“Un-chugging” Crystal Reports for Optimal Performance

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Topics

- Database issues
- Multi-pass reporting
- Miscellaneous tidbits

Topics

- **Database issues**
  - Indexed fields
  - Table linking
  - Grouping on server
  - Pushing record selections to the server
  - SQL expressions
  - SQL commands
- **Multi-pass reporting**
- **Miscellaneous tidbits**

Database Issues – Indexed Fields 1/4

- **Table A contains 26 records**
- **Table B contains 2600 records**
  - 100 matching records for every record in Table A
- **Find two specific records in Table A and the 200 records (100+100) in Table B**
- **Crystal Reports should only have to read about 200 records in total**

Database Issues – Indexed Fields 2/4

- Does your primary report include a record selection formula that sets range limits on the key (Indexed) field in Table A?
- Index A – is Table A field indexed?
- Index B – is Table B field indexed?
- How many records does Crystal Reports have to read out of Table A to find the two records in Table B?

Database Issues – Indexed Fields

Are your selection formula fields indexed?

What is the total number of records the program has to process to complete the task?

PC Data

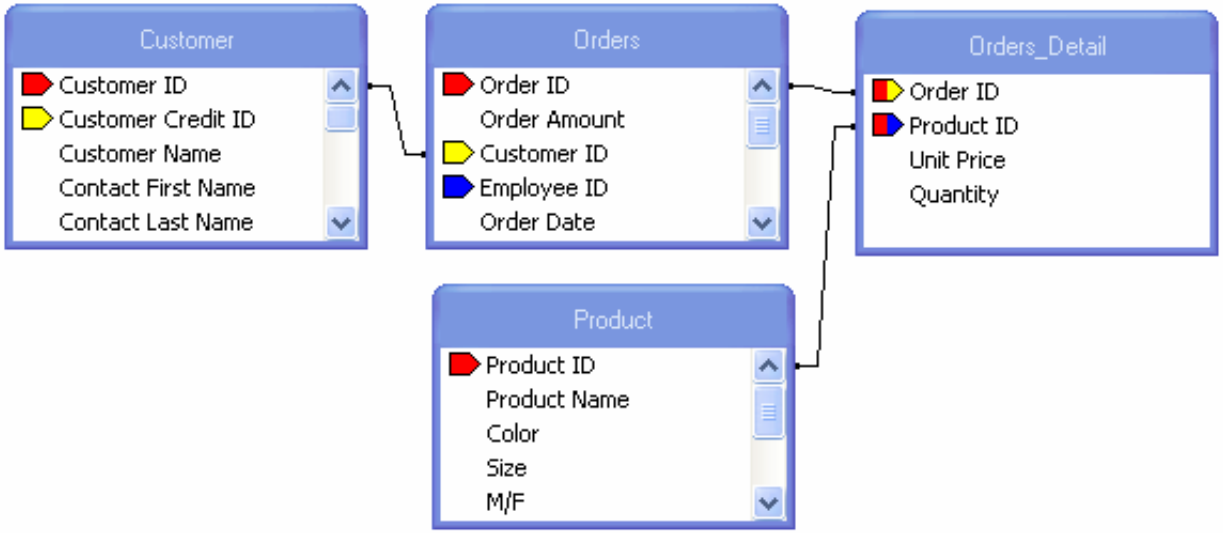
Linking/ Subreport	Selection Formula	Index A	Index B	Reads A	For each A reads in B	Total Records Read
Linking	No	Yes or No	Yes	26	100 (26*100)	2600
Linking	Yes	No	Yes	26	100 (26*100)	2600
Linking	Yes	Yes	Yes	2	100 (2*100)	200
Subreport	No	No	No	26	2600 (26*2600)	67,600
Subreport	No	Yes	No	2	2600 (26*2600)	67,600
Subreport	No	Yes	Yes	26	100 (26*100)	2600
Subreport	Yes	No	No	2	2600 (2*2600)	5200
Subreport	Yes	No	Yes	26	100 (26*100)	2600
Subreport	Yes	Yes	Yes	2	100 (2*100)	200

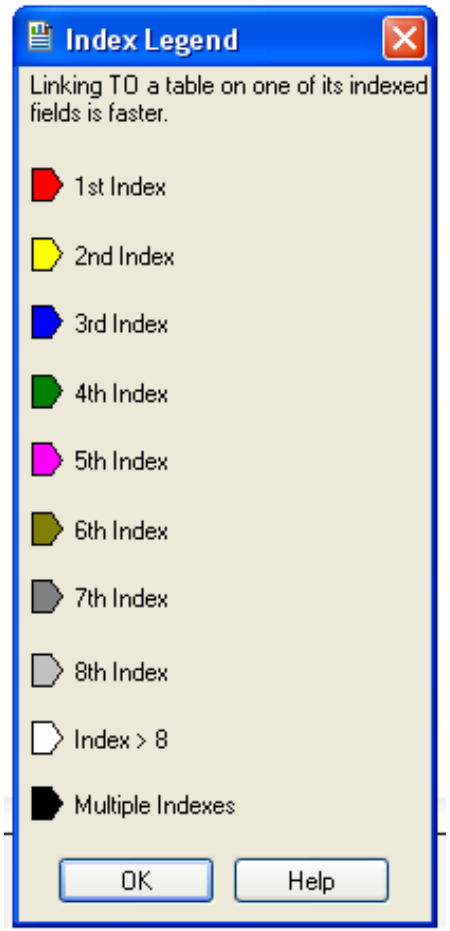
SQL Data

Linking/ Subreport	Selection Formula	Reads A	For each A reads in B	Total Records Read
Linking	No	26	100 (26*100)	2600
Linking	Yes	2	100 (2*100)	200
Subreport	No	26	100 (26*100)	2600
Subreport	Yes	2	100 (2*100)	200

Database Issues – Indexed Fields 4/4

Are your tables linked on indexed fields?



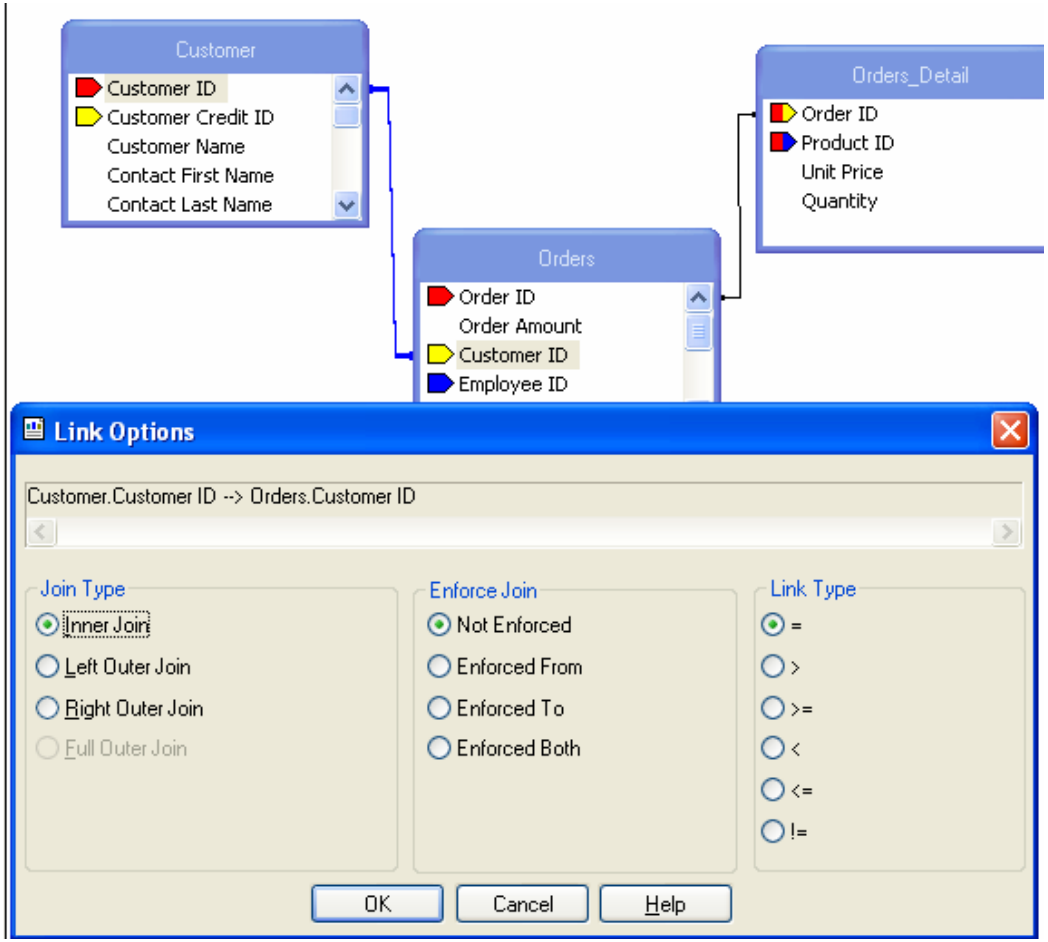


Business Objects

Database Issues – Table Linking

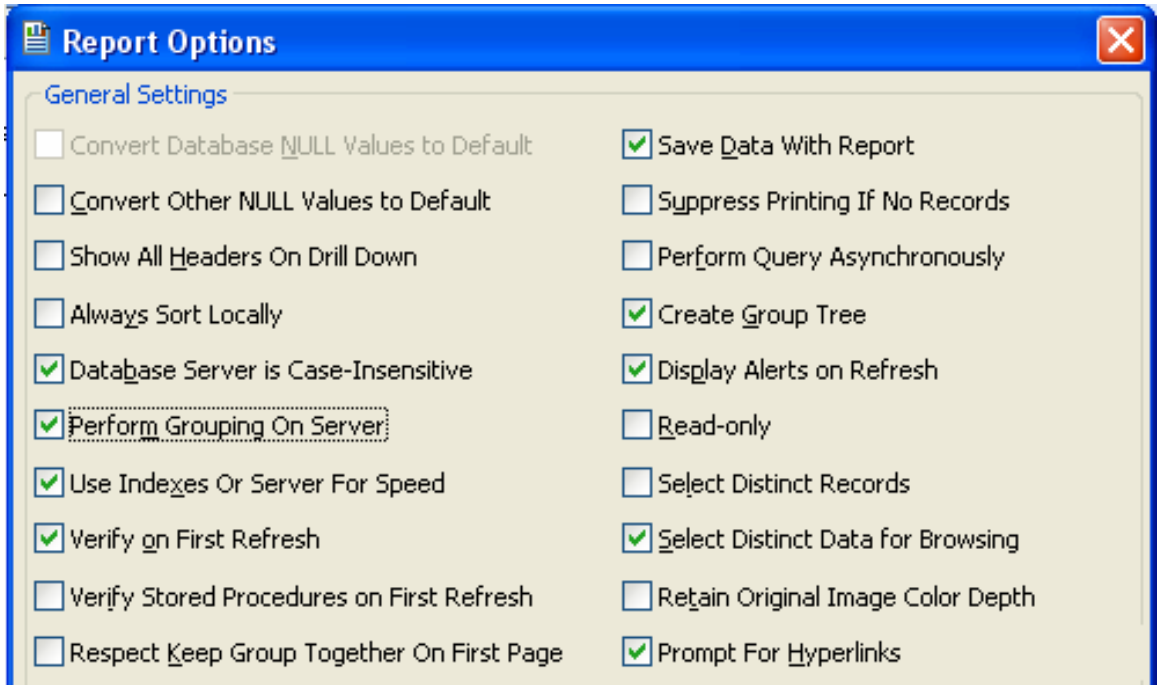
Ensuring you are using the right join type

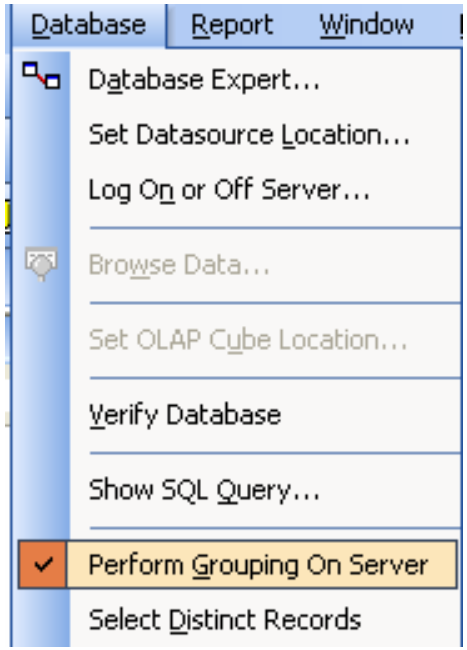
Using the various join enforcement options can ensure that linked tables are included in the SQL query, even when none of the fields in the table are used in the report. (New in version 10)



Database Issues – Grouping on the Server 1/3

- **Server-side processing – let the server do the work**
  - Less time connected to the server
  - Less memory needed to process the report on your PC
  - Lower transfer time from the server to the client





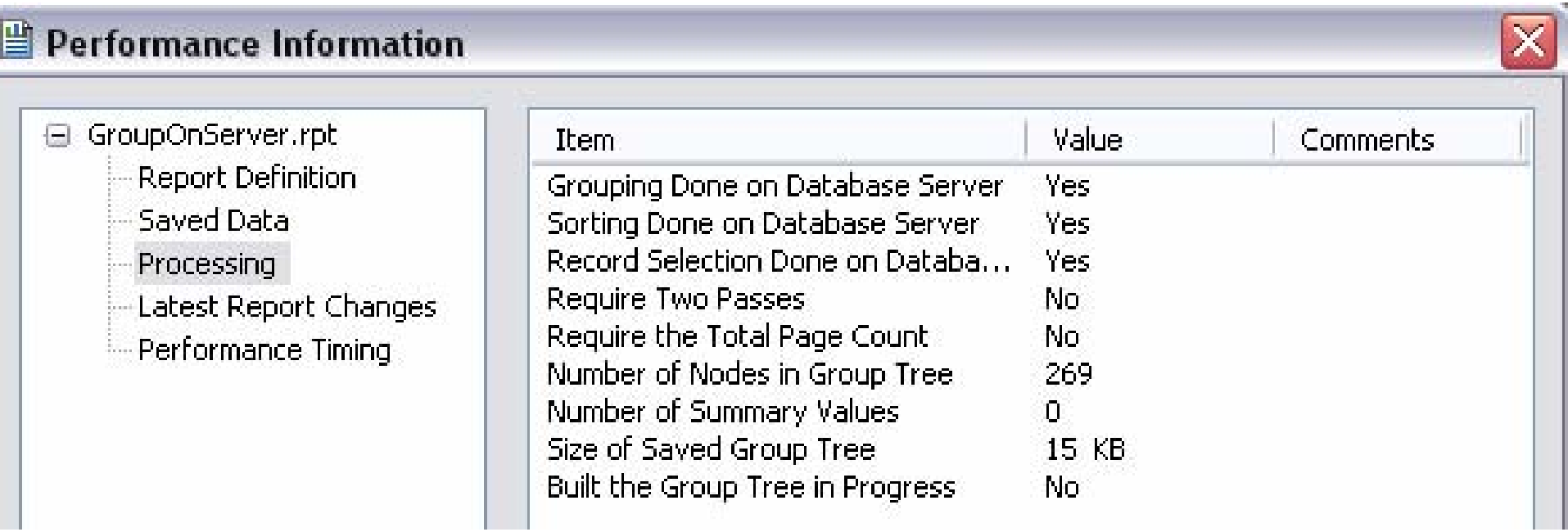
Business Objects

Database Issues – Grouping on the Server 2/3

1. **Use SQL data sources**
2. **“Perform Grouping on Server” option is checked on**
3. **Use some form of grouping**
4. **The report is at least partially hidden**
   - At minimum, the Details section must be hidden
5. **Do not group on a formula field, or use a formula in a summary field**
   - Use SQL expressions as an alternative to formulas
6. **Running totals must be based on summary fields only**
7. **No average or distinct count summaries**
8. **No specified grouping**

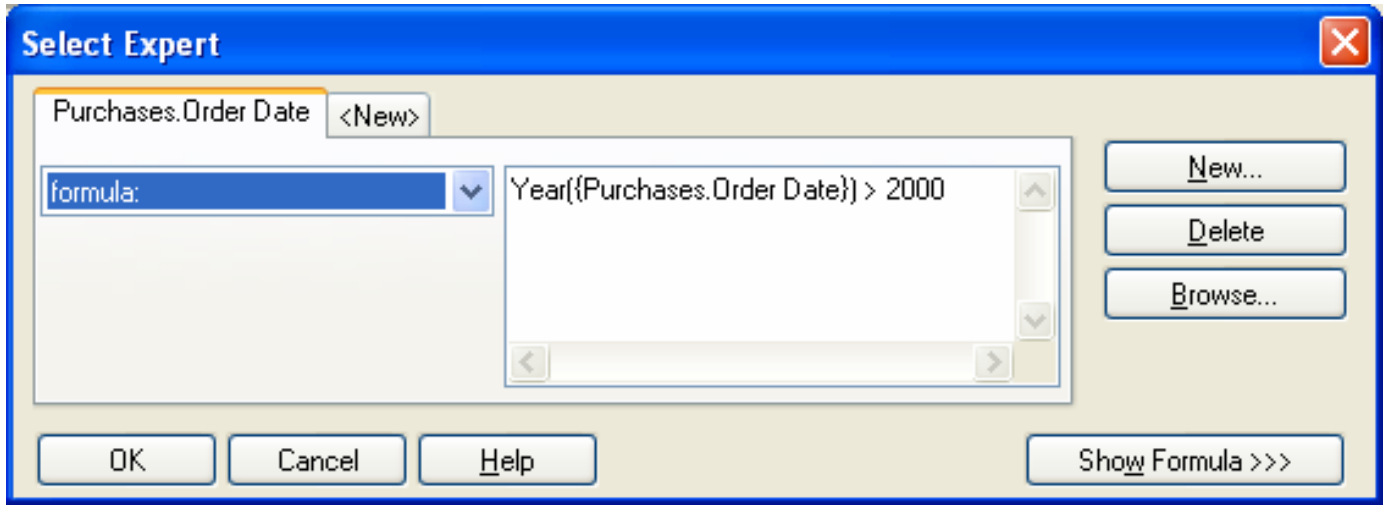
Database Issues – Grouping on the Server 3/3

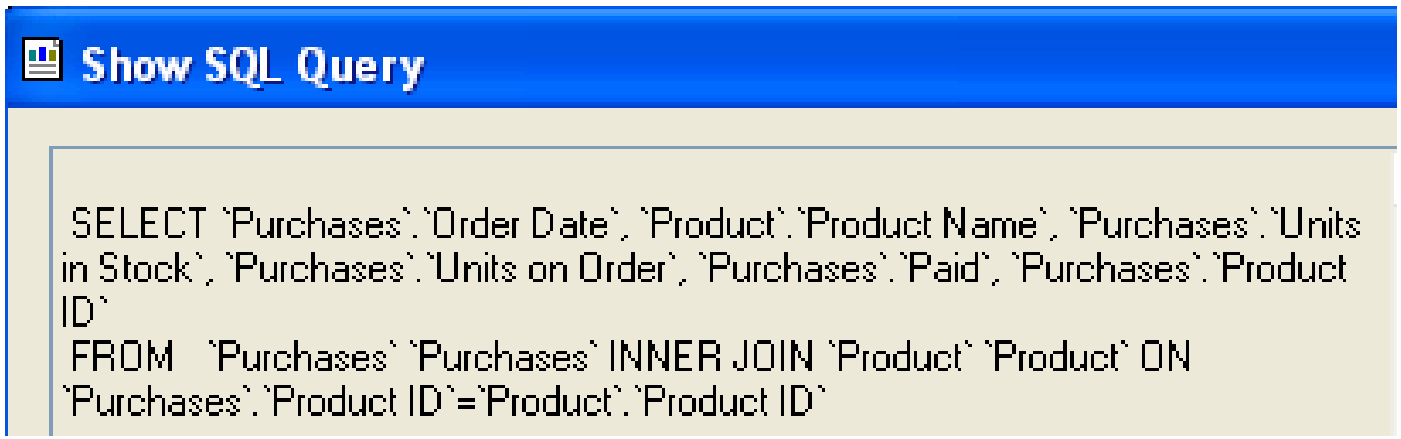
1. **Review the Report Performance Information Dialog Box to confirm Grouping on the Server is working**



Database Issues – Pushing Record Selections 1/2

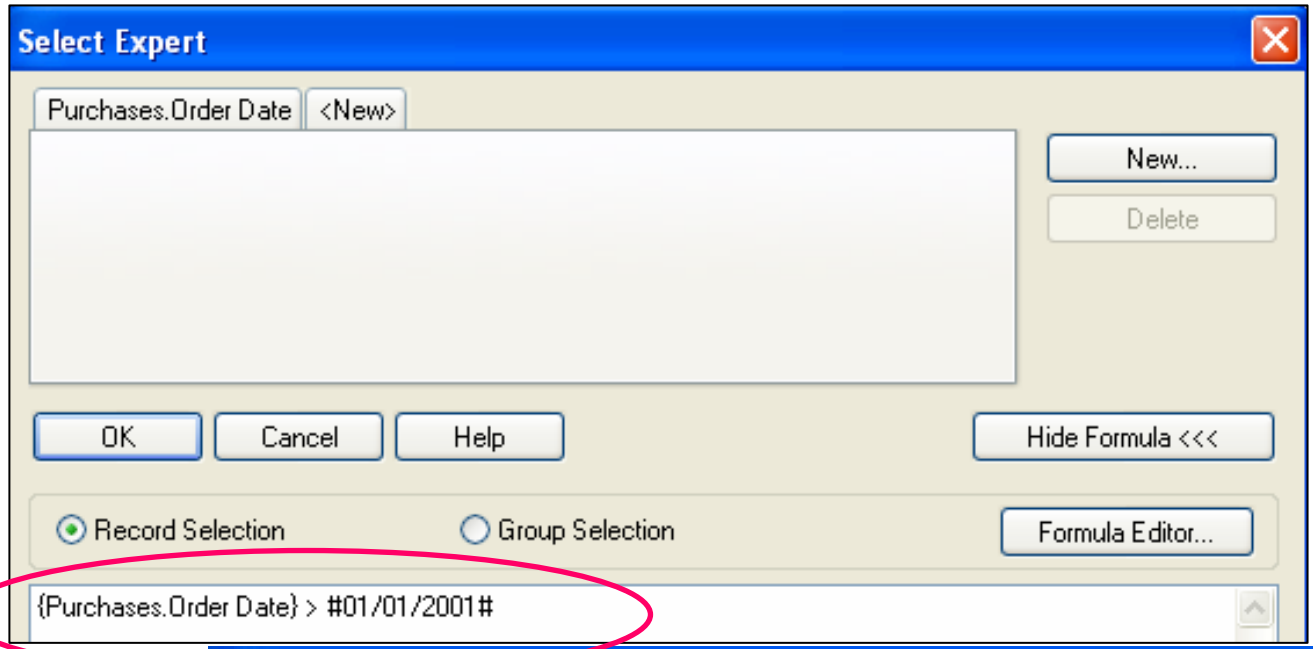
Be careful when trying to do a record selection on a formula!

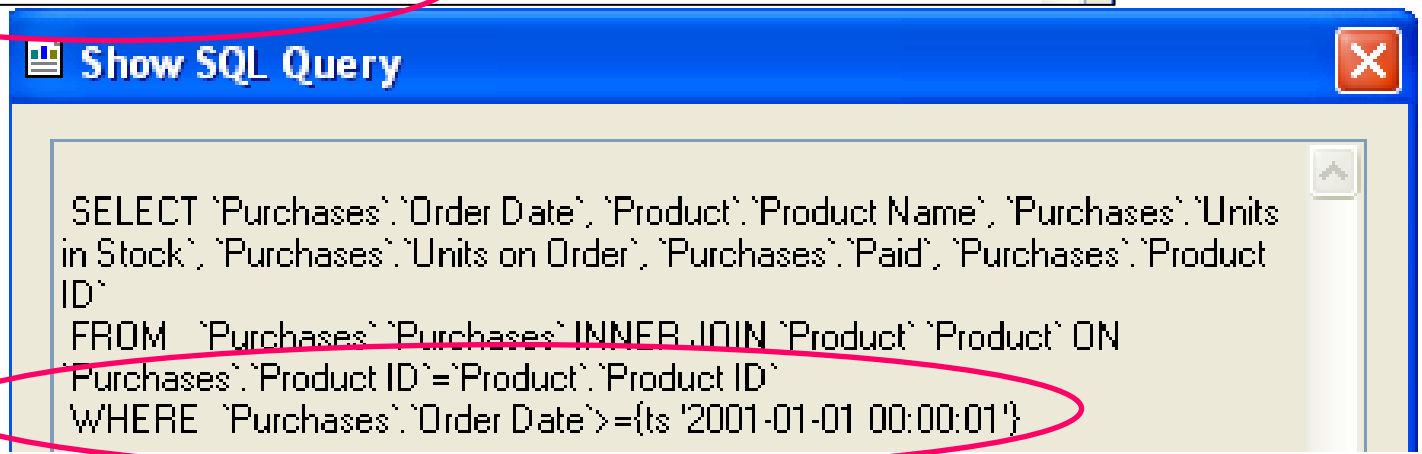




Database Issues – Pushing Record Selections 2/2

Using an absolute value instead of a formula

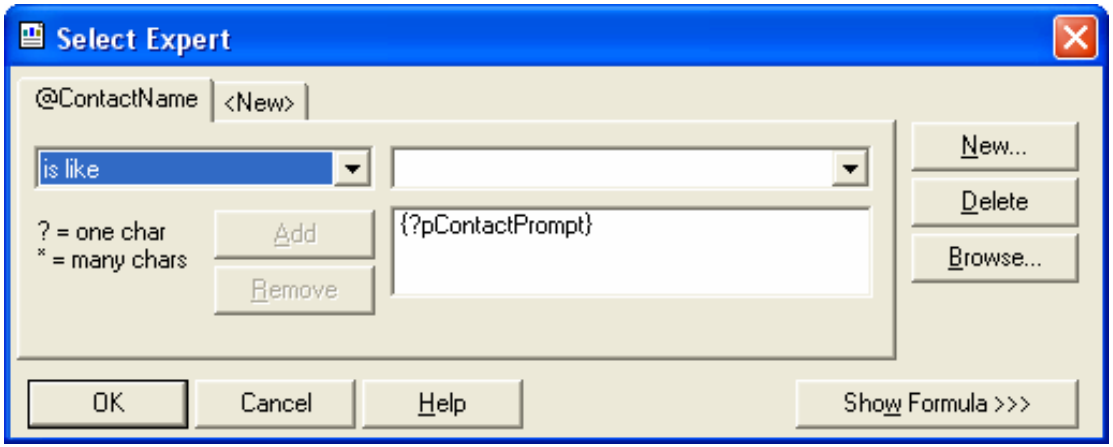




Business Objects

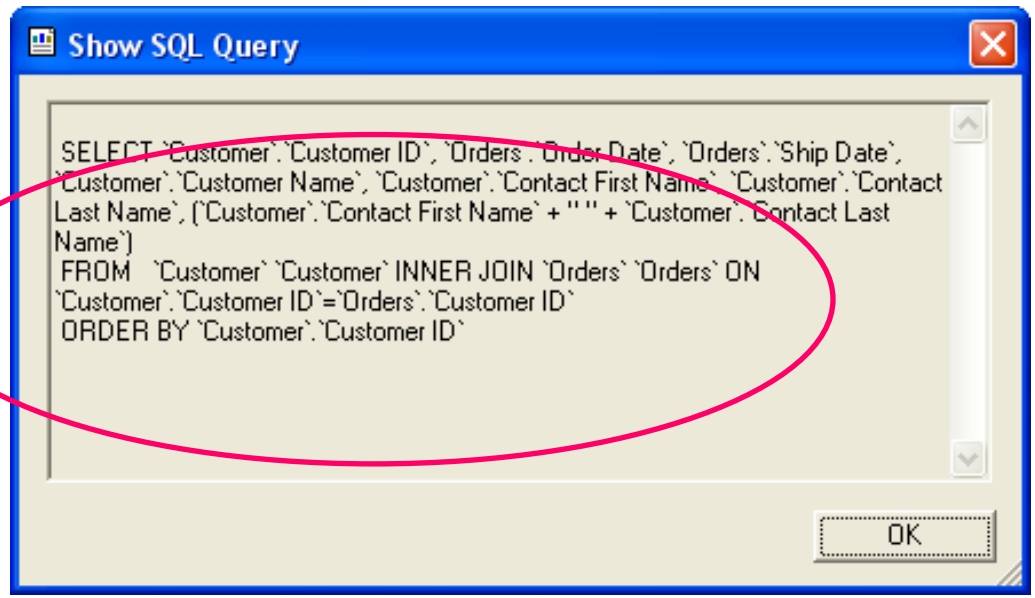
Database Issues – SQL Expressions 1/2

Using a formula in your record selection



Do not base your record selection on a formula! …

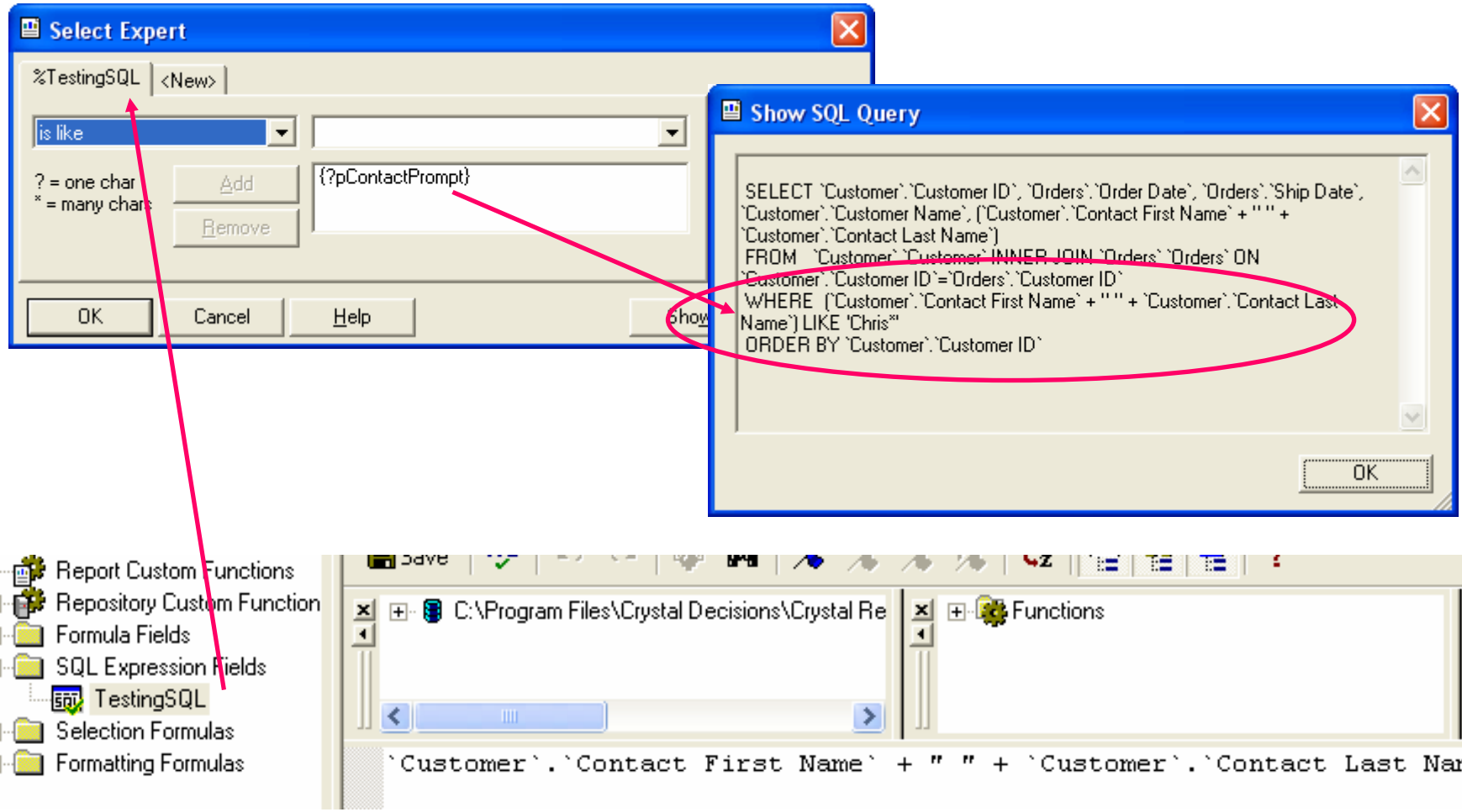
No WHERE clause therefore the server is not doing the work!



Business Objects

Database Issues – SQL Expressions 2/2

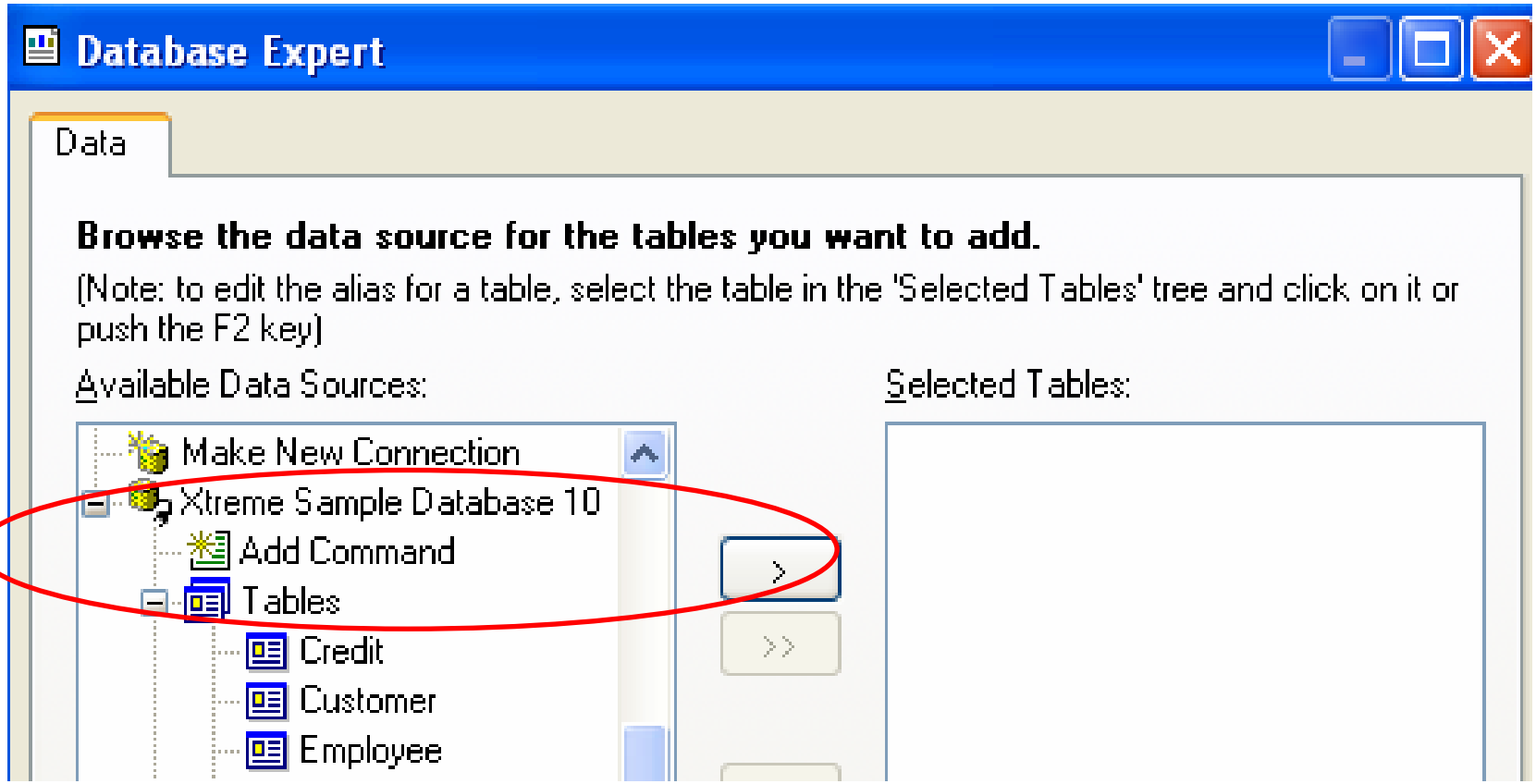
Using a SQL expression in your record selection formula



Business Objects

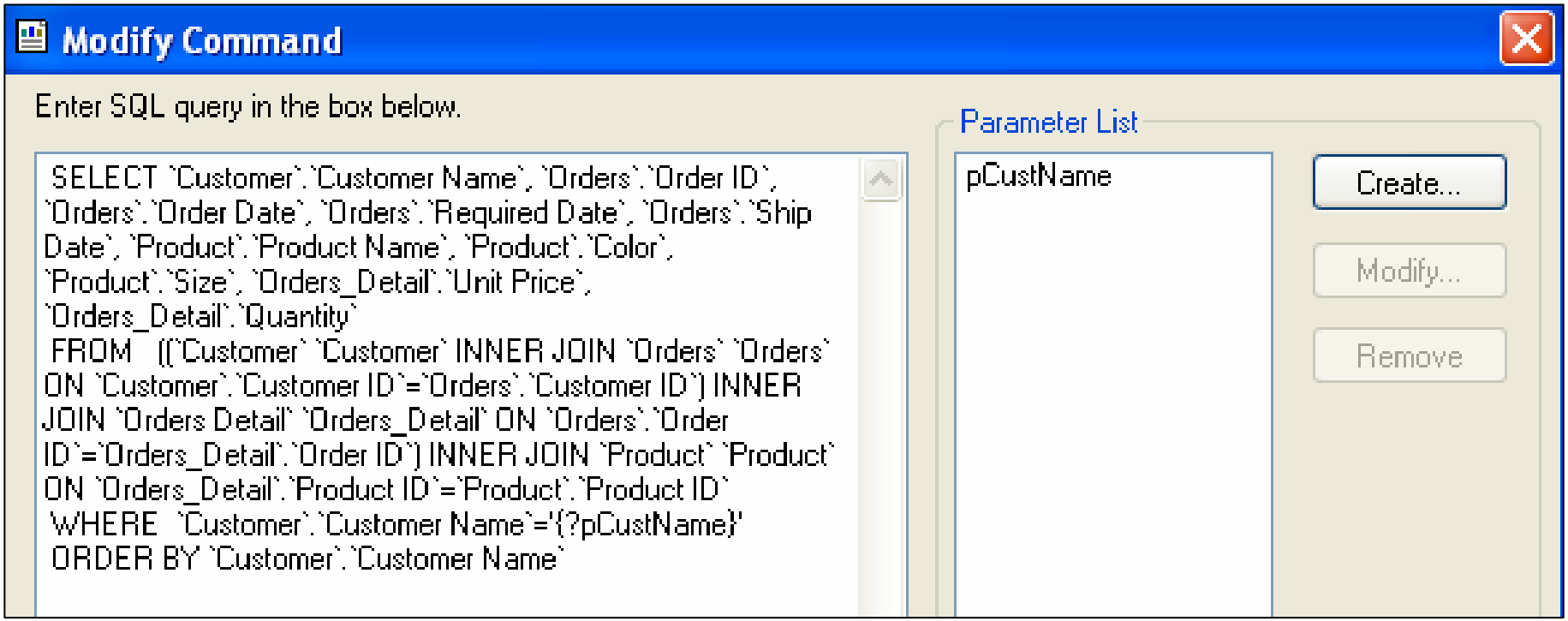
Database Issues – SQL Commands

Pick "Add Command" once you pick your database connection

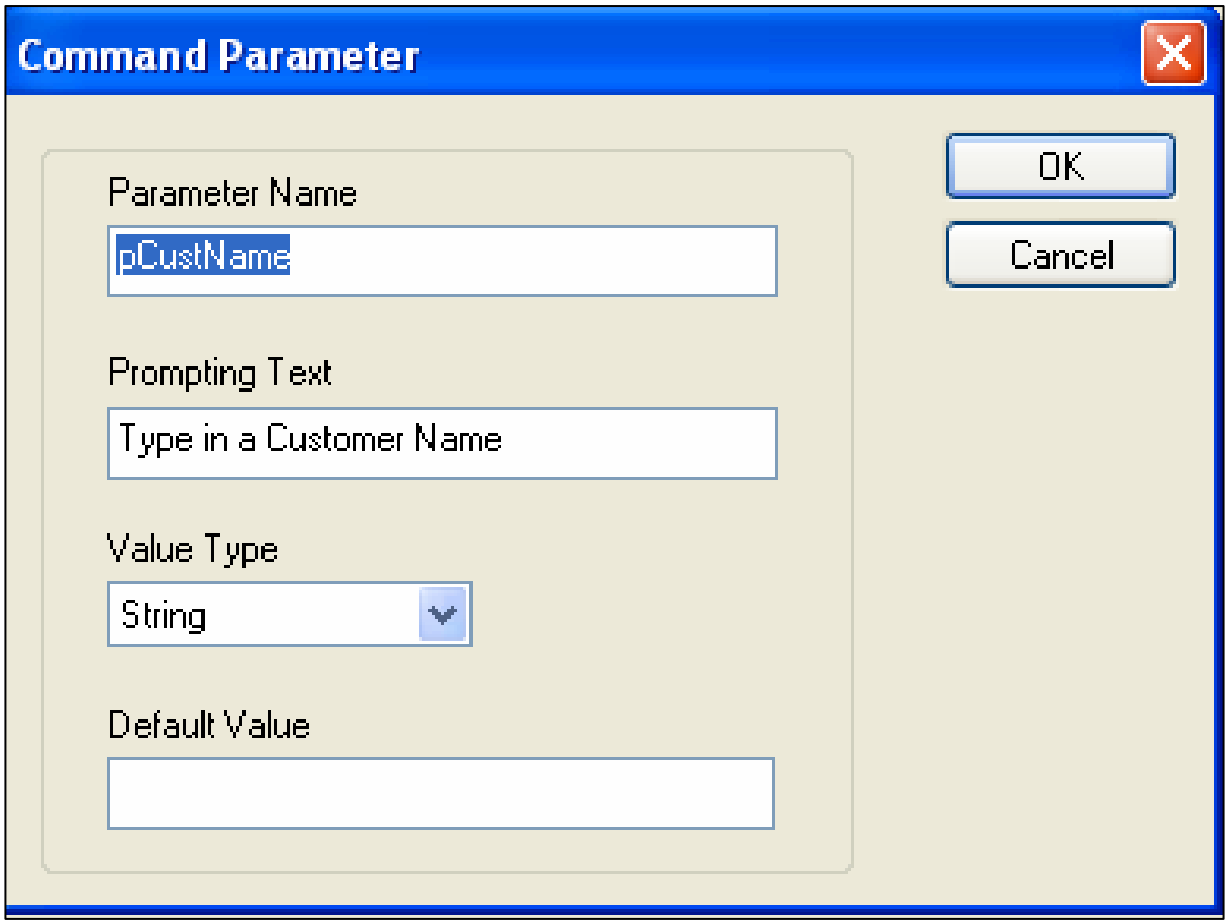


Database Issues – SQL Commands

Sample SQL command including a parameter

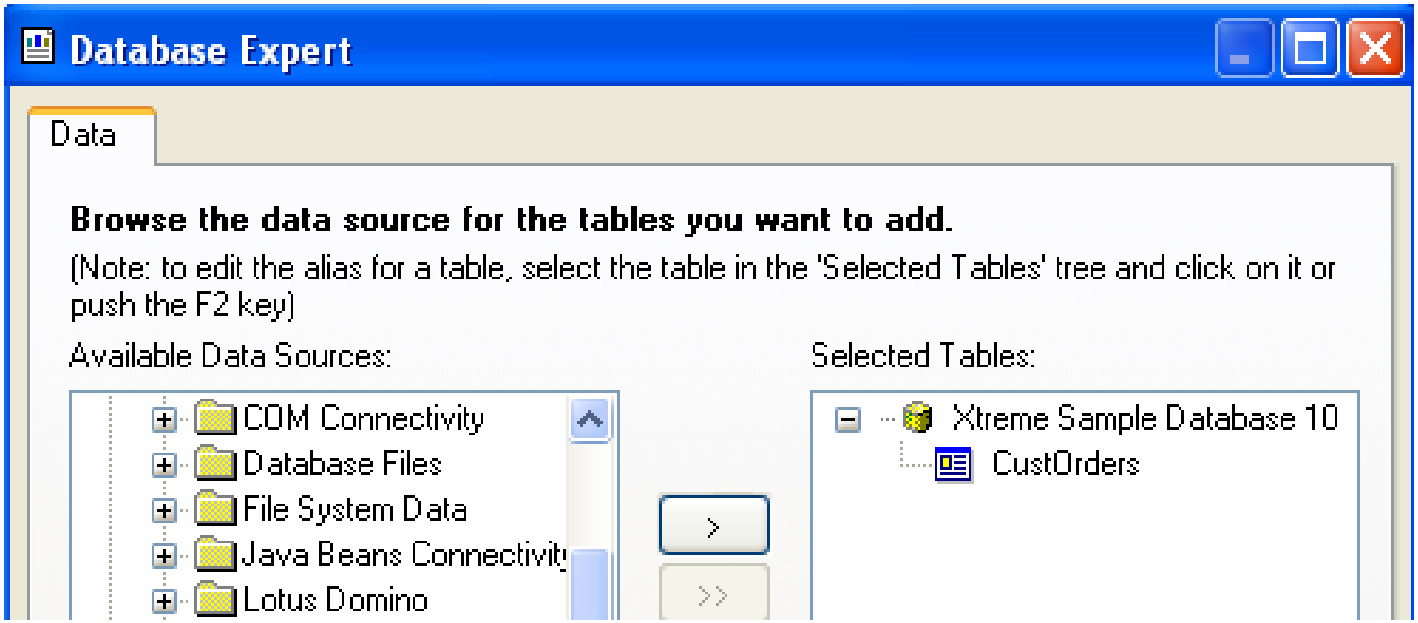


Sample SQL command parameter



Database Issues – SQL Commands

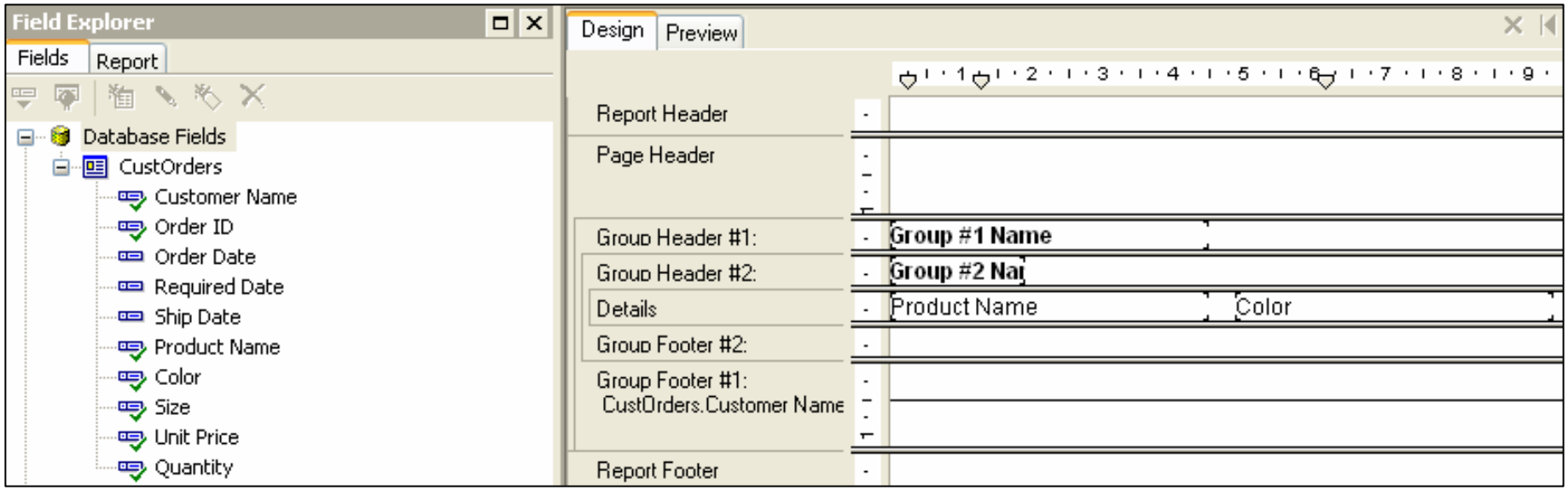
Changing the name of a SQL command



To change the command name, hold the left mouse button down on the name. Release to change the name.

Database Issues – SQL Commands 5/5

How the SQL command data shows in Crystal Reports



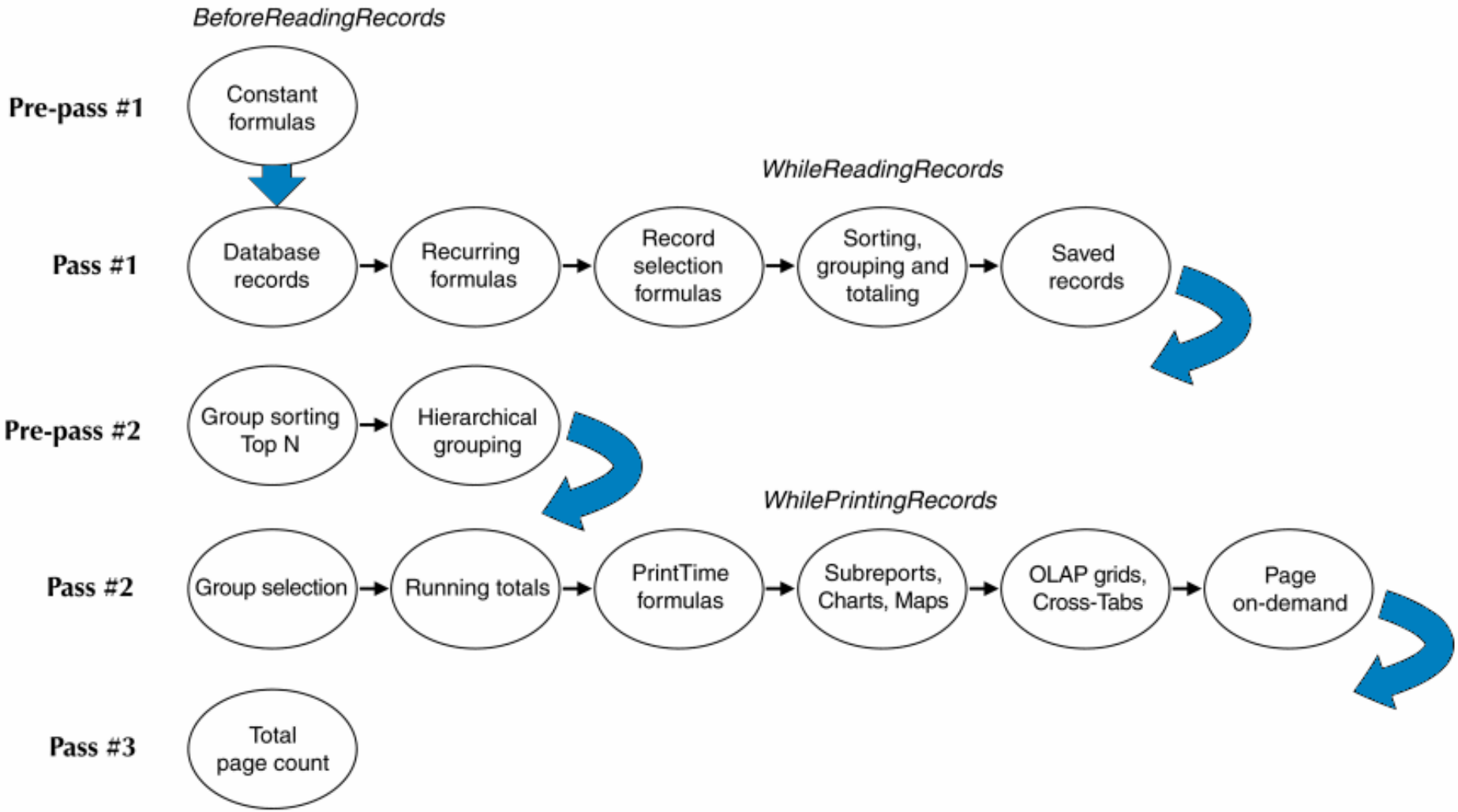
Business Objects

Topics

- **Database issues**
- **Multi-pass reporting flow chart**
  - Performance consideration goal
  - Using arrays instead of sub-reports
  - Manual running totals and manual distinct counts
  - Page N of M
- **Miscellaneous tidbits**

Multi-Pass Reporting Flow Chart

Crystal Reports XI



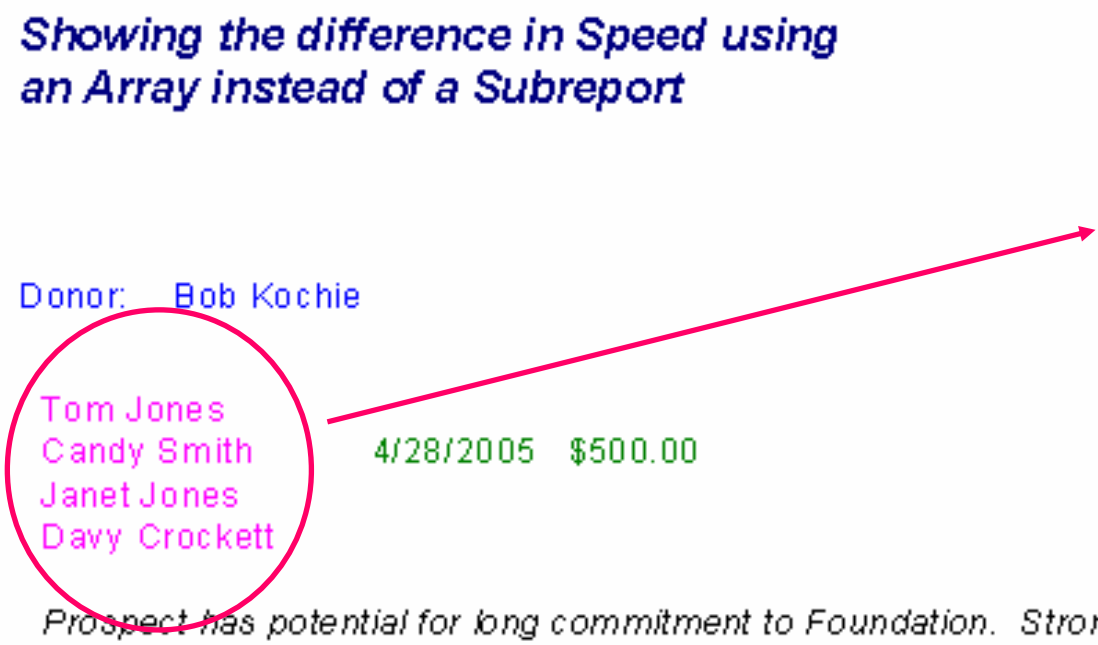
Performance Consideration Goal

The smaller the number of reporting passes, the faster your report processes

- **Do you really need the Page N of M?**
  - Avoid pass 3
- **Use on-demand sub-reports?**
  - Pass 2 then only runs during drill-down
- **Can you avoid the subreports altogether?**
  - Sometimes!
- **Is there another way to process Running Totals?**
  - Yes .. using manual running total formulas
- **Review what data you are bringing into Crystal Reports**
  - Can calculations be done prior to Crystal Reports?

Using Arrays Instead of Sub-reports 1/2

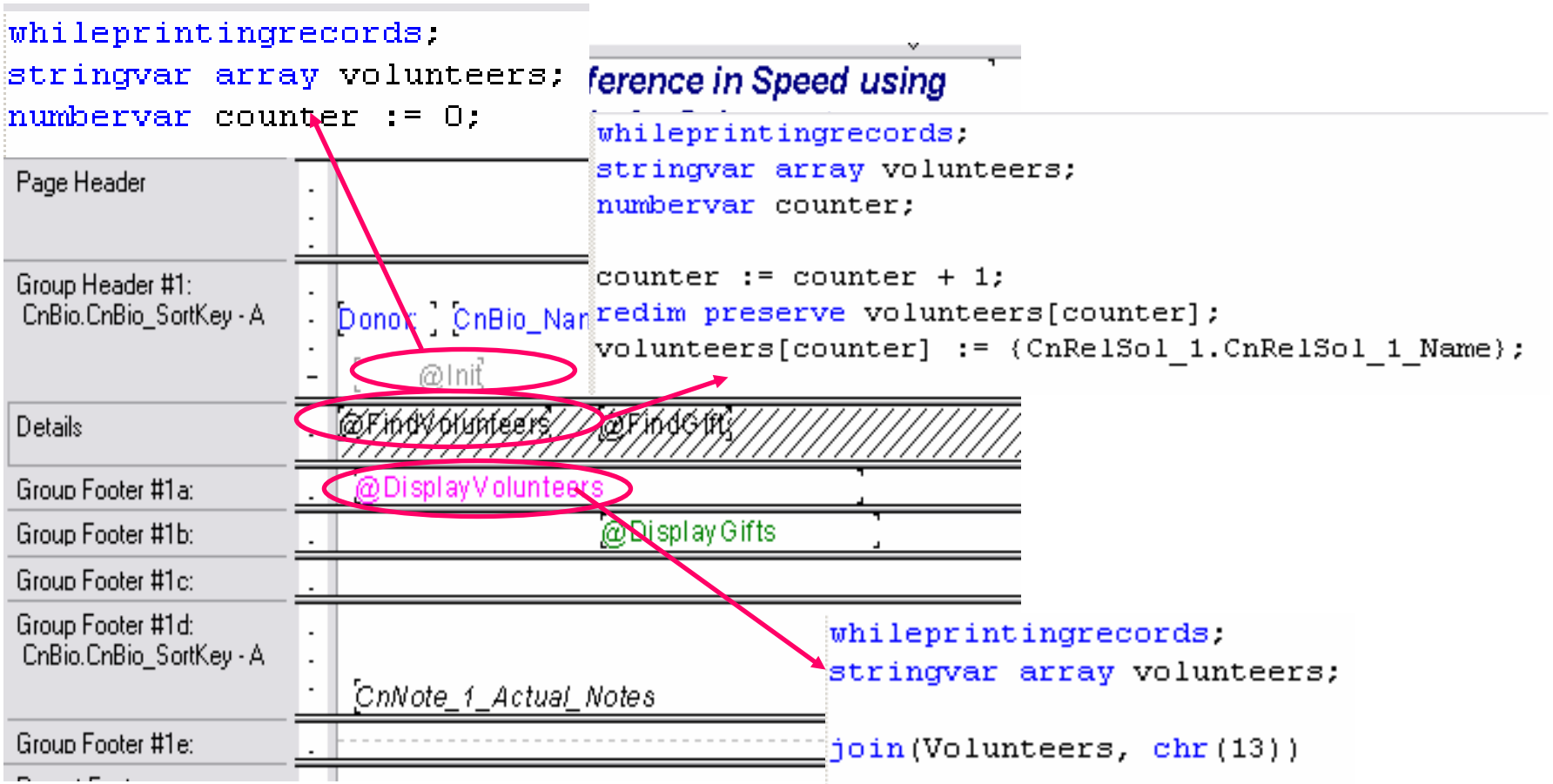
Need a list of records from another table?



Use an array to pull a list of volunteers assigned to one donor instead of a sub-report

Using Arrays Instead of Sub-reports 2/2

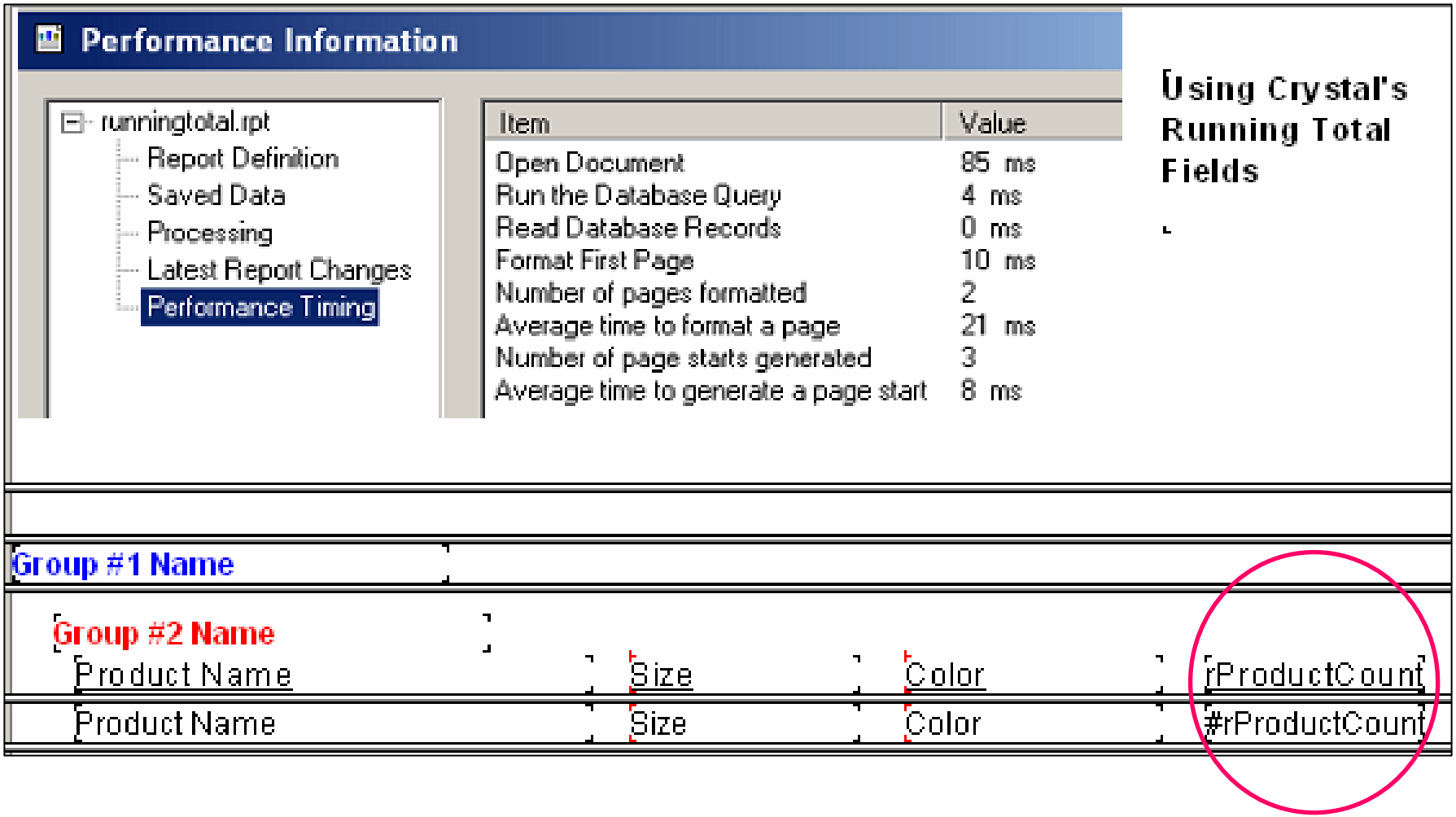
Array setup, display and reset formulas



Business Objects

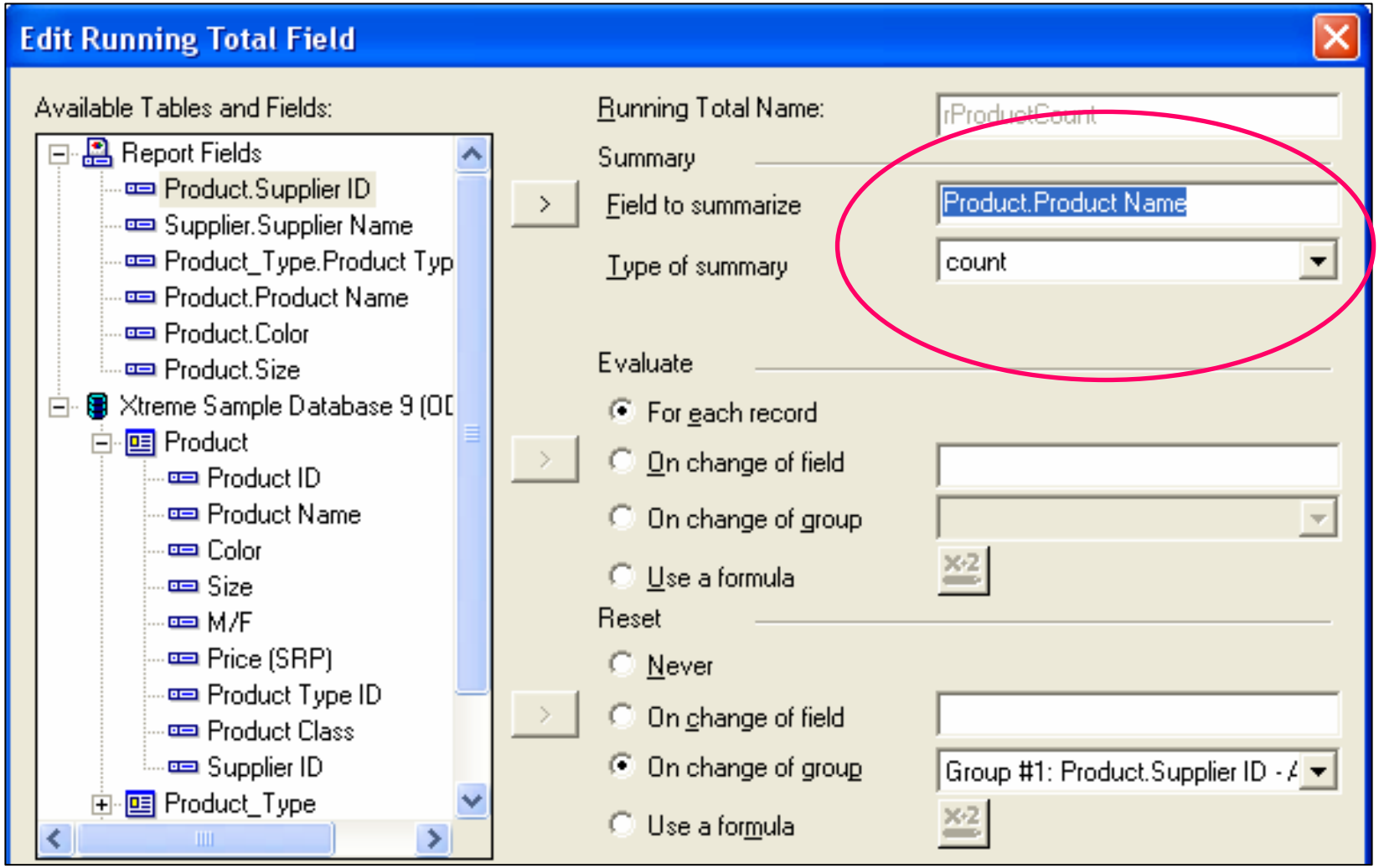
Manual Running Totals and Distinct Counts 1/6

Manual running totals to replace Crystal Reports feature 1/2



Manual Running Totals and Distinct Counts 2/6

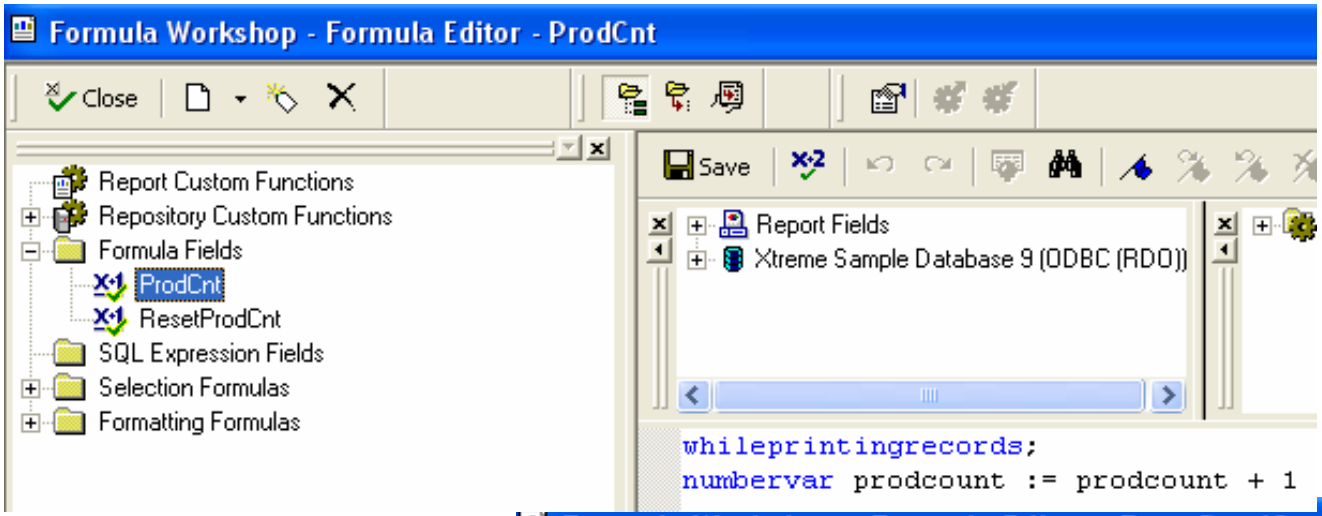
Manual running totals to replace Crystal Reports feature 2/2

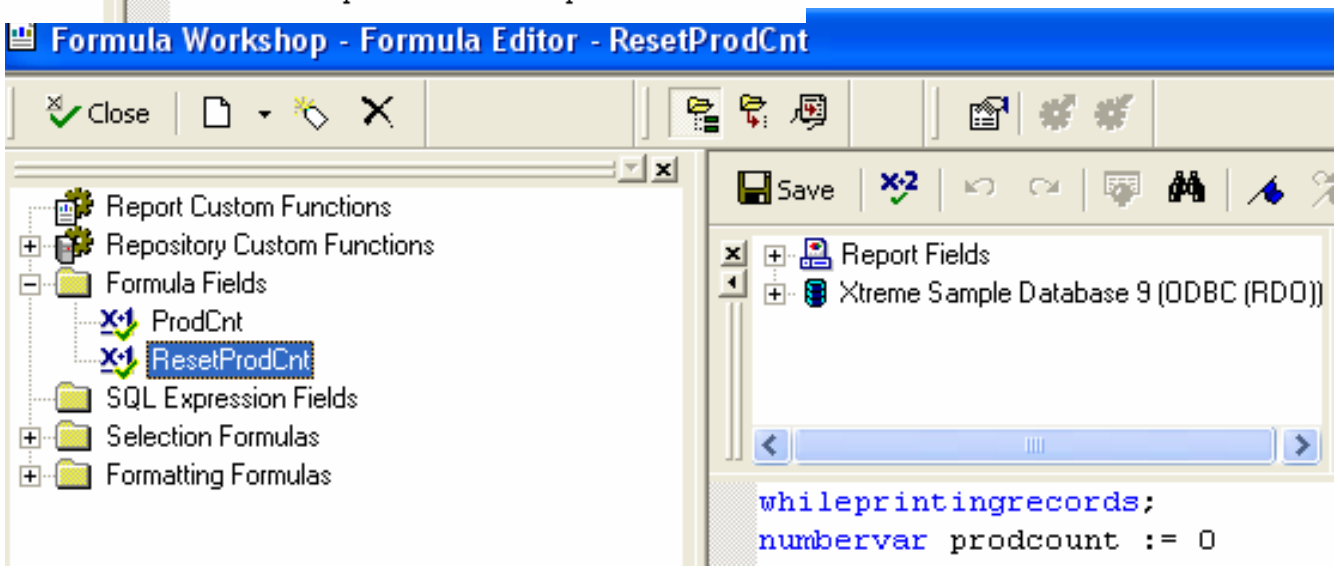


Business Objects

Manual Running Totals and Distinct Counts 3/6

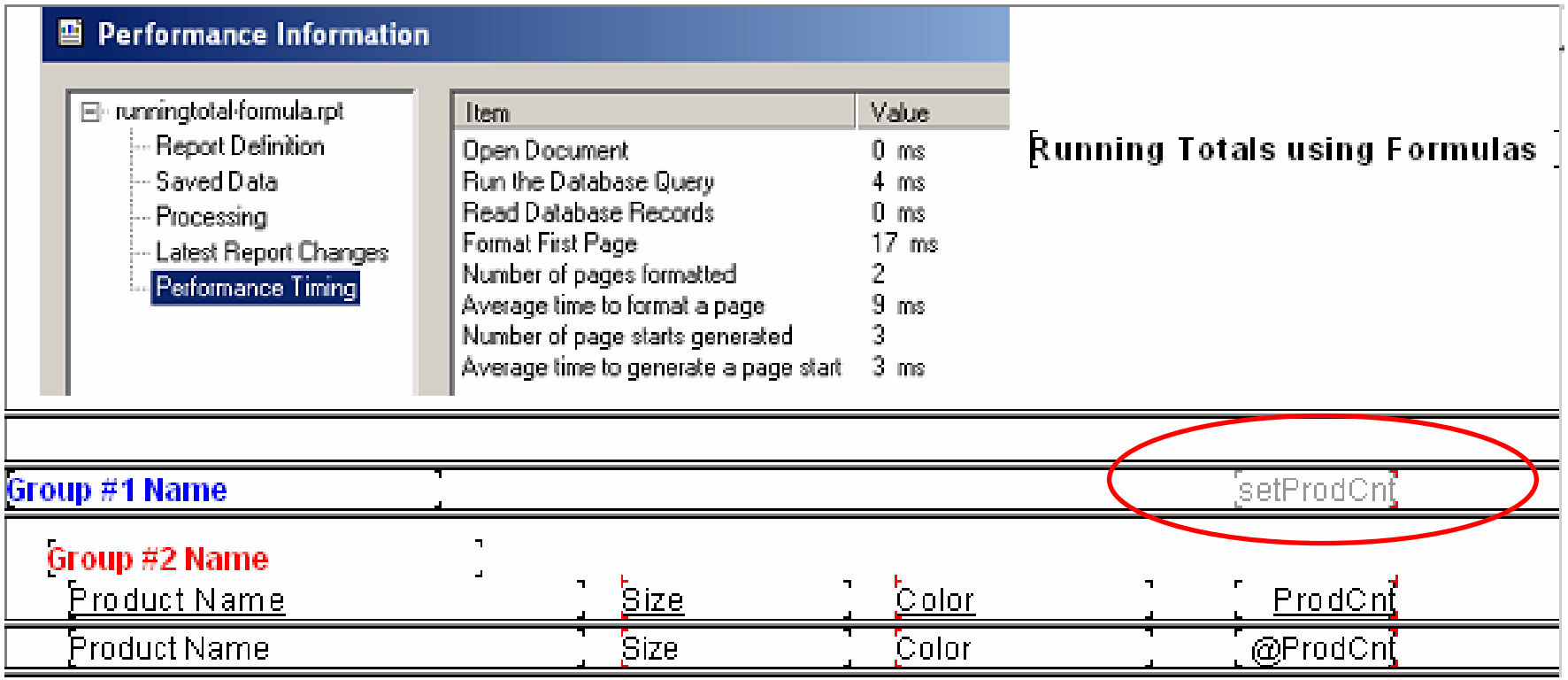
The actual running total formulas in Crystal Reports syntax





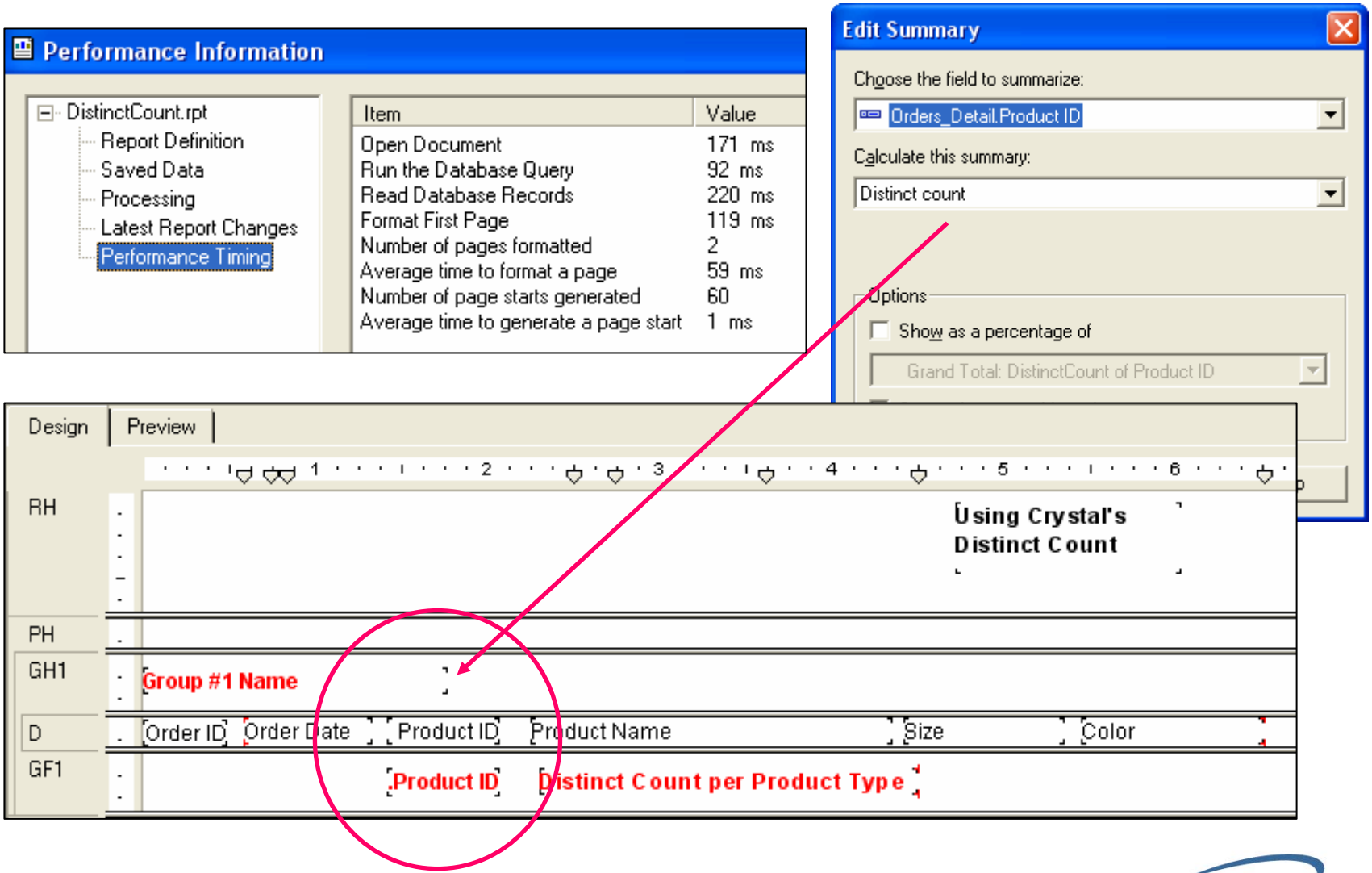
Manual Running Totals and Distinct Counts 4/6

Reset in the group header



Manual Running Totals and Distinct Counts 5/6

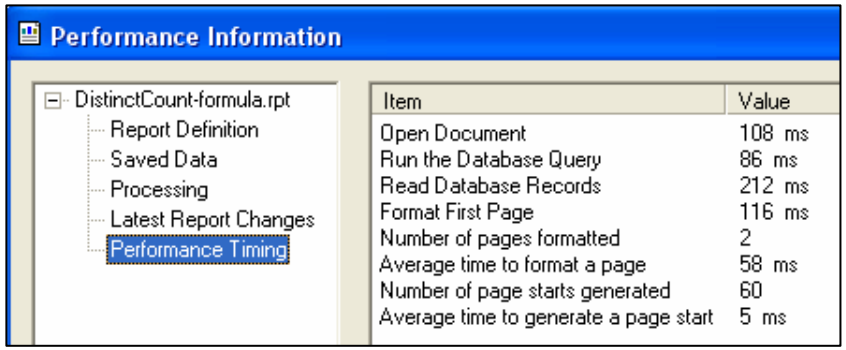
Using Crystal Reports distinct count summary feature



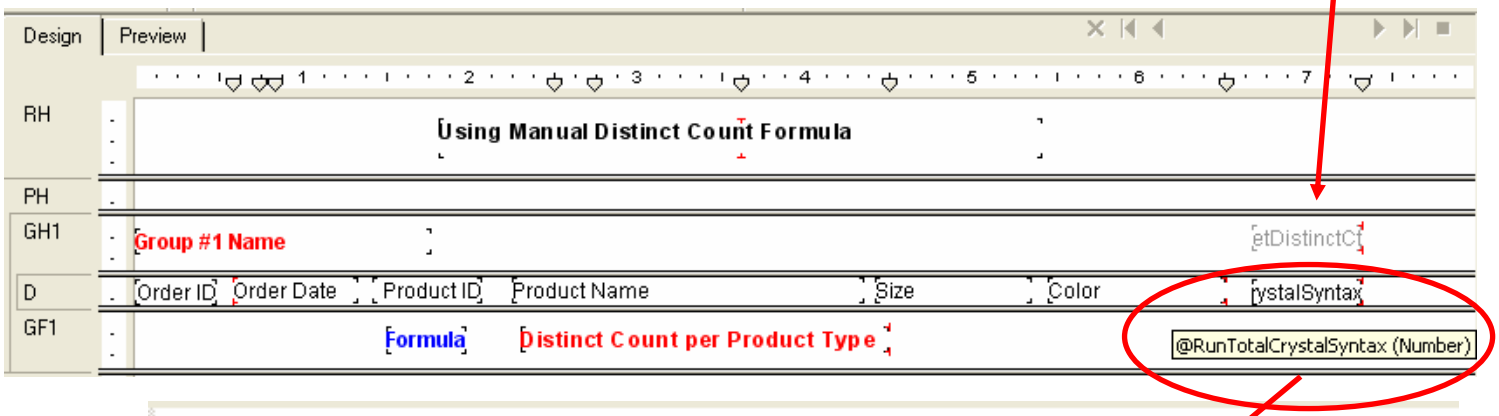
Business Objects

Manual Running Totals and Distinct Counts 6/6

Using a formula instead of the distinct count summary feature



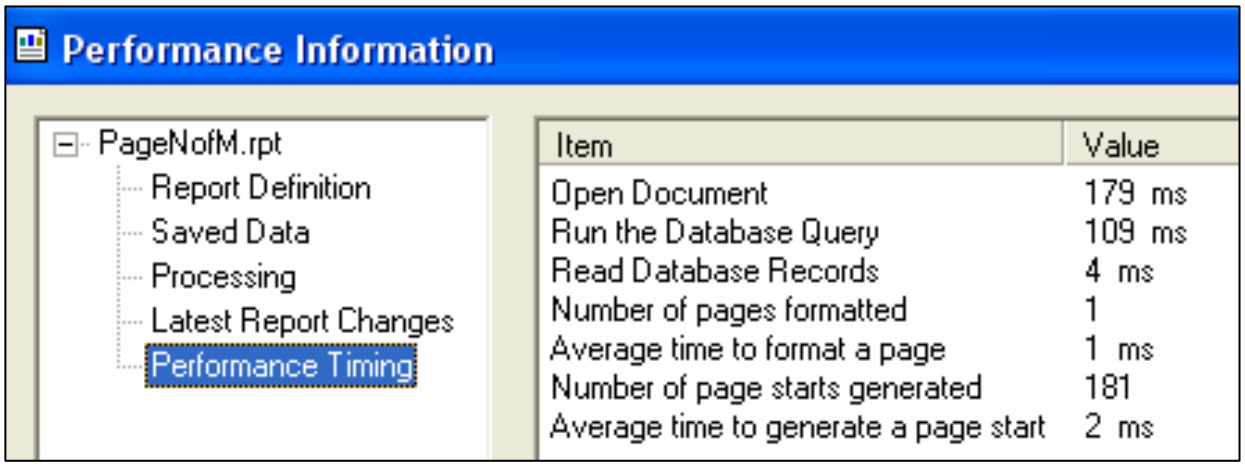

```
whileprintingrecords;
shared stringvar stringRT := "";
shared numbervar distinctCt := 0
```

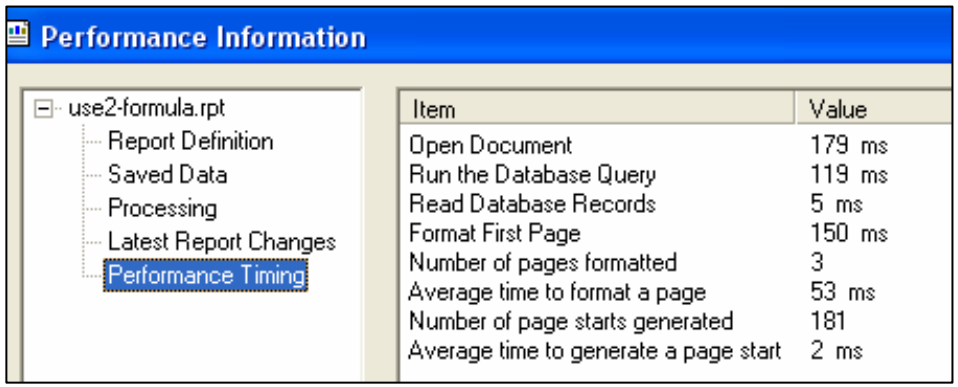


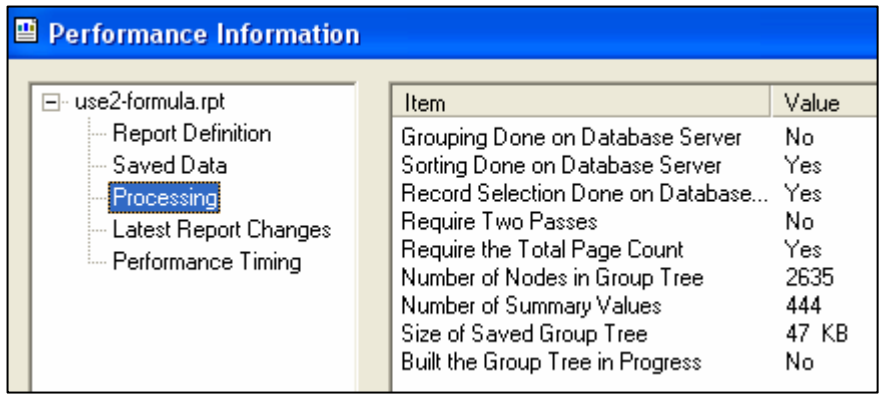

```
whileprintingrecords;
shared stringvar stringRT;
shared numbervar distinctCt;

if instr(stringRT, totext({Orders_Detail.Product ID}) + "^") = 0 then
    (stringRT:= stringRT + totext({Orders_Detail.Product ID}) + "^";
    distinctCt:= distinctCT + 1)
```

Page N of M – Pass 3

Only use the Page N of M if absolutely necessary!







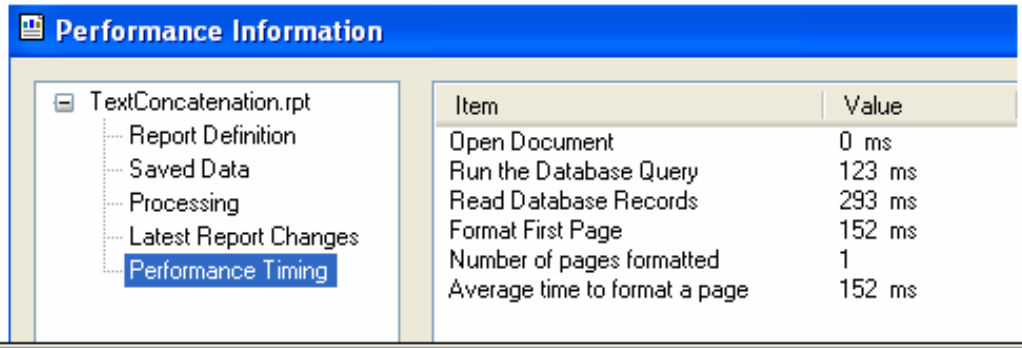
Topics

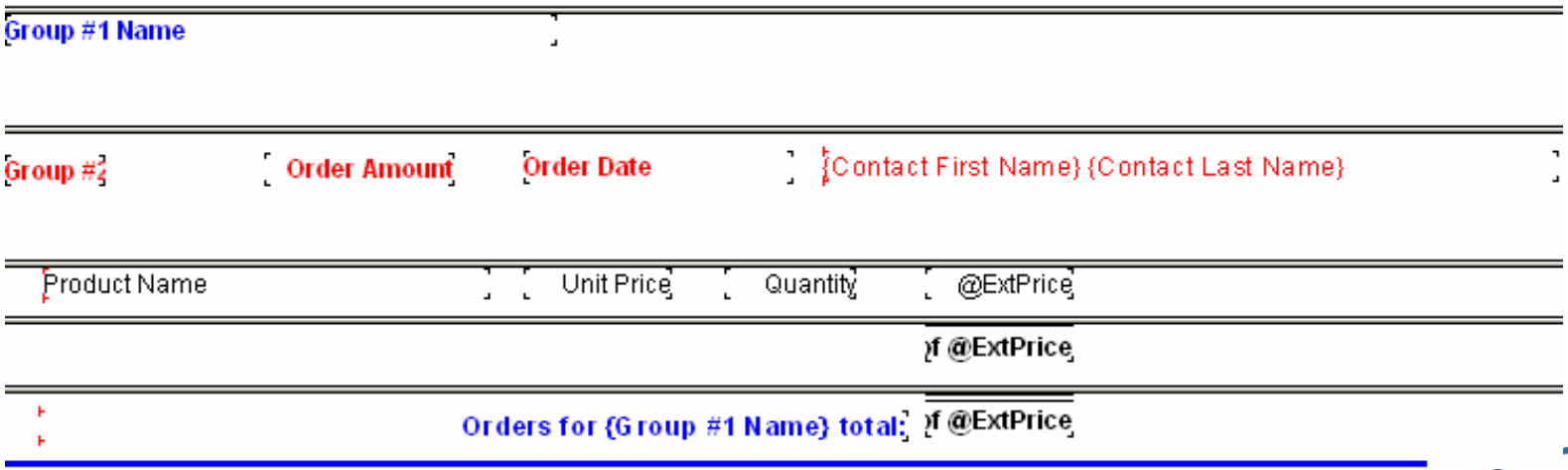
- **Database issues**
- **Multi-Pass reporting flow chart**
  - Performance consideration goal
  - Using arrays instead of sub-reports
  - Manual running totals and manual distinct counts
  - Page N of M
- **Miscellaneous tidbits**

Miscellaneous Tidbits

Text box versus concatenation formula

Why use a formula for concatenation?
Report using two Text Box Merges



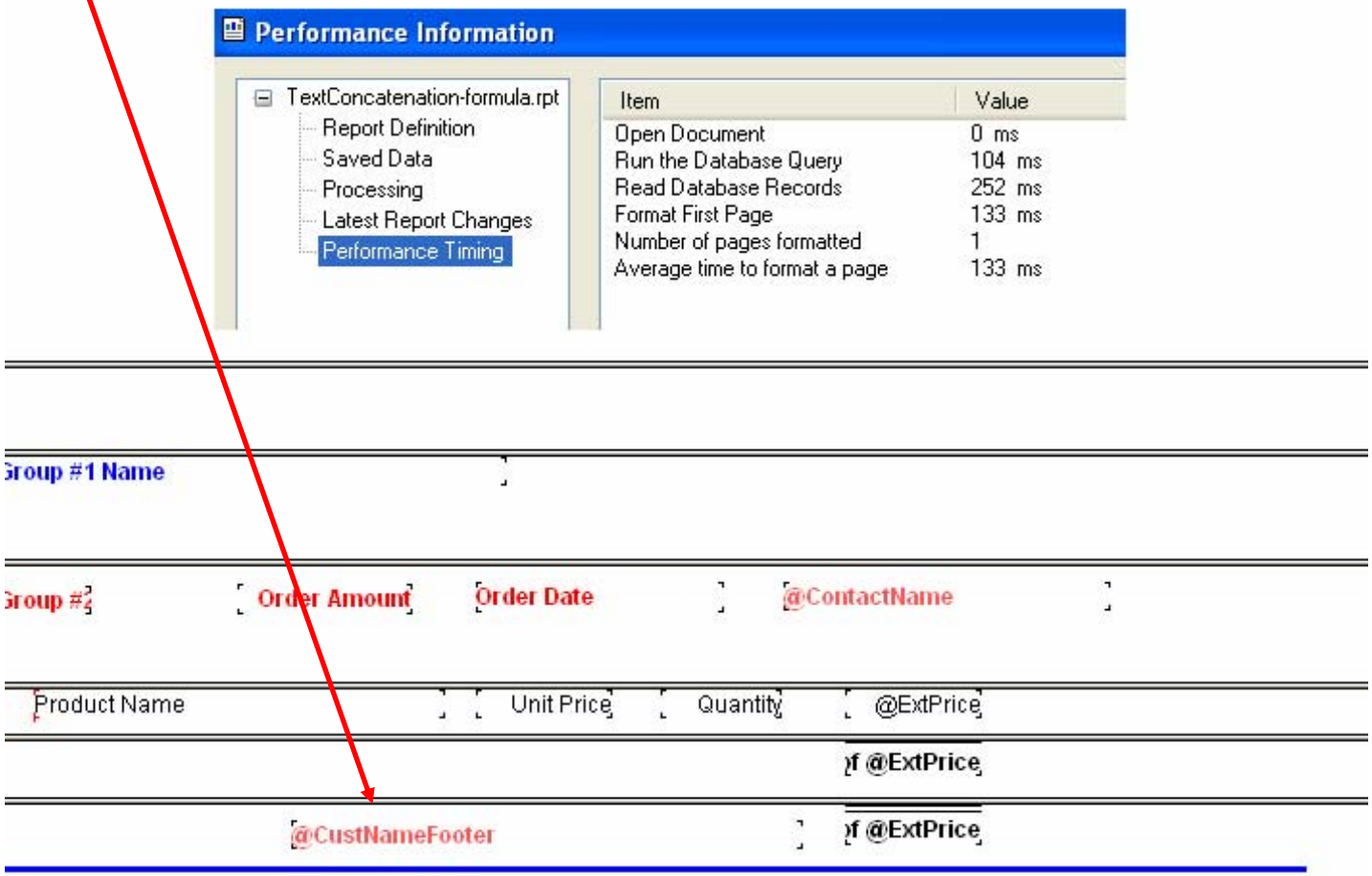


Miscellaneous Tidbits

Text box versus concatenation formula

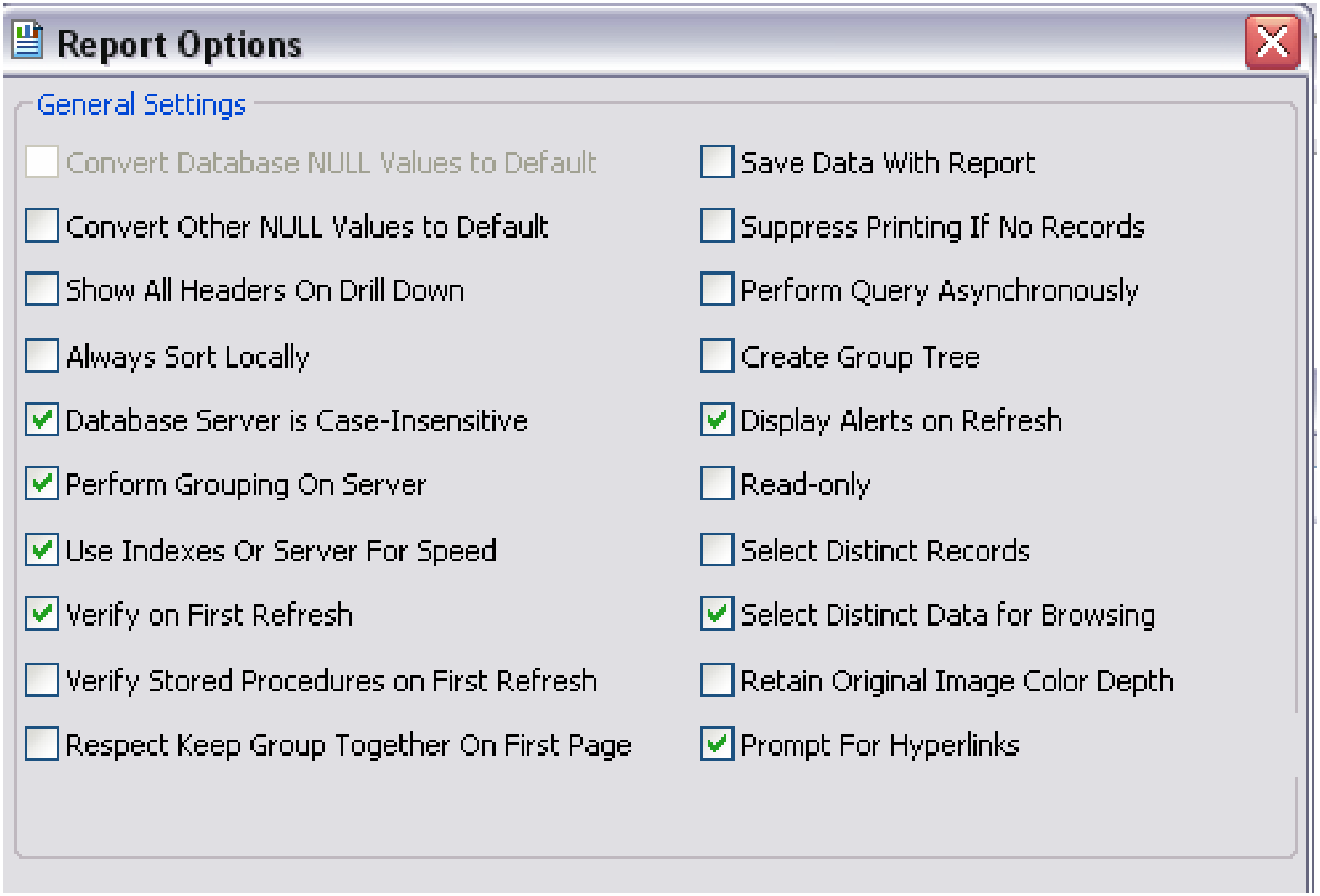
Why use a formula for concatenation? Speed!

```
trim({Customer.Contact First Name}) + " " + trim({Customer.Contact Last Name})
```



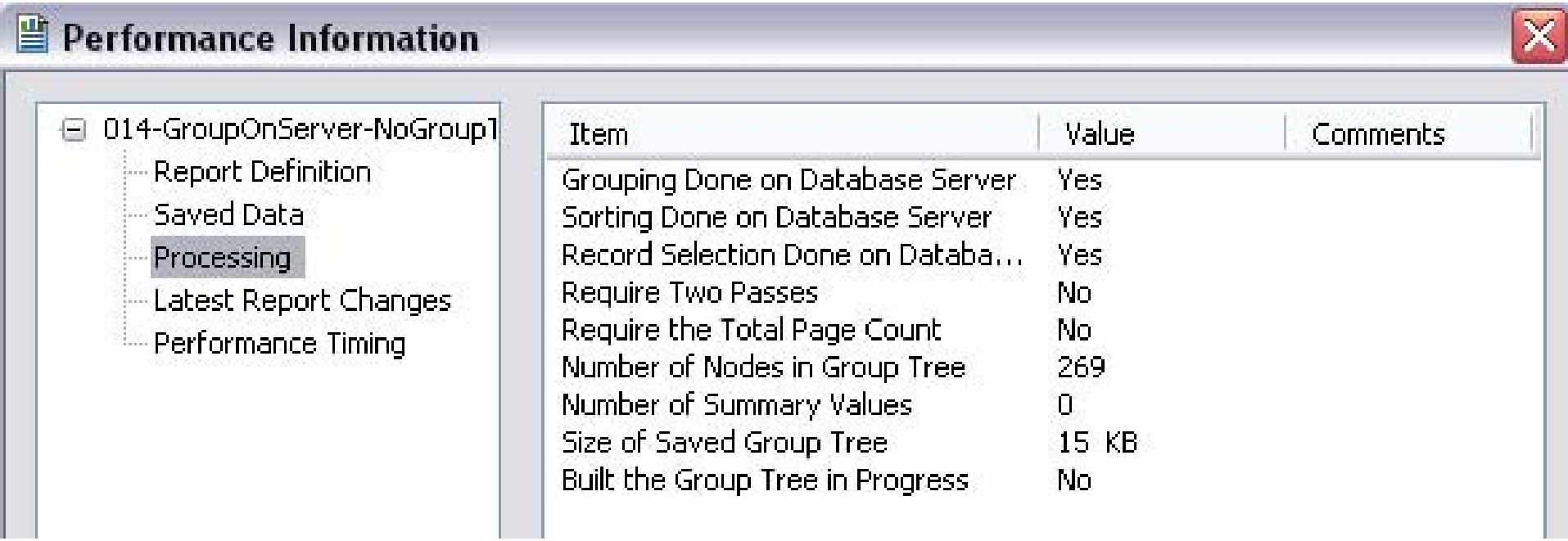
Miscellaneous Tidbits

Create a group tree



Miscellaneous Tidbits

Building a group tree



Miscellaneous Tidbits

What else could cause your report to run slow?

- **Considerations for when your report is running extremely slow on one computer but not on another**
  - Check your ODBC drivers – sometimes they get corrupted
  - Options settings (SQL server / database options)
  - CPU / RAM – workstation hardware
  - Review if other programs are running on that workstation (Task Manager)
  - Network traffic
  - Other database processes running at the same time
  - NIC – network card
  - HUB / SWITCH – network infrastructure
  - Security issues