

# Developers – Get Up and Running with IBM Informix with Docker

**think 2019**

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## Up & Running with Informix Database

Using the IBM Informix Docker image you can have a database system up and available in minutes.

# Github Project based on docker-compose

## Docker Compose

This repo contains the files to start and run the Sandbox project



<https://github.com/informix/compose-developer-sandbox>

```
$git clone https://github.com/informix/compose-developer-sandbox
```

# Start The Sandbox

This will start a **server** docker container and a **client** docker container

The first time you run the docker-compose it will download the images from dockerhub

## docker-compose

This command will run a docker container, setup connectivity ports, accept the license agreement and name the container '**server**'.

This command will also run a docker container, with client drivers and code for demo purposes. The container is named '**client**'.

```
$ cd compose-developer-sandbox  
$ docker-compose up -d
```



## Up & Running with Informix Application Development

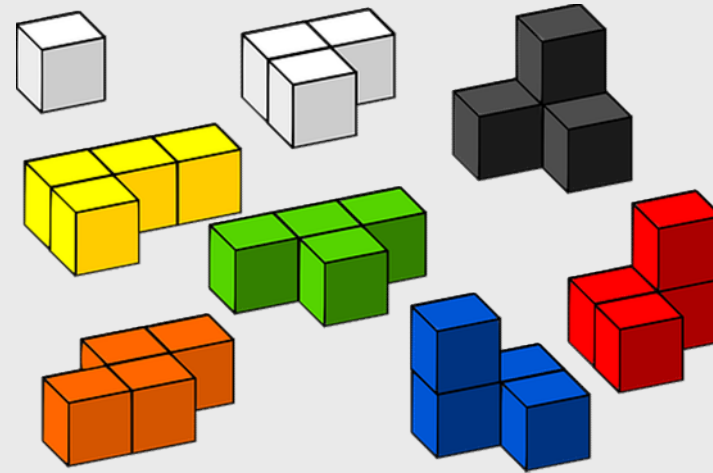
Using the IBM Informix Developer Sandbox Docker image you can have a development system up and running in minutes.



# Building blocks

Client Sandbox includes,

- Java 1.8
- Informix JDBC
- Python 2.7
- NodeJS 8.10.0
- Informix Python Driver
- Informix NodeJS Driver
- Informix ODBC Driver



## Information on the run options used

The `-td` starts the container as a daemon. You can then start a shell with the `docker exec` command and specify the name of the container to attach to.

The `-name server`, will name this container '**client**'

The `-p` options map the ports within the container to the host system. Port 9001 is needed for a demo needing http access.

```
$docker exec -it client bash
```



# Application Development Examples

Using the IBM Informix Docker image you can have a database system up and available in minutes.

# Java Examples – Initial setup

## 1. Initial setup

- Login to the client Docker container
  - (docker exec –it client bash)
- cd informix-db-examples/sql/java
- chmod 777 gradlew
- ./gradlew clean jar



<https://github.com/informix/informix-db-examples/tree/master/java>

## Java Example – Create database

2. Run the following to create a database for use with the examples.

```
$java -cp build/libs/informix-examples-java.jar setup.Setup  
"jdbc:informix-  
sqli://server:9088/sysadmin:user=informix;password=in4mix"
```

- This example will create a database named **banktest**. This can be used for the other examples. And will be used for the Demo program referred to later on.

```
https://github.com/informix/informix-db-examples/tree/master/java
```



# Java Example – Code - Create database

- src/main/java/setup/Setup.java

```
informix@41c8a47b1e38:~/informix-db-examples/java$ java -cp build/libs/informix-  
examples-java.jar setup.Setup "jdbc:informix-sqli://10.134.76.15:9088/sysadmin:u  
ser=informix;password=in4mix"  
[main] INFO setup.Setup - Setup complete  
informix@41c8a47b1e38:~/informix-db-examples/java$
```

```
package setup;  
  
import java.sql.Connection;  
import java.sql.DriverManager;  
import java.sql.ResultSet;  
import java.sql.SQLException;  
import java.sql.Statement;  
import java.text.MessageFormat;  
import java.util.Properties;  
  
import com.informix.jdbc.IfmxStatement;  
  
import org.slf4j.Logger;  
import org.slf4j.LoggerFactory;  
  
public class Setup {  
  
    private static final Logger logger = LoggerFactory.getLogger(Setup.class);  
  
    public static void main(String [] args) throws SQLException {  
        if(args.length != 1) {  
            throw new NullPointerException("You must pass the connection URL as the  
            first argument to the demo");  
        }  
        try(Connection con = DriverManager.getConnection(args[0])) {  
            try(Statement s = con.createStatement()) {  
                s.execute("DATABASE sysmaster");  
                s.execute("DROP DATABASE IF EXISTS banktest");  
                s.execute("CREATE DATABASE banktest WITH LOG");  
            }  
        }  
        logger.info("Setup complete");  
    }  
}
```

## Java Example – BSON Example

3. Run the following to BSON example.

```
$java -cp build/libs/informix-examples-java.jar  
dataTypes.jsonBson.BsonExample "jdbc:informix-  
sqli://server:9088/banktest:user=informix;password=in4mix"
```

- This example will create a table named **bsonTab**. It creates a bson object and performs a couple inserts using different options.

```
https://github.com/informix/informix-db-examples/tree/master/java
```



# Java Example – Code – BSON example

- src/main/java/dataTypes/jsonBson/BsonExample.java

```
Informix@41c8a47b1e38:~/informix-db-examples/java$ java -cp build/libs/informix-examples-java.jar dataTypes.jsonBson.BsonExample "jdbc:informix-sqli://10.134.76.15:9088/banktest:user=informix;password=in4mix"
[main] INFO dataTypes.jsonBson.BsonExample - Exec: DROP TABLE IF EXISTS bsontab
[main] INFO dataTypes.jsonBson.BsonExample - Exec: CREATE TABLE bsontab(c1 BSON)
[main] INFO dataTypes.jsonBson.BsonExample - ID=1      Name=John Smith
[main] INFO dataTypes.jsonBson.BsonExample - ID is 1
[main] INFO dataTypes.jsonBson.BsonExample - Data type from query: com.informix.jdbc.IfxBSONObject
[main] INFO dataTypes.jsonBson.BsonExample - String output of object ==> IfxBSONObject { "id" : 1 , "name" : "John Smith" }
[main] INFO dataTypes.jsonBson.BsonExample - Data type from query: com.informix.jdbc.IfxBSONObject
[main] INFO dataTypes.jsonBson.BsonExample - String output of object ==> IfxBSONObject { "id" : 2 , "name" : "Ricky Bobby" }
[main] INFO dataTypes.jsonBson.BsonExample - ID=1      Name=John Smith
[main] INFO dataTypes.jsonBson.BsonExample - ID=2      Name=Ricky Bobby
Informix@41c8a47b1e38:~/informix-db-examples/java$
```

```
public void run(String url) throws SQLException {
    try (Connection con = DriverManager.getConnection(url)) {
        this.conn = con;
        createTables();
        informixBsonObject();
        insertBson();
        insertBsonAsString();
        basicBsonQuery();
    }
}

private void createTables() throws SQLException {
    /*
     * Create a table for us to use with a BSON column
     */
    try (Statement s = this.conn.createStatement()) {
        String dropSQL = "DROP TABLE IF EXISTS bsontab";
        String createSQL = "CREATE TABLE bsontab(c1 BSON)";
        logger.info("Exec: {}", dropSQL);
        s.execute(dropSQL);
        logger.info("Exec: {}", createSQL);
        s.execute(createSQL);
    }
}

private void informixBsonObject() {
    IfxBSONObject bson = new IfxBSONObject();
    bson.put("id", 1);
    bson.put("name", "John Smith");
    /*
     * You can convert the bson to a straight map object with toMap();
     */
    Map<String, Object> map = bson.toMap();
    logger.info("ID={} \t Name={}", map.get("id"), map.get("name"));

    /*
     * You can also get values directly from the IfxBSONObject
     */
    logger.info("ID is {}", bson.get("id"));
}

private void insertBson() throws SQLException {
```



## Java Example – SmartTrigger example

4. Run the following to SmartTrigger example.

```
$java -cp build/libs/informix-examples-java.jar  
smartTriggers.SmartTrigger "jdbc:informix-  
sqli://server:9088/sysadmin:user=informix;password=in4mix"
```

- This example will create a smart Trigger on an account table. It will periodically update the account balance, decreasing the total. When the account goes below 0 an Alert will trigger on the update.

– Important to use connect to **sysadmin** for this example

<https://github.com/informix/informix-db-examples/tree/master/java>



# Java Example – Code – SmartTrigger example

- src/main/java/smartTriggers/SmartTrigger.java

```
informix@35b2c56698a2:~/informix-db-examples/java$ java -cp build/libs/informix-examples-java.jar smartTriggers.SmartTrigger "jdbc:informix-sqli://10.134.76.15:9088/sysadmin:user=informix;password=in4mix"
[main] INFO smartTriggers.SmartTrigger - Starting account updates
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $20
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $15
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $10
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $5
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $0
[main] INFO smartTriggers.SmartTrigger - Updated balance in table to $-5
[Thread-2] WARN smartTriggers.SmartTrigger - [SmartTrigger] ALERT on account #1.
Balance $-5
```

```
public void run(String url) throws SQLException {
    try (Connection con = DriverManager.getConnection(url)) {
        this.conn = con;
        createTables();
        informixBsonObject();
        insertBson();
        insertBsonAsString();
        basicBsonQuery();
    }
}

private void createTables() throws SQLException {
    /*
     * Create a table for us to use with a BSON column
     */
    try (Statement s = this.conn.createStatement()) {
        String dropSQL = "DROP TABLE IF EXISTS bsontab";
        String createSQL = "CREATE TABLE bsontab(c1 BSON)";
        logger.info("Exec: {}", dropSQL);
        s.execute(dropSQL);
        logger.info("Exec: {}", createSQL);
        s.execute(createSQL);
    }
}

private void informixBsonObject() {
    IfxBSONObject bson = new IfxBSONObject();
    bson.put("id", 1);
    bson.put("name", "John Smith");
    /*
     * You can convert the bson to a straight map object with toMap();
     */
    Map<String, Object> map = bson.toMap();
    logger.info("ID={} \t Name={}", map.get("id"), map.get("name"));

    /*
     * You can also get values directly from the IfxBSONObject
     */
    logger.info("ID is {}", bson.get("id"));
}

private void insertBson() throws SQLException {
```

# Python Examples – Initial setup

## 1. Initial setup

- Login to the client Docker container
  - (docker exec –it client bash)
- cd informix-db-examples
- Modify connections.json accordingly. Set the host in the connections.json to your IP address of the HOST where the docker containers are running
- export LD\_LIBRARY\_PATH=\$LD\_LIBRARY\_PATH:\$INFORMIXDIR/lib/cli
- cd informix-db-examples/sql/python

```
{  
  "host": "localhost",  
  "port": "9088",  
  "user": "informix",  
  "password": "in4mix",  
  "database": "banktest",  
  "server": "informix"  
}
```

<https://github.com/informix/informix-db-examples/tree/master/python>



## Python Examples – basicQuery example

### 2. Run basicQuery.py

```
$python basicQuery.py
```

- This example will create a table named **t1**, insert some data and query the data.

```
https://github.com/informix/informix-db-examples/tree/master/python
```



# Python Example – Code – basicQuery example

- basicQuery.py

```
informix@35b2c56698a2:~/informix-db-examples/python$ python basicQuery.py
{'database': 'banktest', 'server': 'informix', 'host': '10.134.76.15', 'user': 'informix', 'password': 'in4mix', 'port': '9088'}
SERVER=informix;DATABASE=banktest;HOST=10.134.76.15;SERVICE=9088;UID=informix;PWD=in4mix;PROTOCOL=onsoctcp
DROP TABLE IF EXISTS t1
create table t1 ( c1 int, c2 char(20), c3 int, c4 int );
insert into t1 values( 1, 'Sunday', 101, 201 );
insert into t1 values( 2, 'Monday', 102, 202 );
insert into t1 values( 3, 'Tuesday', 103, 203 );
insert into t1 values( 4, 'Wednesday', 104, 204 );
insert into t1 values( 5, 'Thursday', 105, 2005 );
```

```
-- Record 1 --
('c1 is : ', 1)
('c2 is : ', u'Sunday')
('c3 is : ', 101)
('c4 is : ', 201)

-- Record 2 --
('c1 is : ', 2)
('c2 is : ', u'Monday')
```

```
connectionString = "SERVER=" + connectionJson['server'] + ";DATABASE=" +
connectionJson['database'] + ";HOST=" + connectionJson['host'] + ";SERVICE=" +
connectionJson['port'] + ";UID=" + connectionJson['user'] + ";PWD=" +
connectionJson['password'] + ";PROTOCOL=onsoctcp"
print (connectionString)
conn = IfxPy.connect(connectionString, "", "")

SetupSqlSet = [
    "DROP TABLE IF EXISTS t1",
    "create table t1 ( c1 int, c2 char(20), c3 int, c4 int );",
    "insert into t1 values( 1, 'Sunday', 101, 201 );",
    "insert into t1 values( 2, 'Monday', 102, 202 );",
    "insert into t1 values( 3, 'Tuesday', 103, 203 );",
    "insert into t1 values( 4, 'Wednesday', 104, 204 );",
    "insert into t1 values( 5, 'Thursday', 105, 2005 );",
    "insert into t1 values( 6, 'Friday', 106, 206 );",
    "insert into t1 values( 7, 'Saturday', 107, 207 );"
]

for sql in SetupSqlSet:
    print (sql)
    stmt = IfxPy.exec_immediate(conn, sql)

sql = "SELECT * FROM t1"
stmt = IfxPy.exec_immediate(conn, sql)
dictionary = IfxPy.fetch_both(stmt)

rc = 0
while dictionary != False:
    rc = rc + 1
    print ("-- Record {0} --".format(rc))
    print ("c1 is : ", dictionary[0])
    print ("c2 is : ", dictionary[1])
    print ("c3 is : ", dictionary["c3"])
    print ("c4 is : ", dictionary[3])
    print (" ")
```

## NodeJS Examples – Under construction



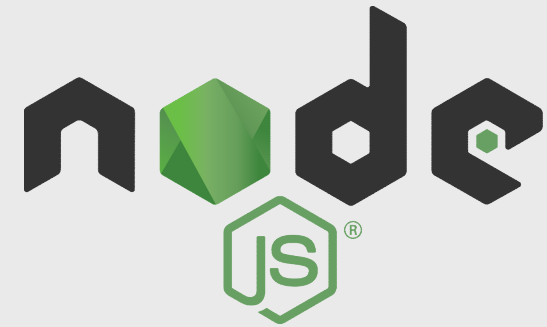
# NodeJS Examples – Initial setup

## 1. Initial setup

- Login to the client Docker container
  - (docker exec –it client bash)
- cd informix-db-examples
- Modify connections.json accordingly. Set the host in the connections.json to your IP address of the HOST where the docker containers are running
- cd nodejs

```
{  
  "host": "localhost",  
  "port": "9088",  
  "user": "informix",  
  "password": "in4mix",  
  "database": "banktest",  
  "server": "informix"  
}
```

<https://github.com/informix/informix-db-examples/tree/master/nodejs>



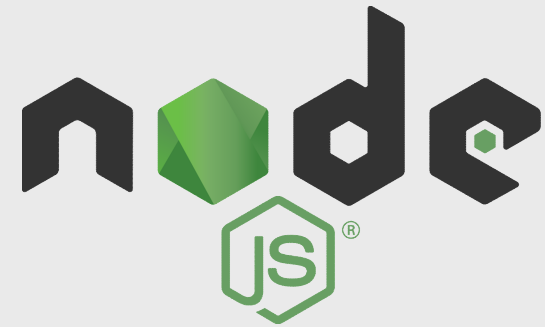
# NodeJS Examples – basicQuery example

## 2. Run basicQuery.js

```
$node basicQuery.js
```

- This example will query the first 10 rows from systables.

```
https://github.com/informix/informix-db-examples/tree/master/nodejs
```





# NodeJS Example – Code – basicQuery example

- basicQuery.js

```
Informix@35b2c56698a2:~/informix-db-examples/nodejs$ node basicQuery.js
SERVER=informix;DATABASE=banktest;HOST=10.134.76.15;SERVICE=9088;UID=informix;PWD=in4mix;PROTOCOL=onsoctcp
SERVER=informix;DATABASE=banktest;HOST=10.134.76.15;SERVICE=9088;UID=informix;PWD=in4mix;PROTOCOL=onsoctcp
[ { tabid: 1, tabname: 'systables' },
  { tabid: 2, tabname: 'syscolumns' },
  { tabid: 3, tabname: 'sysindices' },
  { tabid: 4, tabname: 'systabauth' },
  { tabid: 5, tabname: 'syscolauth' },
  { tabid: 6, tabname: 'sysviews' },
  { tabid: 7, tabname: 'sysusers' },
  { tabid: 8, tabname: 'sysdepend' },
  { tabid: 9, tabname: 'syssynonyms' },
  { tabid: 10, tabname: 'syssyntable' } ]
Informix@35b2c56698a2:~/informix-db-examples/nodejs$
```

```
var ifxDriver = require('ifxnjs');
var connectionString = require('./getConnection.js').getConnection();
console.log(connectionString);
var conn = ifxDriver.openSync(connectionString);
var rows = conn.querySync("SELECT FIRST 10 tabid, tabname from systables");
console.log(rows);
conn.closeSync();
```



## Demo

Using the IBM Informix Docker image you can have a database system up and available in minutes.

# GeoSpatial – SmartTrigger Demo

## 1. Initial setup

- Login to the client Docker container
  - (docker exec –it client bash)
- cd demo
- Modify config.json accordingly. Set the host in the connections.json to your IP address of the HOST where the docker containers are running



# GeoSpatial – SmartTrigger Demo

## 2. Run the demo

- `Java -jar geotriggers.jar`
- This Demo simulates fleet management. A random number of trucks are tracked on their delivery routes.
- When a truck goes outside of its geo-fenced area an Alert will be triggered.
- This Demo uses Smart Triggers for the alerting, and Geospatial data for the tracking of the truck's routes.



# GeoSpatial – SmartTrigger Demo