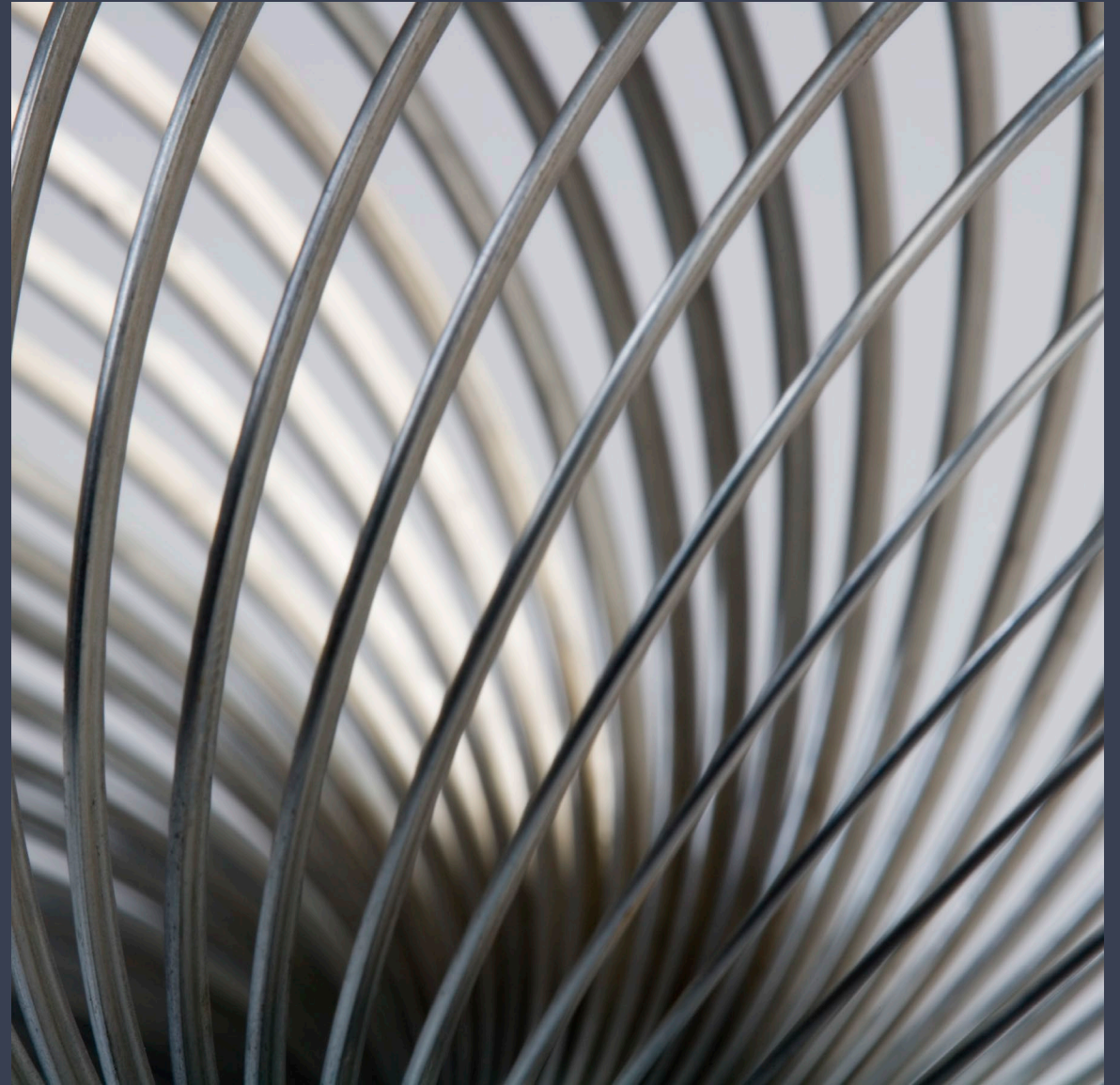


NUGM 2024

BUILDING AN INTELLIGENT SCHEMA

Schema designed to present
Business Data in SQL as a
preparation for analysis and
Business Intelligence

Trey Miller, NovoRoi Systems, LLC



THE PROBLEM OF UNIDATA

Data is multi-valued.

Those curly braces are the ascii character that separates multi-valued data throughout the database.

Sales_Due_Date 10-04-17}10-11-17}10-13-17}10-14-17}10-17-17
}10-18-17}10-20-17}10-21-17}11-06-17}11-07-17}11-14-17
}11-15-17}11-16-17}11-17-17}11-20-17}11-21-17}12-08-17

Sales_Qty 3}1}161}20}20}20}100}30}50}40}185}25}25}25}100}35}55

For purposes of illustration, consider UniData to organize data horizontally.



THE PROBLEM OF UNIDATA

SQL Server, and most of the rest of the world, organizes data into tables of columns and rows.

Multiple data elements are separated into vertical rows.

Vertical vs. Horizontal
Seems simple enough?

Sales Order Due Date	Sales Order Quantity
10-04-17	3
10-11-17	1
10-13-17	161
10-14-17	20
10-17-17	20
10-18-17	20
10-20-17	100
10-21-17	30
11-06-17	50
11-07-17	40
11-14-17	185
11-15-17	25
11-16-17	25



UNIDATA IS EXCEPTIONALLY FORGIVING

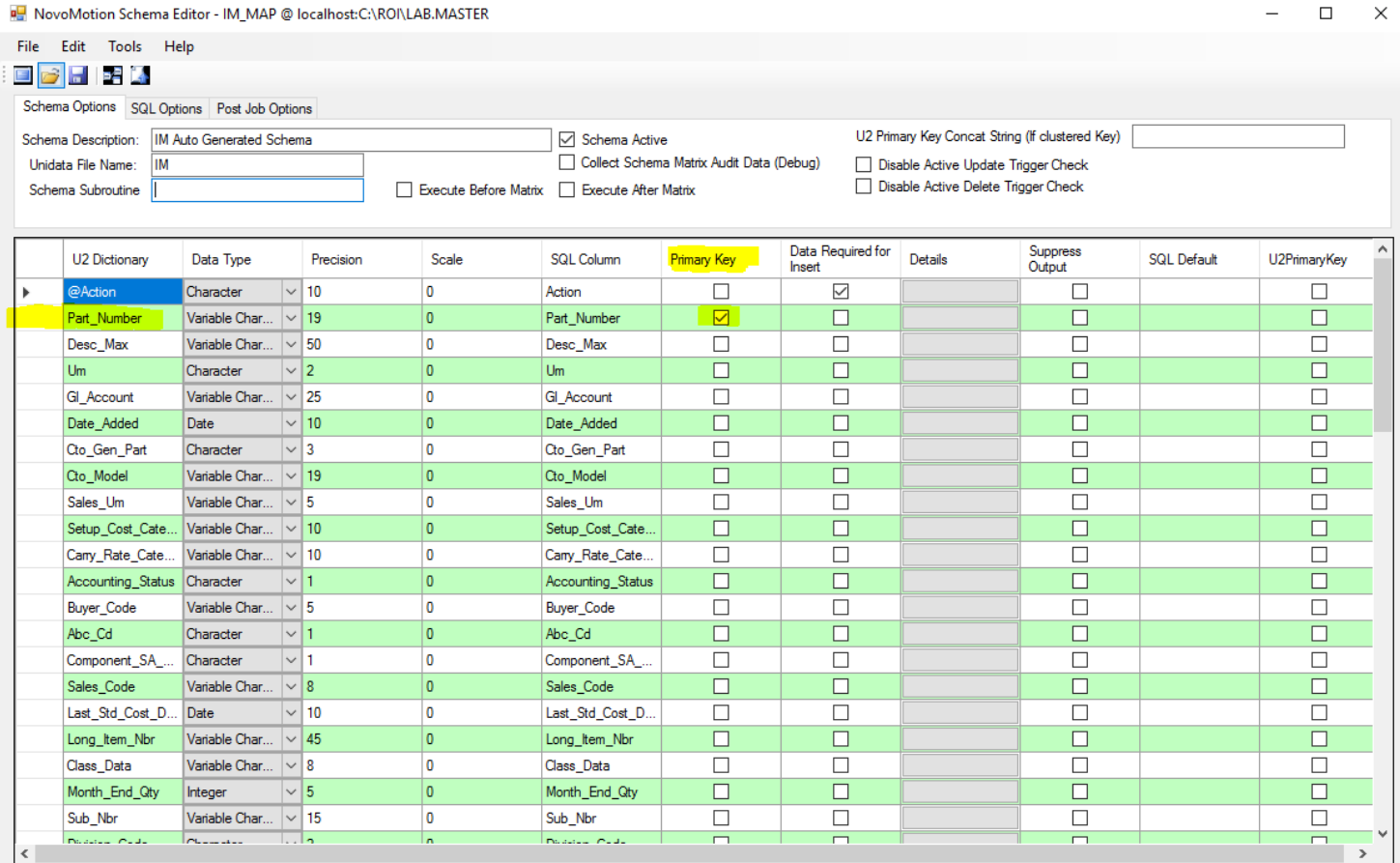
- The UniData database defines its data elements by Dictionary definition. All databases have some means of organizing the meta-data (data about data) that describes their basic building block. For UniData, this important job falls to the data Dictionary; HOWEVER, where other databases establish meta data as hard and fast rules (what type of data, how many characters long, what are the data associations), UniData treats its own Dictionary definitions as more of a *wish* than a *rule*.
- The other basic problem with UniData's forgiving nature specifically involves the data associations between its multivalued sets. Where a rigid, strongly-typed, database like SQL is completely unforgiving to data-type violations—if you say it's a Date, it better be a Date—another major conflict arises in that SQL server is a hierarchical database such that multi-valued data is organized in columns and rows, and must be associated to other multi-values which have the same number of columns and rows. The data might be “null”, but there still needs to be a meta-data place holder to determine that the associated null valued is in the proper column, in the proper row.
- This mapping of horizontal UniData data to the columns and rows of SQL is called data normalization.



NOVOMOTION IS THE NORMALIZATION SYSTEM BETWEEN UNIDATA AND SQL

The Attributes of UniData are mapped to the Columns of SQL.

The most important element to determine multi-valued association is the Primary Key (PK).



The screenshot shows the NovoMotion Schema Editor window. The title bar reads "NovoMotion Schema Editor - IM_MAP @ localhost:C:\ROI\LAB.MASTER". The interface includes a menu bar (File, Edit, Tools, Help) and several tabs (Schema Options, SQL Options, Post Job Options). Below the tabs, there are input fields for "Schema Description" (IM Auto Generated Schema), "Unidata File Name" (IM), and "Schema Subroutine". There are also several checkboxes for options like "Schema Active", "Collect Schema Matrix Audit Data (Debug)", "Execute Before Matrix", "Execute After Matrix", "U2 Primary Key Concat String (if clustered Key)", "Disable Active Update Trigger Check", and "Disable Active Delete Trigger Check".

The main part of the window is a table with the following columns: U2 Dictionary, Data Type, Precision, Scale, SQL Column, Primary Key, Data Required for Insert, Details, Suppress Output, SQL Default, and U2PrimaryKey. The "Part_Number" row is highlighted in yellow, and its "Primary Key" checkbox is checked.

U2 Dictionary	Data Type	Precision	Scale	SQL Column	Primary Key	Data Required for Insert	Details	Suppress Output	SQL Default	U2PrimaryKey
@Action	Character	10	0	Action	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Part_Number	Variable Char...	19	0	Part_Number	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Desc_Max	Variable Char...	50	0	Desc_Max	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Um	Character	2	0	Um	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Gl_Account	Variable Char...	25	0	Gl_Account	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Date_Added	Date	10	0	Date_Added	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Cto_Gen_Part	Character	3	0	Cto_Gen_Part	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Cto_Model	Variable Char...	19	0	Cto_Model	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sales_Um	Variable Char...	5	0	Sales_Um	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Setup_Cost_Cate...	Variable Char...	10	0	Setup_Cost_Cate...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Carry_Rate_Cate...	Variable Char...	10	0	Carry_Rate_Cate...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Accounting_Status	Character	1	0	Accounting_Status	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Buyer_Code	Variable Char...	5	0	Buyer_Code	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Abc_Cd	Character	1	0	Abc_Cd	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Component_SA_...	Character	1	0	Component_SA_...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sales_Code	Variable Char...	8	0	Sales_Code	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Last_Std_Cost_D...	Date	10	0	Last_Std_Cost_D...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Long_Item_Nbr	Variable Char...	45	0	Long_Item_Nbr	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Class_Data	Variable Char...	8	0	Class_Data	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Month_End_Qty	Integer	5	0	Month_End_Qty	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sub_Nbr	Variable Char...	15	0	Sub_Nbr	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Schema Record Loaded



SINGLE VALUED DATA IS EASY TO MAP

In this example a Primary Key (PK) will only ever have one of these UniData elements and so the resulting table equates perfectly to SQL columns.

Each PK will be a row, each U2 dictionary will be a column.

The screenshot shows the NovoMotion Schema Editor interface. The main window displays a table mapping U2 Dictionary elements to SQL columns. The table has columns for U2 Dictionary, Data Type, Precision, Scale, SQL Column, Primary Key, Data Required for Insert, Details, Suppress Output, SQL Default, and U2PrimaryKey. The U2 Dictionary column is highlighted in yellow, and the SQL Column column is also highlighted in yellow. The Primary Key column has a checkmark in the first row, indicating that the @Action dictionary element is the primary key for the SQL table.

U2 Dictionary	Data Type	Precision	Scale	SQL Column	Primary Key	Data Required for Insert	Details	Suppress Output	SQL Default	U2PrimaryKey
@Action	Character	10	0	Action	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Part_Number	Variable Char...	19	0	Part_Number	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Desc_Max	Variable Char...	50	0	Desc_Max	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Um	Character	2	0	Um	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Gl_Account	Variable Char...	25	0	Gl_Account	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Date_Added	Date	10	0	Date_Added	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Cto_Gen_Part	Character	3	0	Cto_Gen_Part	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Cto_Model	Variable Char...	19	0	Cto_Model	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sales_Um	Variable Char...	5	0	Sales_Um	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Setup_Cost_Cate...	Variable Char...	10	0	Setup_Cost_Cate...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Carry_Rate_Cate...	Variable Char...	10	0	Carry_Rate_Cate...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Accounting_Status	Character	1	0	Accounting_Status	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Buyer_Code	Variable Char...	5	0	Buyer_Code	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Abc_Cd	Character	1	0	Abc_Cd	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Component_SA_...	Character	1	0	Component_SA_...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sales_Code	Variable Char...	8	0	Sales_Code	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Last_Std_Cost_D...	Date	10	0	Last_Std_Cost_D...	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Long_Item_Nbr	Variable Char...	45	0	Long_Item_Nbr	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Class_Data	Variable Char...	8	0	Class_Data	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Month_End_Qty	Integer	5	0	Month_End_Qty	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Sub_Nbr	Variable Char...	15	0	Sub_Nbr	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

DICT.INQ IS THE M2K TOOL FOR INVESTIGATING DATA

This is a DICT.INQ listing of sets for the IPL file. Sets are another way of saying 'associated multi-values'. The IPL is a difficult file to normalize. Our Open_So_Data is easy to normalize. Some of the other data sets are not.

DICT.INQ 16:37 CDT Fri May 17 2024 Epicor Software Corporation Sys M2K81SP2 Acct roi:MANAGE-2000.8.1
IPL (Inventory Planning) Data Sets

Set Name	Description	Attr	Controlling Item	Attr	Component Dictionary Items
Open_Po_Data	Open PO data for MRP	22	Purch_Due_Date	I-desc	POD_Nbr Purch_Order_Nbr 22 Pur_Due_Date 23 Purch_Qty 24 Po_Ln_Dlv 271 Purch_Del_Time 272 Purch_Del_Time_Qty 277 Purch_Del_Ref_Nbr
Open_Reqmnt_Data	The requirement data for MRP	28	Reqmnt_Due_Date	29	Reqmnt_Qty 30 Reqmnt_Ref 120 Req_Source 268 Reqmnt_Time_Due
Open_Reqn_Data	Open requisition detail information	64	Reqn_Dates	65	Open_Reqn_Qtys 66 Reqn_Det_Keys 193 Prqn_Flg 194 Prqn_Source 260 Reqn_Vendor 273 Reqn_Del_Time 274 Reqn_Del_Time_Qty
Open_So_Data	Sales order data for MRP	19	Sales_Due_Date	20	Sales_Qty
Open_Wo_Data	Open work order data for MRP	25	Work_Due_Date	25	Wrk_Due_Date 26 Work_Qty

Complete Rows 71-97 of 176



PREPARE YOUR SQL REPOSITORY

The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the server hierarchy for 'localhost\HEMLABSQ17 (SQL Server 14.0.2052.1 - sa)'. The 'Planning_Data' database is highlighted in yellow. The ODBC Data Source Administrator (64-bit) dialog box is open, showing the 'System DSN' tab. The 'System Data Sources' table lists three entries: 'HEM', 'LAB_DATA', and 'Planning_Data'. The 'Planning_Data' entry is highlighted in yellow. The dialog box also includes buttons for 'Add...', 'Remove', and 'Configure...'. At the bottom of the dialog box, there is a text box explaining that an ODBC System data source stores information about how to connect to the indicated data provider and is visible to all users of this computer, including NT services. The 'OK' button is highlighted in blue.

Microsoft SQL Server Management Studio

File Edit View Debug Tools Window Help

Object Explorer

Connect

localhost\HEMLABSQ17 (SQL Server 14.0.2052.1 - sa)

- Databases
 - System Databases
 - Database Snapshots
 - DWConfiguration
 - DWDiagnostics
 - DWQueue
 - HEM
 - LAB_DATA
 - NOVONEXUSLAB
 - SF_MAIN_GoodMinMin
 - SF_MAIN_May8
 - SF_MAIN_Testing
 - SWPDM_WCCOM2K
 - Planning_Data**
- Security
- Server Objects
- Replication
- PolyBase
- Always On High Availability
- Management
- Integration Services Catalogs
- SQL Server Agent
- XEvent Profiler

ODBC Data Source Administrator (64-bit)

User DSN System DSN File DSN Drivers Tracing Connection Pooling About

System Data Sources:

Name	Platform	Driver
HEM	64-bit	SQL Server Native Client 11.0
LAB_DATA	64-bit	SQL Server
Planning_Data	64-bit	SQL Server Native Client 11.0

Add...
Remove
Configure...

An ODBC System data source stores information about how to connect to the indicated data provider. A System data source is visible to all users of this computer, including NT services.

OK Cancel Apply Help



NOVO.GEN.SCHEMA - GENERATE YOUR SCHEMA

localhost - roi:LAB.MASTER - Manage 2000 - ROI Systems, Inc.

File Edit Commands Scripts Tools ProcessOpts Help

Generate NovoMotion Outbound Schema records

01 UniData File name	IPL Inventory Planning		
02 Schema Name	IPL	13 MySQL	
03 Starting Dict	0	04 Ending Dict	274
05 Generate Set Schema	Y	06 Set Prefix	
07 Include full Sets	Y	08 Include Action	Y
		09 Include Multi	Y

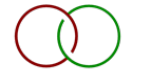
10 Function Names	.01)		^	Entries	0
11 Function Module	.01)		^	Entries	0

	12 Additional Dicts	Entries	2
.01)	POD_Nbr		
.02)	Purch_Order_Nbr		
.03)			
.04)			
.05)			
.06)			
.07)			
.08)			
.09)			
.10)			

Change Which Field, END, TOP, \P |.....

0 Ins

User roi:LAB.MASTER, PID 0010 on localhost



NOVOMOTION DIALOGUE – VIEW YOUR RESULTS

Select Schema

Filter

	SchemalD	Description	Status	U2FileName	SQLFileName	DSN	Bulk Gen
▶	IPL	IPL Auto Generated Schema	INACTIVE	IPL	dbo.IPL		<input type="checkbox"/>
	IPL_Asset_Type_Data	IPL Asset_Type_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Asset_Type_Data		<input type="checkbox"/>
	IPL_Blanket_Info	IPL Blanket_Info Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Blanket_Info		<input type="checkbox"/>
	IPL_Container_Data	IPL Container_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Container_Data		<input type="checkbox"/>
	IPL_Line_Info	IPL Line_Info Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Line_Info		<input type="checkbox"/>
	IPL_Location_Data	IPL Location_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Location_Data		<input type="checkbox"/>
	IPL_Lt_Bq_Info	IPL Lt_Bq_Info Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Lt_Bq_Info		<input type="checkbox"/>
	IPL_Mps_Data	IPL Mps_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Mps_Data		<input type="checkbox"/>
	IPL_Mps_Period_Data	IPL Mps_Period_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Mps_Period_Data		<input type="checkbox"/>
	IPL_Mto_In_Ref_Data	IPL Mto_In_Ref_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Mto_In_Ref_Data		<input type="checkbox"/>
	IPL_Mto_Out_Ref_Data	IPL Mto_Out_Ref_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Mto_Out_Ref_Data		<input type="checkbox"/>
	IPL_Open_Po_Data	IPL Open_Po_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Open_Po_Data		<input type="checkbox"/>
	IPL_Open_Reqmnt_Data	IPL Open_Reqmnt_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Open_Reqmnt_Data		<input type="checkbox"/>
	IPL_Open_Reqn_Data	IPL Open_Reqn_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Open_Reqn_Data		<input type="checkbox"/>
	IPL_Open_So_Data	IPL Open_So_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Open_So_Data		<input type="checkbox"/>
	IPL_Open_Wo_Data	IPL Open_Wo_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Open_Wo_Data		<input type="checkbox"/>
	IPL_Parts_List_Data	IPL Parts_List_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Parts_List_Data		<input type="checkbox"/>
	IPL_Phantom_Sales_Data	IPL Phantom_Sales_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Phantom_Sales_Data		<input type="checkbox"/>
	IPL_Planned_Order_Data	IPL Planned_Order_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Planned_Order_Data		<input type="checkbox"/>
	IPL_Planned_Po_Data	IPL Planned_Po_Data Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Planned_Po_Data		<input type="checkbox"/>
	IPL_Reservations	IPL Reservations Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Reservations		<input type="checkbox"/>
	IPL_Usage_History	IPL Usage_History Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Usage_History		<input type="checkbox"/>
	IPL_Vendor_Info	IPL Vendor_Info Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Vendor_Info		<input type="checkbox"/>
	IPL_Years_Usage_History	IPL Years_Usage_History Auto Generated Schema	INACTIVE	IPL	dbo.IPL_Years_Usage_History		<input type="checkbox"/>

OK Cancel Delete Bulk Gen Toggle Bulk Select

Ready



NOVOMOTION INVESTIGATE PRIMARY KEY CLUSTER

- Activate the schema
- Note ID1, ID2, . . . etc.
- Alter Primary ID to facilitate joins
- Remove redundant lines
- Save your results

The screenshot shows the NovoMotion Schema Editor window. The title bar reads "NovoMotion Schema Editor - IPL_Open_So_Data @ localhost:C:\ROI\LAB.MASTER". The menu bar includes "File", "Edit", "Tools", and "Help". Below the menu bar are icons for various functions. The main interface is divided into sections for "Schema Options", "SQL Options", and "Post Job Options".

Under "Schema Options", the "Schema Description" is "IPL Open_So_Data Auto Generated Schema". The "Schema Active" checkbox is checked. Other options include "Unidata File Name" (IPL), "Schema Subroutine", "Execute Before Matrix", "Execute After Matrix", "Collect Schema Matrix Audit Data (Debug)", "Disable Active Update Trigger Check", and "Disable Active Delete Trigger Check".

The main table displays the following data:

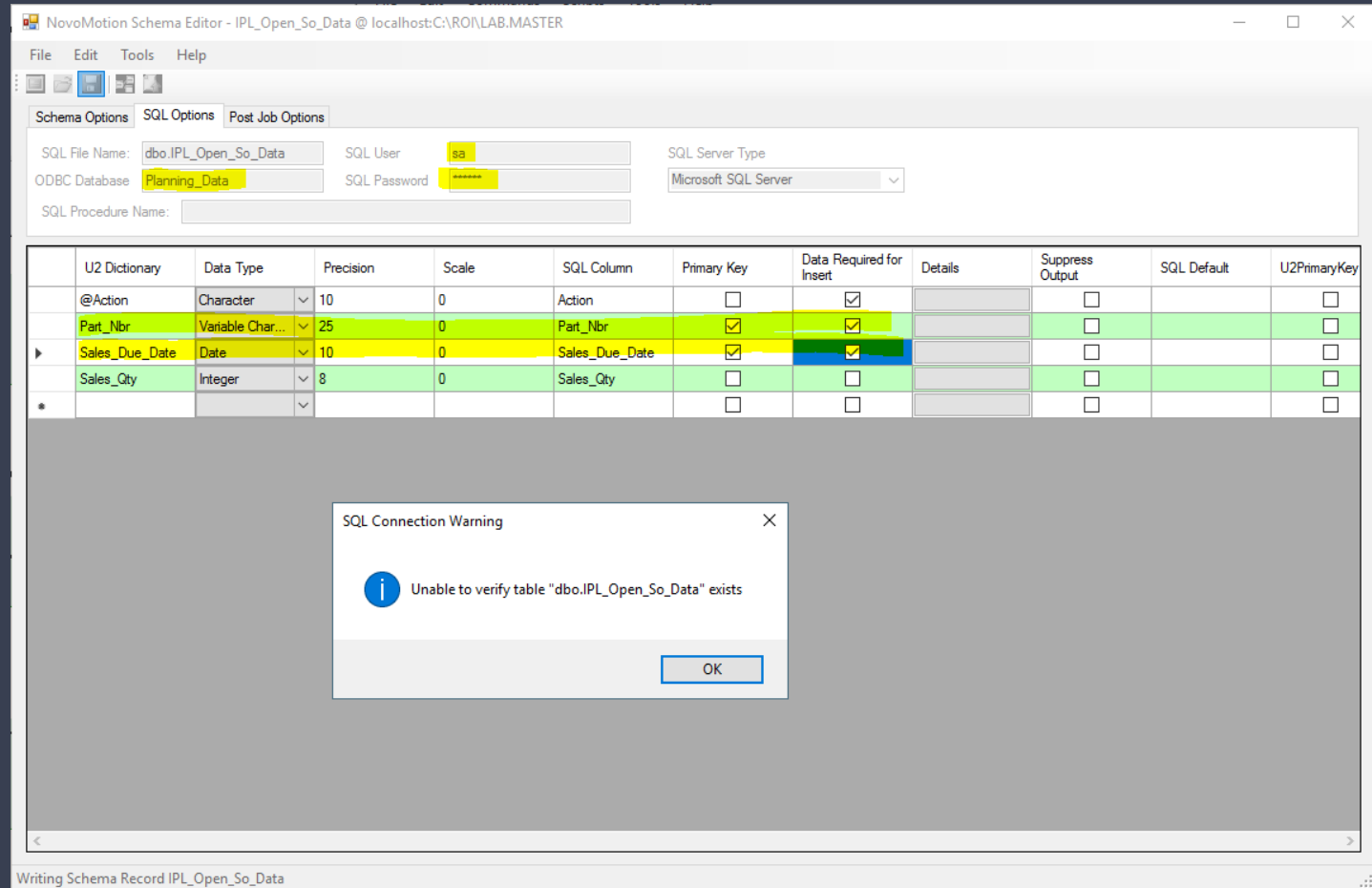
	U2 Dictionary	Data Type	Precision	Scale	SQL Column	Primary Key	Data Required for Insert	Details	Suppress Output	SQL Default	U2PrimaryKey
▶	@Action	Character	10	0	Action	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	ID	Variable Char...	25	0	ID1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	Sales_Due_Date	Variable Char...	25	0	ID2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	Sales_Due_Date	Date	10	0	Sales_Due_Date	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
	Sales_Qty	Integer	8	0	Sales_Qty	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
*						<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

At the bottom of the window, the status bar indicates "Schema Record Loaded".

NOVOMOTION ENTER THE ODBC CREDENTIALS ESTABLISHED FOR THE DATABASE

The credentials are correct if you get the 'Unable to verify table', message.

This means that the NovoMotion system was able to navigate the ODBC pipe and could not find the database object by that name.



NOVOMOTION - GENERATE TABLES AND PROCEDURE

```
Generate SQL
Copy to Clipboard Execute on SQL Server
 Generate Primary Table  Generate Procedure
1 ----- BEGIN for Table [dbo].[IPL_Open_So_Data]-----
2 SET ANSI_NULLS ON
3 GO
4 SET QUOTED_IDENTIFIER ON
5 GO
6 if exists (select * from sysobjects where id = object_id('[dbo].[IPL_Open_So_Data]') and OBJECTPROPERTY(id, N'IsUserTable') = 1)
7 DROP TABLE [dbo].[IPL_Open_So_Data]
8 GO
9 CREATE TABLE [dbo].[IPL_Open_So_Data] (
10 [Part_Nbr] [varchar] (25) NOT NULL,
11 [Sales_Due_Date] [smalldatetime] NOT NULL,
12 [Sales_Qty] [int] NULL
13 ) ON [PRIMARY]
14 GO
15 ALTER TABLE [dbo].[IPL_Open_So_Data] WITH NOCHECK ADD
16 CONSTRAINT [PK_IPL_Open_So_Data] PRIMARY KEY CLUSTERED
17 (
18 [Part_Nbr],
19 [Sales_Due_Date]
20 ) ON [PRIMARY]
21 GO
22 ----- BEGIN Stored Procedure Code for Table [dbo].[IPL_Open_So_Data]-----
23 if exists (select * from sysobjects where id = object_id('[dbo].[sp_novosys_rx_IPL_Open_So_Data]'))
24 DROP PROCEDURE [dbo].[sp_novosys_rx_IPL_Open_So_Data]
25 GO
26 CREATE PROCEDURE [dbo].[sp_novosys_rx_IPL_Open_So_Data]
27     @ActionFlag [char] (10),
28     @Part_Nbr [varchar] (25),
29     @Sales_Due_Date [smalldatetime],
30     @Sales_Qty [int]
31 AS
32 SET XACT_ABORT, NOCOUNT ON
33 BEGIN TRY
34     IF UPPER(@ActionFlag) = 'C'
35     BEGIN
36         IF exists(select Part_Nbr FROM [dbo].[IPL_Open_So_Data] WHERE Part_Nbr = @Part_Nbr AND Sales_Due_Date = @Sales_Due_Date)
37         BEGIN
38             UPDATE [dbo].[IPL_Open_So_Data]
```



NOVOMOTION TABLE HAS BEEN GENERATED WITH THE PROPER PRIMARY KEYS

Of the three columns in this multi-valued data set, two of the three are the Primary Key designation. This is critical to ensuring the important concept of uniqueness in the SQL data table. The third element is the data, which is not likely to be unique.

The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the 'Planning_Data' database structure, with the 'dbo.IPL_Open_So_Data' table and its columns highlighted. The main query window shows the following SQL query:

```
SELECT TOP (1000) [Part_Nbr]
, [Sales_Due_Date]
, [Sales_Qty]
FROM [Planning_Data].[dbo].[IPL_Open_So_Data]
```

The Results pane at the bottom shows the following columns: Part_Nbr, Sales_Due_Date, and Sales_Qty. A status bar at the bottom indicates 'Query executed successfully.' and '0 rows'.



NOVOMOTION LAUNCH FILE LOADER TO INITIALIZE DATA

Selection Criteria must follow UniData syntax rules and the proper upper and lower case of the Dictionaries must be utilized in order to get good selection results.

The screenshot displays Microsoft SQL Server Management Studio (SSMS) with the following components:

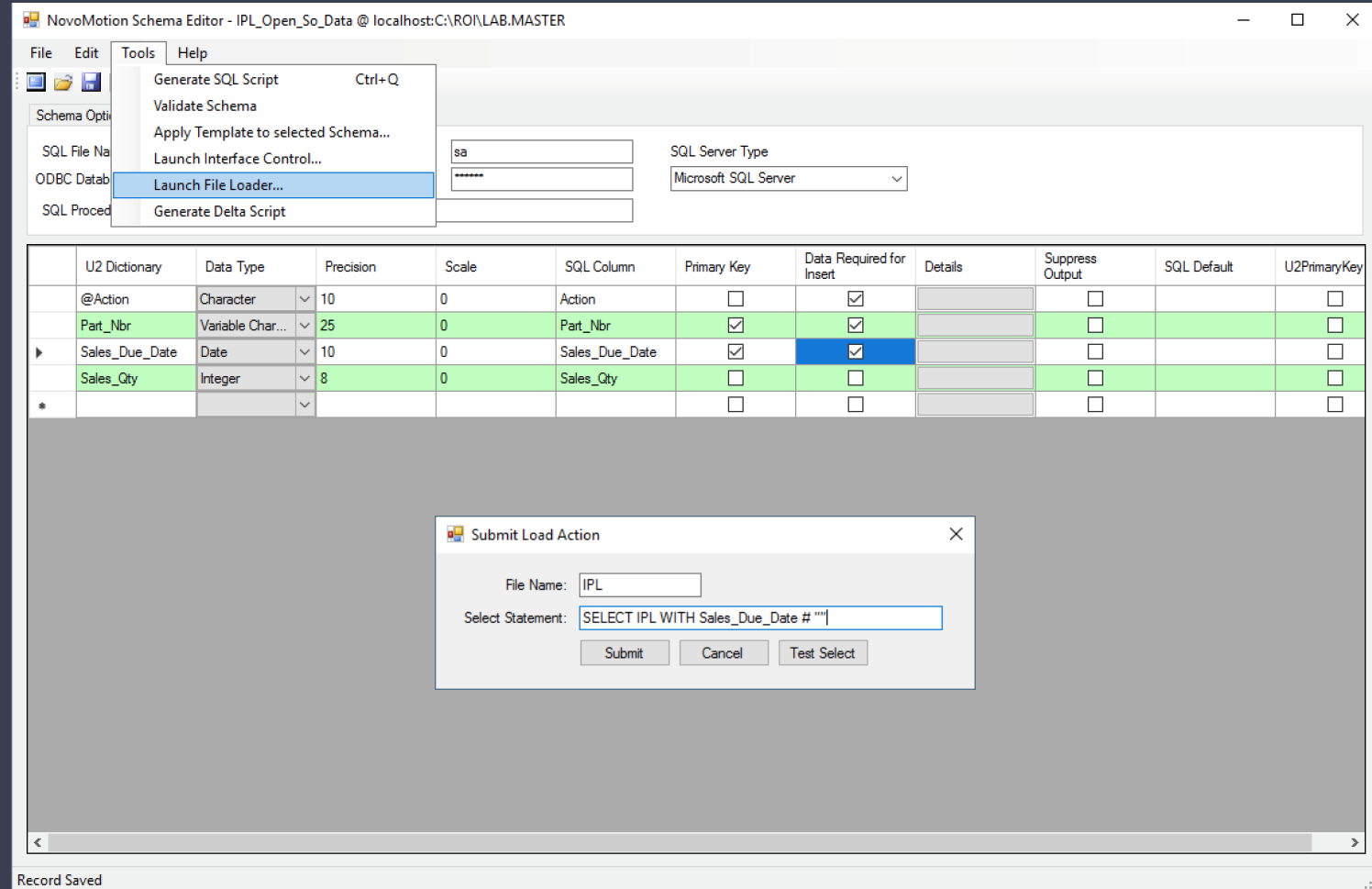
- Object Explorer:** Shows the server hierarchy for 'localhost\HEMLABSQ17 (SQL Server 14.0.2052.1 - sa)'. The 'Planning_Data' database is expanded, showing 'dbo.IPL_Open_So_Data' with columns: Part_Nbr (PK, varchar(25), not null), Sales_Due_Date (PK, smalldatetime, not null), and Sales_Qty (int, null). A primary key 'PK_IPL_Open_So_Data' is also visible.
- SQL Query Window:** Contains the following T-SQL script:

```
/****** Script for SelectTopNRows command from SSMS *****/  
SELECT TOP (1000) [Part_Nbr]  
    ,[Sales_Due_Date]  
    ,[Sales_Qty]  
FROM [Planning_Data].[dbo].[IPL_Open_So_Data]
```
- Results Window:** Shows a single row of data with the following columns: Part_Nbr, Sales_Due_Date, Sales_Qty.
- Status Bar:** Indicates 'Query executed successfully.' with a green checkmark icon. Additional information includes 'localhost\HEMLABSQ17 (14.0...', 'sa (60)', 'Planning_Data', '00:00:00', and '0 rows'.



NOVOMOTION LAUNCH FILE LOADER TO INITIALIZE DATA

Selection Criteria must follow UniData syntax rules and the proper upper and lower case of the Dictionaries must be utilized in order to get good selection results.



NOVOMOTION BACK TO SQL MANAGEMENT STUDIO

The Data is presented in the
promised rows and columns.

Notice that the primary key cluster
was necessary to separate the multi-
valued data into the proper row
structures.

The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the server structure, with the 'Planning_Data' database selected. The query editor on the right contains the following SQL script:

```
/****** Script for SelectTopNRows command from SSMS *****/  
SELECT TOP (1000) [Part_Nbr]  
    , [Sales_Due_Date]  
    , [Sales_Qty]  
FROM [Planning_Data].[dbo].[IPL_Open_So_Data]
```

The Results pane shows the following data:

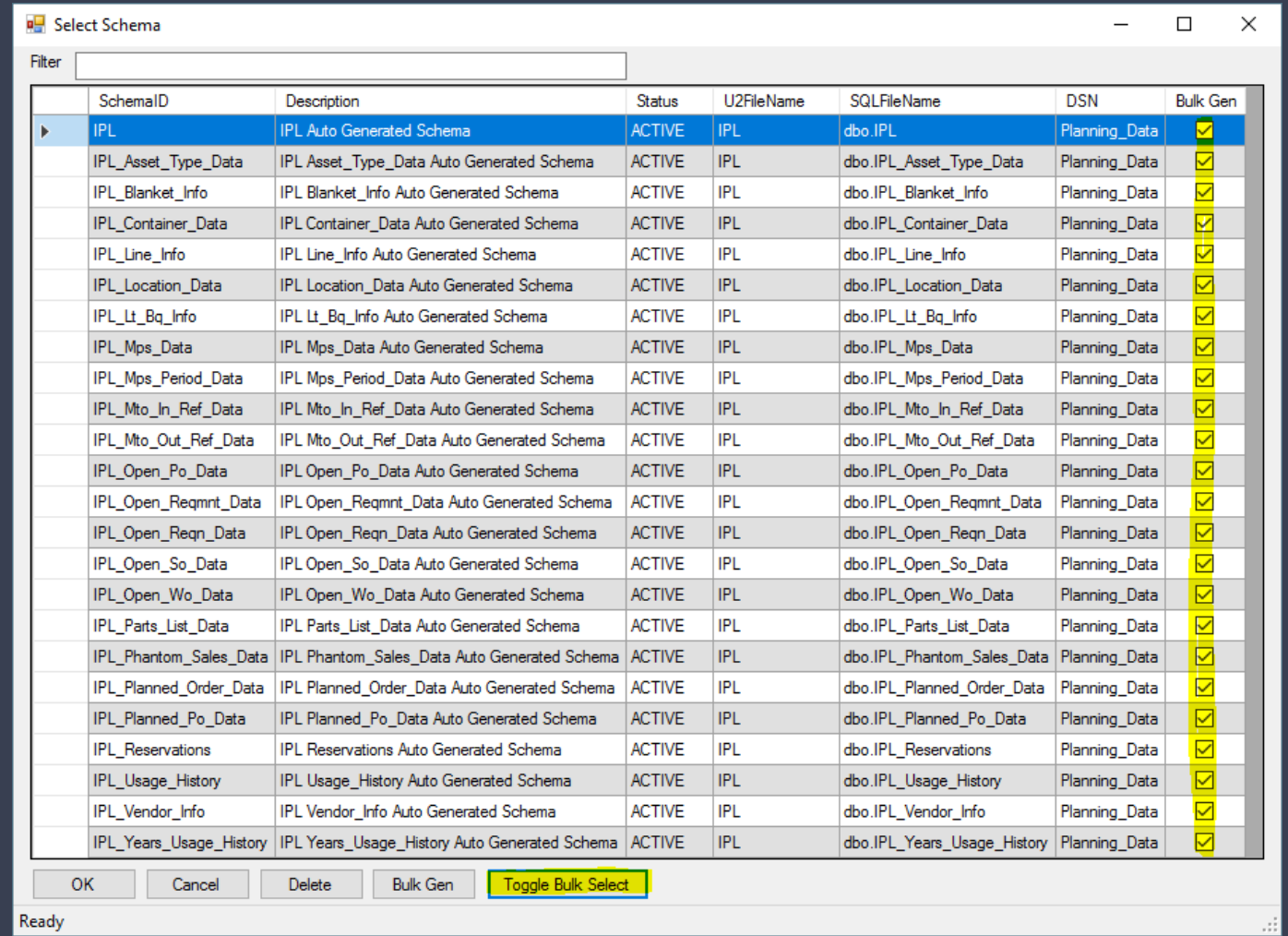
	Part_Nbr	Sales_Due_Date	Sales_Qty
1	100 01	1994-10-02 00:00:00	73
2	100 01	1994-10-04 00:00:00	1
3	100 01	1994-10-10 00:00:00	1
4	100 01	1994-10-11 00:00:00	100
5	100 01	1994-10-12 00:00:00	1
6	100 01	1994-10-13 00:00:00	550
7	100 01	1994-10-14 00:00:00	100
8	100 01	1994-10-17 00:00:00	150
9	100 01	1994-10-18 00:00:00	10
10	100 01	1994-10-19 00:00:00	25
11	100 01	1994-10-20 00:00:00	200
12	100 01	1994-10-21 00:00:00	125
13	100 01	1994-11-06 00:00:00	105
14	100 01	1994-11-07 00:00:00	185
15	100 01	1994-11-10 00:00:00	110
16	100 01	1994-11-14 00:00:00	440
17	100 01	1994-11-15 00:00:00	101
18	100 01	1994-11-16 00:00:00	266

The status bar at the bottom indicates: Query executed successfully... | localhost\HEMLABSQ17 (14.0... | sa (60) | Planning_Data | 00:00:00 | 297 rows



NOVOMOTION THE SCHEMA DIALOGUE BOX DISPLAYS ACTIVE SCHEMA

The important activity that has occurred on our single test schema is that it has been investigated and altered from the auto generated state. The “intelligence” was provided by a database designer following naming convention, with specific design intentions.



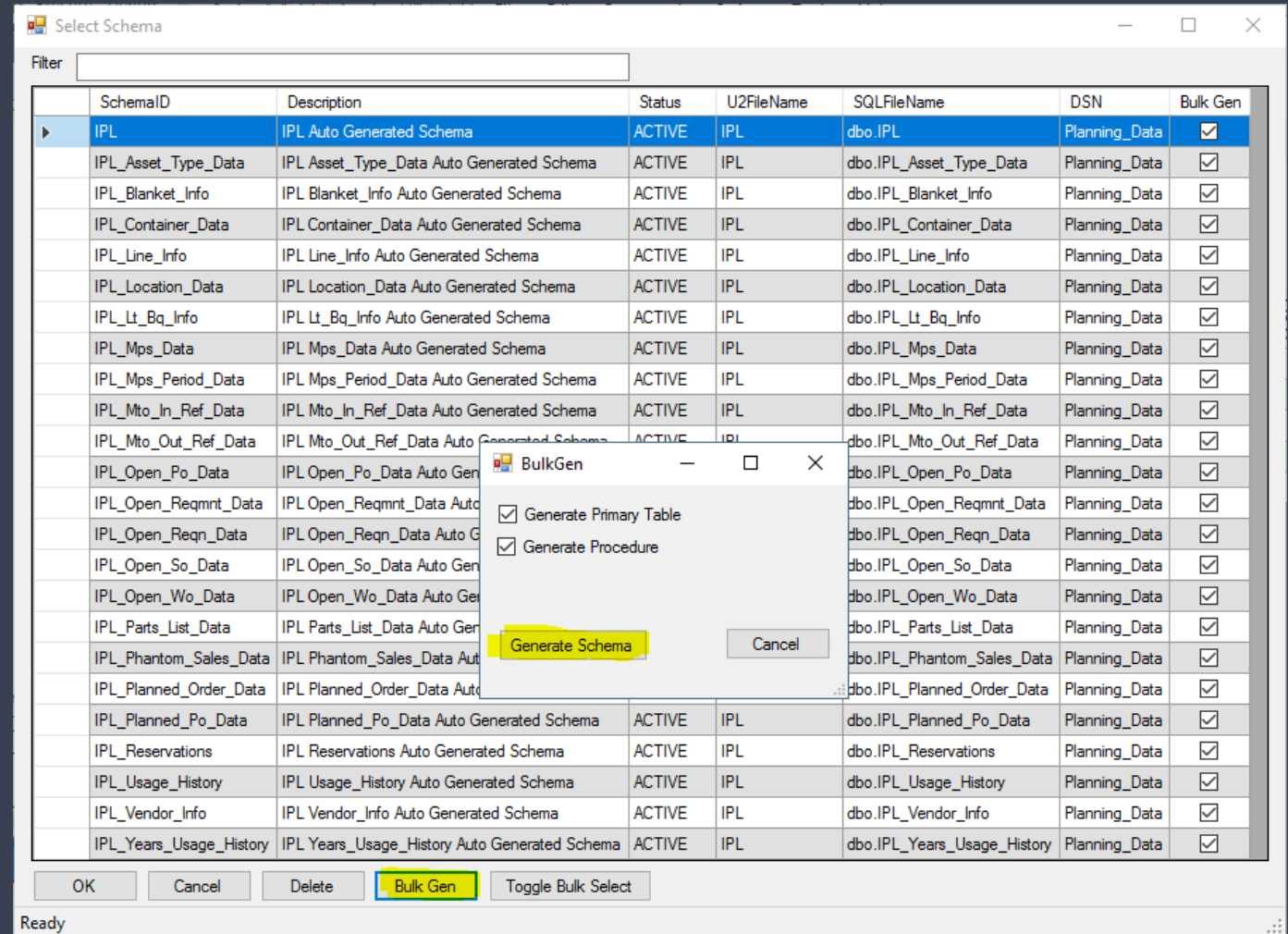
The screenshot shows a 'Select Schema' dialog box with a table of schemas. The table has columns for SchemaID, Description, Status, U2FileName, SQLFileName, DSN, and Bulk Gen. The 'IPL' schema is selected, and all schemas listed are in an 'ACTIVE' state. The 'Bulk Gen' column contains checkmarks for all schemas.

SchemaID	Description	Status	U2FileName	SQLFileName	DSN	Bulk Gen
IPL	IPL Auto Generated Schema	ACTIVE	IPL	dbo.IPL	Planning_Data	<input checked="" type="checkbox"/>
IPL_Asset_Type_Data	IPL Asset_Type_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Asset_Type_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Blanket_Info	IPL Blanket_Info Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Blanket_Info	Planning_Data	<input checked="" type="checkbox"/>
IPL_Container_Data	IPL Container_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Container_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Line_Info	IPL Line_Info Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Line_Info	Planning_Data	<input checked="" type="checkbox"/>
IPL_Location_Data	IPL Location_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Location_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Lt_Bq_Info	IPL Lt_Bq_Info Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Lt_Bq_Info	Planning_Data	<input checked="" type="checkbox"/>
IPL_Mps_Data	IPL Mps_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Mps_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Mps_Period_Data	IPL Mps_Period_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Mps_Period_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Mto_In_Ref_Data	IPL Mto_In_Ref_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Mto_In_Ref_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Mto_Out_Ref_Data	IPL Mto_Out_Ref_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Mto_Out_Ref_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Open_Po_Data	IPL Open_Po_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Open_Po_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Open_Reqmnt_Data	IPL Open_Reqmnt_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Open_Reqmnt_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Open_Reqn_Data	IPL Open_Reqn_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Open_Reqn_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Open_So_Data	IPL Open_So_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Open_So_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Open_Wo_Data	IPL Open_Wo_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Open_Wo_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Parts_List_Data	IPL Parts_List_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Parts_List_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Phantom_Sales_Data	IPL Phantom_Sales_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Phantom_Sales_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Planned_Order_Data	IPL Planned_Order_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Planned_Order_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Planned_Po_Data	IPL Planned_Po_Data Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Planned_Po_Data	Planning_Data	<input checked="" type="checkbox"/>
IPL_Reservations	IPL Reservations Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Reservations	Planning_Data	<input checked="" type="checkbox"/>
IPL_Usage_History	IPL Usage_History Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Usage_History	Planning_Data	<input checked="" type="checkbox"/>
IPL_Vendor_Info	IPL Vendor_Info Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Vendor_Info	Planning_Data	<input checked="" type="checkbox"/>
IPL_Years_Usage_History	IPL Years_Usage_History Auto Generated Schema	ACTIVE	IPL	dbo.IPL_Years_Usage_History	Planning_Data	<input checked="" type="checkbox"/>

NOVOMOTION THE SCHEMA BULK TABLE AND PROCEDURE SCRIPT

This process will only work on ACTIVE schema, regardless of being tagged for bulk generation.

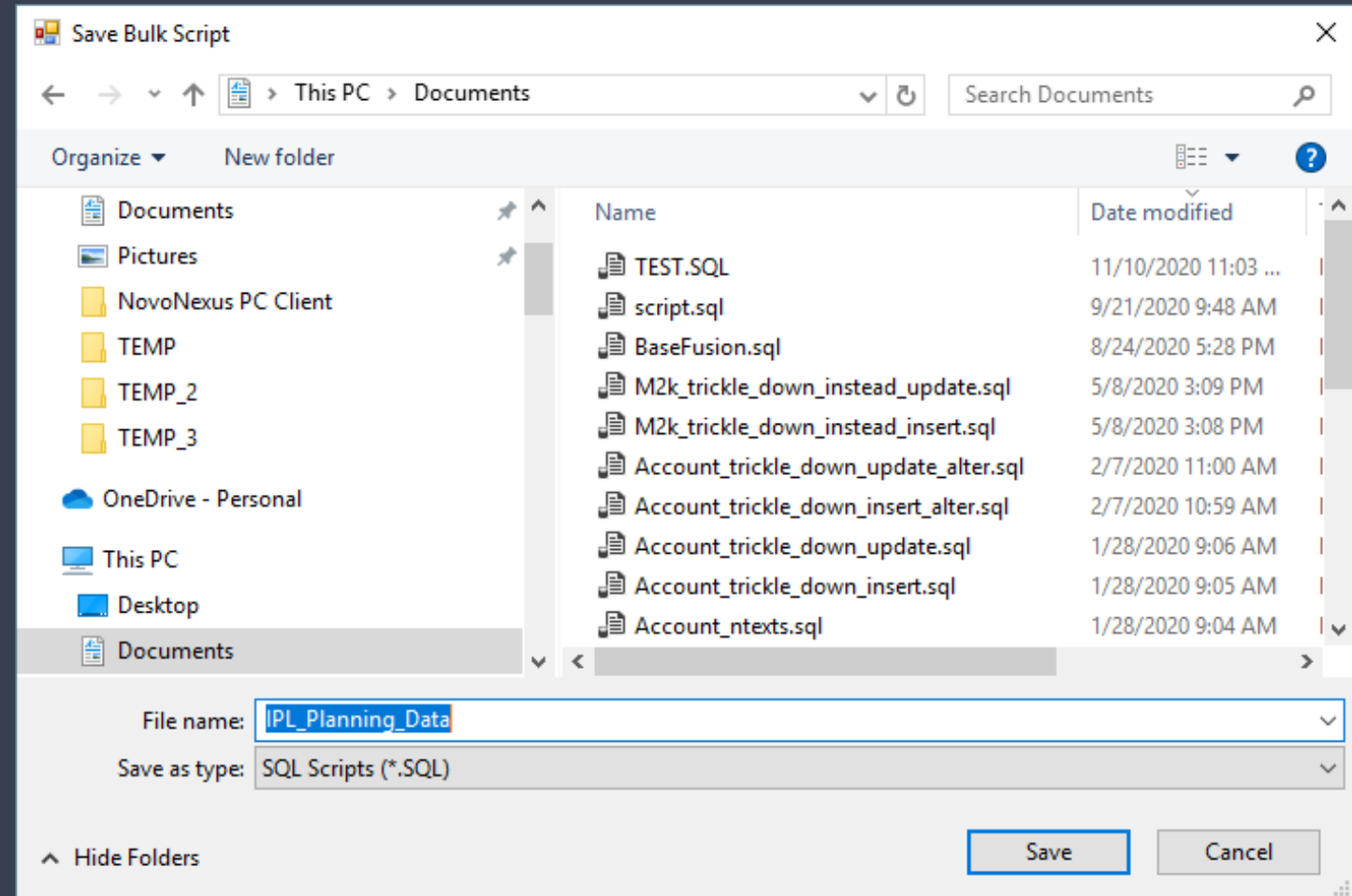
A SQL script is produced, and this should be saved to a file location on your workstation. You can edit that script prior to execution in SQL Management Studio.



NOVOMOTION THE SCHEMA BULK TABLE AND PROCEDURE SCRIPT

It is not necessary to save the generated bulk script forever, but you might want to keep a library of scripts to detail how your SQL database came into existence.

In that regard, a good naming convention is useful.



NOVOMOTION LOAD YOUR DATABASE FOR INITIALIZATION VALUES

- Execute the load data process
- Confirm data in new tables
- Now you have an Operational Data Store (ODS) ready for data reporting or Business Intelligence.

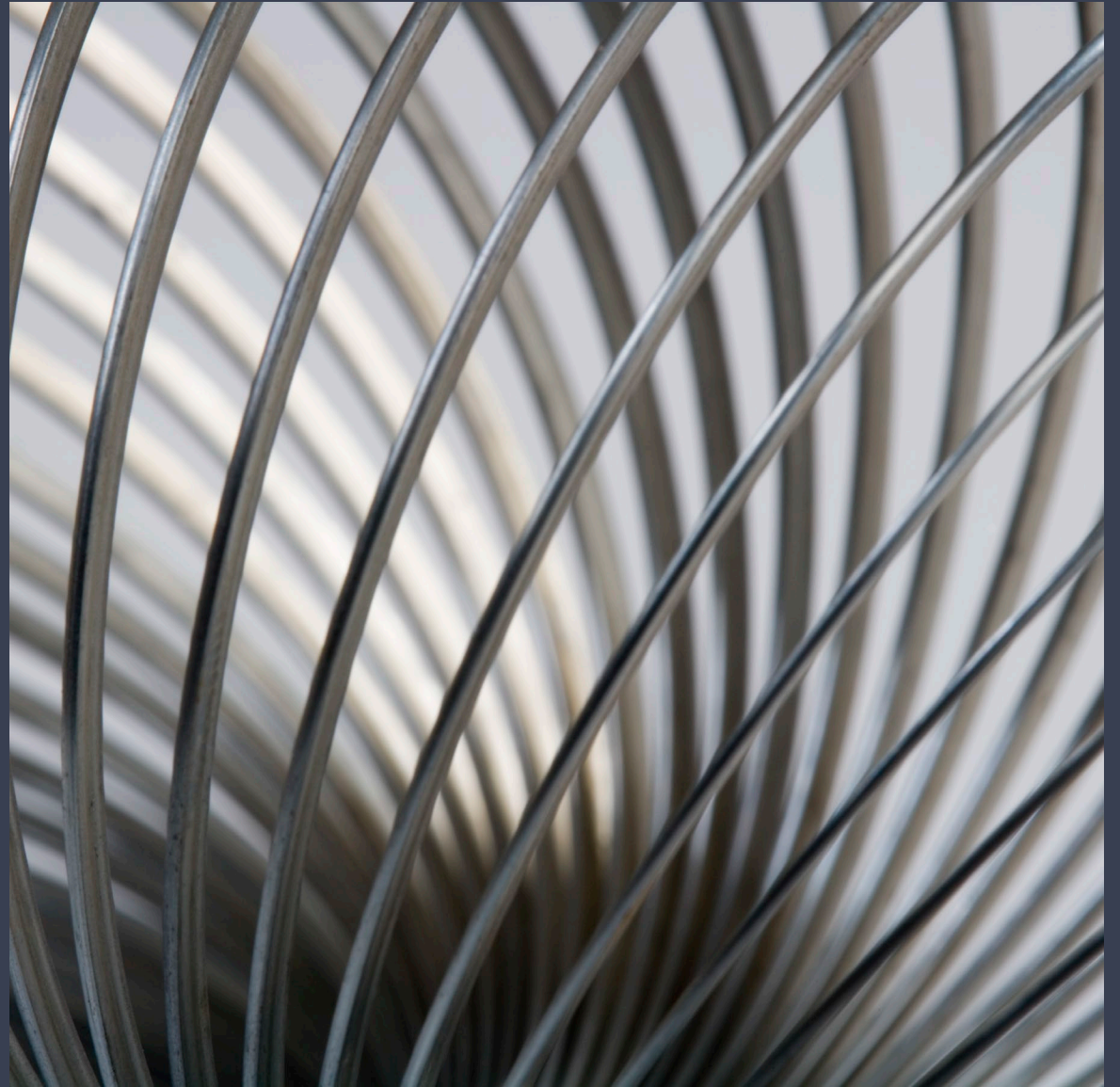
The screenshot displays the Microsoft SQL Server Management Studio interface. The Object Explorer on the left shows the database structure, with the 'dbo.IPL' table selected. The main window shows a SQL query being executed, which includes a 'FROM' clause referencing '[Planning_Data].[dbo].[IPL]'. The Results pane at the bottom shows a table with 11 rows and 11 columns. The status bar at the bottom indicates 'Query executed successfully' and '44 rows'.

Part_Nbr	Low_Lvl_Cd	Phantom_Code	Bin_Code	Usage_Code	Shrink_Factor	Safety_Stock	Dflt	Eqq_Reorder	Tir
10001	1	NULL	NULL	NULL	0.030	NULL	NULL	NULL	NI
10002	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10003	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10004	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10101	1	NULL	NULL	NULL	0.030	NULL	NULL	NULL	NI
10102	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10201	2	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10202	1	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10203	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10204	0	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NI
10301	2	NULL	NULL	NULL	0.030	NULL	NULL	NULL	NI



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QUESTIONS?



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THANK YOU

