

## **BUSINESS INTELLIGENCE FOR A PASSIONATE COMMUNITY**

# [ Universe Designer Essentials

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# [ Universe Designer Essentials

- The universe is the central focal point for any Business Objects installation. Yet the implementation of a universe often falls to the DBA or perhaps a “power user” from the business. The session today will review some of the essential components of a universe that must be correct in order to have a successful implementation. The material that I will cover in the next hour is supplemented by a number of existing posts from my “Adventures in Business Intelligence” blog at [www.dagira.com](http://www.dagira.com)

# [ About Dave

- Dedicated to BusinessObjects solutions since 1995
  - Consultant and trainer for fifteen years
  - Currently BI Solutions Architect for PepsiCo
  - Note: Content is my own and does not reflect my employer
- 16 consecutive years presenting at major BI conferences
  - United States, Europe, Australia
- Charter member of BOB
  - <http://busobj.forumtopics.com>
- I Blog! Dave's Adventures in Business Intelligence
  - <http://www.dagira.com>
- SAP Mentor for 2009 – 2012



# [ Demonstration Platform

- Demonstration universes
  - Summit Sporting Goods
- Software configuration
  - BusinessObjects Enterprise XI 3.1
  - Oracle 10g
- BusinessObjects toolset
  - Web Intelligence Rich Client
  - Universe Designer



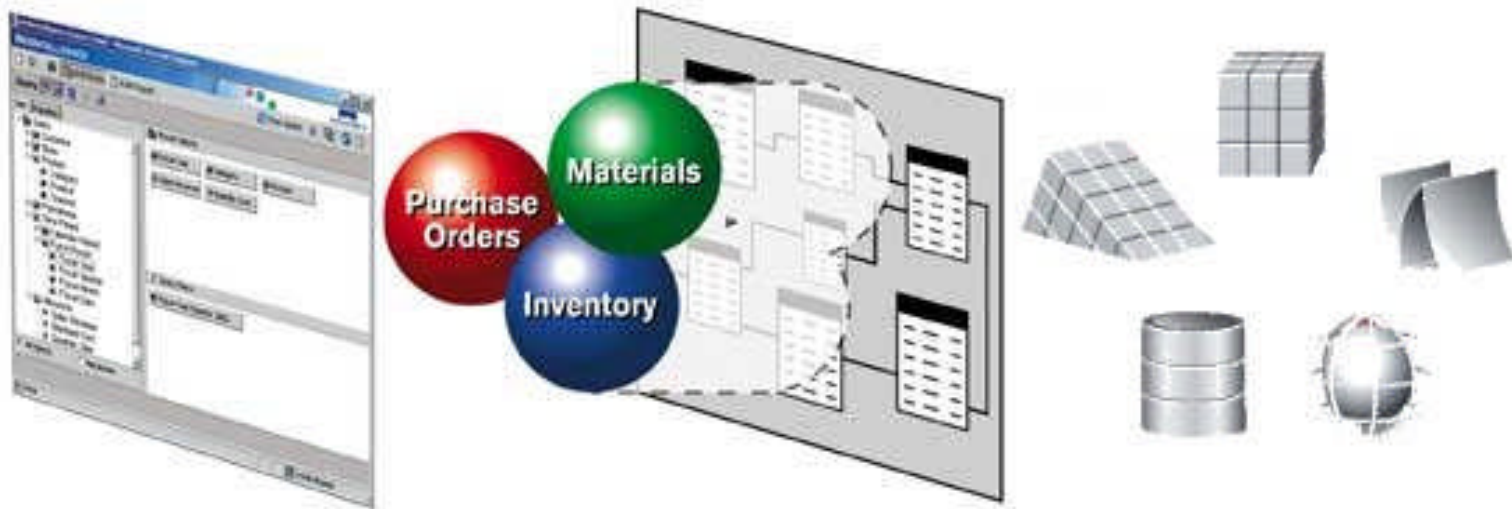
Demonstration slides will be highlighted with this icon

# [ Agenda

- Setting the stage
  - What is a universe?
  - Why is it important?
- Implementation
  - Step by step
- Some typical challenges
  - SQL Issues
    - Chasm trap
    - Fan Trap

# [ Role of the Universe Designer

- The universe designer sits between the business users and the database team

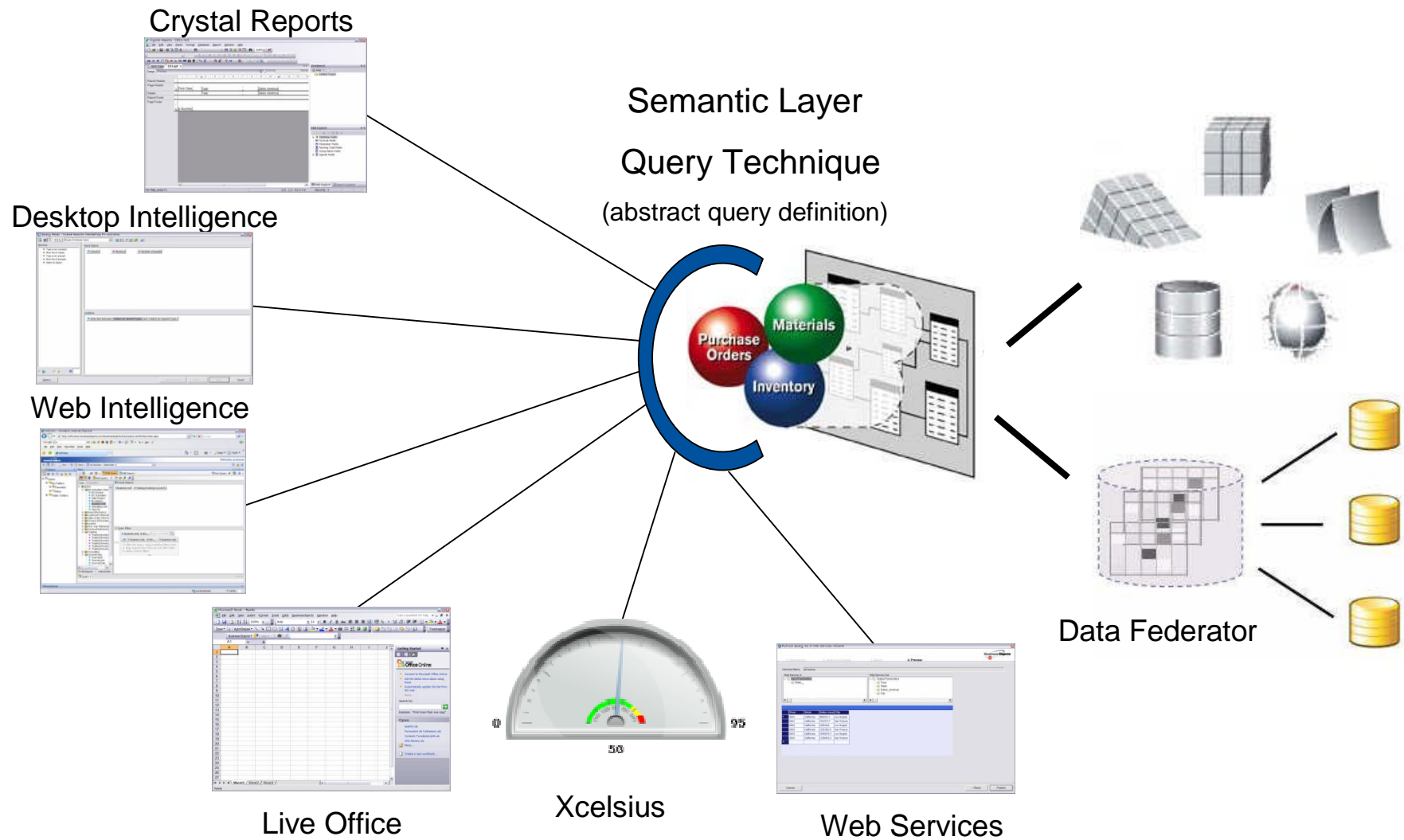


- Semantic Layer
  - Mapping of data attributes to business functional areas

# [ Database Requirements

- None!
- A universe can be built on
  - Relational model
  - Operational data store (ODS)
  - Star schema
  - Snowflake schema
  - Cubes
- Some designs do have more issues than others
  - Single-fact star schemas are probably the easiest...
  - ... but they're still not immune from challenges

# [ How Can I Use My Universe?

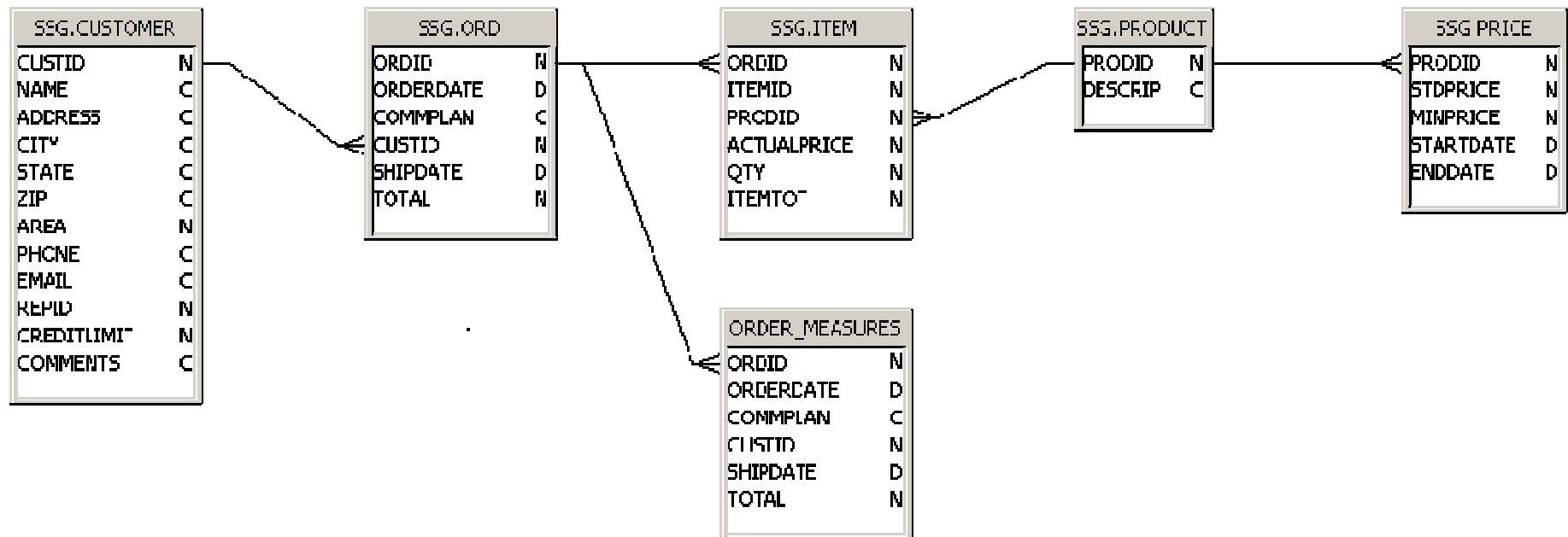




# [ Most Important Aspect of a Universe?

- Some possibilities
  - User friendly
  - Good performance
  - Ease of maintenance
  - Others?
- None of the above!
  - While important, none of the above attributes should be considered critical
- Most important goal for a universe designer is to provide the correct answer
  - Wrong answers lead to “Dis-ing”
  - Discussion, Dissatisfaction, Disillusionment, and Discontinuation

# [ Summit Sporting Goods Universe



# [ Building the Summit Sporting Goods Universe

1. Establish connection
  2. Insert tables
  3. Add joins
  4. Add classes and objects
  5. Test
- Steps 2, 3, 4, and 5 can be repeated as needed

# [ Summit Sporting Goods Connection

The image shows a screenshot of a software interface for configuring a database connection. The main window is titled "Edit SSG Secured connection" and has a tab labeled "Login Parameters [2/4]". Below the tab, there is a subtitle: "Define the login parameters to access your Oracle database server using Net Client".

The main window contains the following fields:

- Authentication Mode:** A dropdown menu set to "Use specified username and password".
- User name:** A text field containing "ssg".
- Password:** A text field containing "\*\*\*".
- Service:** A dropdown menu set to "localhost".

At the bottom of the main window, there are five buttons: "Test Connection", "< Back", "Next >", "Cancel", and "Help".

Overlaid on the main window is a smaller dialog box titled "Test the connection". It contains an information icon (a lowercase 'i' in a circle) and the text "The server is responding!". There are two buttons in this dialog: "OK" and "Details >>".

 Demonstration – Building a universe connection

## [ Connection Considerations

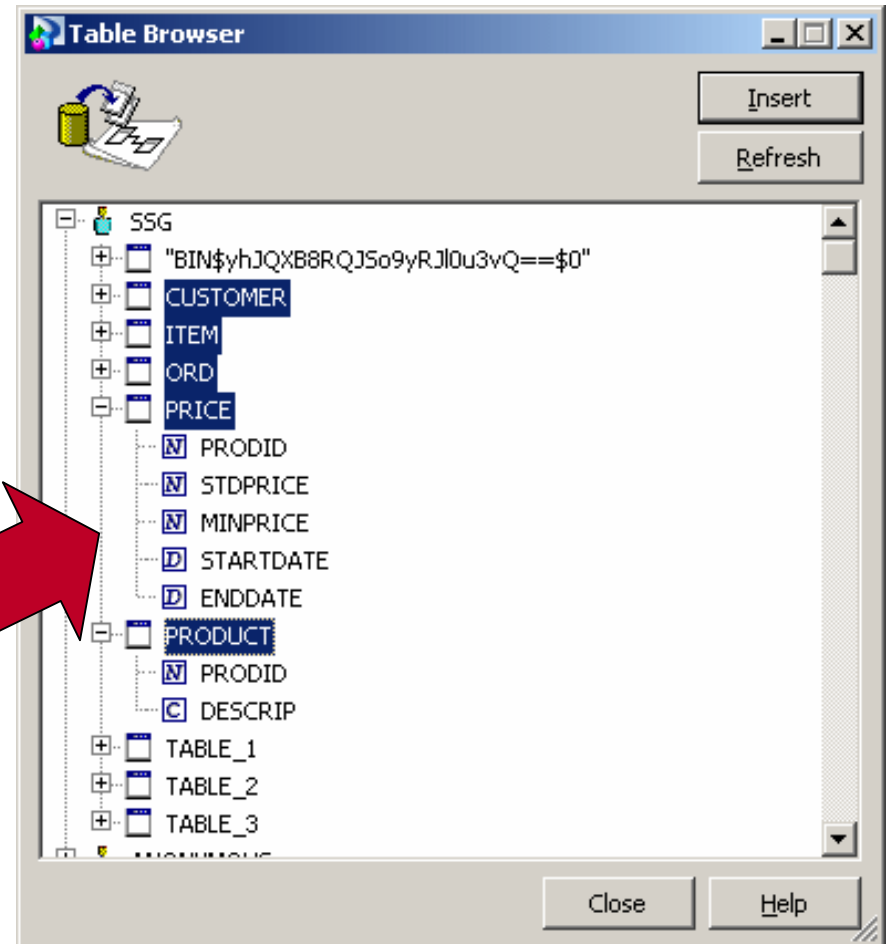
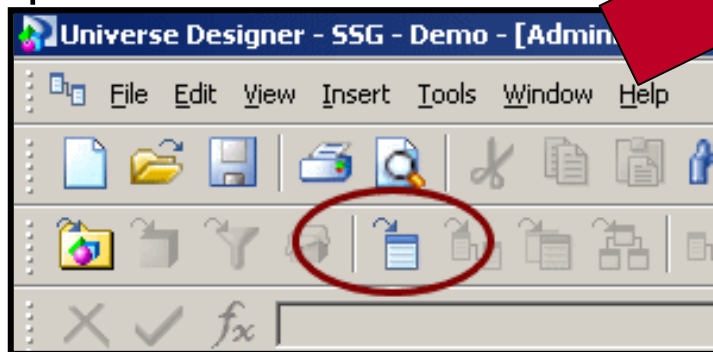
- Use a single username and password
  - + Simple for the DBA to set up
  - Must create a non-expiring account or deal with maintenance
  - Additional steps required to track who is running a query
- Use unique username and password  
@Variable('BOUSER')
  - + Allows DBA to track who is running a query
  - Requires a unique database account for every potential user
  - Password synchronization can be problematic


Use unique username and common password

- + Allows DBA to track who is running a query
- + Allows DBA to reset passwords with a single script
- Requires a unique database account for every potential user

# [ Summit Sporting Goods Inserting Tables

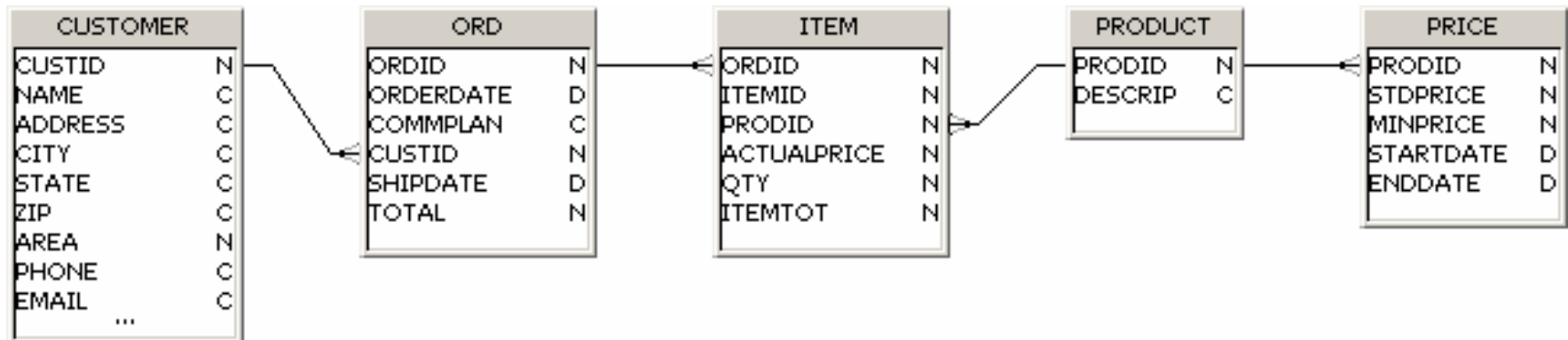
- Multiple ways to insert tables
  - Right-click on structure pane
  - Insert tables from the menu
  - Insert tables button from the toolbar
  - Invoke table browser by double-clicking on structure pane



 Demonstration – Inserting tables

# [ Summit Sporting Goods Adding Joins

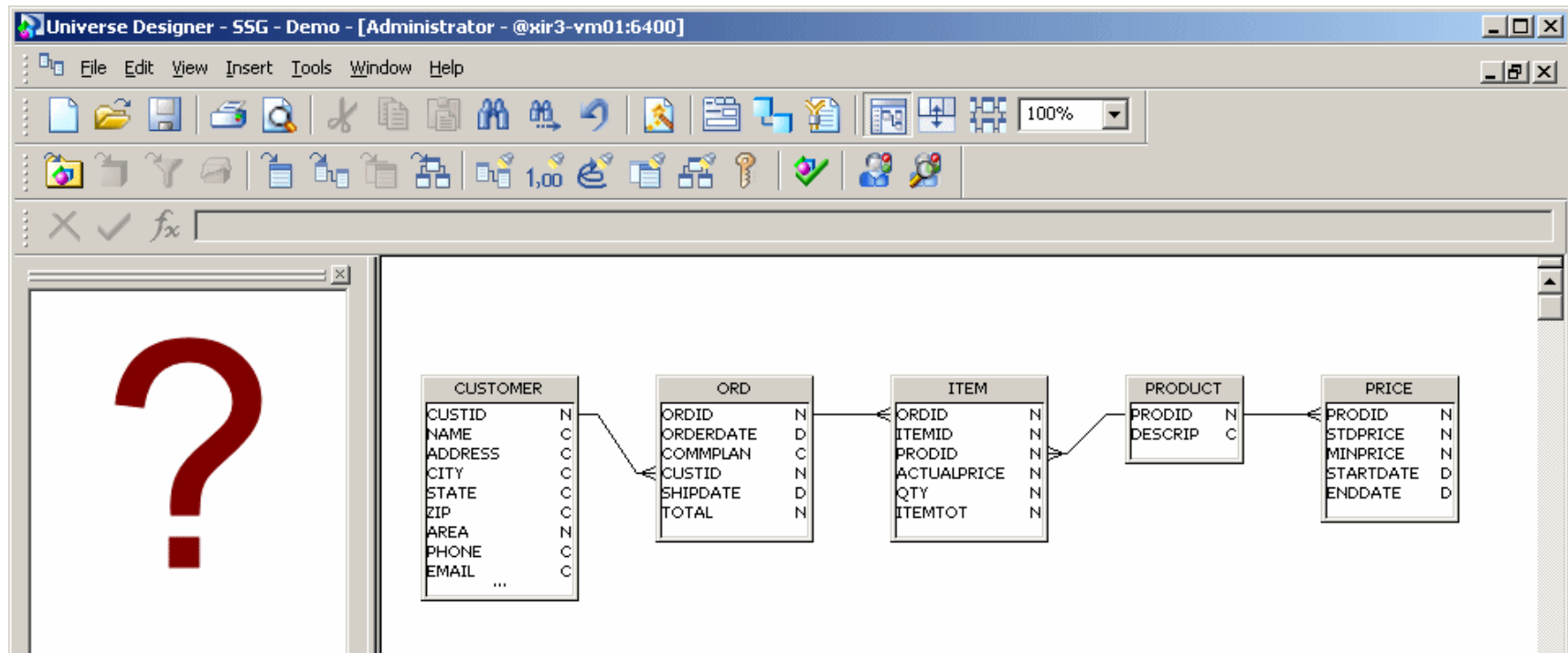
- Business Objects supports many join types
  - Inner
  - Outer
  - Theta
  - Self or “stub”
- Cardinalities (type of relationship) should be set manually



 Demonstration – Adding cardinalities

# [ Summit Sporting Goods Adding Classes and Objects

- At this point the universe includes tables and joins
  - Only the structure has been created
  - The next step is building the user interface





# [ Summit Sporting Goods Adding Classes and Objects

- Classes and objects are independent of tables and columns
  - Don't make your universe look like a database design document
  - Classes are functional
  - Tables are physical implementations of a logical design
- Classes provide organizational structure
  - Not all tables will become classes
  - Classes may contain more than one table
- Objects are the query building blocks used by report writers
  - Not all columns will become objects
  - Some objects are built from multiple columns, perhaps from multiple tables
  - Some objects might be built from no tables!

 Demonstration – Adding classes and objects

# [ Testing The Universe

- Designers cannot possibly test every combination of objects
- Test cases should probably include
  - Queries for each path
  - Dimension only queries
  - Measure only queries
  - Dimension + measure combinations

 Demonstration – Running some test queries

# [ Correctness Is The Ultimate Goal

- Some of the test cases returned unexpected results
- Different combinations of objects affected the output

- State + Total

State	Total
CA	97,187
MN	6,400
Sum:	103,587

- State + Total + Extended Amount

State	Total	Extended Amount
CA	648,333	97,187
MN	25,600	6,400
Sum:	673,933	103,587

- State + Total + Standard Price

State	Total
CA	1,171,997.9
MN	32,000
Sum:	1,203,997.9

- How many values should there be for the total amount?

## [ A Universe Is A Framework

- A universe does not provide a single SQL statement
- A universe should provide a framework for all possible SQL statements
- Certain SQL “traps” can occur in this environment that do not occur in purpose-driven SQL report tools
- Traps include
  - Chasm trap      many-one-many relationship
  - Fan trap      one-many-many relationship
  - SQL Loop      multiple SQL paths between tables

## [ Chasm Trap Example

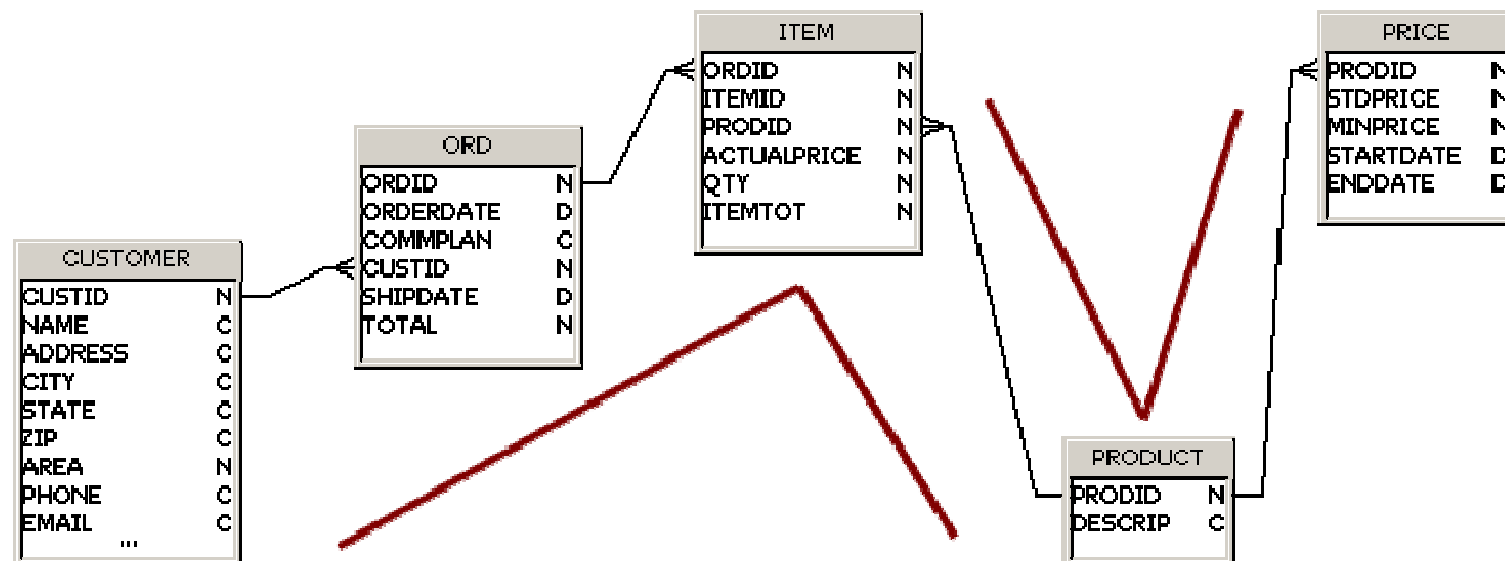
- Sample query showing product, extended amount, and standard price returns unexpected results
- The total should be 103,587

Product	Extended Amount
ACE TENNIS BALLS-3 PACK	13,653.8
ACE TENNIS BALLS-6 PACK	20,113.6
ACE TENNIS NET	59,376
ACE TENNIS RACKET I	66,432
ACE TENNIS RACKET II	39,928.5
RH: "GUIDE TO TENNIS"	2,451.4
SB ENERGY BAR-6 PACK	3,586.4
SB VITA SNACK-6 PACK	2,200
SP JUNIOR RACKET	4,900
SP TENNIS RACKET	8,424
Sum:	221,065.7

 Demonstration – Chasm Trap demonstration

# [ Chasm Trap Definition

- Chasm traps are found over many to one to many relationships
  - Think of the “many” tables as having more rows
  - More rows means they appear higher in the schema
  - Look for the valleys (chasms) formed in the joins
  - One SQL statement cannot cross this valley



## [ Solving Chasm Traps

- Chasm traps require separate SQL statements for each side of the “V”
- Contexts allow the universe designer to isolate sections of the universe that work together
  - A context is nothing more than a set of joins
  - Each side of the chasm becomes a context

 Demonstration – Chasm Trap Resolution with Contexts

## [ Fan Trap Example

- Is the universe completely correct with the chasm trap resolved?

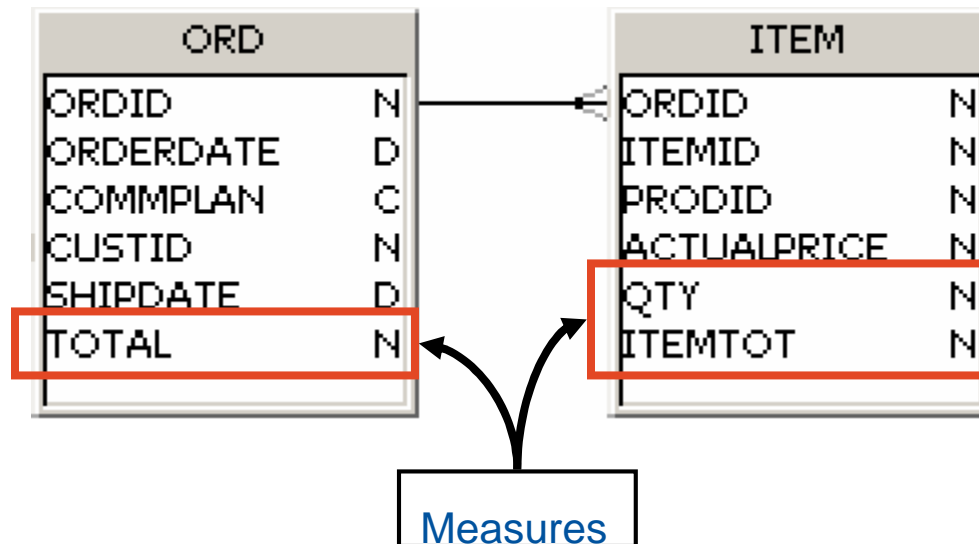
State	Total	Extended Amount
CA	648,333	97,187
MN	25,600	6,400
Sum:	673,933	103,587

- A fan trap also exists and must be corrected



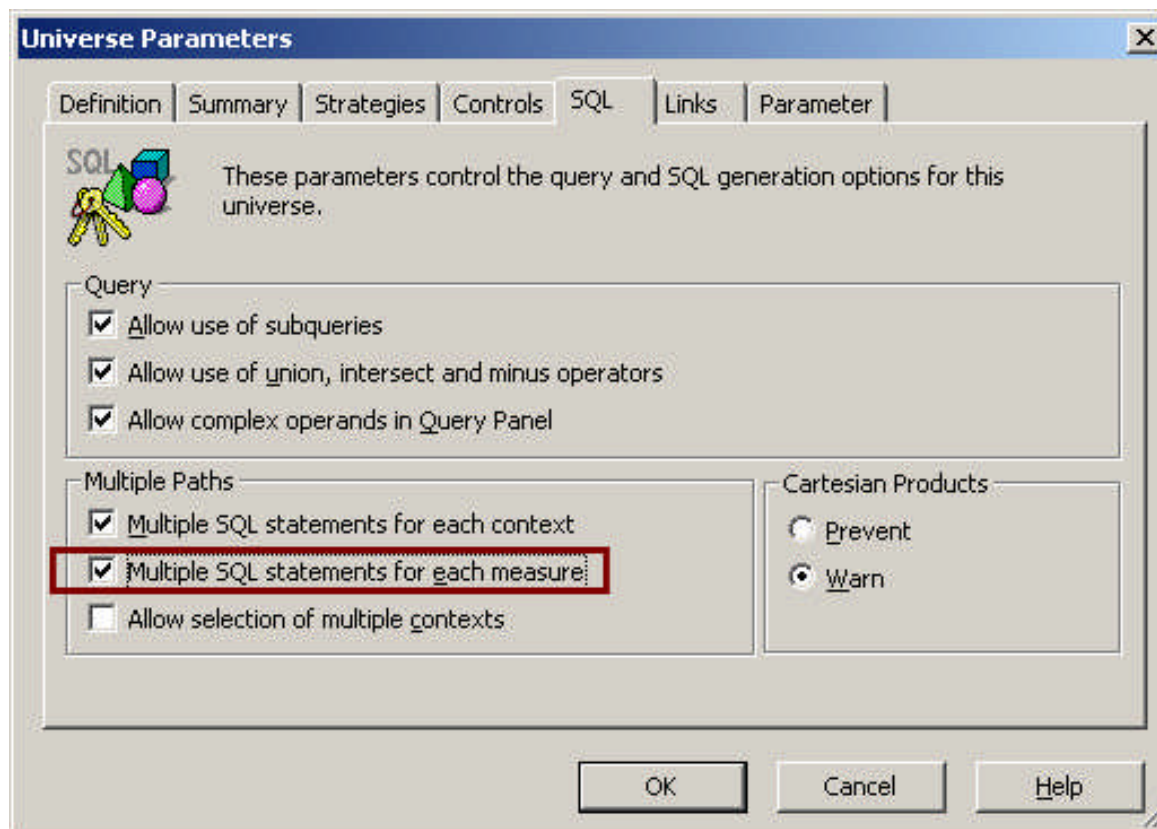
# [ Fan Trap Definition

- A fan trap consists of
  - Two or more tables
  - Series of one to many relationships
  - Measure objects from more than one table
- Star schema does not have fan traps
- Summit Sporting Goods has a fan trap between ORD and ITEM



## [ Fan Trap Solution – Simple Version

- If each measure is retrieved separately then no fan trap exists
- Designer presents an option that provides this



 Demonstration – Simple fan trap solution

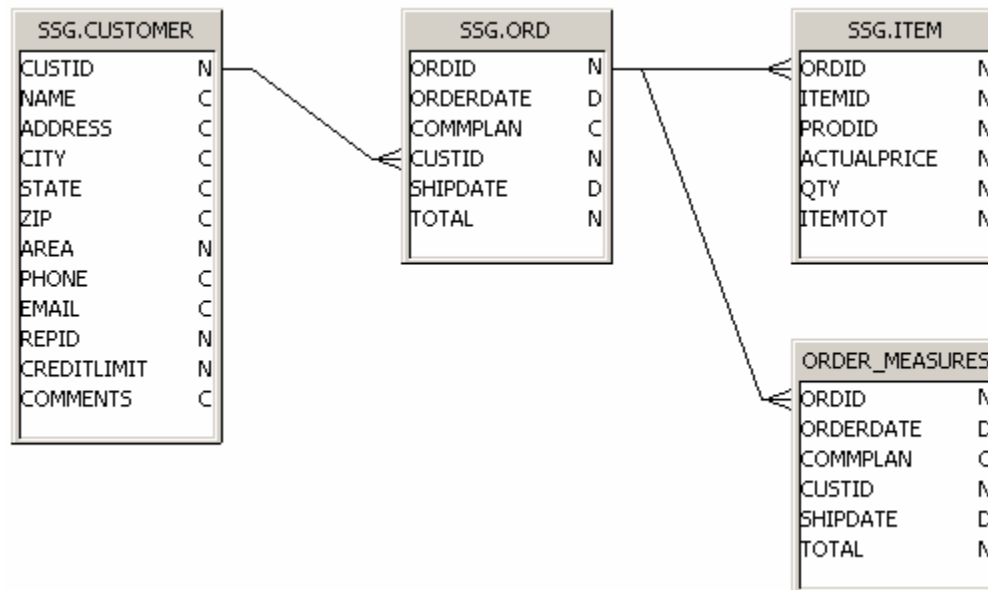
## [ Dimensions Break The Simple Solution

- The parameter setting breaks down when dimensions are included in the query
  - Multiple SQL statements for each “measure”
  - Dimensions cause the fan to reoccur

 Demonstration – Simple fan trap solution broken with dimension

# [ Fan Trap Solution – Complex Version

- These steps fix a fan trap without the dimension issue
  - Create an alias of the header (top) table from the fan trap
  - Join that alias to the header table using one to many join (incorrect but allows Designer to detect contexts)



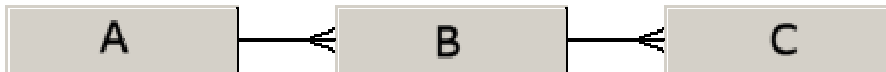
 Demonstration – Fan Trap Resolution with Aliases and Contexts

## [ Fan Trap Solutions Still Has Problems

- Conditions on the child table (ITEM) will only impact one half of the query
- The header measures will be summarized without taking the item condition into consideration
- One solution (used in Summit Sporting Goods) is to only retrieve measures from the most detailed table
  - Order header “Total” is calculated by summing up the line item extended amounts
  - The aggregate awareness option could be used to switch between the two measures

## [ Fan Trap Summary

- Assume tables A, B, and C as follows



- No fan trap if:
  - Dimensions from A, B, C, measures from C only
- Simple fan trap if:
  - Dimensions from A, measures from B, C, solved with universe parameter
  - Dimensions from A, B, measures from B, C, solved with universe parameter
- Fan trap
  - Dimensions from A, B, C, measures from B, C

## [ Essential Universe Steps – Revised

1. Establish connection (done only once in XI 3.1 or earlier)
  2. Insert tables
  3. Add joins
    1. Set join cardinality
    2. Check for SQL traps (Fan, Chasm, Loop) as resolve them
  4. Add classes and objects
  5. Test! Test! Test!
- Steps 2, 3, 4, and 5 may be repeated as often as needed

# [ Where Do We Go From Here?

- Performance tuning
  - Aggregate awareness
  - Index awareness
  - Shortcut joins
- Improve user experience
  - Create common prompts in the universe
  - Customize list of values (LOV) queries where appropriate
  - Add system date based objects to help with scheduled reports
    - Today, Start of Last Week, End of Last Week, ...
- Ease of maintenance
  - Use of @Select() where appropriate



## [ Final Summit Sporting Goods Universe

- Connection built to the database
- All fan and chasm traps are resolved
- Appropriate classes and objects have been created
- Performance improvements
  - Aggregate awareness on order total amount
  - Index awareness on appropriate dimensions

## [ Wrap Up

- A universe does not provide a single SQL statement
- A universe should provide a framework for all possible SQL statements
- Most important goal for a universe designer is to provide the correct answer

## [ Further Reading

- I have a number of Designer technique posts already on my BI Blog
  - [www.dagira.com](http://www.dagira.com)
- Past conference presentations are also available
  - Tales of a Universe Ninja, Parts I and II
  - ZEN and the ART of Universe Design
  - [www.dagira.com/conference-presentations/](http://www.dagira.com/conference-presentations/)
- Tweet me
  - [http://twitter.com/dagira\\_tweets](http://twitter.com/dagira_tweets)

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