

# The Data Warehouse V.I.P. Tour

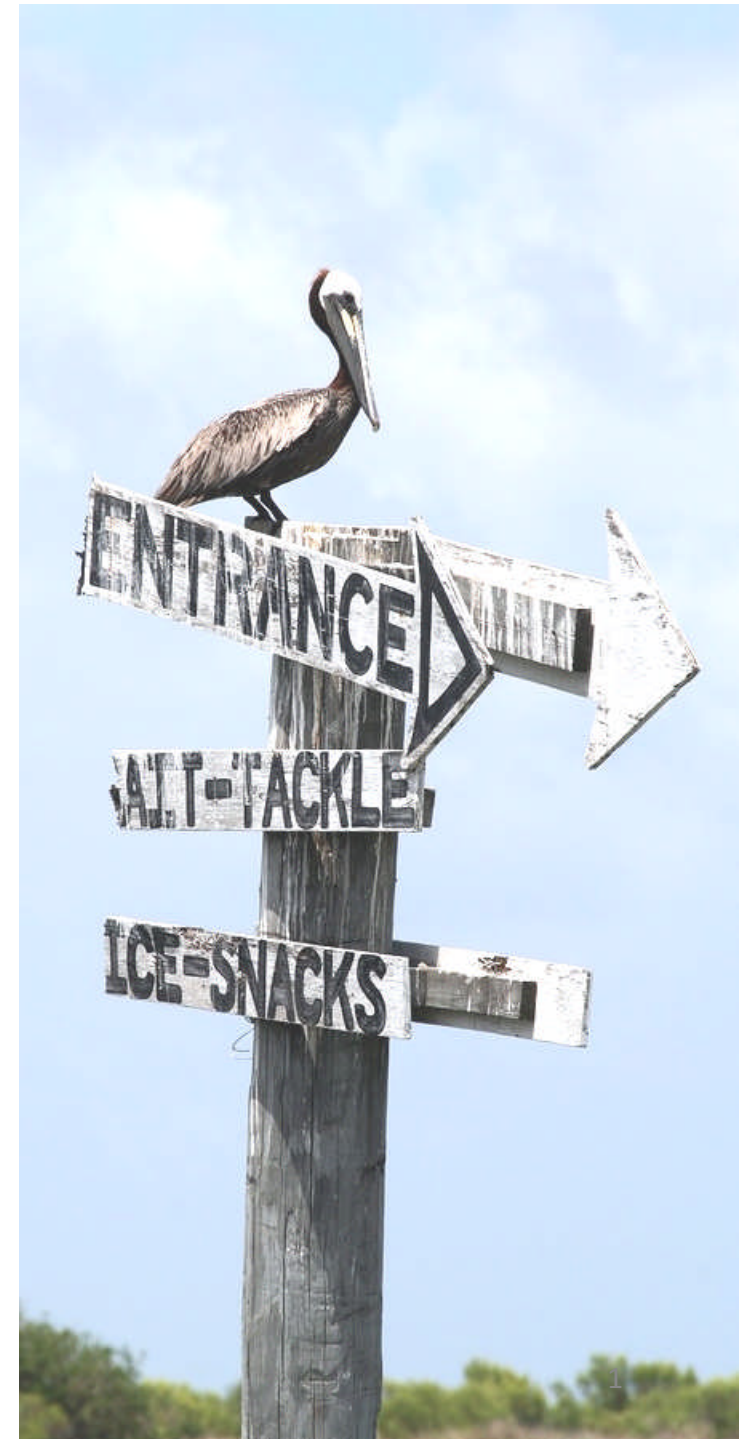
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# Welcome to Cypress Cay Marina

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How would you build a data warehouse?  
What would it do for your business?

**The answers are inside. Let's begin your  
tour with functional requirements.**

...Each night, a closing report is prepared by Managers at Baracles (restaurant/pub), Dockside Gifts & Sundries, and at the boat rental kiosk...

...The proposed solution must bring in this information. Cypress Cay Managers must be able to quickly and easily retrieve daily **scorecards** and **drill-down reports** for **trend analysis**...

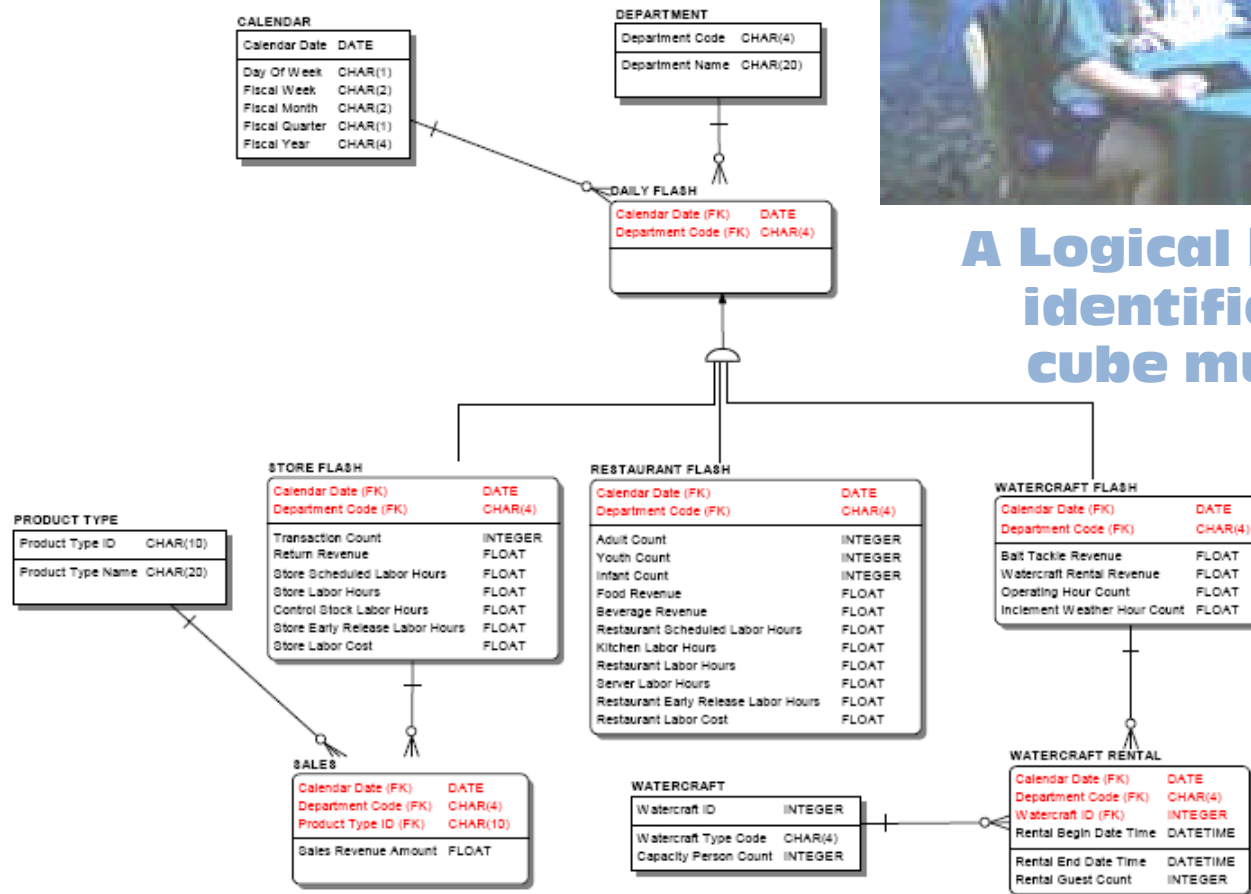
# We find critical requirements that call for **On-Line Analytical Processing**

...The proposed solution must bring in this information. Cypress Cay Managers must be able to quickly and easily retrieve daily **scorecards** and **drill-down reports** for **trend analysis**...

**OLAP cubes enable scorecards, drill-down reports and trend analysis.**



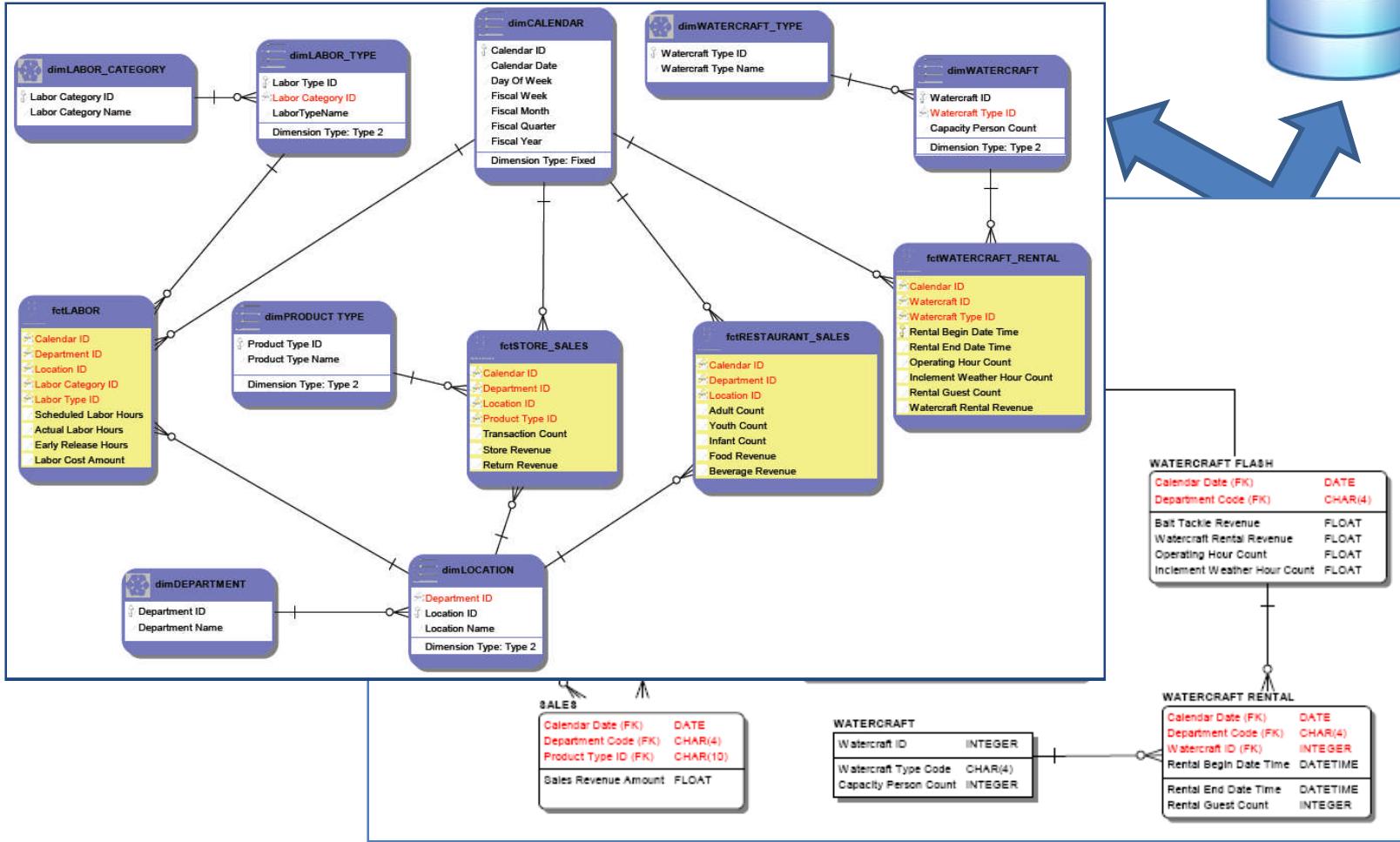
# We discuss data requirements with Cypress Cay Management



**A Logical Data Model identifies what the cube must contain.**

# A Dimensional Model forward-engineers into a Physical Database.

Both reflect the Logical Model.



# Our tour pauses at the new, empty database

Cypress Cay keeps Point Of Sale *tables*, *flat files* and *spreadsheets*. Each must be moved into staging tables.

Microsoft SQL Server

SSIS

SSAS

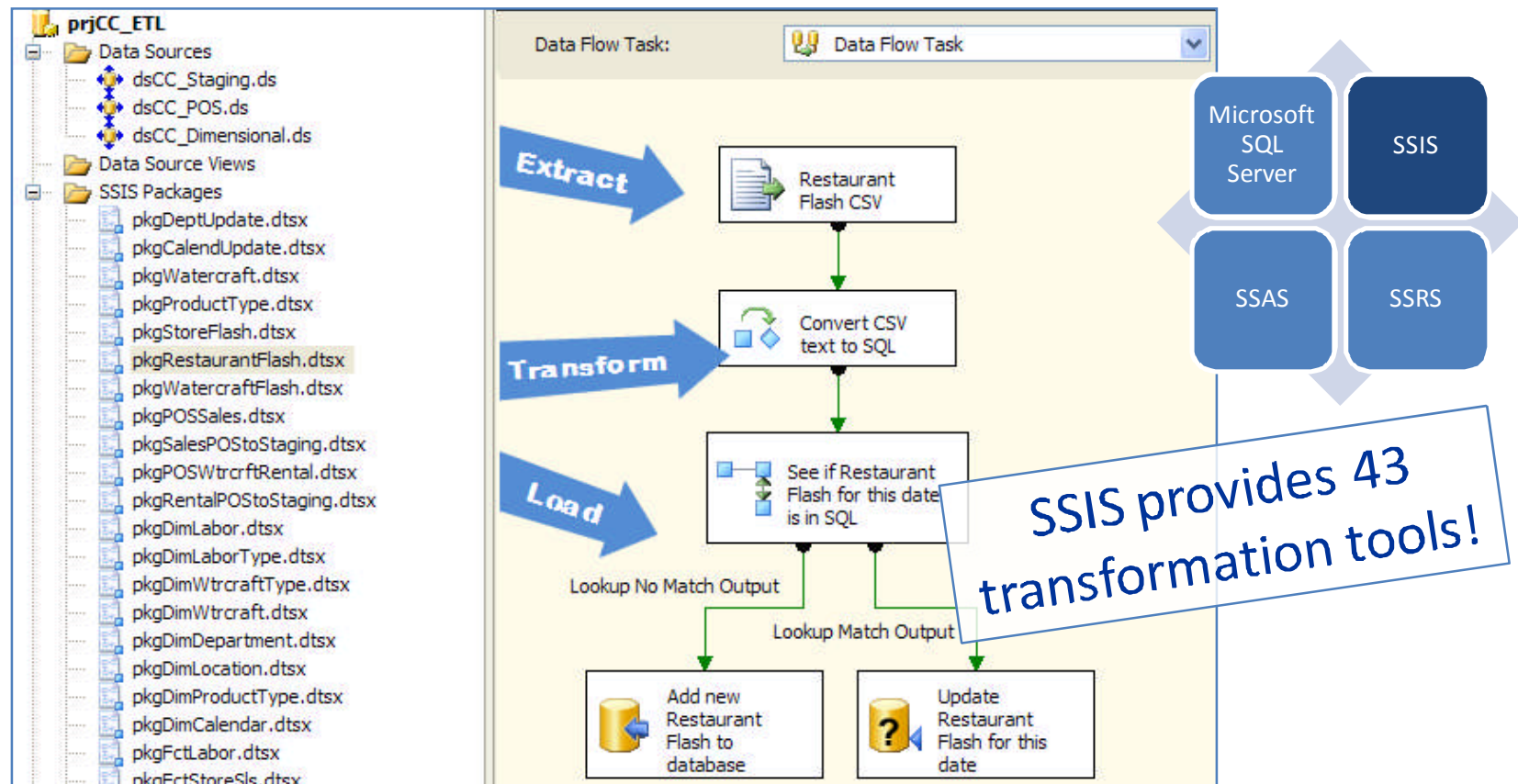
SSRS

The screenshot shows the Microsoft SQL Server Management Studio interface. The Object Explorer on the left displays the 'CC Dimensional' database structure, including tables like 'dbo.dimPRODUCT\_TYPE'. The main window shows a query in 'CODE3W-GEORG...LQuery2.sql\*' and its results in a table.

```
1 SELECT [ProductTypeID]
2     , [ProductTypeName]
3 FROM [CC Dimensional].[dbo].[dimPRODUCT_TYPE]
```

	ProductTypeID	ProductTypeName
1	1	Ready-To-Wear
2	2	Housewares
3	3	Toys
4	4	Publications
5	5	Stationery
6	6	Groceries
7	7	Skin Care
8	8	Sunglasses

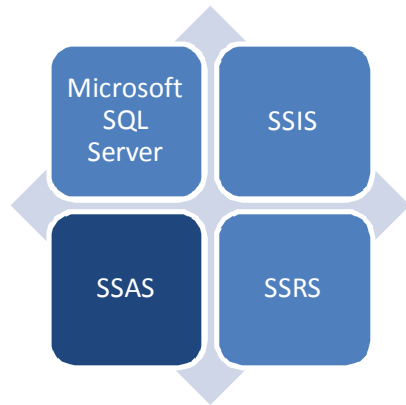
# SQL Server Integration Services (SSIS) moves data into staging tables





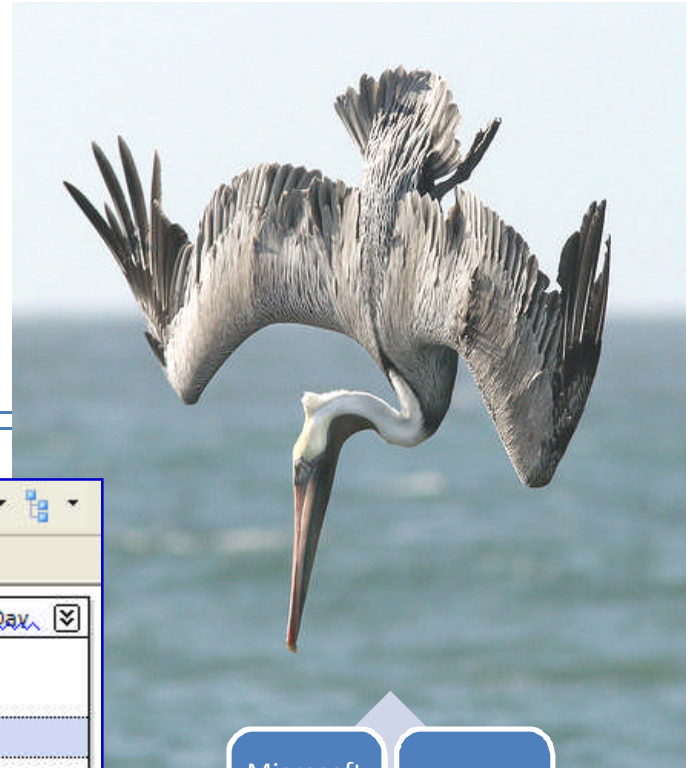
# After staging, data is moved again

**SQL Server Analysis Services (SSAS) builds 4 fact tables and 5 dimensions of Cypress Cay data**



Measure Groups				
Dimensions	Fct WATERCRAFT	Fct STORE	Fct RESTAURANT	Fct LABOR
Dim DEPARTMENT	Department ID	Department ID	Department ID	Department ID
Dim CALENDAR	Calendar ID	Calendar ID	Calendar ID	Calendar ID
Dim WATERCRAFT	Watercraft ID			
Dim PRODUCT TYPE		Product Type ID		
Dim LABOR TYPE				Labor Type ID

# Hierarchies provide drill-down paths into the OLAP cube

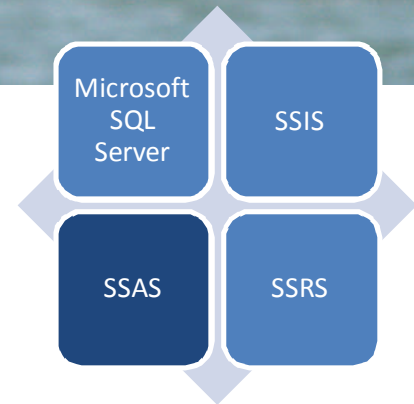


GroupingBehavior	EncourageGrouping
ID	Month Desc
InstanceSelection	None
IsAggregatable	True
KeyColumns	dimCALENDAR.MonthSortValue
MemberNamesUnique	False
MembersWithData	NonLeafDataVisible
MembersWithDataCaption	
Name	<b>Month Desc</b>
NameColumn	<b>dimCALENDAR.MonthDesc</b>
NamingTemplate	
OrderBy	<b>Key</b>
OrderByAttribute	
RootMemberIf	ParentIsBlankSelfOrMissing
Type	Regular
UnaryOperatorColumn	(none)
Usage	Regular
ValueColumn	(none)

Attributes	Hierarchies
Dim CALENDAR	Year to Day
Calendar Date	Year
Calendar ID	Quarter
Day Of Week	Month
Day Of Week Name	Week
Day Sort Value	Day
Fiscal Month	<new level>
Fiscal Quarter	
Fiscal Week	
Fiscal Year	
Month Desc	
Month Name	
Month Sort Value	
Qtr Sort Value	
Quarter Desc	

To create a new hierarchy, drag an attribute here.



# Within the data warehouse, we see trend analysis added to the cube

The screenshot displays the configuration of a measure named `[LaborHrTrend]` in the SSAS cube. The measure is a calculated field based on the difference between current and previous period labor hours. The interface includes a Script Organizer, Calculation Tools, and a Properties pane.

**Script Organizer:**

- 2 [ActualtoScheduled]
- 3 [ERPctofScheduled]
- 4 [ReturnsPctOfRevenue]
- 5 [AvgLaborRate]
- 6 **[LaborHrTrend]**
- 7 [FoodRevenueTrend]
- 8 [ReverseRevenueTrend]

**Calculation Tools:**

- Metadata
- Functions

**Measure Group:** Fct LABOR

- CC\_DailyFlash
- Measures
  - Fct LABOR
    - Actual Labor Hours
    - ActualtoScheduled
    - AvgLaborRate
    - Early Release Hours
    - ERPctofScheduled
    - Fct LABOR Count
    - Labor Cost Amount
    - LaborHrTrend
    - Scheduled Labor Hours
    - ScheduledHrTrend
- Dim CALENDAR
- Dim DEPARTMENT
- Dim LABOR TYPE

**Name:** [LaborHrTrend]

**Parent Properties:**

- Parent hierarchy: Measures
- Parent member: [Empty]

**Expression:**

```
(([Dim CALENDAR].[Year to Day].currentmember, [Measures].[Actual Labor Hours]) - ([Measures].[Actual Labor Hours], [Dim CALENDAR].[Year to Day].currentmember.prevmember))
```

**Additional Properties:**

- Format string: "#,##0.0;-#,##0.0"
- Visible: True
- Non-empty behavior: [Empty]
- Associated measure group: Fct LABOR
- Display folder: [Empty]
- Color Expressions: [Checked]
- Font Expressions: [Checked]

**Diagram:**

A diagram shows four blue boxes representing SSAS components: Microsoft SQL Server, SSIS, SSAS, and SSRS. Arrows point from the SSAS box to the other three boxes, indicating its central role in the data warehouse architecture.

**Text Box:**

**SSAS includes forms for adding calculations and Key Performance Indicators (KPI).**

# Multi-dimensional cubes require Multi-Dimensional eXpressions: MDX

This MDX query builds a matrix of dates and food sales trends.

```
1 WITH MEMBER [This Month] AS
2   ([Dim CALENDAR].[Year to Day].currentmember
3   ,[Measures].[Food Revenue]) ,format = "currency"
4 MEMBER [Last Month] AS
5   ([Measures].[Food Revenue],
6   [Dim CALENDAR].[Year to Day].currentmember.prevmember)
7   ,format = "currency"
8 MEMBER [Food Trend %] AS
9   [Measures].[FoodRevenueTrend%] ,format = "percent"
10 SELECT {[Last Month],[This Month]}
11   ,[Measures].[FoodRevenueTrend]
12   ,[Food Trend %]} ON COLUMNS,
13   [Dim CALENDAR].[Year to Day].[Month].members ON ROWS
14 FROM [CC_DailyFlash]
15 WHERE [Dim CALENDAR].[Fiscal Year].&[2008]
```

	Last Month	This Month	FoodRevenueTrend	Food Trend %
Jan 2008	\$99,994.14	\$108,334.30	\$8,340.16	8.34%
Feb 2008	\$108,334.30	\$122,099.61	\$13,765.31	12.71%
Mar 2008	\$122,099.61	\$116,905.29	(\$5,194.32)	-4.25%
Apr 2008	\$116,905.29	\$133,845.75	\$16,940.46	14.49%
May 2008	\$133,845.75	\$129,678.23	(\$4,167.52)	-3.11%
Jun 2008	\$129,678.23	\$109,013.77	(\$20,664.46)	-15.94%
Jul 2008	\$109,013.77	\$121,951.18	\$12,937.41	11.87%
Aug 2008	\$121,951.18	\$120,311.29	(\$1,639.89)	-1.34%
Sep 2008	\$120,311.29	\$118,391.29	(\$1,920.00)	-1.60%
Oct 2008	\$118,391.29	\$113,539.81	(\$4,851.48)	-4.10%
Nov 2008	\$113,539.81	\$132,038.57	\$18,498.76	16.29%
Dec 2008	\$132,038.57	\$127,237.32	(\$4,801.25)	-3.64%

# Microsoft Excel pivot tables can publish a matrix in graphical format

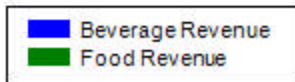
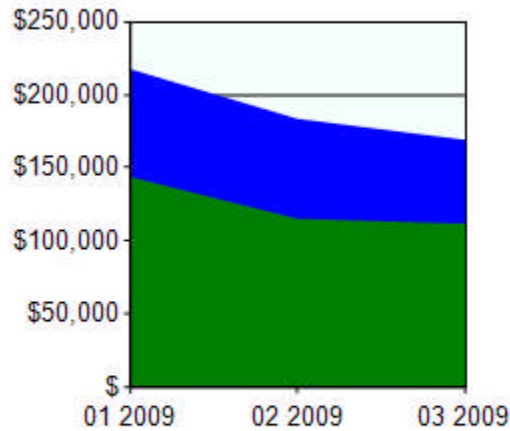


Now our matrix has filters, drill-down capability and status indicators.

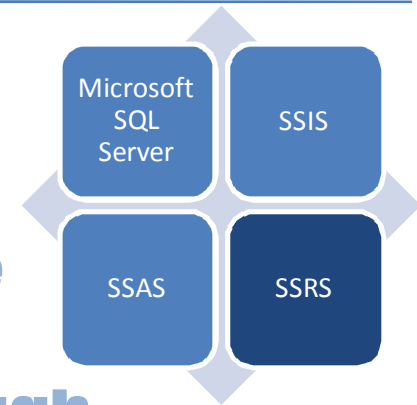
Fiscal Year 2008					
Values					
Row Labels	GuestCount	\$/Guest	Food Revenue	Trend%	Status
2008	112,308	\$ 19.45	\$ 1,453,346	22.5%	●
Q1 2008	27,233	\$ 18.98	\$ 347,339	10.6%	●
Jan 2008	8,339	\$ 18.68	\$ 108,334	8.3%	●
Feb 2008	9,532	\$ 18.47	\$ 122,100	12.7%	●
Mar 2008	9,362	\$ 19.75	\$ 116,905	-4.3%	●
Q2 2008	27,967	\$ 20.19	\$ 372,538	7.3%	●
Apr 2008	9,918	\$ 21.18	\$ 133,846	14.5%	●
May 2008	9,713	\$ 19.77	\$ 129,678	-3.1%	●
Jun 2008	8,336	\$ 19.51	\$ 109,014	-15.9%	●
Q3 2008	28,216	\$ 19.05	\$ 360,654	-3.2%	●
Jul 2008	9,699	\$ 19.54	\$ 121,951	11.9%	●
Aug 2008	9,716	\$ 18.14	\$ 120,311	-1.3%	●
Sep 2008	8,801	\$ 19.51	\$ 118,391	-1.6%	●
Q4 2008	28,892	\$ 19.57	\$ 372,816	3.4%	●
Oct 2008	8,719	\$ 19.52	\$ 113,540	-4.1%	●
Nov 2008	10,491	\$ 19.19	\$ 132,039	16.3%	●
Dec 2008	9,682	\$ 20.04	\$ 127,237	-3.6%	●
<b>Grand Total</b>	<b>112,308</b>	<b>\$ 19.45</b>	<b>\$ 1,453,346</b>	<b>22.5%</b>	<b>●</b>

# With SQL Server Reporting Services, Cypress Cay sees beyond dry facts.

Quarter



Patterns emerge and performance is tracked through slice, dice and drill-down.



## Labor Matrix

	KitchenLabor		ServerLabor	
	Scheduled	Actual	Scheduled	Actual
Jan 2009	509.4	488.5	937.6	847.0
Feb 2009	461.6	448.2	742.7	680.3
Mar 2009	488.4	454.3	841.3	750.2

# This concludes your Data Warehouse tour

You won't find Cypress Cay  
Marina on any map. It is a  
composite of hospitality  
businesses in the Orlando area.



For your tour today, I  
generated randomized  
data and built an OLAP cube  
with four fact tables and five  
dimensions. Thank you for  
taking the tour!

*George Pond*

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