Guidelines: Writing Java applications with CA Datacom and CA Datacom Server

CTC 18 – App Dev – Thursday, April 28 2016

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Abstract

- This session provides an overview of the steps and best practices used to code and execute JDBC applications to access CA Datacom tables with CA Datacom Server.

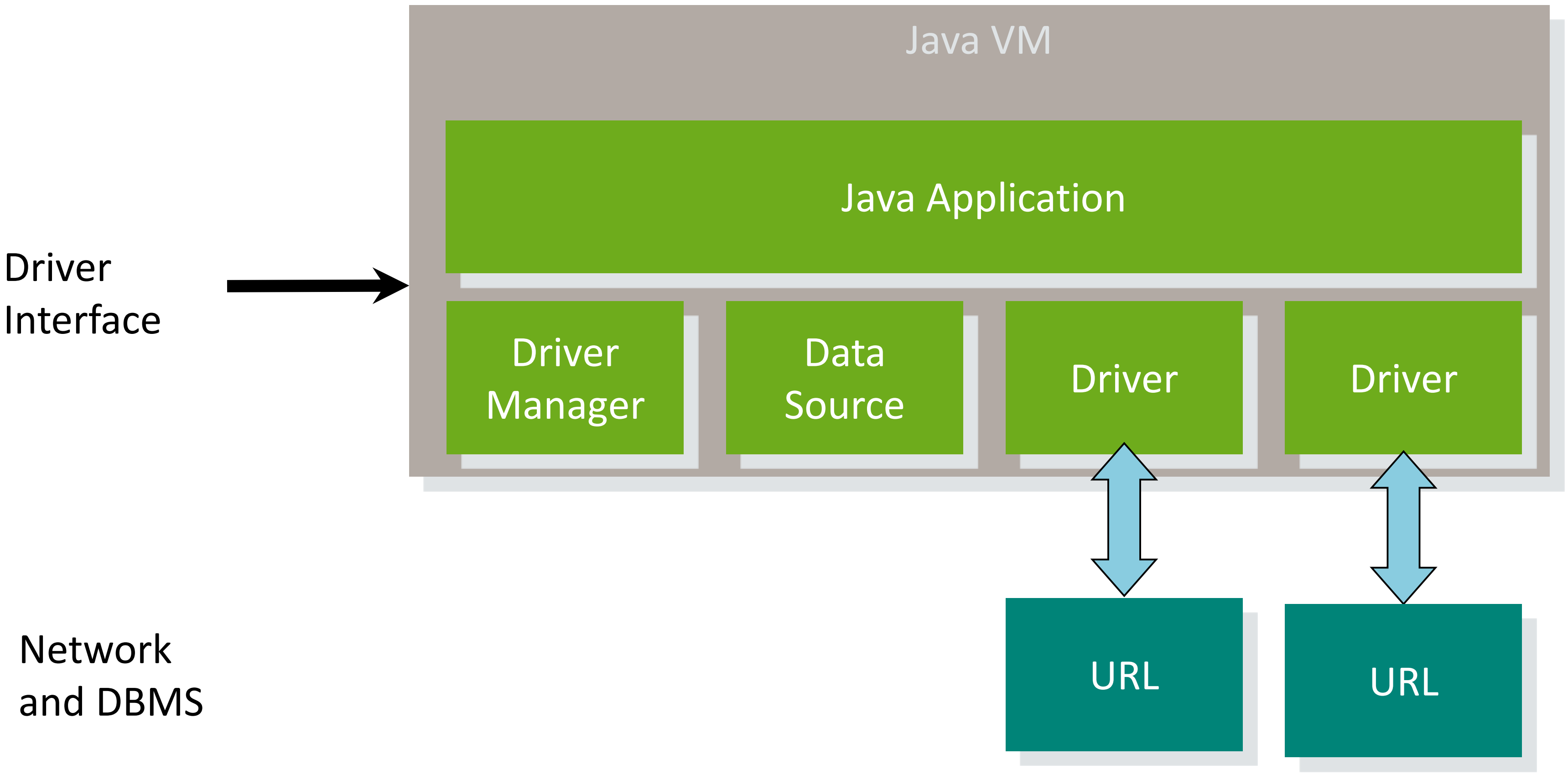
Agenda

- JDBC Concepts
- JDBC Architecture

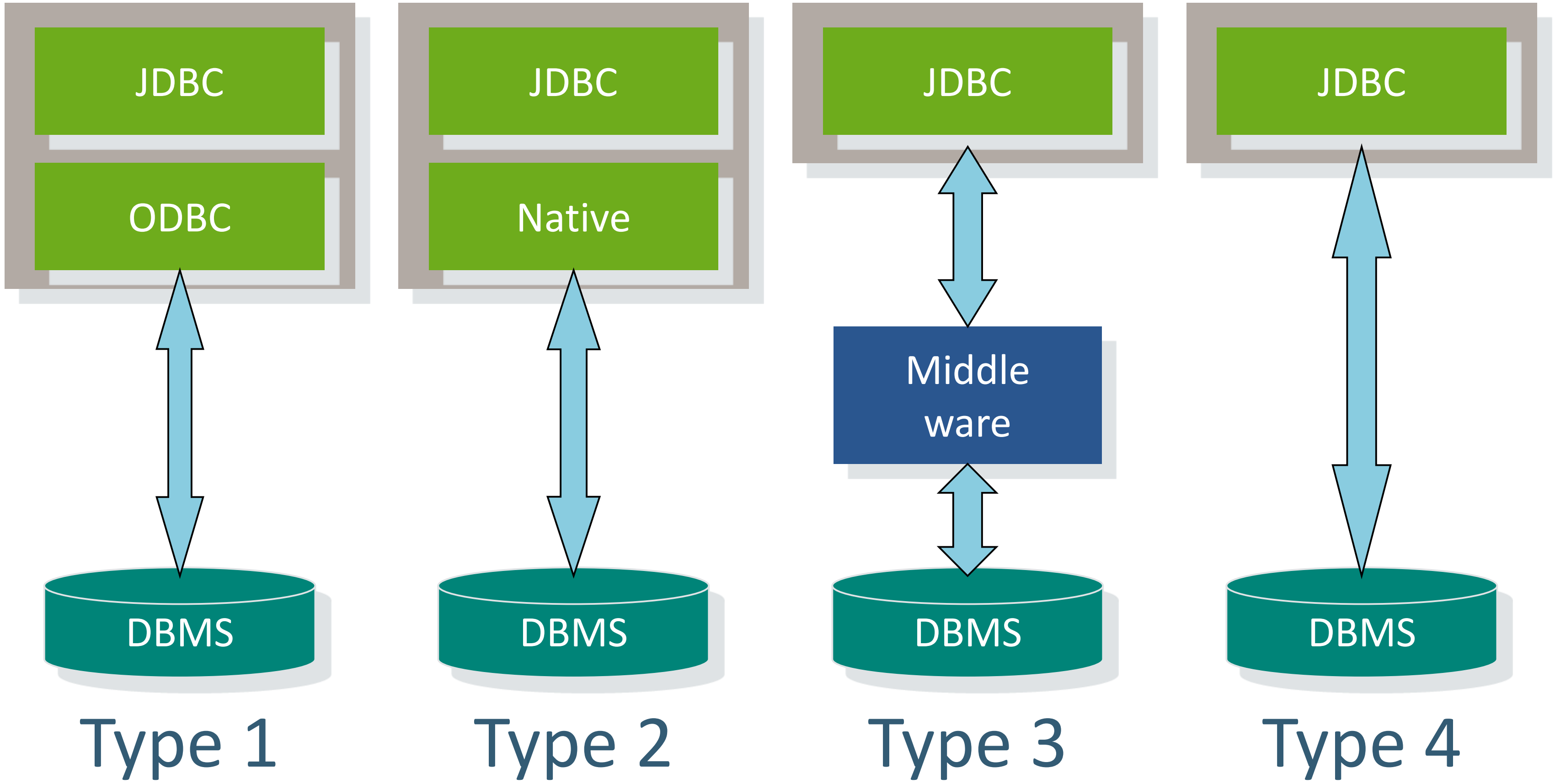
JDBC – Java Database Connectivity

- Industry standard API for database-independent connectivity
- Object oriented
- Interoperability
- “Write Once, Run Anywhere” capabilities of Java for access to enterprise data
- Runs on any platform that supports Java

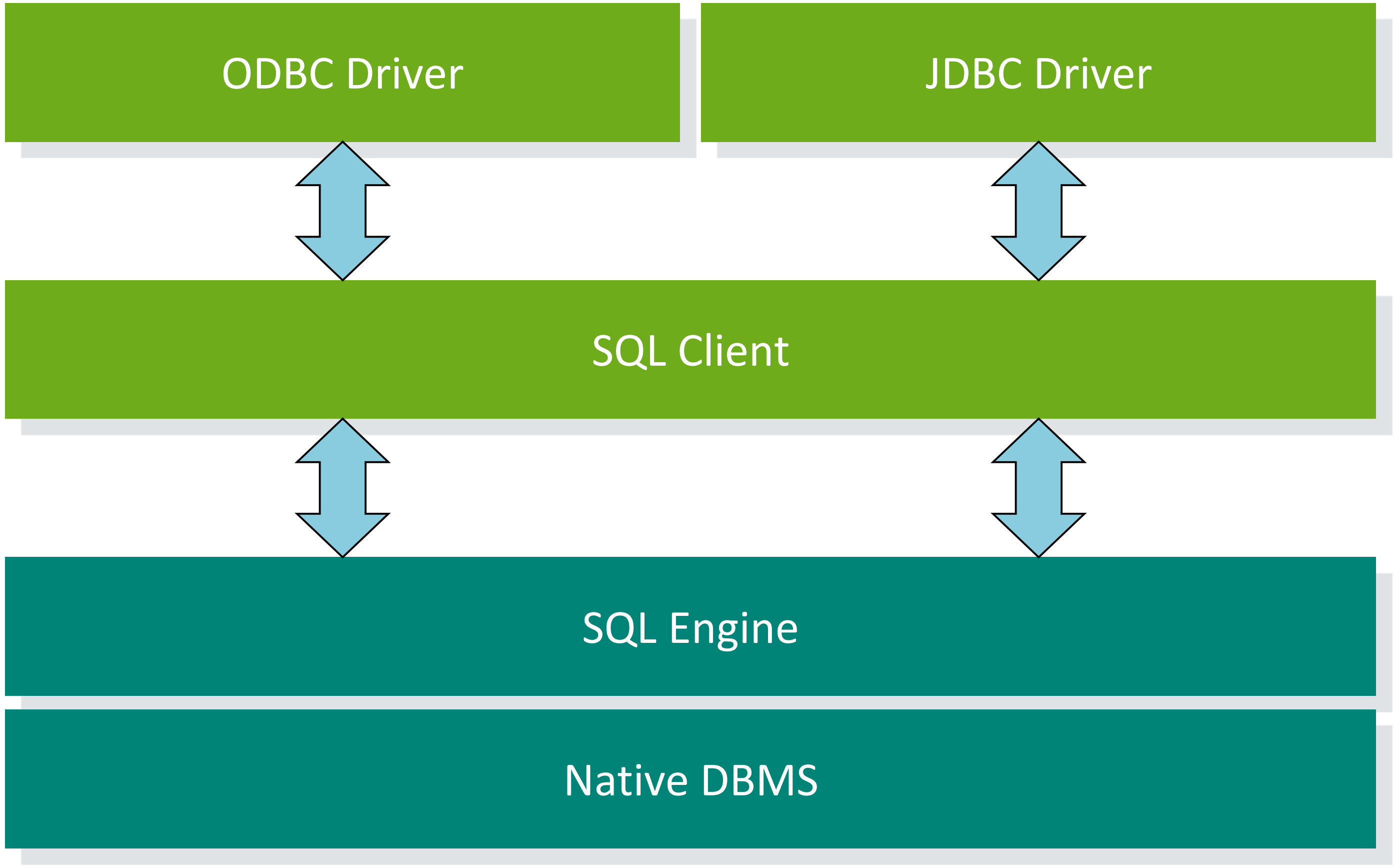
JDBC Architecture



JDBC Driver Types



CA Datacom Server Basic Architecture

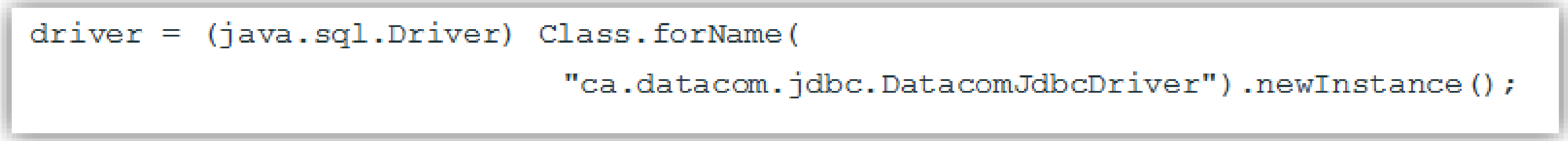


JDBC Driver – cadcjdbc.jar

- JDBC 4.0 compliant
- “Universal” driver
  - Types 2, 3, 4
- All client platforms that support Java
  - Windows
  - z/OS USS
  - Linux(x86, z/Series)
  - Other Unix

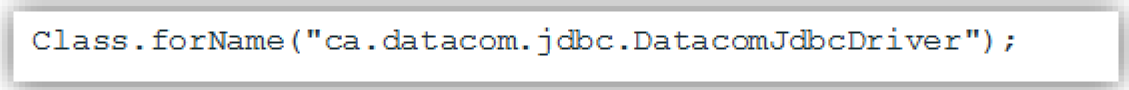
JDBC Driver – cadcjdbc.jar

- Driver Name: ca.datacom.jdbc.DatacomJdbcDriver
- Auto-Loading of JDBC Driver – JDBC 4.0
  - No need to invoke Class.forName()



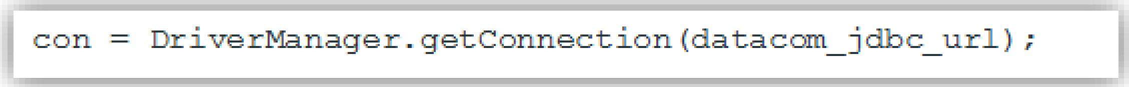
```
driver = (java.sql.Driver) Class.forName(
                                  "ca.datacom.jdbc.DatacomJdbcDriver").newInstance();
```

  - … or …



```
Class.forName("ca.datacom.jdbc.DatacomJdbcDriver");
```

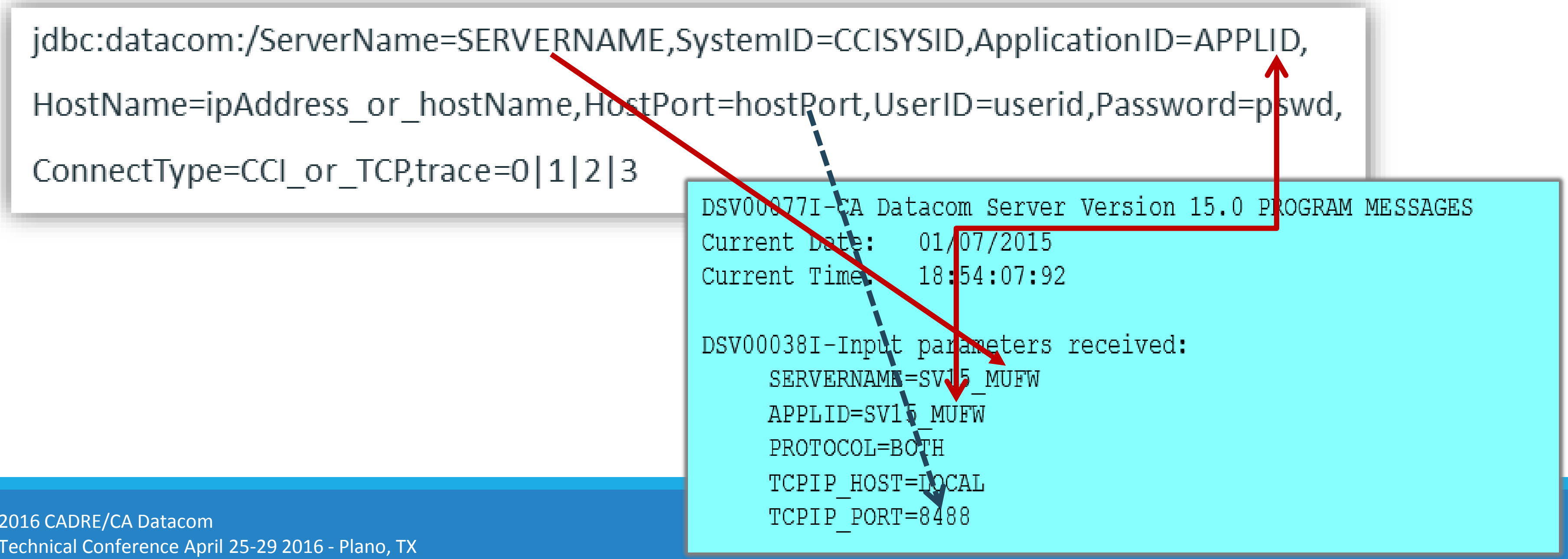
  - Now, simply call getConnection()



```
con = DriverManager.getConnection(datacom_jdbc_url);
```

JDBC Type 2 Connection

- Requires CA Datacom Server native interface
  - cadcdb32 – 32bit JVMs
  - cadcdb64 – 64bit JVMs
- Windows and z/OS USS, only – not valid on Linux platforms

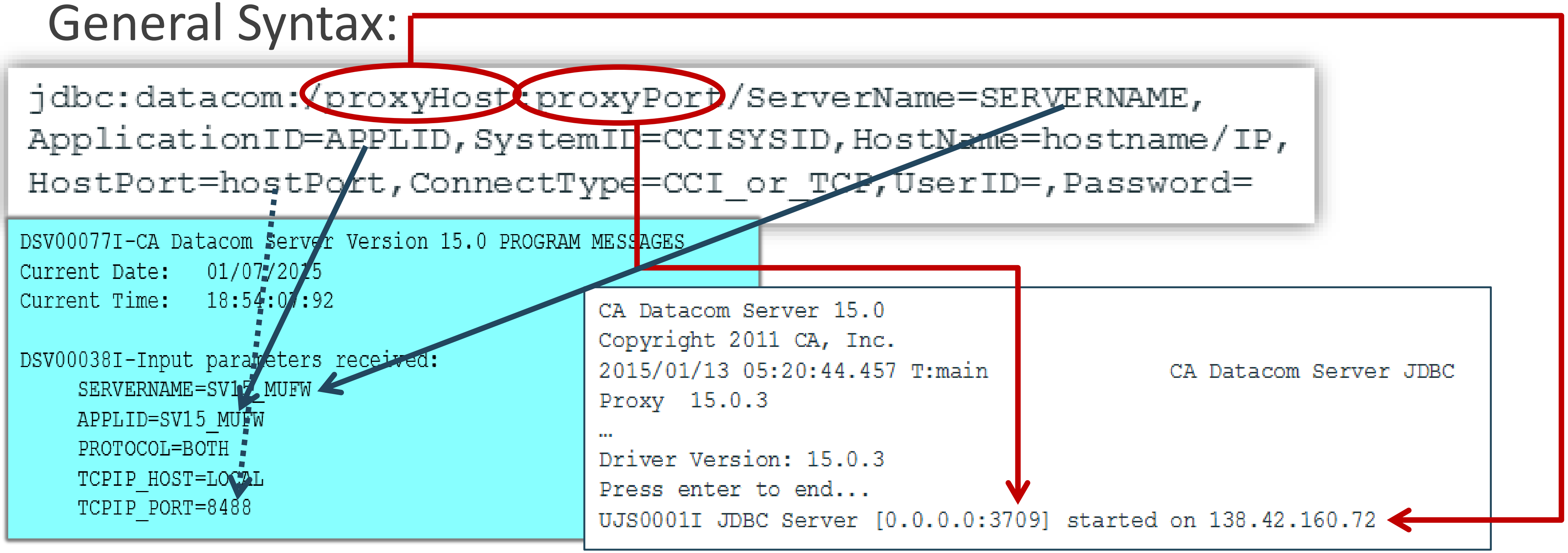


```
jdbc:datacom:/ServerName=SERVERNAME,SystemID=CCISYSID,ApplicationID=APPLID,
HostName=ipAddress_or_hostName,HostPort=hostPort,UserID=userid,Password=pswd,
ConnectType=CCI_or_TCP,trace=0|1|2|3
```

```
DSV00077I-CA Datacom Server Version 15.0 PROGRAM MESSAGES
Current Date:   01/07/2015
Current Time:   18:54:07:92

DSV00038I-Input parameters received:
     SERVERNAME=SV15_MUFW
     APPLID=SV15_MUFW
     PROTOCOL=BOTH
     TCPIP_HOST=LOCAL
     TCPIP_PORT=8488
```

JDBC Type 3 Connection

- Type 3 – Requires a JDBC Proxy on Windows or USS
- Linux Platforms – x86 or z/Series
- General Syntax:



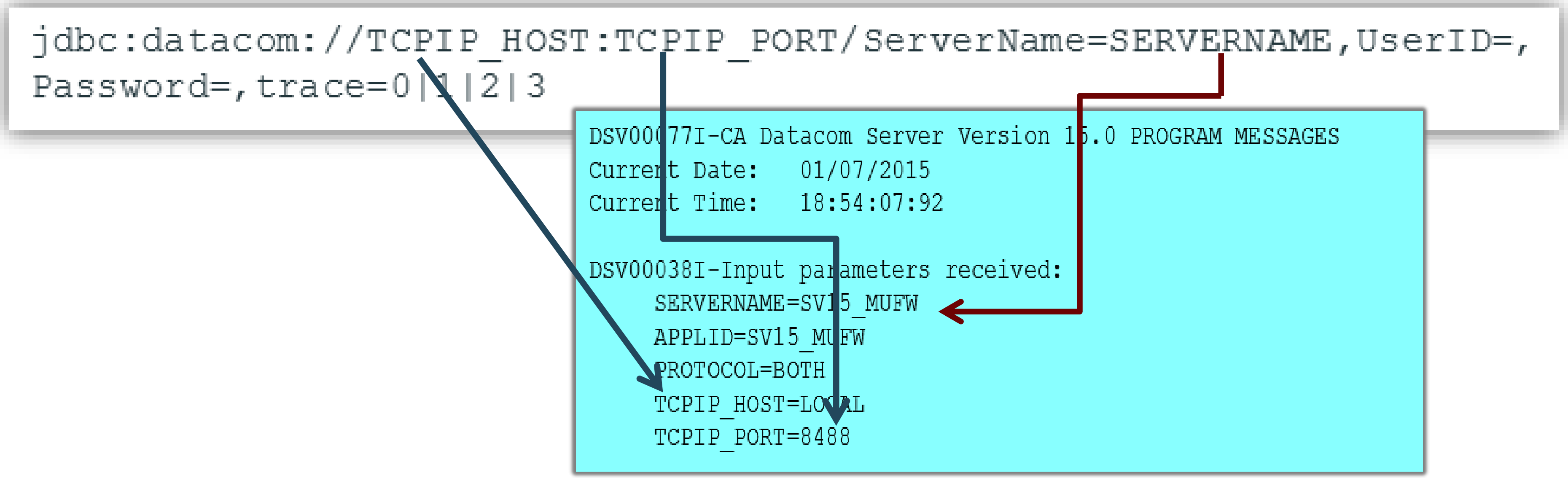
```
jdbc:datacom://proxyHost:proxyPort/ServerName=SERVERNAME,
ApplicationID=APPLID,SystemID=CCISYSID,HostName=hostname/IP,
HostPort=hostPort,ConnectType=CCI_or_TCP,UserID=,Password=
```

```
DSV00077I-CA Datacom Server Version 15.0 PROGRAM MESSAGES
Current Date:   01/07/2015
Current Time:   18:54:07:92

DSV00038I-Input parameters received:
     SERVERNAME=SV15_MUFW
     APPLID=SV15_MUFW
     PROTOCOL=BOTH
     TCPIP_HOST=LOCAL
     TCPIP_PORT=8488
```

```
CA Datacom Server 15.0
Copyright 2011 CA, Inc.
2015/01/13 05:20:44.457 T:main                    CA Datacom Server JDBC
Proxy  15.0.3
…
Driver Version: 15.0.3
Press enter to end...
UJS0001I JDBC Server [0.0.0.0:3709] started on 138.42.160.72
```

JDBC Type 4 Connection

- Type 4 – Requires TCP/IP - not valid with PROTOCOL=CCI
- Pure Java - Supported on all Java platforms
- Direct Connection to CA Datacom Server Mainframe region

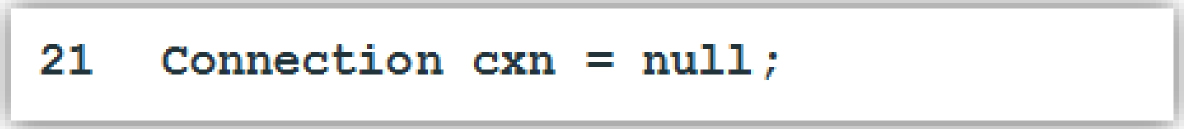


```
jdbc:datacom://TCPIP_HOST:TCPIP_PORT/ServerName=SERVERNAME,UserID=,
Password=,trace=0|1|2|3
```

```
DSV00077I-CA Datacom Server Version 15.0 PROGRAM MESSAGES
Current Date:    01/07/2015
Current Time:    18:54:07:92

DSV00038I-Input parameters received:
     SERVERNAME=SV15_MUFW
     APPLID=SV15_MUFW
     PROTOCOL=BOTH
     TCPIP_HOST=LOCAL
     TCPIP_PORT=8488
```

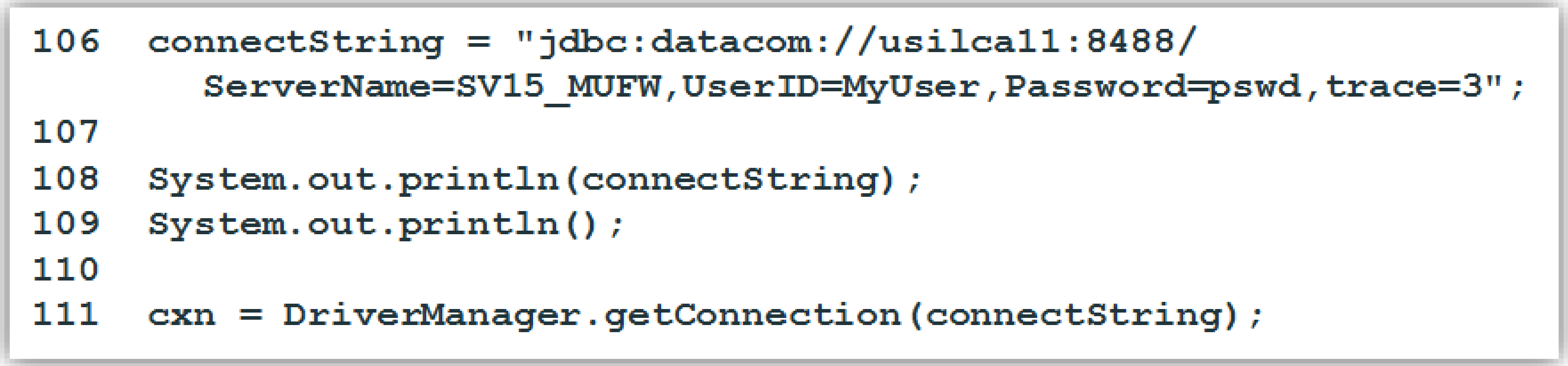
JDBC_Example.java – Establish a Connection

- Instantiate a connection object



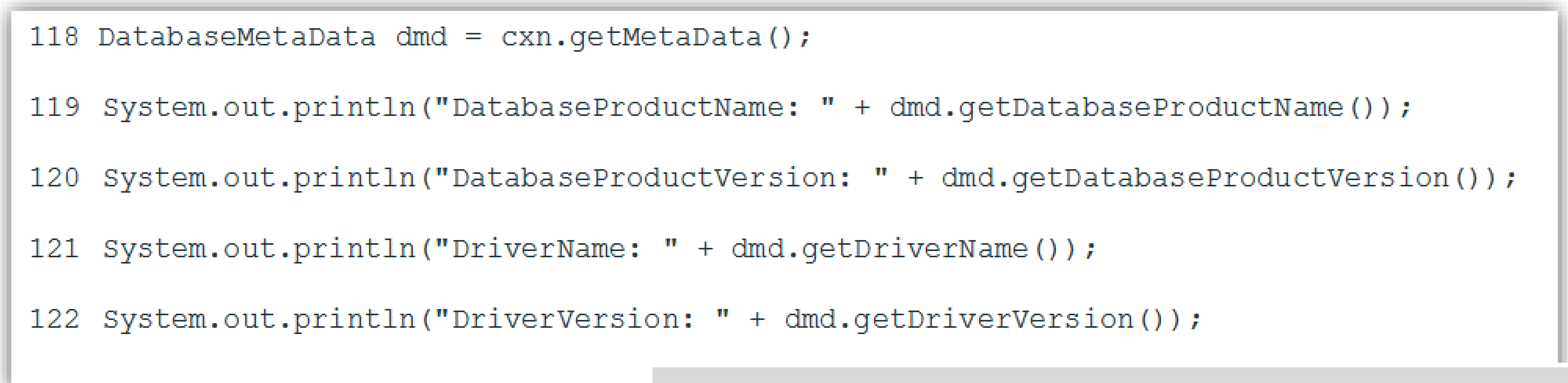
```
Connection cxn = null;
```

- Get a connection

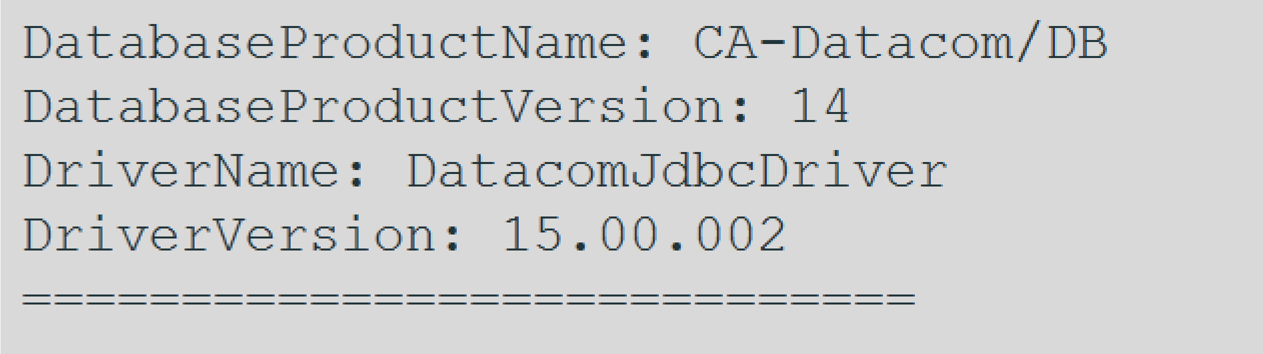


```
connectString = "jdbc:datacom://usilca11:8488/
    ServerName=SV15_MUFW,UserID=MyUser,Password=pswd,trace=3";

System.out.println(connectString);
System.out.println();

cxn = DriverManager.getConnection(connectString);
```

JDBC_Example.java
Data Base Metadata



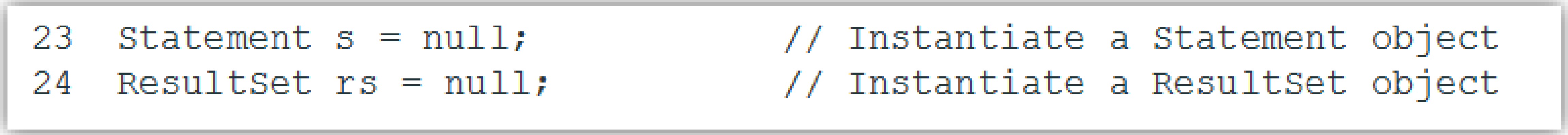
```java
DatabaseMetaData dmd = cxn.getMetaData();

System.out.println("DatabaseProductName: " + dmd.getDatabaseProductName());

System.out.println("DatabaseProductVersion: " + dmd.getDatabaseProductVersion());

System.out.println("DriverName: " + dmd.getDriverName());

System.out.println("DriverVersion: " + dmd.getDriverVersion());
```



```
DatabaseProductName: CA-Datacom/DB
DatabaseProductVersion: 14
DriverName: DatacomJdbcDriver
DriverVersion: 15.00.002
==============================
```

JDBC_Example.java – Execute a simple Statement and retrieve the results

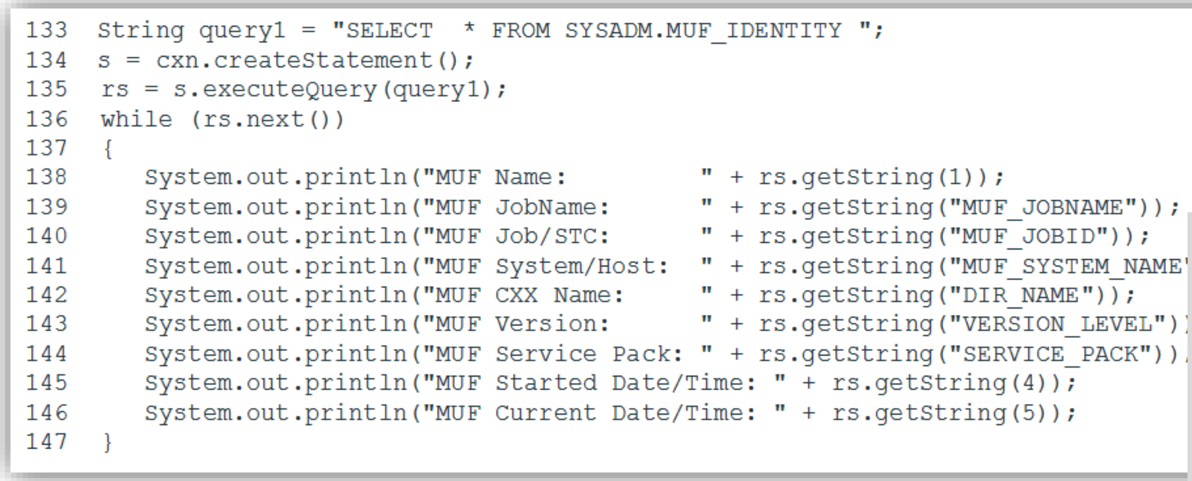
- Instantiate a Statement object and a ResultSet object



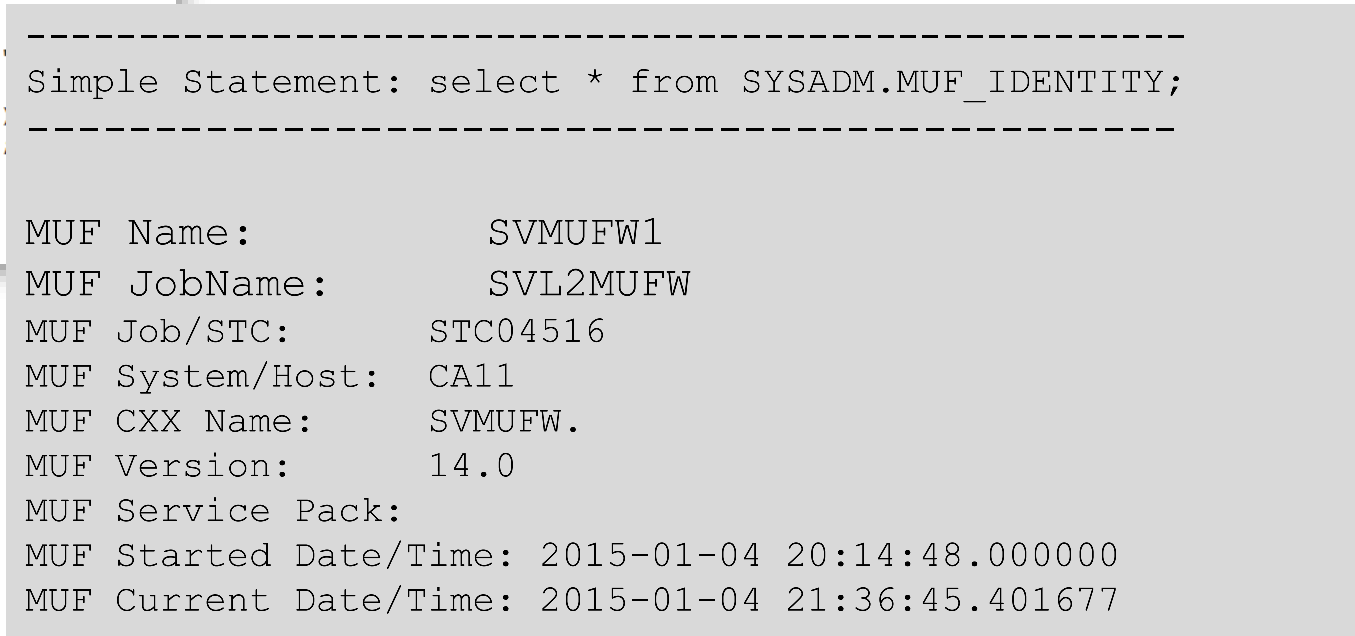
```
Statement s = null;                 // Instantiate a Statement object
ResultSet rs = null;                // Instantiate a ResultSet object
```

JDBC_Example.java – Execute a simple Statement and retrieve the results

- createStatement(), executeQuery(), next()



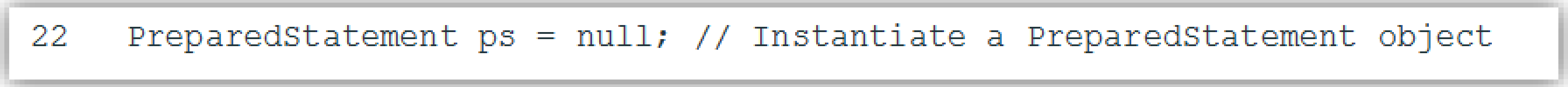
```
String query1 = "SELECT  * FROM SYSADM.MUF_IDENTITY ";
s = cxn.createStatement();
rs = s.executeQuery(query1);
while (rs.next())
{
    System.out.println("MUF Name:         " + rs.getString(1));
    System.out.println("MUF JobName:      " + rs.getString("MUF_JOBNAME"));
    System.out.println("MUF Job/STC:      " + rs.getString("MUF_JOBID"));
    System.out.println("MUF System/Host:  " + rs.getString("MUF_SYSTEM_NAME"
    System.out.println("MUF CXX Name:     " + rs.getString("DIR_NAME"));
    System.out.println("MUF Version:      " + rs.getString("VERSION_LEVEL"))
    System.out.println("MUF Service Pack: " + rs.getString("SERVICE_PACK"))
    System.out.println("MUF Started Date/Time: " + rs.getString(4));
    System.out.println("MUF Current Date/Time: " + rs.getString(5));
}
```



```
-----------------------------------------------------
Simple Statement: select * from SYSADM.MUF_IDENTITY;
----------------------------------------------------


MUF Name:         SVMUFW1
MUF JobName:      SVL2MUFW
MUF Job/STC:      STC04516
MUF System/Host:  CA11
MUF CXX Name:     SVMUFW.
MUF Version:      14.0
MUF Service Pack:
MUF Started Date/Time: 2015-01-04 20:14:48.000000
MUF Current Date/Time: 2015-01-04 21:36:45.401677
```

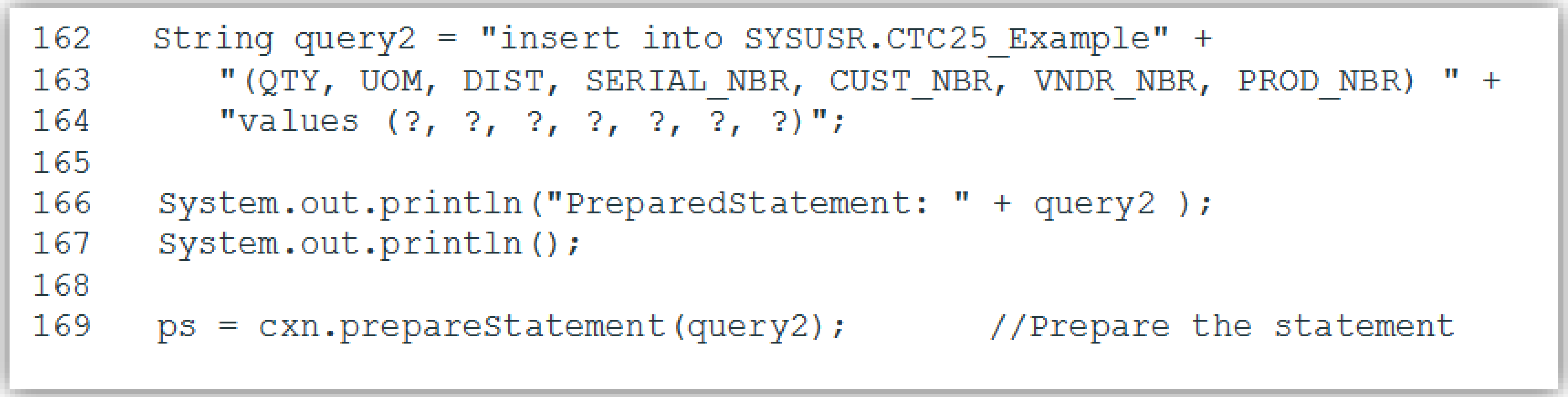
JDBC_Example.java – PreparedStatement with SQL Parameter Markers

- Instantiate a PreparedStatement object



```java
PreparedStatement ps = null; // Instantiate a PreparedStatement object
```

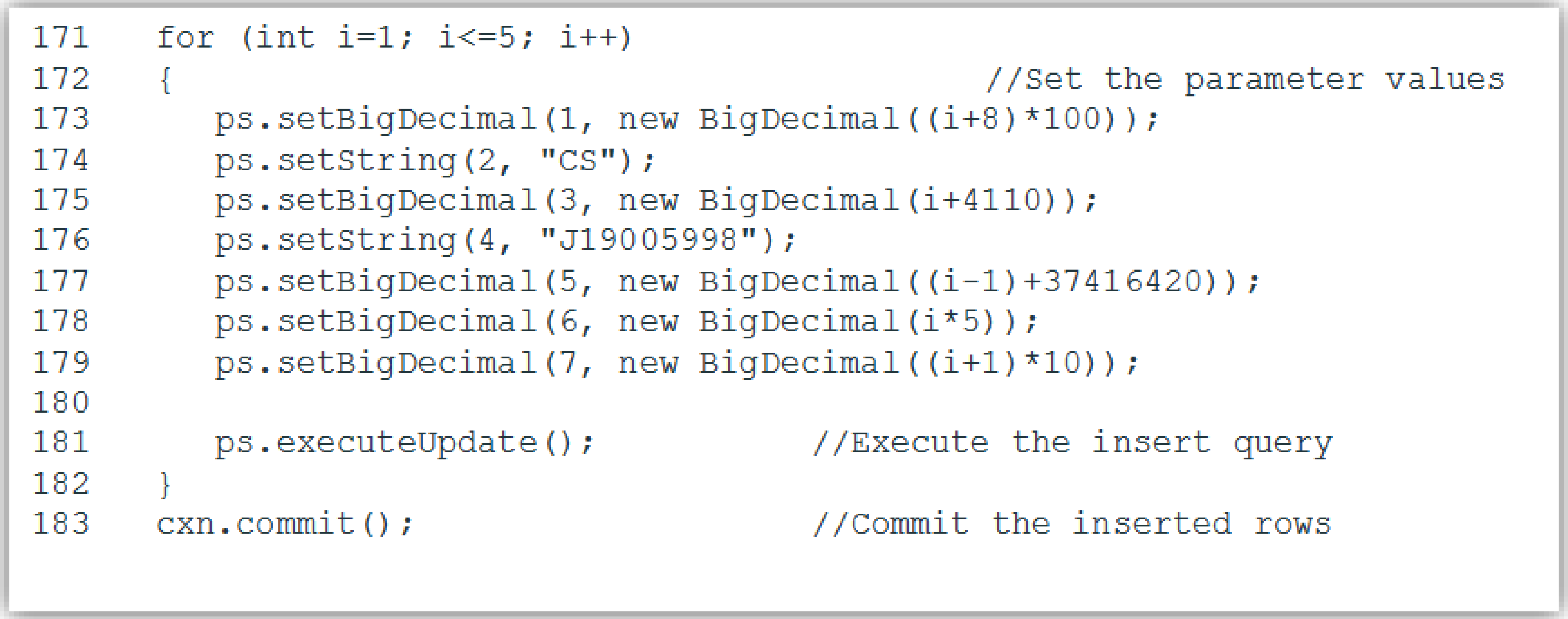
- prepareStatement()



```java
String query2 = "insert into SYSUSR.CTC25_Example" +
   "(QTY, UOM, DIST, SERIAL_NBR, CUST_NBR, VNDR_NBR, PROD_NBR) " +
   "values (?, ?, ?, ?, ?, ?, ?)";

System.out.println("PreparedStatement: " + query2 );
System.out.println();

ps = cxn.prepareStatement(query2);       //Prepare the statement
```

JDBC_Example.java – Set Parameter Values and Execute PreparedStatement

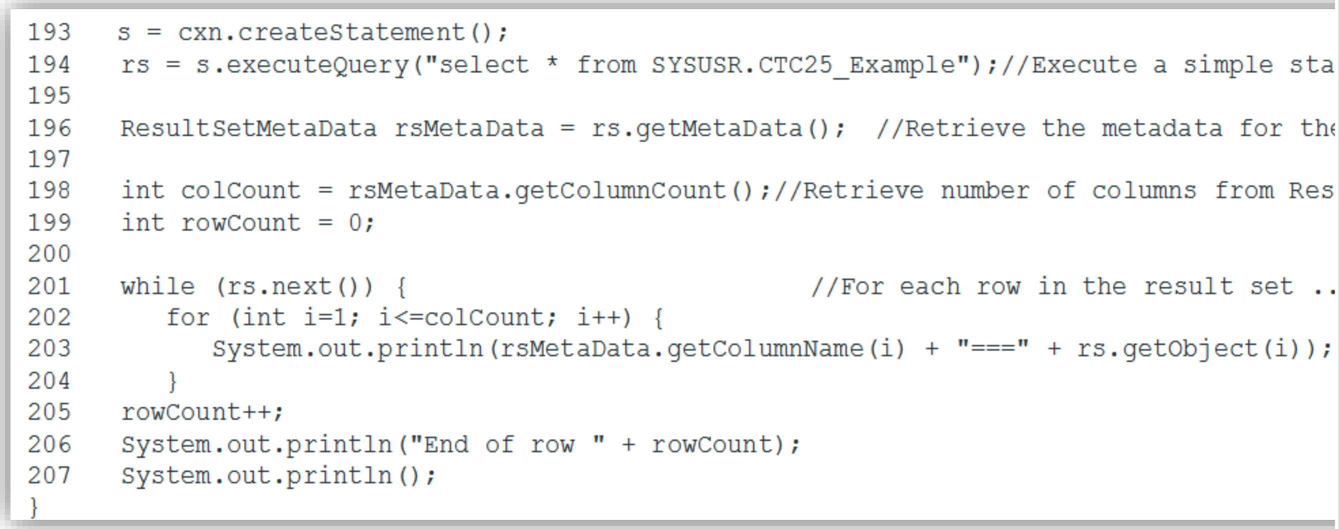
- Setter methods – setBigDecimal(), setString()
- executeUpdate()



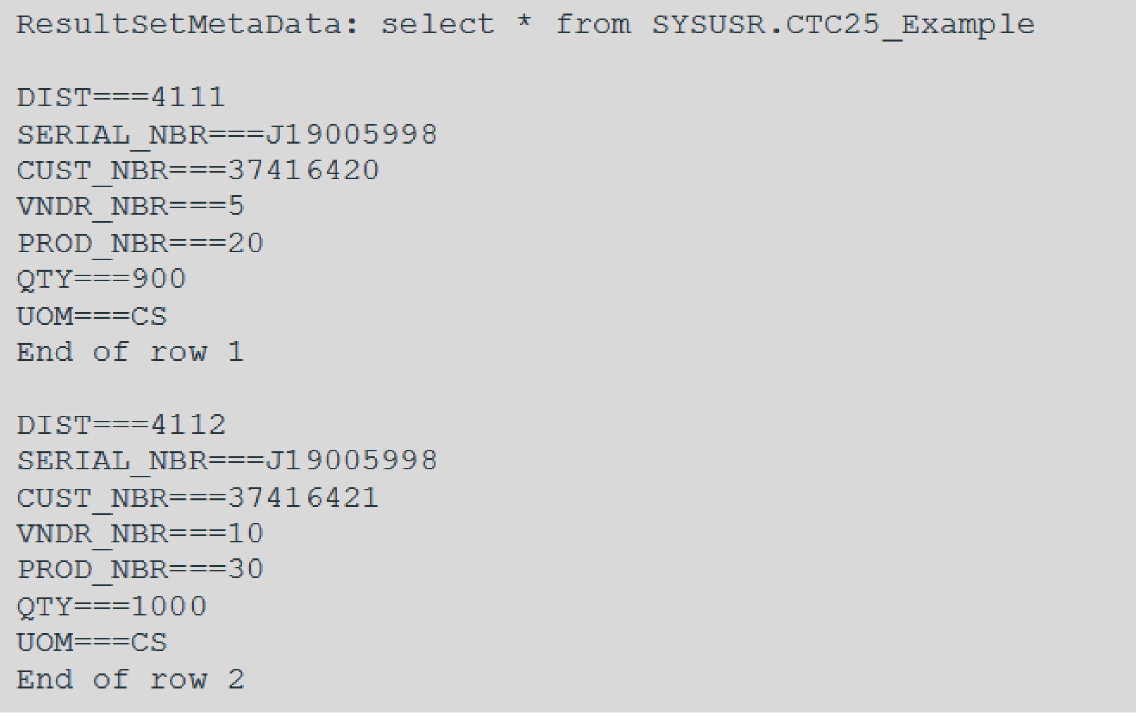
```
for (int i=1; i<=5; i++)
{                                        //Set the parameter values
   ps.setBigDecimal(1, new BigDecimal((i+8)*100));
   ps.setString(2, "CS");
   ps.setBigDecimal(3, new BigDecimal(i+4110));
   ps.setString(4, "J19005998");
   ps.setBigDecimal(5, new BigDecimal((i-1)+37416420));
   ps.setBigDecimal(6, new BigDecimal(i*5));
   ps.setBigDecimal(7, new BigDecimal((i+1)*10));

   ps.executeUpdate();          //Execute the insert query
}
cxn.commit();                   //Commit the inserted rows
```

JDBC_Example.java – Result Set Metadata

- ResultSet.getMetaData()
- ResultSetMetaData.getColumnCount(), getColumnName() and getObject()



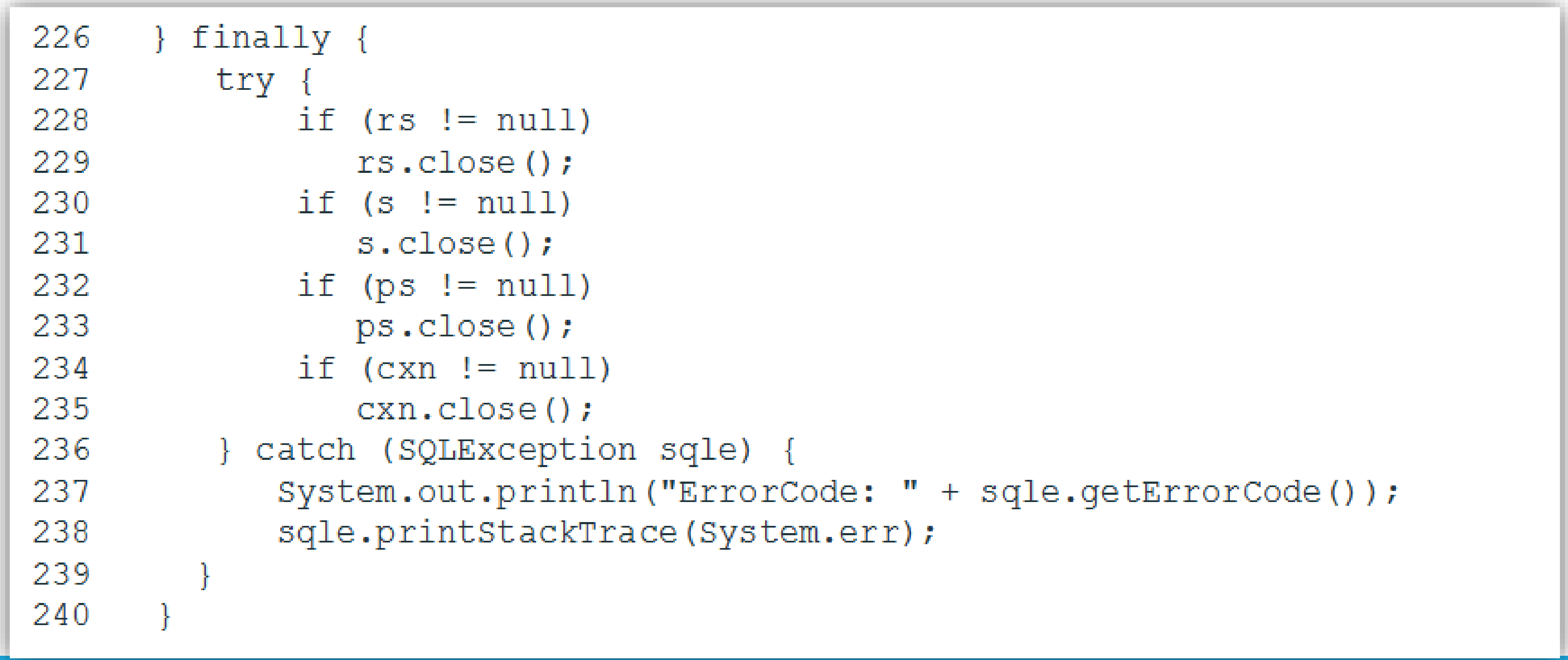
```
      s = cxn.createStatement();
      rs = s.executeQuery("select * from SYSUSR.CTC25_Example");//Execute a simple sta

      ResultSetMetaData rsMetaData = rs.getMetaData();  //Retrieve the metadata for the

      int colCount = rsMetaData.getColumnCount();//Retrieve number of columns from Res
      int rowCount = 0;

      while (rs.next()) {                           //For each row in the result set ..
         for (int i=1; i<=colCount; i++) {
            System.out.println(rsMetaData.getColumnName(i) + "===" + rs.getObject(i));
         }
      rowCount++;
      System.out.println("End of row " + rowCount);
      System.out.println();
}
```



```
ResultSetMetaData: select * from SYSUSR.CTC25_Example

DIST===4111
SERIAL_NBR===J19005998
CUST_NBR===37416420
VNDR_NBR===5
PROD_NBR===20
QTY===900
UOM===CS
End of row 1

DIST===4112
SERIAL_NBR===J19005998
CUST_NBR===37416421
VNDR_NBR===10
PROD_NBR===30
QTY===1000
UOM===CS
End of row 2
```

JDBC_Example – Closing Objects

- ResultSet.close(), Statement.close(), PreparedStatement.close(), Connection.close()



```
} finally {
   try {
       if (rs != null)
          rs.close();
       if (s != null)
          s.close();
       if (ps != null)
          ps.close();
       if (cxn != null)
          cxn.close();
   } catch (SQLException sqle) {
      System.out.println("ErrorCode: " + sqle.getErrorCode());
      sqle.printStackTrace(System.err);
  }
}
```

References

- Java™ Platform, Standard Edition 7 API Specification
  - http://docs.oracle.com/javase/7/docs/api/

- CA Datacom Tools – 15.0 – Working with Datacom Server
  - http://docops.ca.com/ca-datacom-tools/15-0/en/working-with-datacom-server

Summary

- Industry standard JDBC implementation
- Utilizes CA Datacom SQL “under the covers”
- Provides open systems access to CA Datacom data

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