

# Judd Solutions

Development, Mentoring and Training



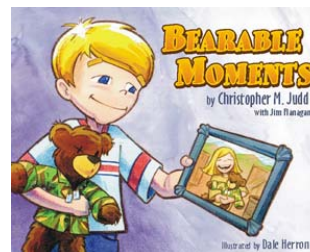
## 204 – Interacting with Relational Databases

Christopher M. Judd  
President/Consultant  
Judd Solutions, LLC



### Christopher M. Judd

- President/Consultant of Judd Solutions
- Central Ohio Java User Group (COJUG) coordinator



Judd Solutions



## Other Sessions of Interest

- DTP
  - T-7. Callisto Boot Camp: Ten Projects. One Day. (Wed 8:45)
  - 106. How to Improve Database Connectivity with the Data Tools Platform (Thu 8:30)
  - 306. Architect and Build High-End Data Tools Solutions (Thu 1:15)
- Other
  - T-4. Develop Better J2EE Applications with the Web Tools Platform (Wed 8:45)
  - 401. Consuming and Producing Web Services with Web Tools (Thu 3:15)
  - 706. Step by Step: Making Enterprise JavaBeans with J2EE Standard Tools (Fri 1:45)

**Judd Solutions**



## Agenda

- DTP Overview
- Apache Derby Database
- Using SQL Development Tools
- Conclusion

**Judd Solutions**



## Data Tools Platform Project (DTP)

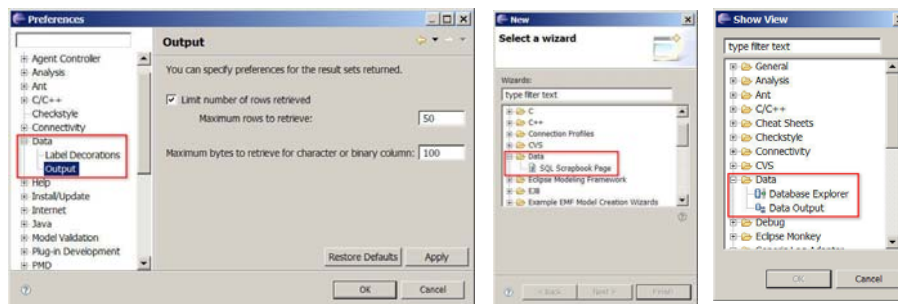
- Top Level Eclipse Project
- [www.eclipse.com/datatools/](http://www.eclipse.com/datatools/)
- Included in Callisto release
- Current version 0.9
- Tools and frameworks for managing data-centric system
  - Refactor common data centric management into one place
  - Vendor independent
  - Vendor extensible
- Subprojects
  - Connectivity
  - Enablement
  - Model Base
  - SQL Dev Tools
- Dependencies
  - Eclipse 3. 2 SDK
  - Eclipse Modeling Framework (EMF) 2.2.0
  - Graphic Editor Framework (GEF) 3.2

Judd Solutions



## DTP Replaces WTP RDB

- WTP Relational Database (RDB) will be removed in the near future. Until then there are two sets of tools that can cause confusing.
- Don't use the following



Judd Solutions



## DTP Uses

- Build data centric applications
  - Eclipse plug-ins
  - [Rich Client Platform \(RCP\)](#) applications
- Developer tool set
  - Executing SQL and DDL
  - View database elements
  - Saving and export results
  - Debugging stored procedures and triggers

Judd Solutions



## DTP Adopters

- [Business Intelligence and Reporting Tools \(BIRT\)](#)
- [Web Tools Platform \(WTP\)](#)
- [Sybase](#)
  - WorkSpace
- [Actuate](#)
  - BusinessReport Studio
  - BIRT Report Designer Pro

Judd Solutions



## DTP Subprojects

- Connectivity
- Model Base
- Enablement
- SQL Development Tools

**Judd Solutions**



## Connectivity

- Driver Management Framework (DMF)
- Connection Management Framework (CMF)
  - Connection Profile
- Open Data Access (ODA)
  - Data abstraction
  - Access data regardless of structure

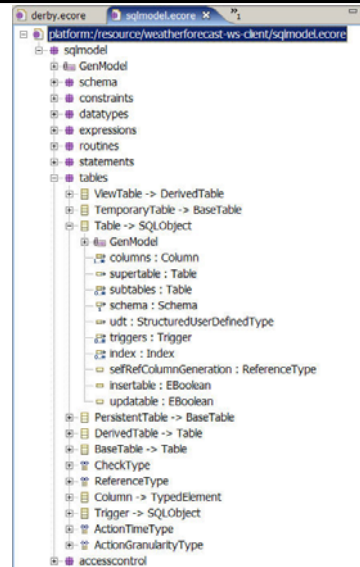
Solves the problem of each plug-in having its own method of configuring a data source and having to create a new connection for each plug-in.

**Judd Solutions**



## Model Base

- Domain model
- EMF model not database modeling tools
- General Models
  - Database definition
  - SQL model
  - SQL query model
  - SQL XML query model
- Implementation Models
  - Derby
  - Derby SQL model



Judd Solutions



## Enablement

- Specialized support built on DTP core extensions
  - Database support
    - DB2 databases
    - Sybase databases
    - Oracle databases
    - MySQL database
  - Data sources
    - XML

Judd Solutions



## SQL Development Tools

- Perspectives
  - Database Development
  - Database Debug
- Editors
  - SQL File Editor & Outline
- Wizards
  - SQL File
- Views
  - Data Source Explorer
  - SQL Results
  - Execution Plan
- Configurations

**Judd Solutions**



## Agenda

- DTP Overview
- Apache Derby Database
- Using SQL Development Tools
- Conclusion

**Judd Solutions**



## Apache Derby

- Relational database
- 100% Java
- Small footprint
- Open Source
- Apache License Version 2.0
- <http://db.apache.org/derby/>
- Current version is 10.1.3.1
- Embedded or Network Server
- IBM donated part of Cloudscape's code base
  - DB2 like
  - 10.0

Judd Solutions



## Database Features

- ANSI SQL Standards
  - SQL-92 core subset
  - some SQL-99 features
- Security
- Schema
- Transactional
  - Full ACID
  - All four isolation levels
- Stored Procedures & triggers
- Views
- Drivers
  - JDBC
  - ODBC

Judd Solutions





## Uses

- Unit Testing
- Proofs of concepts
- Embedded database
- Small applications
  - Web
  - Desktop
- Java Web Start (JWS) deployment

**Judd Solutions**



## Competition

- hsqldb
- IBM Cloudscape
- Borland JDataStore
- MySQL
- PostgreSQL
- Oracle
- IBM DB2
- Microsoft SQLServer

**Judd Solutions**



## Architecture

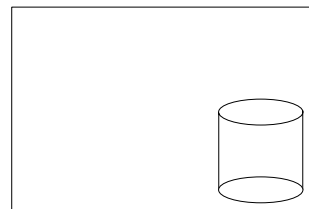
- Embedded
- Network Server

**Judd Solutions**



## Embedded

- Single JVM
- Single Application
- Single User
- Classpath
  - derby.jar



**Judd Solutions**



## Embedded Connection Information

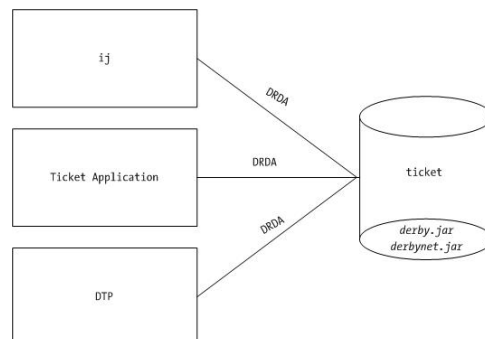
- Driver
  - `org.apache.derby.jdbc.EmbeddedDriver`
- URL
  - `jdbc:derby:[subsubprotocol:][databaseName][;attribute=value]*`
  - subprotocol
    - directory
    - classpath
    - jar
- Example
  - `jdbc:derby:C:\DerbyDB\MyDB;create=true`

Judd Solutions



## Network Server

- Classic Client/Server
- Separate process/JVM
- Multi-user
- Multi-application
- Server Classpath
  - `derby.jar`
  - `derbynet.jar`
- Server Drivers
  - Network Client (10.1)
  - DB2 Universal Driver
- Distributed Relational Database Architecture

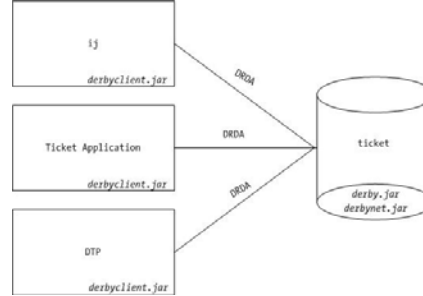


Judd Solutions



## Network Client Driver

- Included in Distribution
- Client Classpath
  - derbyclient.jar
- Driver
  - org.apache.derby.jdbc.ClientDriver
- Connection URL
  - jdbc:derby://<server>[:port]/<db>[:<derby attribute>=<value>]
- Example
  - jdbc:derby://localhost:1527/SAMPLE;create=true

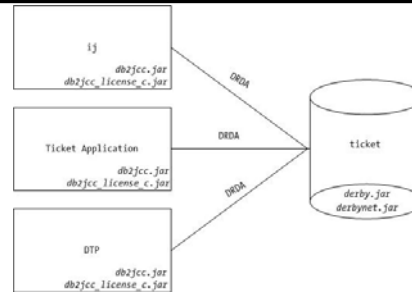


Judd Solutions



## DB2 Universal Driver

- Provided by IBM
- Client Classpath
  - db2jcc.jar
  - db2jcc\_license\_c.jar
- Driver
  - com.ibm.db2.jcc.DB2Driver
- Connection URL
  - jdbc:derby:net://<server>[:port]/<db>[:<derby attribute>=<value> [;...]][:<universal attribute>=<value>; [...]]
- Example
  - jdbc:derby:net://localhost:1527/sample
- <http://www-128.ibm.com/developerworks/db2/downloads/jcc/>



Judd Solutions



## Agenda

- DTP Overview
- Apache Derby Database
- Using SQL Development Tools
- Conclusion

Judd Solutions



## Define Driver

- Window > Preferences
- Establishing Connection

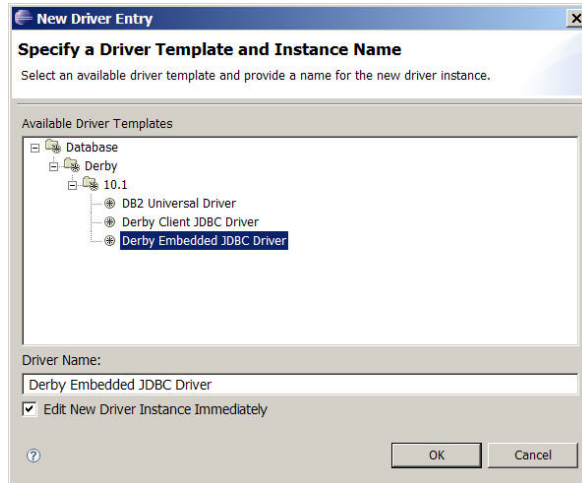


Judd Solutions



## Define Driver

- Select driver template

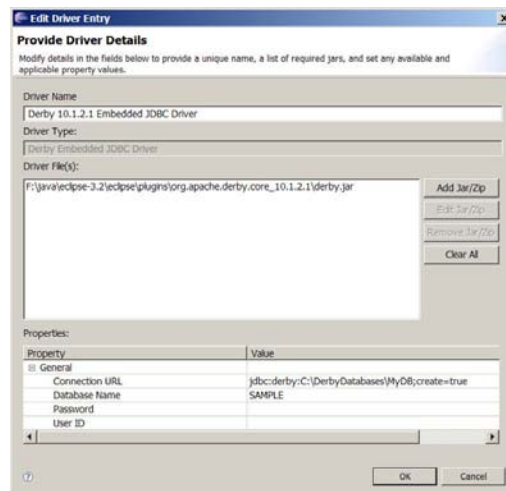


Judd Solutions



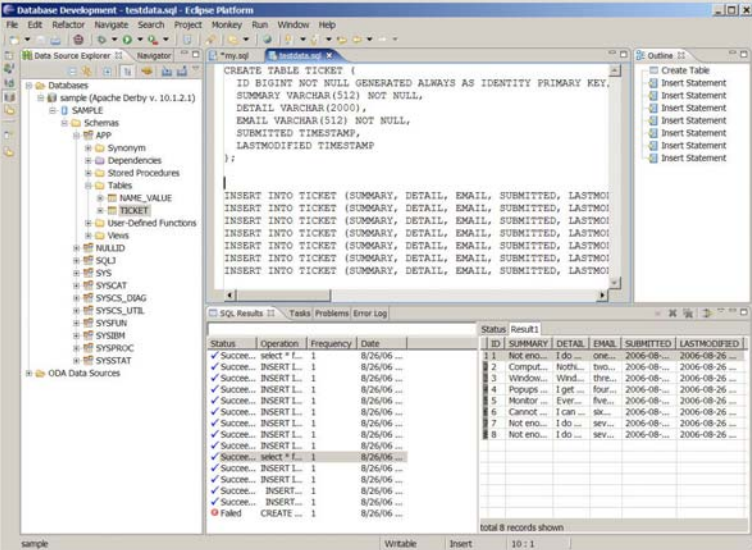
## Define Driver

- Configure driver classpath & properties



Judd Solutions

## Database Development Perspective



The screenshot displays the Eclipse IDE's Database Development perspective. The central editor contains the following SQL code:

```
CREATE TABLE TICKET (  
  ID BIGINT NOT NULL GENERATED ALWAYS AS IDENTITY PRIMARY KEY,  
  SUMMARY VARCHAR(512) NOT NULL,  
  DETAIL VARCHAR(2000),  
  EMAIL VARCHAR(512) NOT NULL,  
  SUBMITTED TIMESTAMP,  
  LASTMODIFIED TIMESTAMP  
)  
  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI  
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMOI
```

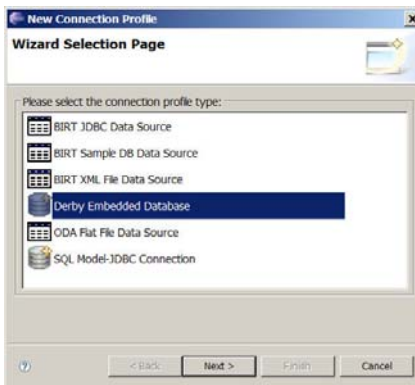
The SQL Results window at the bottom shows the following data:

Status	Operation	Frequency	Date	ID	SUMMARY	DETAIL	EMAIL	SUBMITTED	LASTMODIFIED
✓ Success	select * L...	1	8/26/06 ...	1	Not eno...	1 do ...	one...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	2	Comput...	ModL...	thr...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	3	Window...	Wind...	thr...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	4	Popups...	1 get...	four...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	5	Monitor...	Ever...	Rev...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	6	Cannot...	1 can...	ok...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	7	Not eno...	1 do ...	sev...	2006-08-...	2006-08-26 ...
✓ Success	INSERT L...	1	8/26/06 ...	8	Not eno...	1 do ...	sev...	2006-08-...	2006-08-26 ...

The bottom right corner of the screenshot features the Judd Solutions logo.

## Creating Connection Profile

- New Connection Profile button on Data Source Explorer
- Database Node context menu



Judd Solutions



## Creating Connection Profile

- Provide a descriptive name
- Optionally provide a description

The screenshot shows a dialog box titled "Derby Embedded Database" with a close button (X) in the top right corner. The main heading is "Create connection profile" and the instruction is "Please enter detailed information". There are two text input fields: "Name:" with the value "sample" and "Description(optional):" with the value "Sample Derby Database". Below these fields is a checkbox labeled "Auto-connect when the wizard is finished or when Enterprise Explorer opens." which is currently unchecked. At the bottom, there are four buttons: a help button (question mark), "< Back", "Next >", and "Cancel".

Judd Solutions



## Creating Connection Profile

- Configure driver details and test connection

The screenshot shows a dialog box titled "Derby Embedded Database" with a close button (X) in the top right corner. The main heading is "Specify a Driver and Connection Details" and the instruction is "Select a driver from the drop-down and provide login details for the connection." There is a dropdown menu for "Select a driver from the drop-down:" with "Derby 10.1.2.1 Embedded JDBC Driver" selected. Below this are text input fields for "Database:" (SAMPLE), "URL:" (jdbc:derby:C:\DerbyDatabases\MyDB;create=true), "User name:" (sa), and "Password:" (masked with two asterisks). There is a checked checkbox for "Save Password". Below these fields is an "Optional properties:" section with an empty text box and an "Add" button. To the right of the text box are buttons for "Up", "Down", "Remove", and "Clear All". At the bottom right of the dialog is a "Test Connection" button. At the bottom, there are four buttons: a help button (question mark), "< Back", "Next >", and "Cancel".

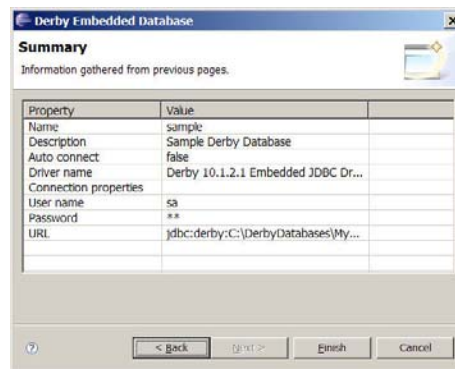
Judd Solutions





## Creating Connection Profile

- Review Summary

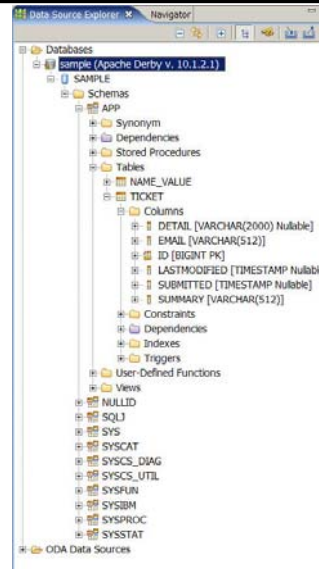


Judd Solutions



## Data Source Explorer

- View database elements
- Context menus
  - Connect
  - Filter
- Import/Export Connection Profiles

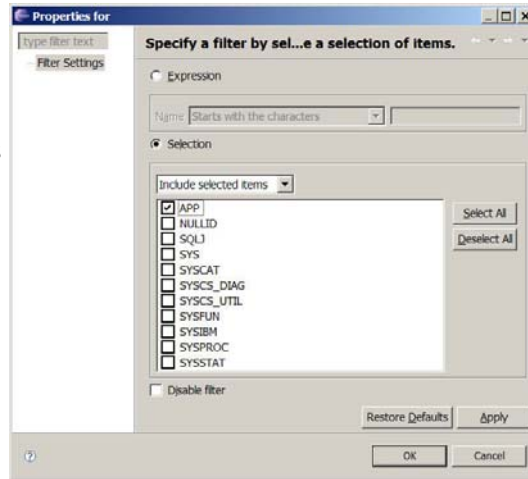


Judd Solutions



## Data Source Explorer - Filtering

- Context filters
  - Schema
  - Tables
  - Views
  - Stored procedures



Judd Solutions



## SQL File Editor

- Associated with \*.ddl, \*.sql and \*.sqlpage
- Must "Set Connection Info" to associate editor with connection
- SQL Scapbook (\*.sqlpage)
  - User specific SQL
  - Ignore version control
- Features
  - Syntax highlighting
  - Content Assist
  - Format
  - Content Tip
  - Execute All or Execute Selected Text



Judd Solutions



## SQL Results View

- Results of query
  - Data (grid or text)
  - Status
- History of statements
- Export results (text, XML, HTML or CSV)

Status	Operation	Frequency	Date	ID	SUMMARY	DETAIL	EMAIL	SUBMITTED	LASTMODIFIED
Failed	select * from ticket	1	8/27/06 ...	1	Not eno...	I do not have enough m...	one...	2006-08-...	2006-08-26 ...
✓ Succeed	select * from ticket	1	8/27/06 ...	2	Comput...	Nothing appears on the ...	two...	2006-08-...	2006-08-26 ...
				3	Window...	Windows always crashes...	thre...	2006-08-...	2006-08-26 ...
				4	Popups ...	I get so many popup ad...	four...	2006-08-...	2006-08-26 ...
				5	Monitor ...	Everytime the heat com...	five...	2006-08-...	2006-08-26 ...
				6	Cannot ...	I can not see my networ...	six...	2006-08-...	2006-08-26 ...
				7	Not eno...	I do not have enough m...	sev...	2006-08-...	2006-08-26 ...
				8	Not eno...	I do not have enough m...	sev...	2006-08-...	2006-08-26 ...
				9	Cannot ...	I can not see my networ...	six...	2006-08-...	2006-08-26 ...
				1...	Window...	Windows always crashes...	thre...	2006-08-...	2006-08-26 ...
				1...	Popups ...	I get so many popup ad...	four...	2006-08-...	2006-08-26 ...
				1...	Monitor ...	Everytime the heat com...	five...	2006-08-...	2006-08-26 ...

total 12 records shown

Judd Solutions



## Debugging Perspective

```

CREATE TABLE TICKET (
  ID BIGINT NOT NULL GENERATED ALWAYS AS IDENTITY PRIMARY KEY,
  SUMMARY VARCHAR(512) NOT NULL,
  DETAIL VARCHAR(2000),
  EMAIL VARCHAR(512) NOT NULL,
  SUBMITTED TIMESTAMP,
  LASTMODIFIED TIMESTAMP
);

INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Not enc
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Compute
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Window
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Popups
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Monico
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Canno
INSERT INTO TICKET (SUMMARY, DETAIL, EMAIL, SUBMITTED, LASTMODIFIED) VALUES ('Not enc

```

Status	Operation	Frequency	Date	ID	SUMMARY	DETAIL	EMAIL	SUBMITTED	LASTMODIFIED
✓ Succeed	select * L...	1	8/26/06 ...	1	Not eno...	I do...	one...	2006-08-...	2006-08-26 ...
✓ Succeed	INSERT L...	1	8/26/06 ...	2	Comput...	both...	two...	2006-08-...	2006-08-26 ...
✓ Succeed	INSERT L...	1	8/26/06 ...	3	Window...	Wind...	thre...	2006-08-...	2006-08-26 ...
✓ Succeed	INSERT L...	1	8/26/06 ...	4	Popups ...	I get ...	four...	2006-08-...	2006-08-26 ...

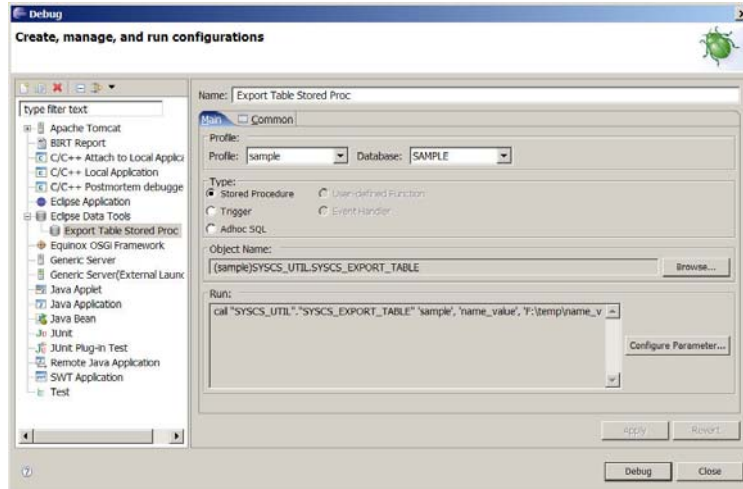
total 8 records shown

Judd Solutions



## Debug Stored Procedure

- Run > Debug > Eclipse Data Tools



Judd Solutions



## Agenda

- DTP Overview
- Apache Derby Database
- Using SQL Development Tools
- Conclusion

Judd Solutions



## Likely To Follow

- Visual query builder
- Data modeler
- Execution Plan
- More databases supported

Judd Solutions



## Resources

- <http://www.eclipse.org/datatools/>
- Wiki
  - [http://wiki.eclipse.org/index.php/Data\\_Tools\\_Platform\\_Project](http://wiki.eclipse.org/index.php/Data_Tools_Platform_Project)
- Tutorial
  - [http://wiki.eclipse.org/index.php/Getting\\_Started\\_with\\_DTP](http://wiki.eclipse.org/index.php/Getting_Started_with_DTP)
- Article
  - <http://www.eclipsezone.com/articles/graham-dtp/?source=archives>
- New Group
  - <news://news.eclipse.org/eclipse.dtp>

Judd Solutions



## Alternative

- SQLExplorer
  - [sourceforge.net/projects/eclipsesql](http://sourceforge.net/projects/eclipsesql)

Judd Solutions



## Contact Information

- <http://www.juddsolutions.com>
- [cjudd@juddsolutions.com](mailto:cjudd@juddsolutions.com)
- Blog
  - <http://blogs.apress.com/authors.php?author=Christopher%20Judd>
- Pro Eclipse JST
  - <http://www.projst.com>
  - <http://www.apress.com/book/bookDisplay.html?biD=447>
- Enterprise Java Development on a Budget
  - <http://www.apress.com/book/bookDisplay.html?biD=197>



Judd Solutions



# Questions ?

Please fill out your evaluations.

Slides can be found at

<http://www.juddsolutions.com/ew2006/>

**Judd Solutions**