the Lawson Guru Letter

Thought-Provoking Commentary for the Lawson Software community

Lawson Mid-Atlantic User Group

Mastering Crystal Reports for Lawson

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Decision Analytics
September 2004

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Mastering Crystal Reports for Lawson - Agenda

- Who Am I?
- Mastering Crystal Reports for Lawson
  - Characteristics of a Effective Reporting Solution
  - What is Crystal Reports?
  - Crystal vs. Lawson Enterprise Reporting
  - The Lawson OLE DB Provider vs. Going Native
  - Let's Go Native:
    - Understanding Table Relationships (Joins)
    - Using Database Views
    - Database Implementation Specifics
  - Tips for efficient, useful Crystal Reports with Lawson
    - Embed DrillArounds into Crystal without Lawson OLE DB
    - Select/Group via SQL Expressions not Formulas
    - Using 'LIKE' SQL operator for wildcard parameters
  - Alternative Crystal Report Deployment Options
- Questions & Discussion

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The LawsonGuru Letter

- Monthly Newsletter
  - Read & Subscribe: http://www.danalytics.com/guru/letter/
- Periodic White Papers
  - http://www.danalytics.com/solutions/
- E-Mail:
  - mailto:john.henley@danalytics.com
- Web:
  - http://www.danalytics.com

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Lawson Experience

- *Over 15 years of consulting experience in the IT industry*
- *Consulting spans multiple industries:*
  - Professional Services
  - Government Contractors
  - Supply Chain/Distribution
  - Healthcare (Hospitals, PPOs, HMOs, etc.)
- *Dozens of varied clients*
  - Multiple suites/modules
  - Variety of industries/environments/platforms
- *Work w/ Lead Adopters*
- *"Specialized Generalist"*
- *"Relationship Manager"*
- *Breadth vs. Depth*
- *CIO*: *"I bring John in not only to implement something, I bring him in to tell me WHAT to implement, WHY to implement it, and HOW to implement it."*

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Information Systems Management

- *Architecture Analysis and Planning*
- *Systems Procurement Planning / Execution*
- *Data Conversion*
- *Systems/DBA Services*
- *Database Modeling/Design*
- *Business Analysis / Process Re-Engineering*
- *Disaster Recovery Planning*
- *Project Control and Management*

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Specialties/Offerings

- Business Application Development/Lawson Customization
  - Deep knowledge of Lawson applications, business logic, and architectures
  - Lawson Development Environments
    - COBOL, SEA/OCS (HTML & JavaScript/ActiveX)
    - Portal Design Studio
  - Visual Studio/SQL
  - Technical mentoring for developers on Lawson's tools
  - Efficiency analysis/critical process redevelopment
  - Complementary Products:
    - DecisionReporter, DecisionCubeIT, SpeedApplyAR
- Application Integration
  - Lawson Interface Development
    - Inbound/Outbound
    - Realtime/Batch
  - Lawson Business Component Integrator (BCI)
  - Lawson Development Environments
  - VB/COM+/ActiveX/SQL
    - Streamlined VB/COM/ActiveX Components for Lawson integration
- Crystal Reports / Crystal Enterprise
- Formscape (Forms Printing)

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Building an Effective Reporting Solution

Why do it?

- Higher-performance reporting and business intelligence allow an organization to:
  - Focus on the products and activities that bring the greatest ROI
  - Analyze and react to sales trends and customer needs more quickly
  - Ensure that financial and project performance remains aligned with strategic goals and initiatives
  - Provide a focal point for collaboration with a custom portal
  - Monitor critical business strategy-oriented metrics

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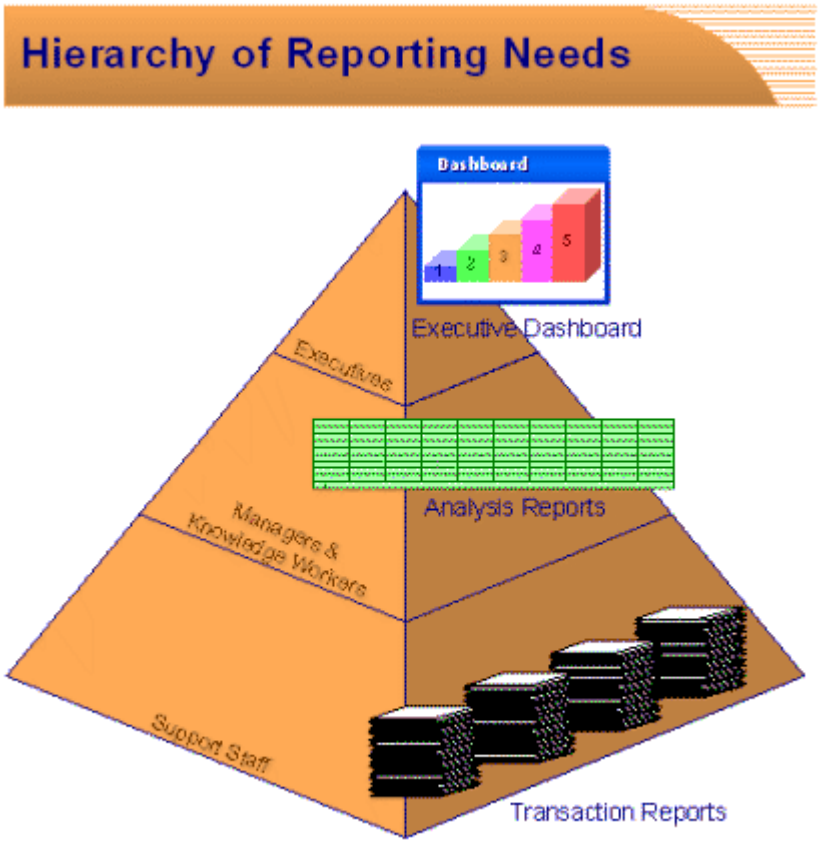
Building an Effective Reporting Solution



- Batch/Transaction Edit Reports
  - Still the day-to-day lifeblood of our systems.
  - Many are “out-of-the-box” in Lawson applications
  - Some reports are not provided, or that you want to enhance, which have to be generated by other means, be it custom Lawson programs or a 3rd-party reporting solution.
- Analysis reports:
  - Adds value to the basic transaction reports
  - Roll-up summaries, or spreadsheets of quarterly and yearly totals
- Scorecards and Dashboards
  - Tools used by the executives and directors to monitor "the pulse" of the organization.
  - Key Performance Indicators (KPIs),
  - Usually in a graphical format
- Proactive Notifications
  - Not part of the traditional reporting needs pyramid.
  - Used by the “knowledge workers and managers” layer of the pyramid
  - Specialized reports containing targeted content
  - Based on various business conditions, intended to trigger a response by the manager, who can quickly act on the content
    - Think of this as “pro-active exception reporting”

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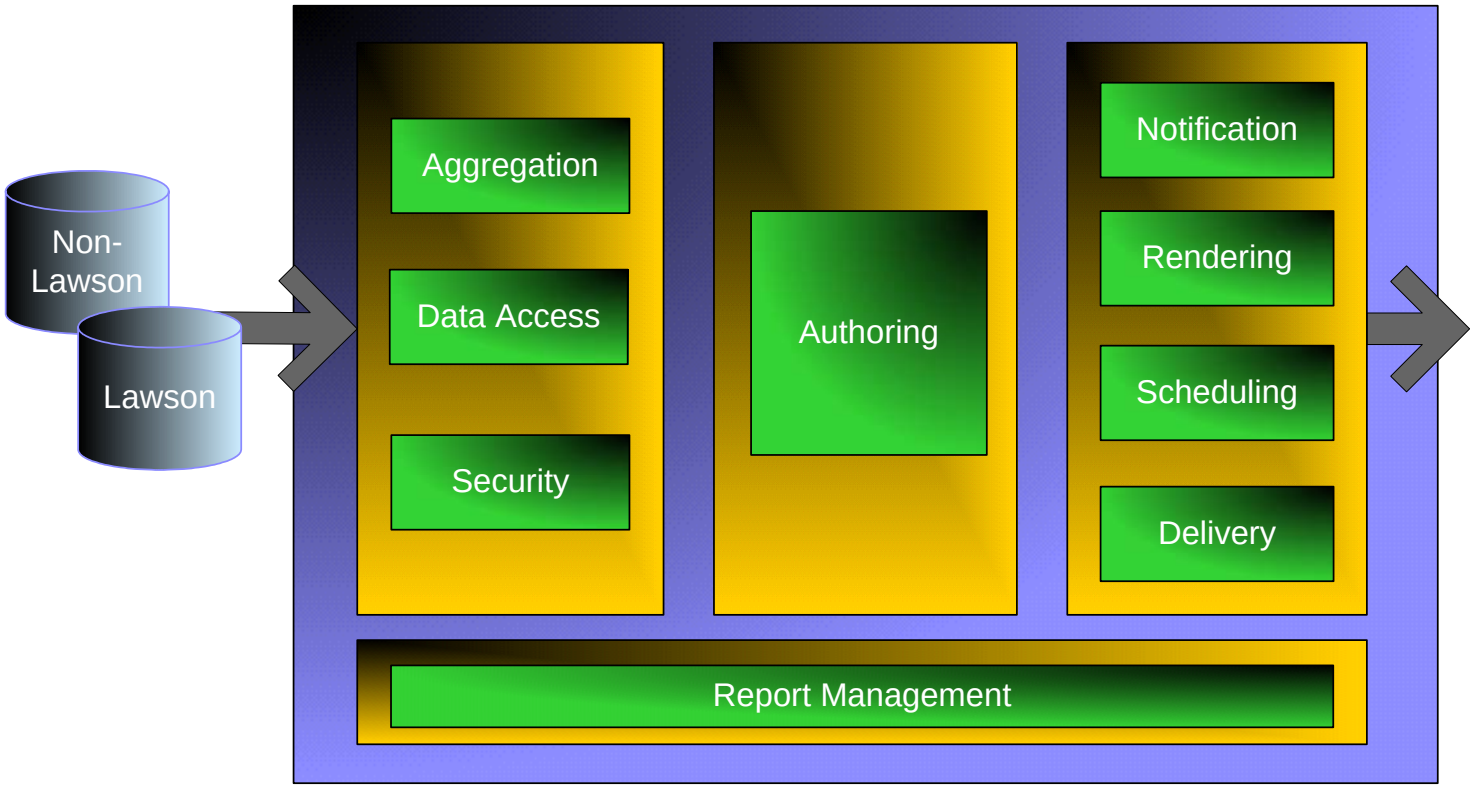
Characteristics of a Reporting Solution



Report Formats:
- PDF
- HTML
- Excel
- Text

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What is Crystal Reports?

- Crystal's reporting solutions are composed of two primary components:
  - Crystal Reports (the report designer)
  - Crystal Enterprise (a web-deployed report viewer/management application)
- Our focus today is Crystal Reports and report/content authoring

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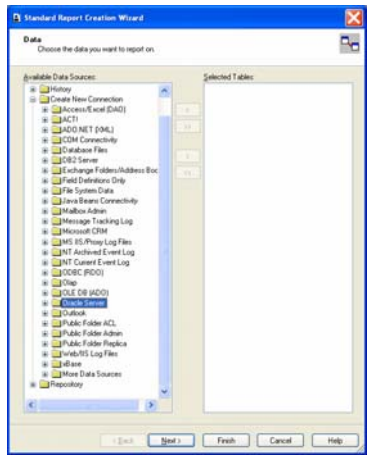
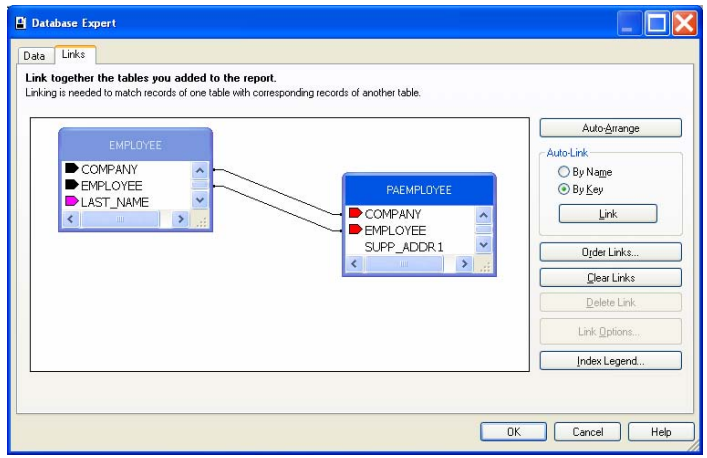
What is Crystal Reports?

Report Authoring

- With some basic training, almost anyone can tackle report creation with Crystal Reports
- The product is packed with wizards, and has almost every feature you'd ever need
- Data Sources Galore:
  - One of Crystal's greatest strengths
  - Include data from multiple data sources on the same reports
  - Connect via OLEDB or ODBC driver, including Oracle, DB2, SQL Server etc.
  - And…Lawson's OLEDB Provider
  - Excel files, Outlook and Exchange Lotus Notes, XML files, IIS Web Server log files, etc.
- Just point-and-click on which tables you want to report





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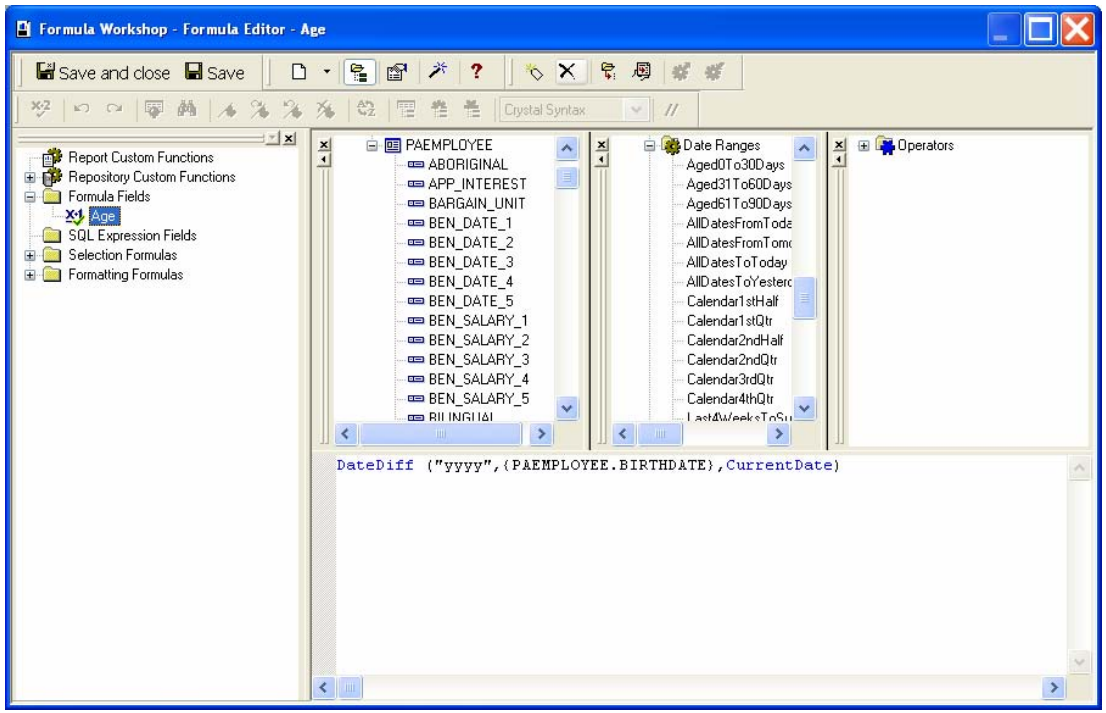
What is Crystal Reports?

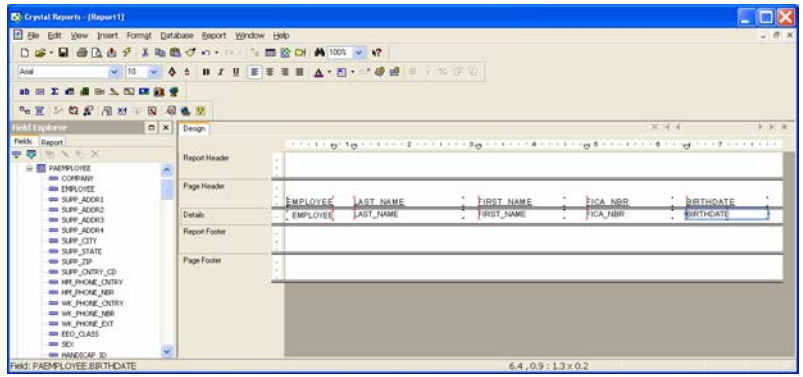
Part of Crystal's power is its formulas

- In addition to reporting data fields from your tables, you can also write your own formula-based fields, using either Visual Basic syntax or Crystal's own macro language:

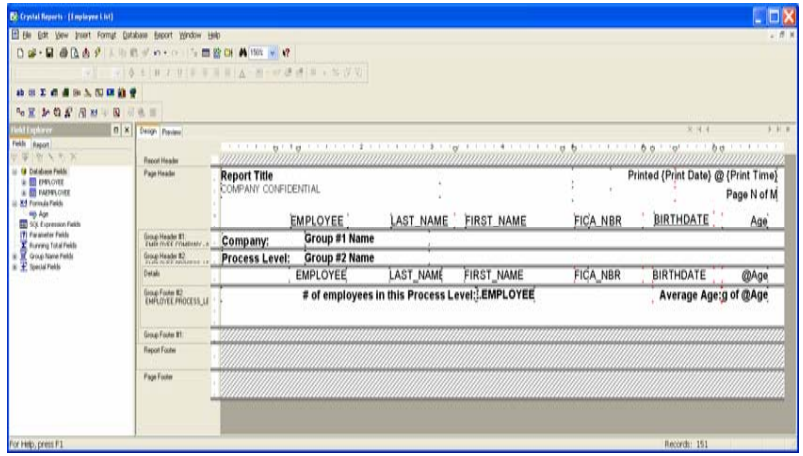


What is Crystal Reports?

- Insert some fields from your selected tables and your formulas:



- Apply some grouping and formatting



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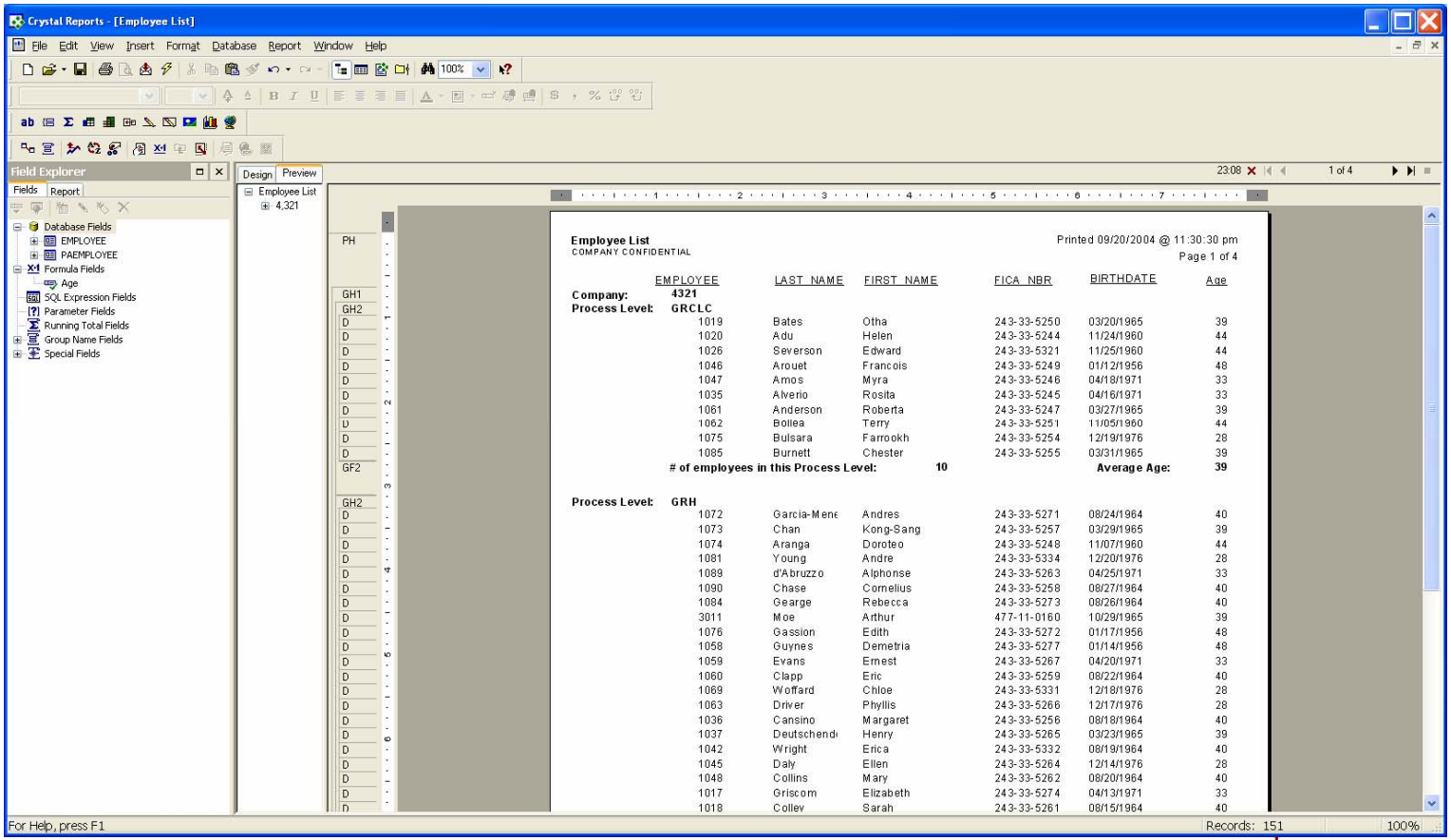
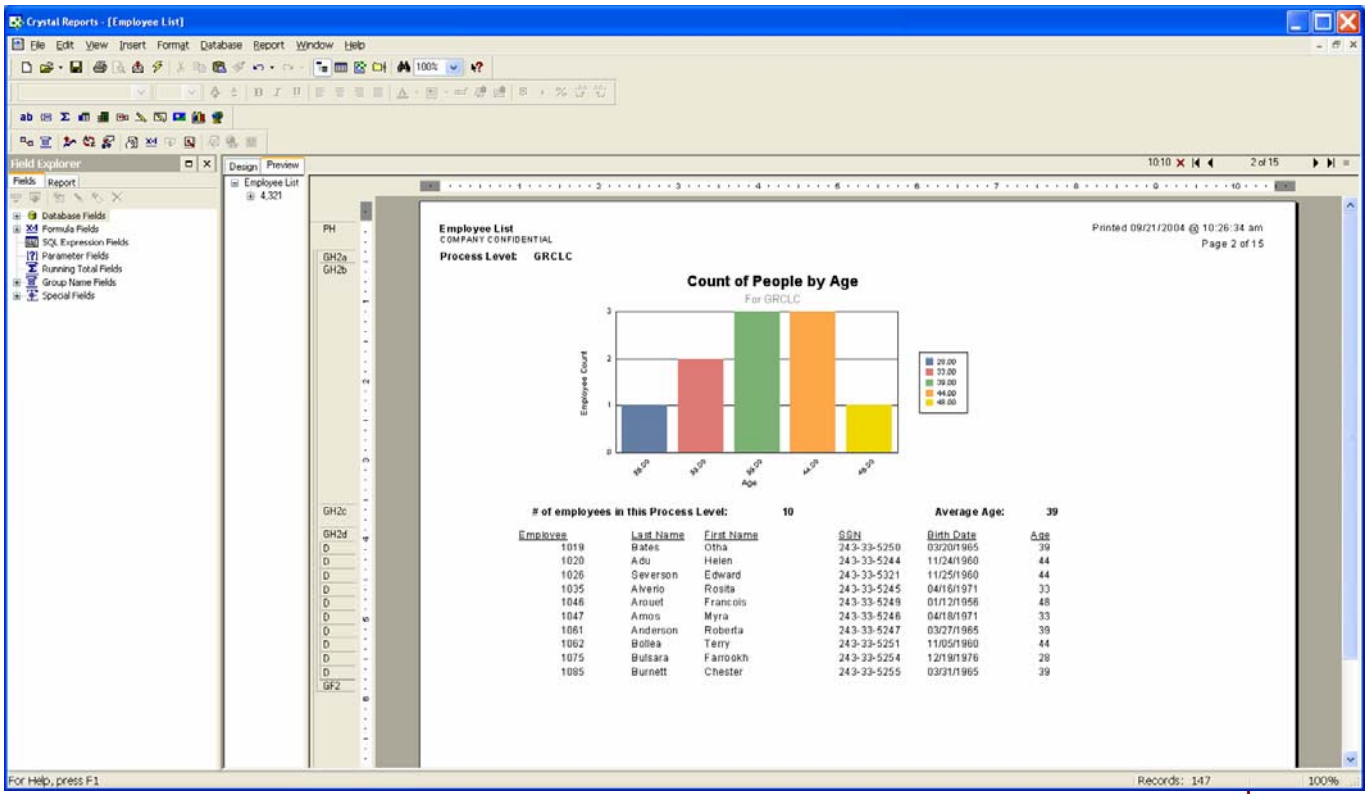
What is Crystal Reports?

- And, voila, you have a report!



What is Crystal Reports?

- Add some charting, and away you go!
- Example/Demo?



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Crystal vs. Lawson Enterprise Reporting

- A Crystal-based solution requires two major components: report design, and report deployment.
- Part of designing and deploying a report involves selecting your data source(s).
- Before the Lawson OLE DB Provider arrived on the scene, we used other methods, such as the native OLE DB provider or ODBC driver provided by the vendor of the backend database, e.g., Oracle, or SQL Server, or DB2, etc.
- Now that we have Lawson OLE DB, should you use anything else?

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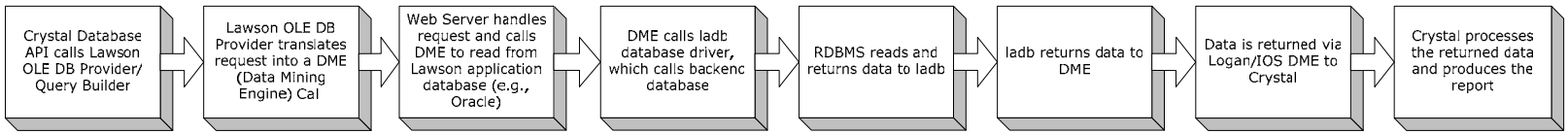
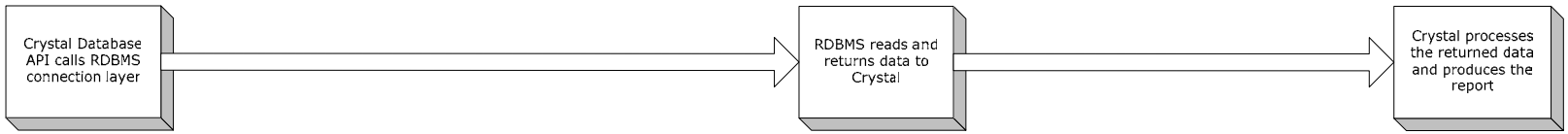
The Lawson OLE DB Provider

- In a nutshell, Crystal calls the Lawson OLE DB Provider which calls upon various LOGAN/IOS and underlying Environment services to return the data to Crystal:

The benefits provided by using the Lawson OLE DB Provider have significant processing costs:



. . . When compared to Crystal connecting directly to the database:



Lawson OLE DB vs. "Going Native"

- The key advantages to using the Lawson OLE DB Provider instead of the database vendor's OLE DB provider are:
  - Lawson's OLE DB Provider applies Lawson security to your report
    - If you use a native database provider, you have to build the security and table relationships into the report yourself
  - Lawson's OLE DB Provider understands more about how Lawson stores its data, in particular the relationships between Lawson tables
  - Lawson data is available regardless of which database is used to store the Lawson data. However, since most organizations stick to a standard across the enterprise, this is typically not an issue
- Let's look at the pros and cons in a little more detail…

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Lawson OLEDB vs. "Going Native"

	Lawson OLE DB	Native RDMBS OLE DB Provider
Security/ Deployment	• Uses the built-in application security classes to limit data access, which probably the #1 reason for using this tool • Usually "foolproof" • Database-independent • Operates through the firewall via HTTP	• Uses database-based security, which is typically "wide-open" in Lawson environments, since most organizations use Lawson's application security to manage data access • However, you can use Lawson's database security tools (e.g., bldorasec for Oracle) to implement your Lawson security classes in the database, and use those to implement reporting security • May require maintenance when updating Lawson versions, as queries against updated tables may fail if table/column names are revised • Vendor-specific firewall ports may be blocked
Table Relationships/ Data Dictionary	• The architecture of OLE DB depends on the application metadata stored in the Lawson Environment., and the Lawson OLE DB provider is very "application-savvy" and understands the business rules and table relationships that make Lawson such a powerful ERP application. • You can only relate ("JOIN") tables that have a relationship defined in the Lawson application metadata repository. • You can report off of Lawson application forms. • However (and this is A HUGE HOWEVER), the relationships can only be one layer deep. In other words, you can't link from ACTRANS to PRTIME to EMPLOYEE.	• Lawson stores nothing about the application table relationships in the database, but rather, stores all of that knowledge in the GEN repository. • This means that a user must understand the table relationships (including contextual relationships). • However, a Lawson-savvy technology consultant should be able to provide robust, meaningful, and user-friendly views of the Lawson data.
Limited Index Usage	• Index filtering applies only to the base table, not to related tables. This requires applying additional selection criteria in Crystal.	• Any table indexes can be used, regardless of whether it's on the base table, or a JOINed table.

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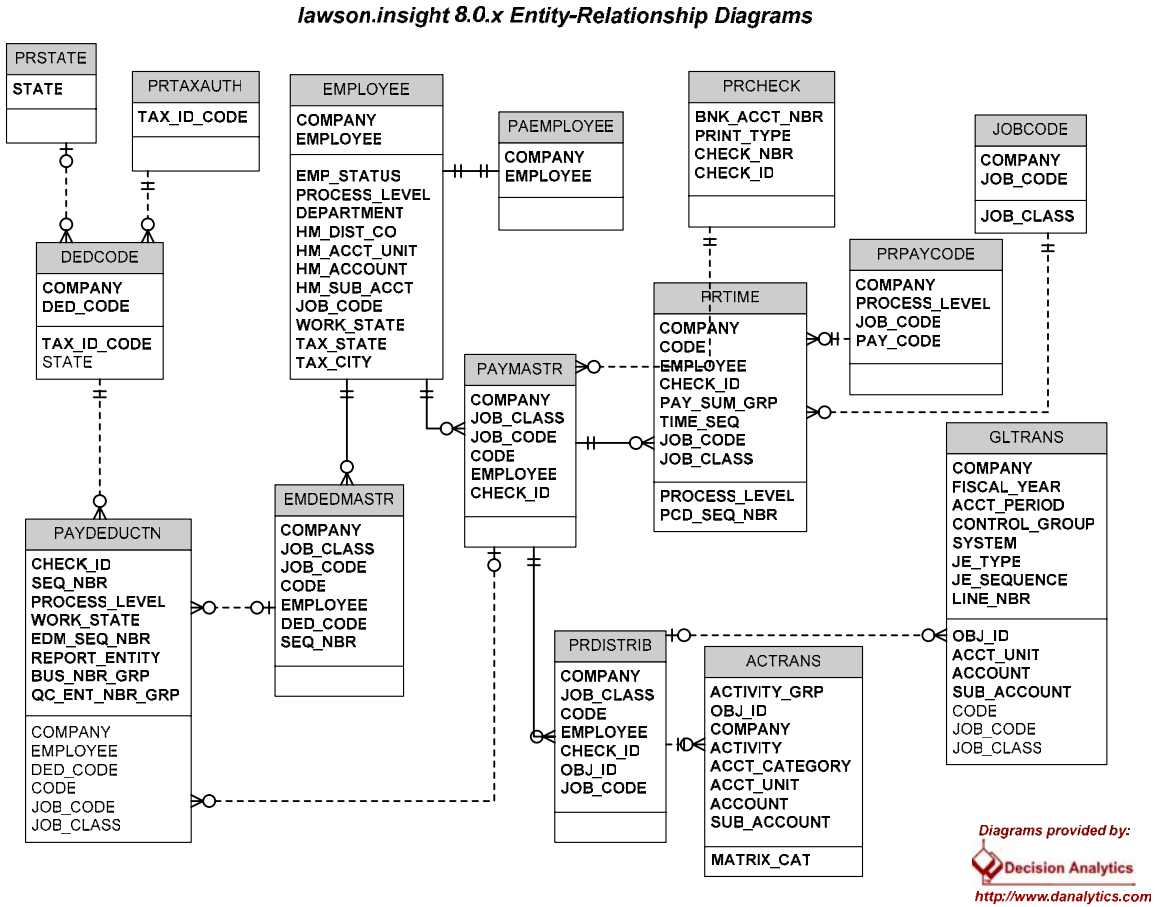
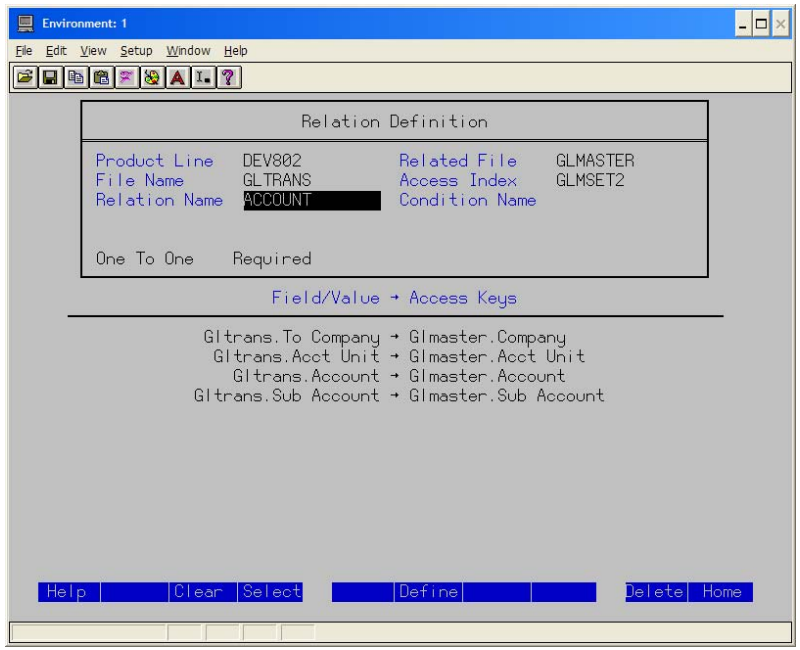
Go Native: Understanding Table Relationships (Joins)



Go Native: Understanding Table Relationships (Joins)

- A logical connection between two database files, a.k.a. “join”
- Used to “relate” one or more records from one file, to one or more records in another file, according to a set of rules
- Relationship types:
  - One-to-One
  - One-to-Many
  - Dependent
  - Self Referential
- Lawson Relationships are defined in dbdef



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Go Native: Understanding Table Relationships (Joins)

- Relationship metadata is stored in:
  - FILEREL (relationship)
  - FILERELFLD (fields that make up the relation)
- Using *rngdbdump* to get information about a Lawson relation:

```
$ rngdbdump -c GEN FILEREL -v ProductLine=DEV802 FileName=GLTRANS | lashow
```

```
ProductLine,FileName,RelName,RelFile,IndexName,Type,Required,DelRule,DptLvl,CndName,NotUsed,Filler
"DEV802","GLTRANS","ACCOUNT","GLMASTER","GLMSET2",,1,,,,,
"DEV802","GLTRANS","ACTIVITY","ACACTIVITY","ACVSET1",,,,,,,
"DEV802","GLTRANS","ACTRANS","ACTRANS","ATNSET14",1,,,,,
"DEV802","GLTRANS","AMTRANS","AMTRANS","AMTSET8",1,,,,,
"DEV802","GLTRANS","APAPDHIST","APAPDHIST","AH2SET5",1,,,,,
   .
   .
   .
```

```
$ rngdbdump -c GEN FILERELFLD -v ProductLine=DEV802 FileName=GLTRANS RelName=ACCOUNT | lashow
```

```
ProductLine,FileName,RelName,FldNbr,FrFldType,FrFileName,FrRelName,FrFldName
"DEV802","GLTRANS","ACCOUNT",,1,"GLTRANS",,"TO-COMPANY"
"DEV802","GLTRANS","ACCOUNT",1,1,"GLTRANS",,"ACCT-UNIT"
"DEV802","GLTRANS","ACCOUNT",2,1,"GLTRANS",,"ACCOUNT"
"DEV802","GLTRANS","ACCOUNT",3,1,"GLTRANS",,"SUB-ACCOUNT"
```

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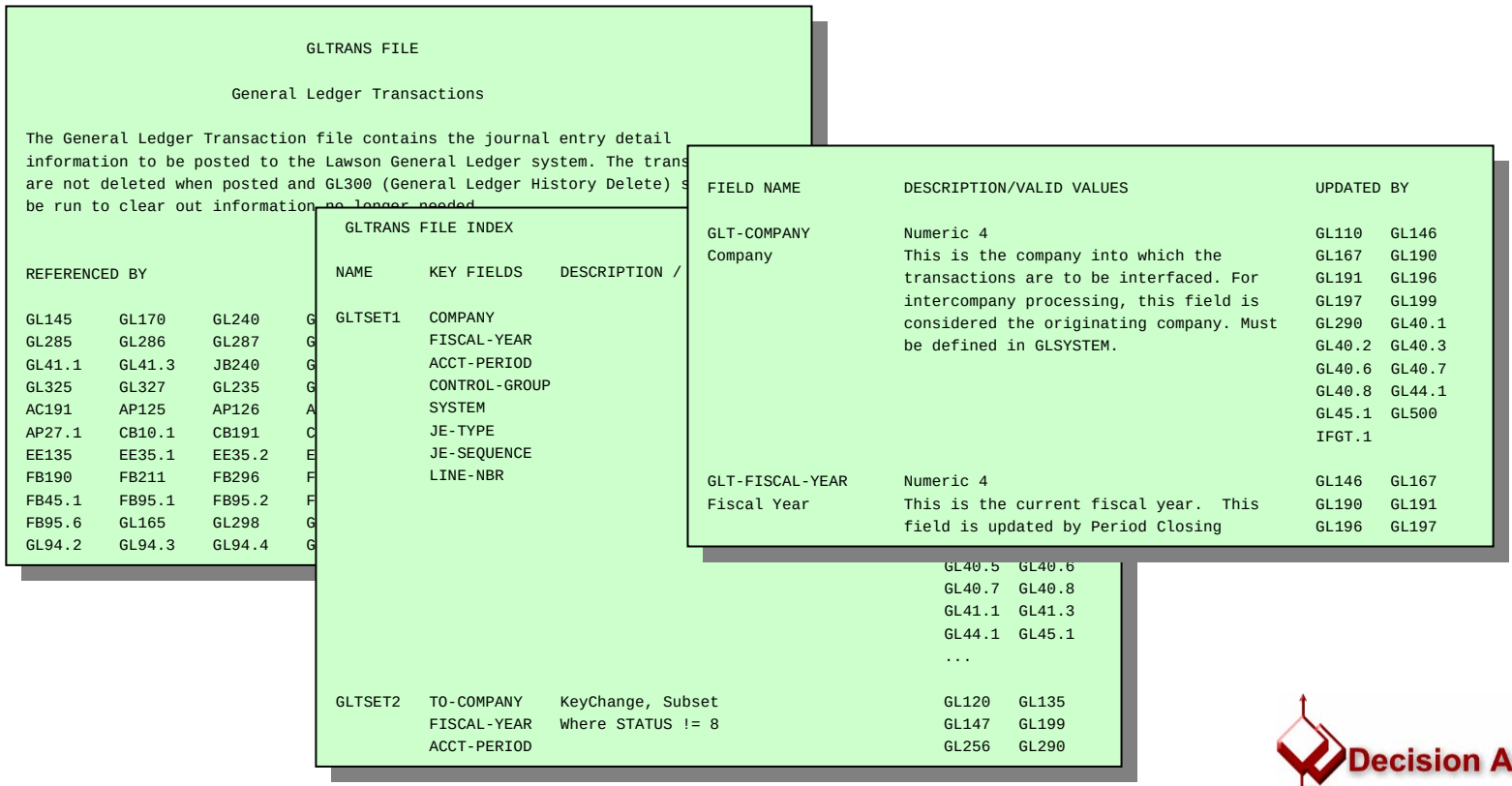
Go Native: Understanding Table Relationships (Joins)

- Using the dbdoc report to get Lawson data dictionary information:

  $ dbdoc DEV802 GL GLTRANS | lashow



GLTRANS FILE

General Ledger Transactions

The General Ledger Transaction file contains the journal entry detail information to be posted to the Lawson General Ledger system. The trans are not deleted when posted and GL300 (General Ledger History Delete) s be run to clear out information no longer needed.

REFERENCED BY

GL145	GL170	GL240	G
GL285	GL286	GL287	G
GL41.1	GL41.3	JB240	G
GL325	GL327	GL235	G
AC191	AP125	AP126	A
AP27.1	CB10.1	CB191	C
EE135	EE35.1	EE35.2	E
FB190	FB211	FB296	F
FB45.1	FB95.1	FB95.2	F
FB95.6	GL165	GL298	G
GL94.2	GL94.3	GL94.4	G

GLTRANS FILE INDEX

NAME	KEY FIELDS	DESCRIPTION /
GLTSET1	COMPANY	
	FISCAL-YEAR	
	ACCT-PERIOD	
	CONTROL-GROUP	
	SYSTEM	
	JE-TYPE	
	JE-SEQUENCE	
	LINE-NBR	
GLTSET2	TO-COMPANY	KeyChange, Subset
	FISCAL-YEAR	Where STATUS != 8
	ACCT-PERIOD	

FIELD NAME	DESCRIPTION/VALID VALUES	UPDATED BY
GLT-COMPANY Company	Numeric 4 This is the company into which the transactions are to be interfaced. For intercompany processing, this field is considered the originating company. Must be defined in GLSYSTEM.	GL110 GL146 GL167 GL190 GL191 GL196 GL197 GL199 GL290 GL40.1 GL40.2 GL40.3 GL40.6 GL40.7 GL40.8 GL44.1 GL45.1 GL500 IFGT.1
GLT-FISCAL-YEAR Fiscal Year	Numeric 4 This is the current fiscal year. This field is updated by Period Closing	GL146 GL167 GL190 GL191 GL196 GL197

GL40.5 GL40.6
GL40.7 GL40.8
GL41.1 GL41.3
GL44.1 GL45.1
...

GL120 GL135
GL147 GL199
GL256 GL290

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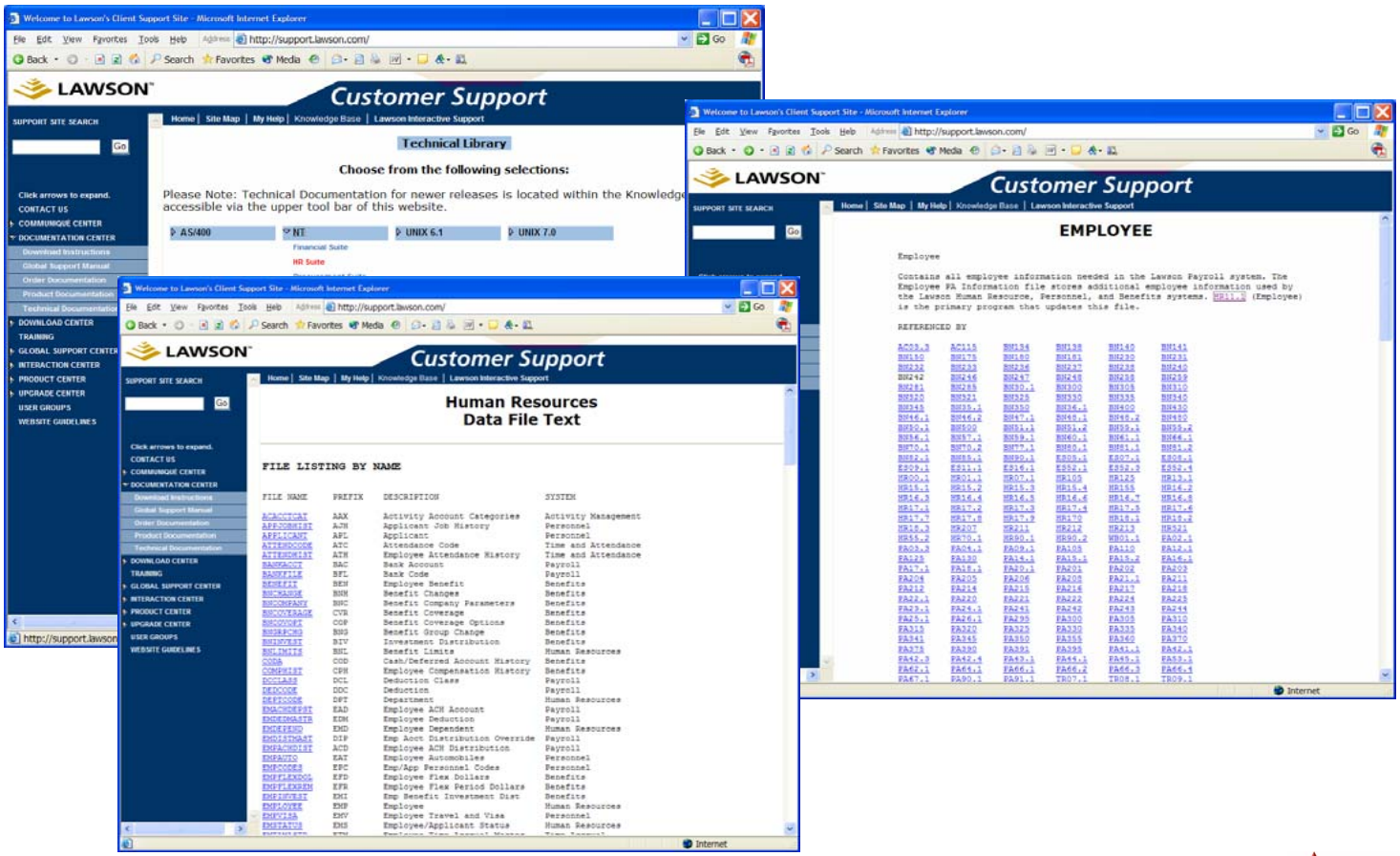
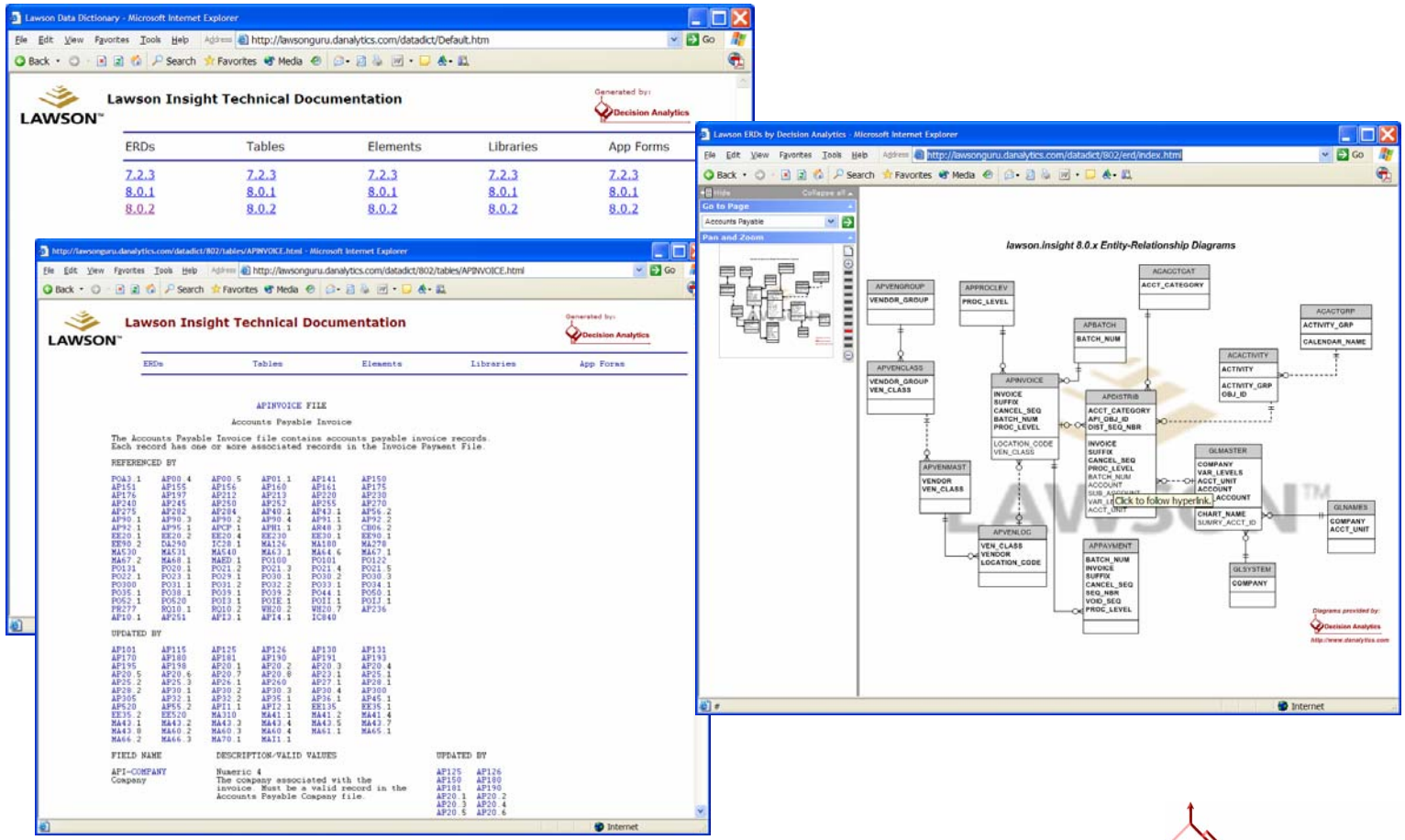
- Data Dictionary on Lawson Support



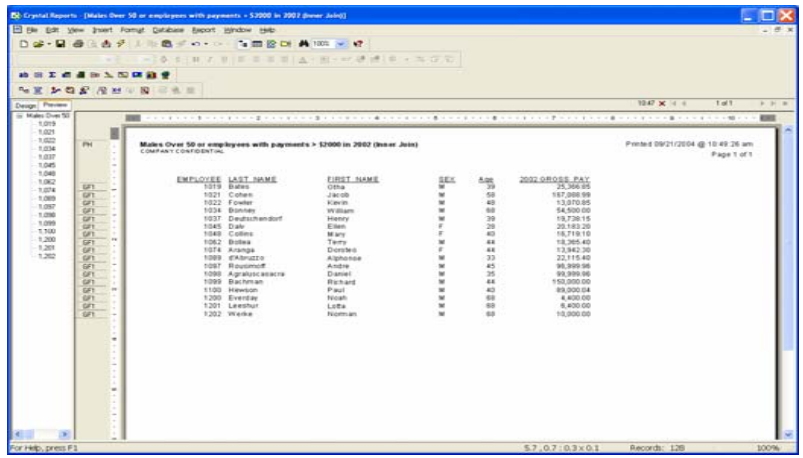
Go Native: Understanding Table Relationships (Joins)

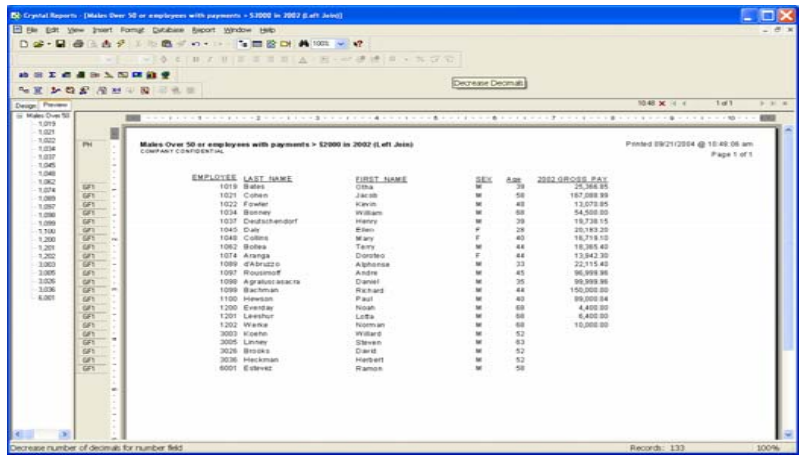
- http://lawsonguru.danalytics.com/datadict



Go Native: Understanding Table Relationships (Joins)

- **Know the difference between an INNER JOIN and a LEFT OUTER JOIN**
- **Don't let the wrong JOIN ruin your day**
- **Example/Demo?**





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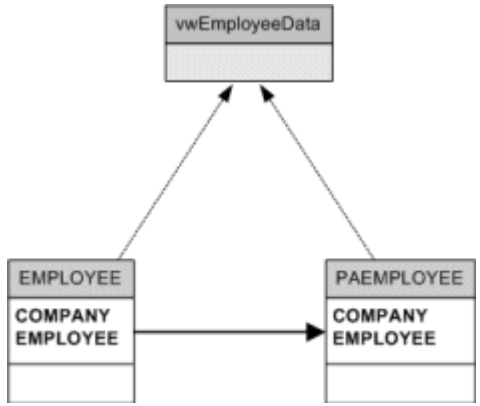
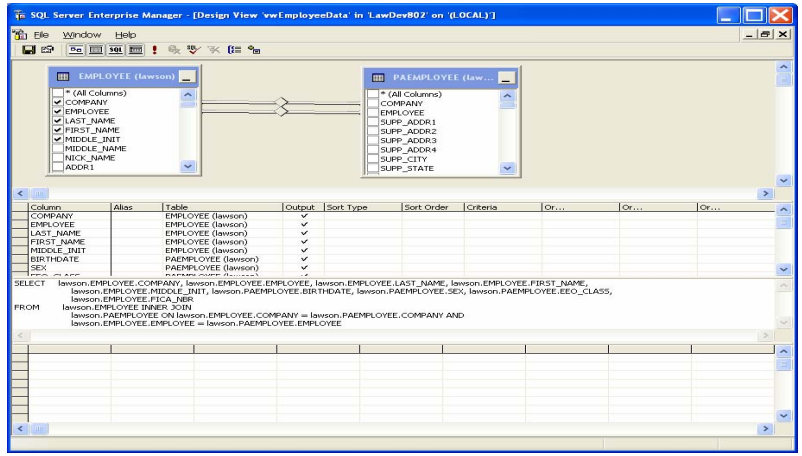
Go Native: Using Database Views

- Using database views:
  - Hides some of the complexity of the underlying table structures (and associated table joins) when creating your reports
  - In addition to creating reports based on simpler structures, you don't have to worry about creating the proper joins in each and every report
  - Consider CE10 "Business Views"
- Examples:
  - Employee Data
  - GL Master Account List
  - AC Activity Tree Structure
  - GL Balances
  - Header/Details (e.g., Paychecks, Invoices)





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Go Native: Database Implementation Specifics

- Underscores, not hyphens
- Reserved Words
  - Certain table names, field names, etc. are “reserved words” in a given database syntax, e.g. STATUS becomes R_STATUS
- Descending values in indexes (one’s complement)
- Array columns (e.g., AMOUNT_01)

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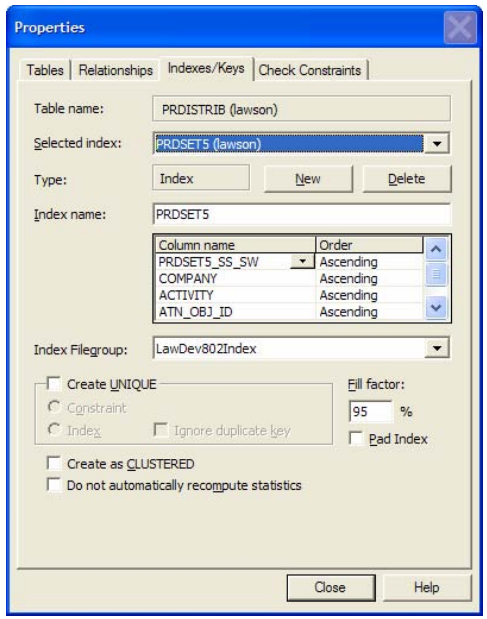
Go Native: Database Implementation Specifics

- Subset Switches
  - Conditions used to include records in a given “index set” to speed retrieval; records that meet that condition have the flag/switch set “Y”.
  - First field in a subset index
  - If you use SQL to join tables, make sure you consider SS_SW’s (ex. ACTRANS->PRDISTRIB)
  - Examples:
    - GLTSET8_SS_SW – Unposted Transactions
    - PRDSET5_SS_SW – Payroll Distribution with an Activity:




```
SELECT ATN.OBJ_ID, PRD.ATN_OBJ_ID
FROM
LawDev802.lawson.ACTRANS ATN,
LawDev802.lawson.PRDISTRIB PRD
where ATN.ACTIVITY = PRD.ACTIVITY
AND ATN.COMPANY = PRD.COMPANY
AND PRD.ATN_OBJ_ID = ATN.OBJ_ID
AND PRD.PRDSET5_SS_SW = 'Y'
```

Caution:

If you ever update the database directly, be sure to use the Lawson *sqlfix* utility to update the _SS_SW columns

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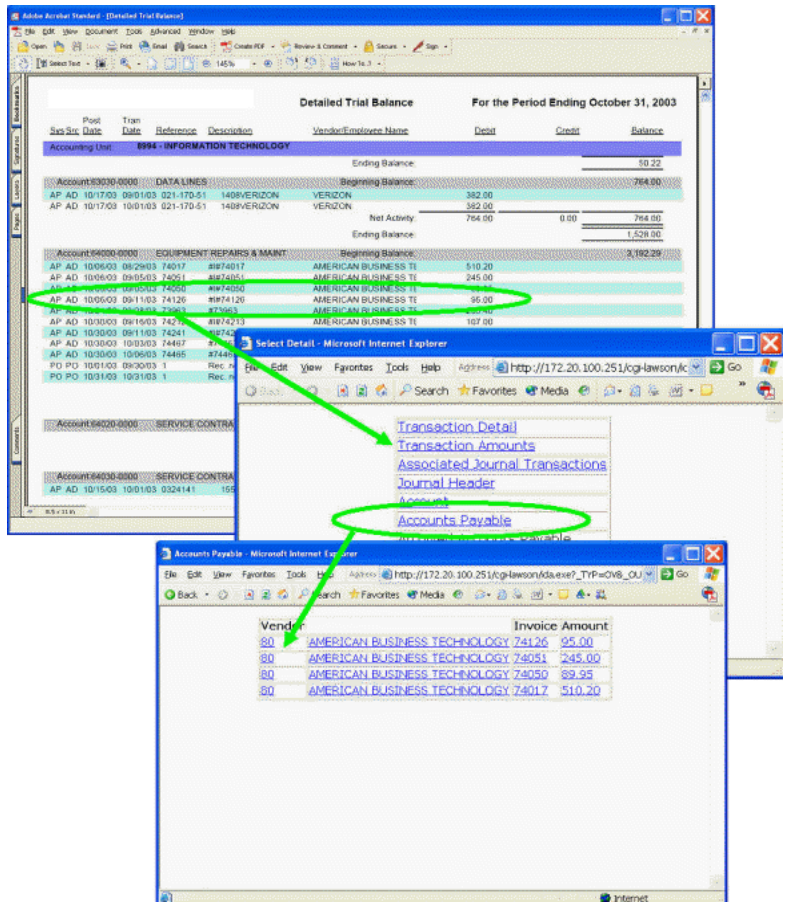
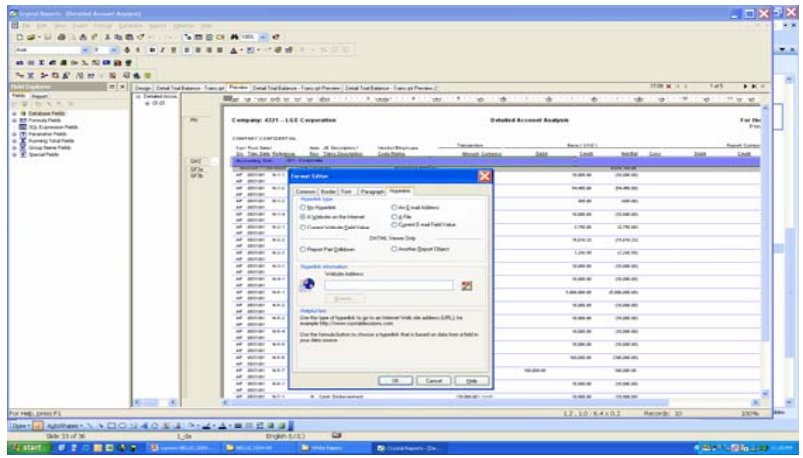
Tip: Lawson DrillAround from a Crystal Report

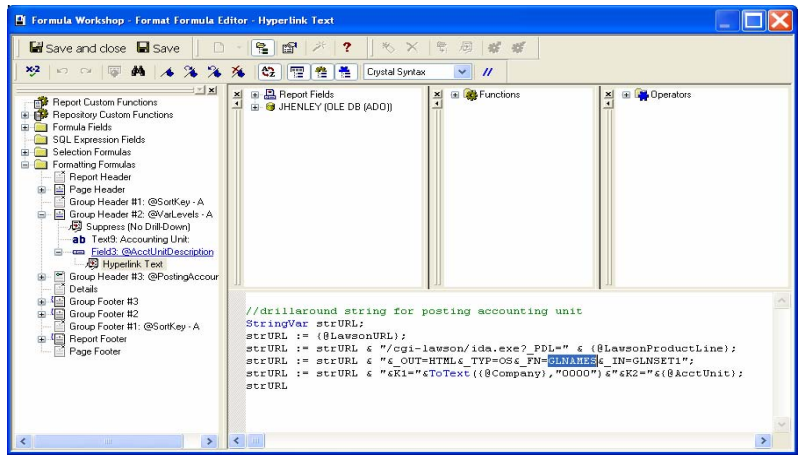
- One of the ways that you can use Crystal formulas is to embed Lawson DrillAround into your reports
- This example report shows detailed transactions from GL, and includes a Lawson DrillAround link on every report detail so that a user viewing the report (shown here as an exported PDF) can then drill into Lawson for more information:



Tip: Lawson DrillAround from a Crystal Report

- Format the field, adding a hyperlink
- The hyperlink is based on a formula
- The formula creates a URL string that calls IDA
- You can hard-code the server and product line, but I prefer to use a parameter or formula
- Need to know *what* you're drilling into





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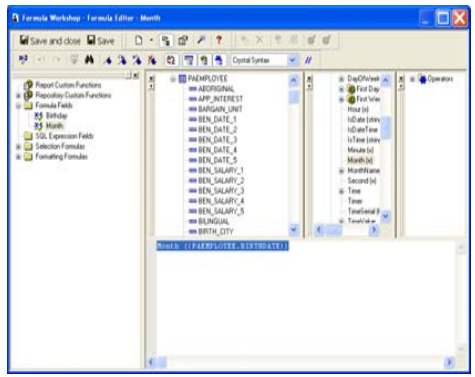
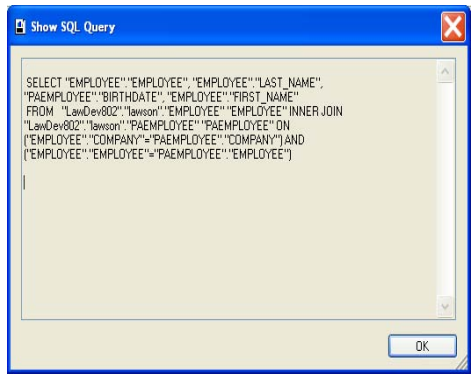
Tip: Select/Group via SQL Expressions not Formulas

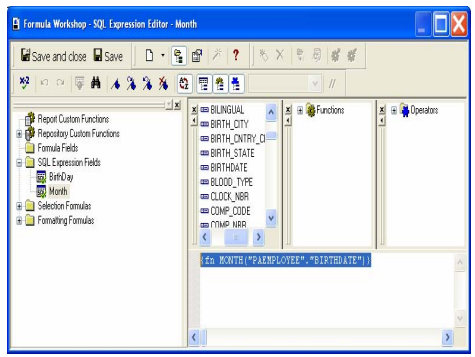
- For any database operations, use SQL Expressions, not Formulas
  - WHERE (selection)
  - ORDER BY (grouping/sorting)
- Example/Demo

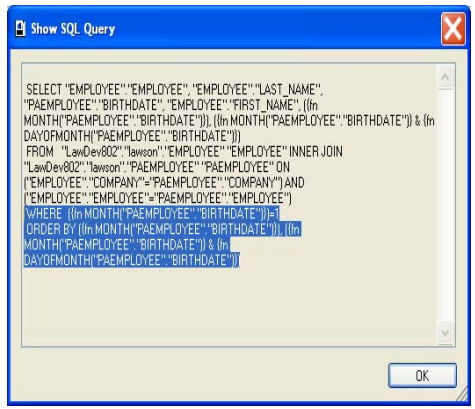
Slower (Crystal does the work):





Faster (Database does the work):





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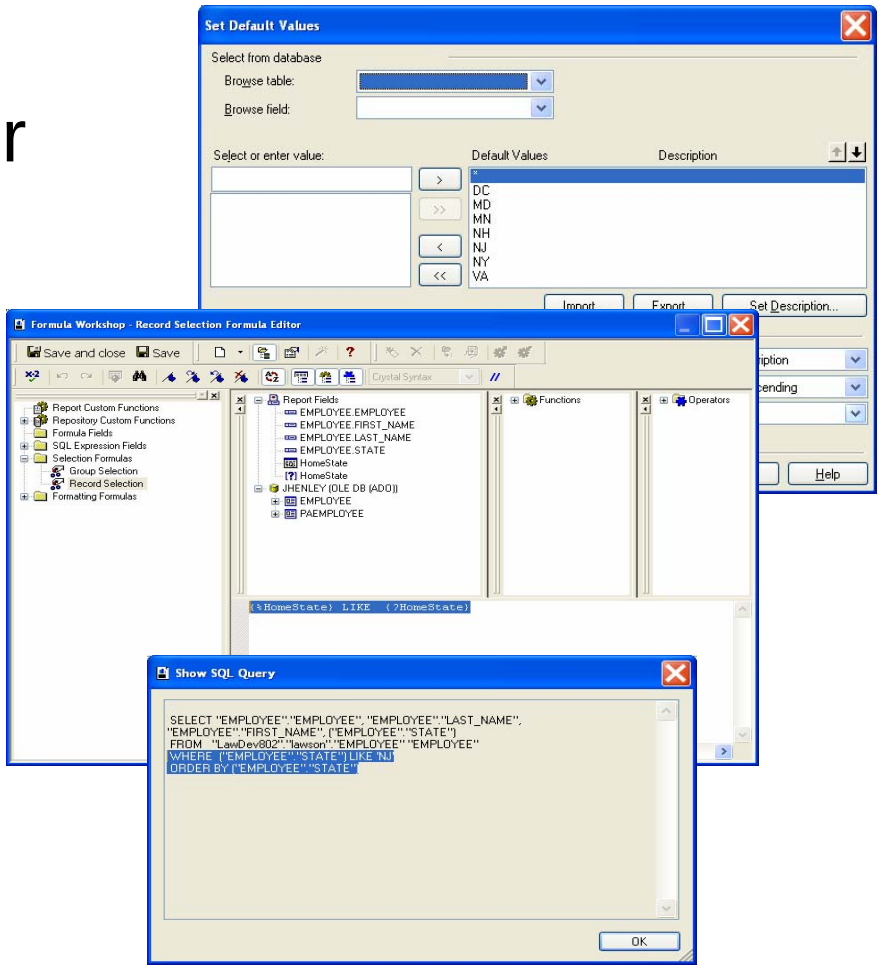
Tip: Use 'LIKE' SQL operator for wildcard parameters

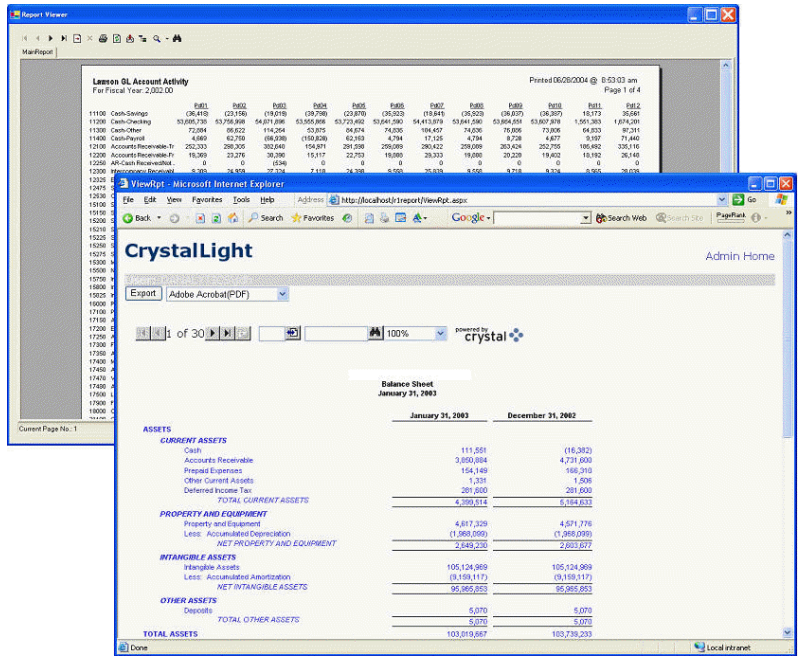
- You can use the 'LIKE' SQL operator as a selection wildcard
- However it can not be used for "allow multiple values" parameters
- Example/Demo



Decision Analytics

Alternative Crystal Report Deployment Options

- Crystal provides the ultimate versatility for deploying reports, in addition to (or, perhaps *instead of*) Crystal Enterprise
- A Crystal report is simply an object that can be run inside a container (e.g. via ActiveX/COM+, Java, etc.), a report can be viewed inside a custom Windows or a web browser
  - (here are two samples I've developed)
- In fact, that's exactly how Lawson Reporting Services works!



- Questions?
- Open Discussion

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