinking about your application code
- $\checkmark$  Creating a database
- $\checkmark$  Bringing your data in
- $\checkmark$  Querying your data
- $\checkmark$  Using your data in an application

### What to do next

 Attend the MarkLogic Fundamentals course (hands-on) marklogic.com/training

- Read the MarkLogic guides
   docs.marklogic.com
- Watch feature-focused training videos
   mlu.marklogic.com/ondemand
- Ask questions on the developer mailing list developer.marklogic.com/discuss



## **Thanks!**

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