



# **PSM PRESENTATION**

**Engineering Process and**

**Tools Organization (EP&TO)**

**Cost-Effective Process Modeling & Simulation Using the  
Balanced Scorecard & Raytheon Six Sigma Methodology**

**July 18, 2003**

**Seventh Annual PSM Conference**

**Keystone, Colorado**

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# PROCESS MODELING

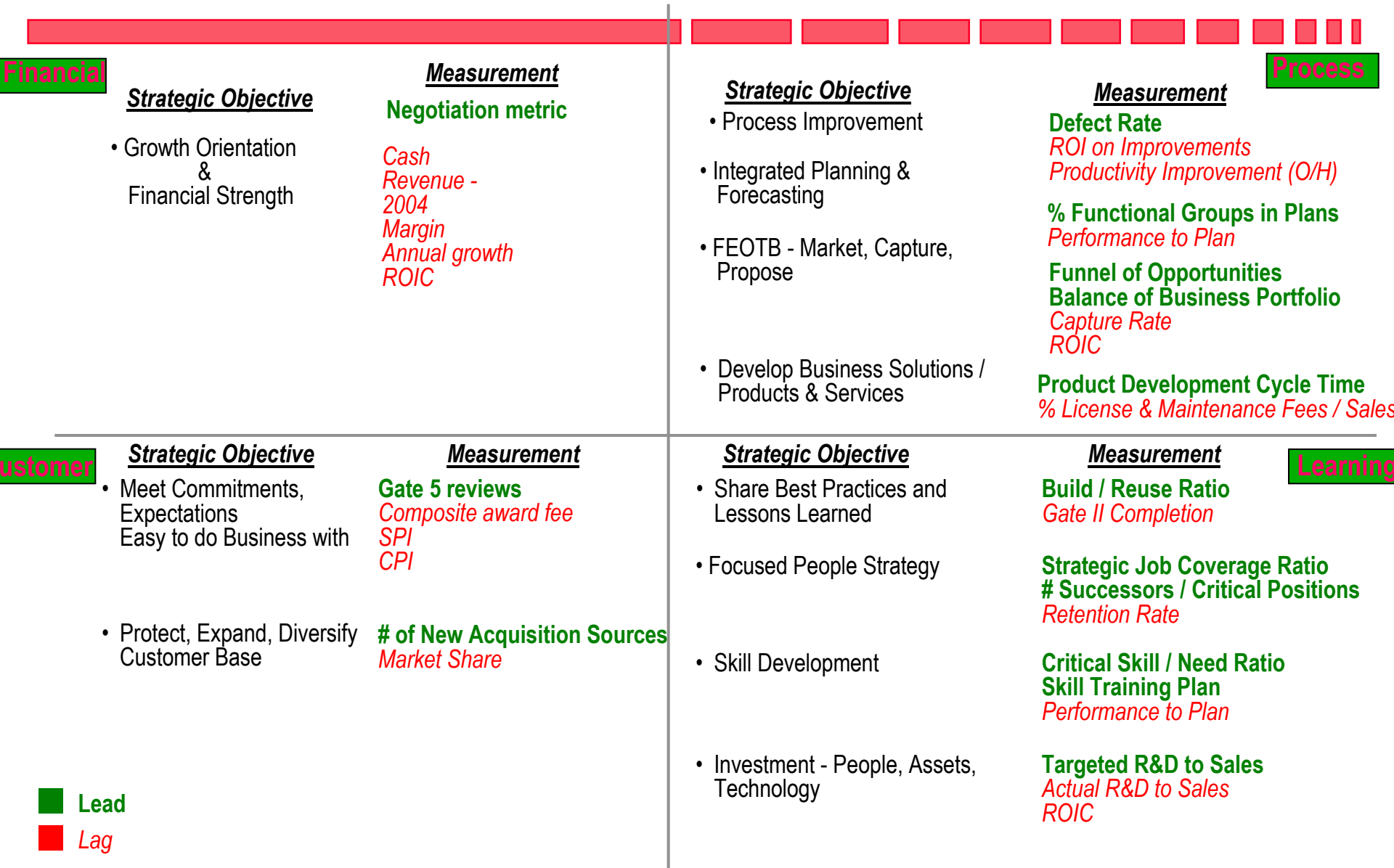
## **COST EFFECTIVE PROCESS MODELING & SIMULATION USING THE BALANCED SCORECARD & RAYTHEON SIX SIGMA METHODOLOGY**

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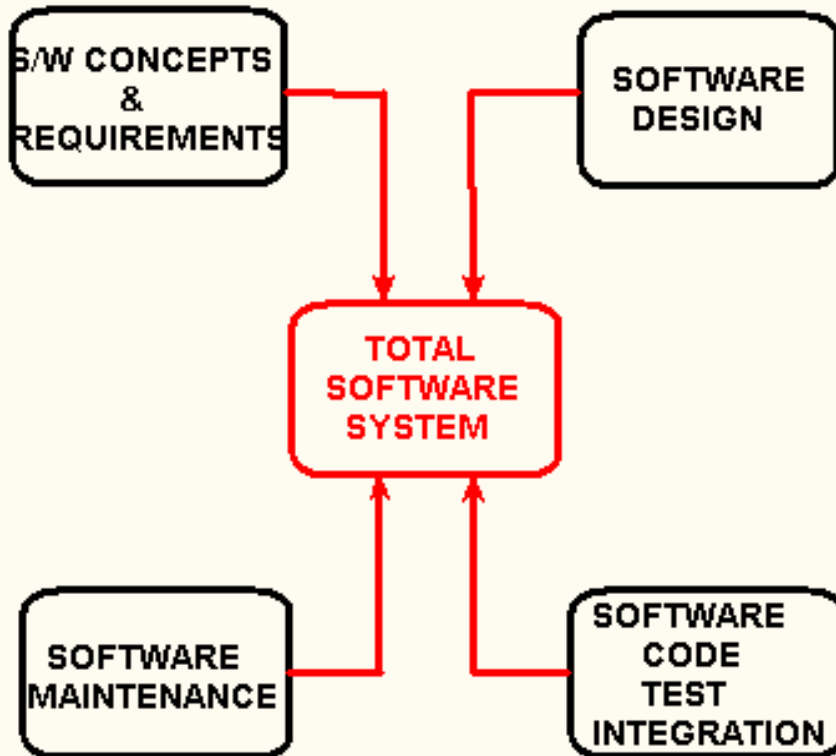
# BALANCED SCORECARD



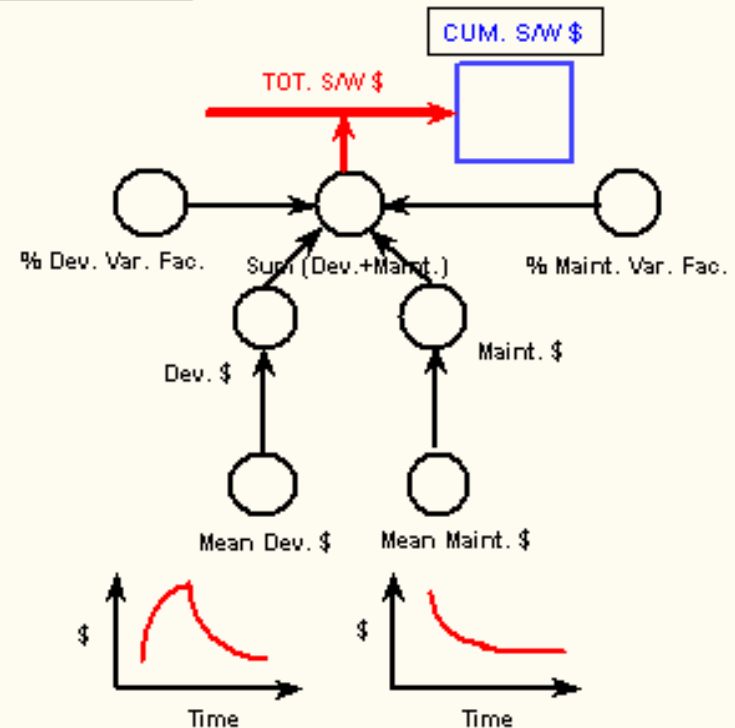
Lead  
 Lag

# BALANCED SCORECARD SIMULATION

## SOFTWARE PROCESS MODEL

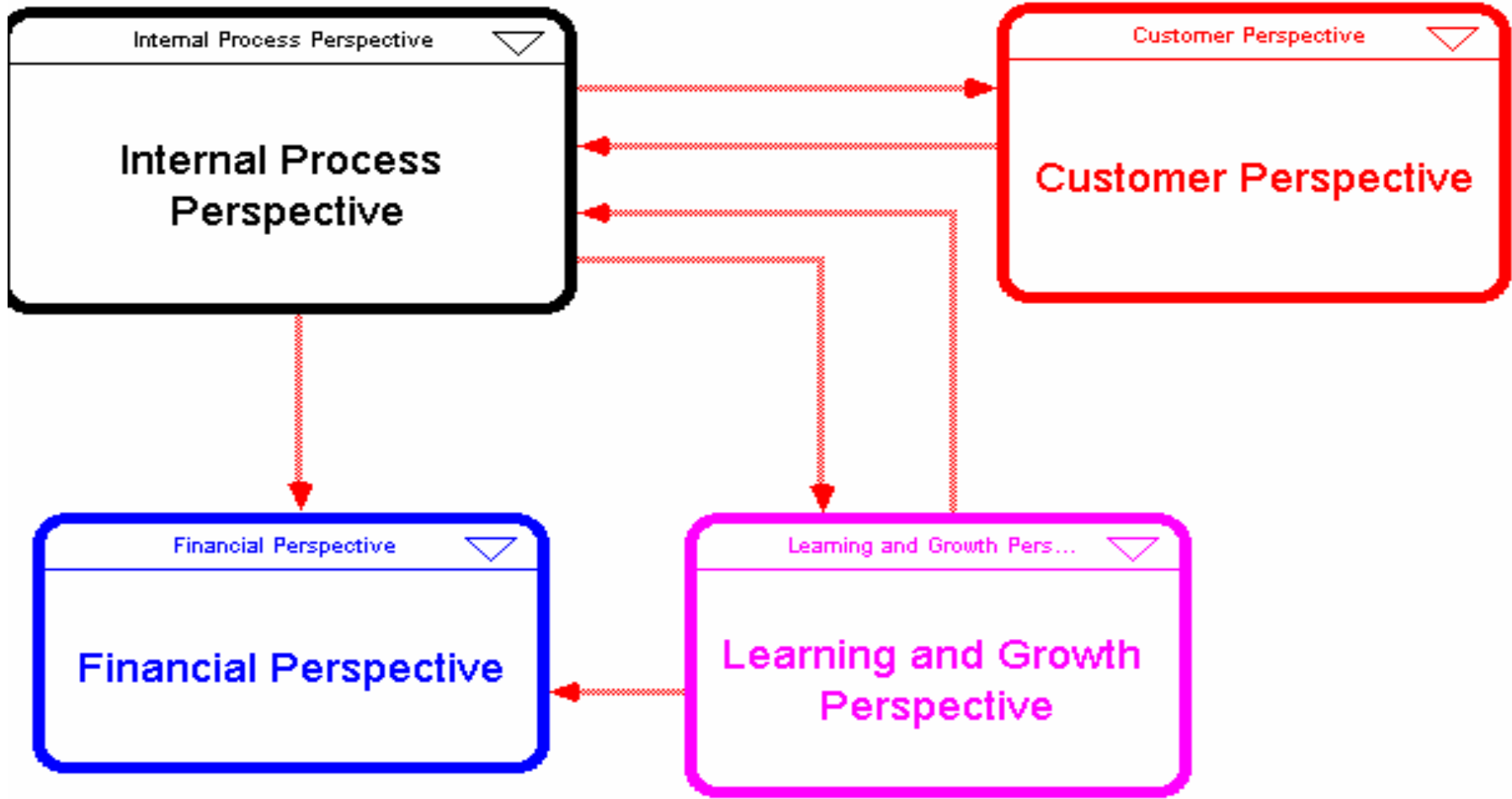


## SYSTEMS MODEL

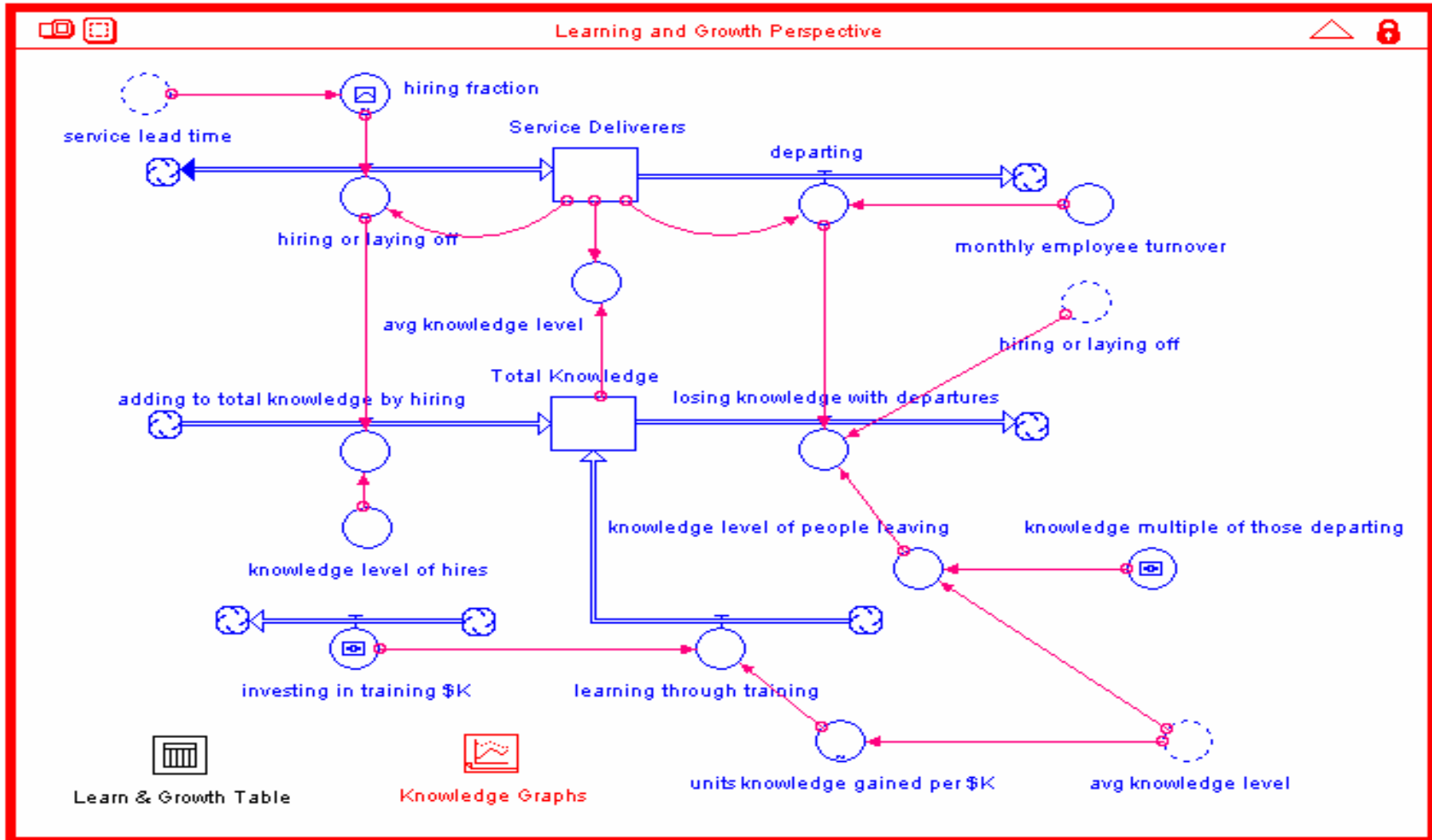


## EXECUTION MODEL

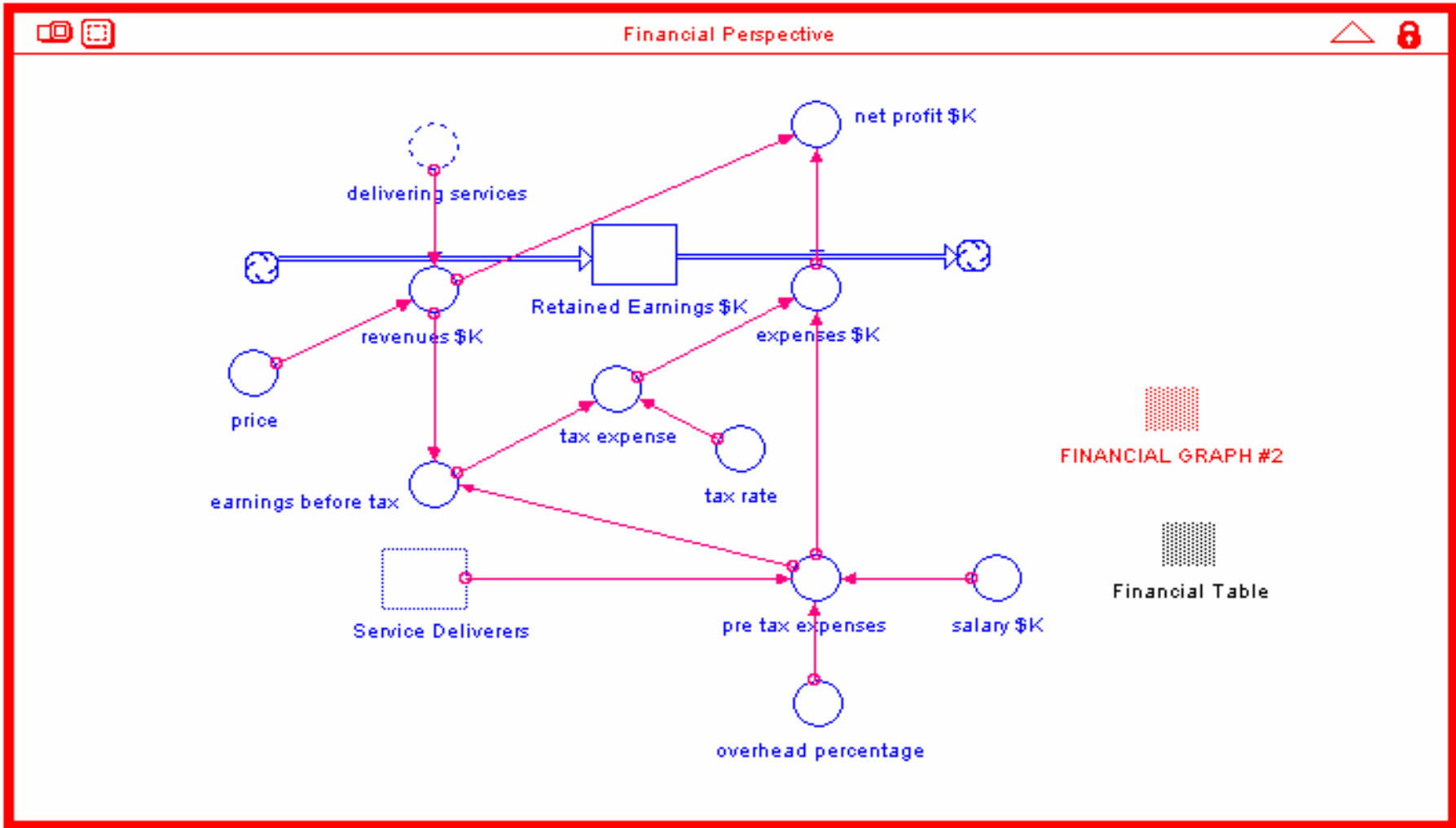
# BALANCED SCORECARD TOP LEVEL MODEL



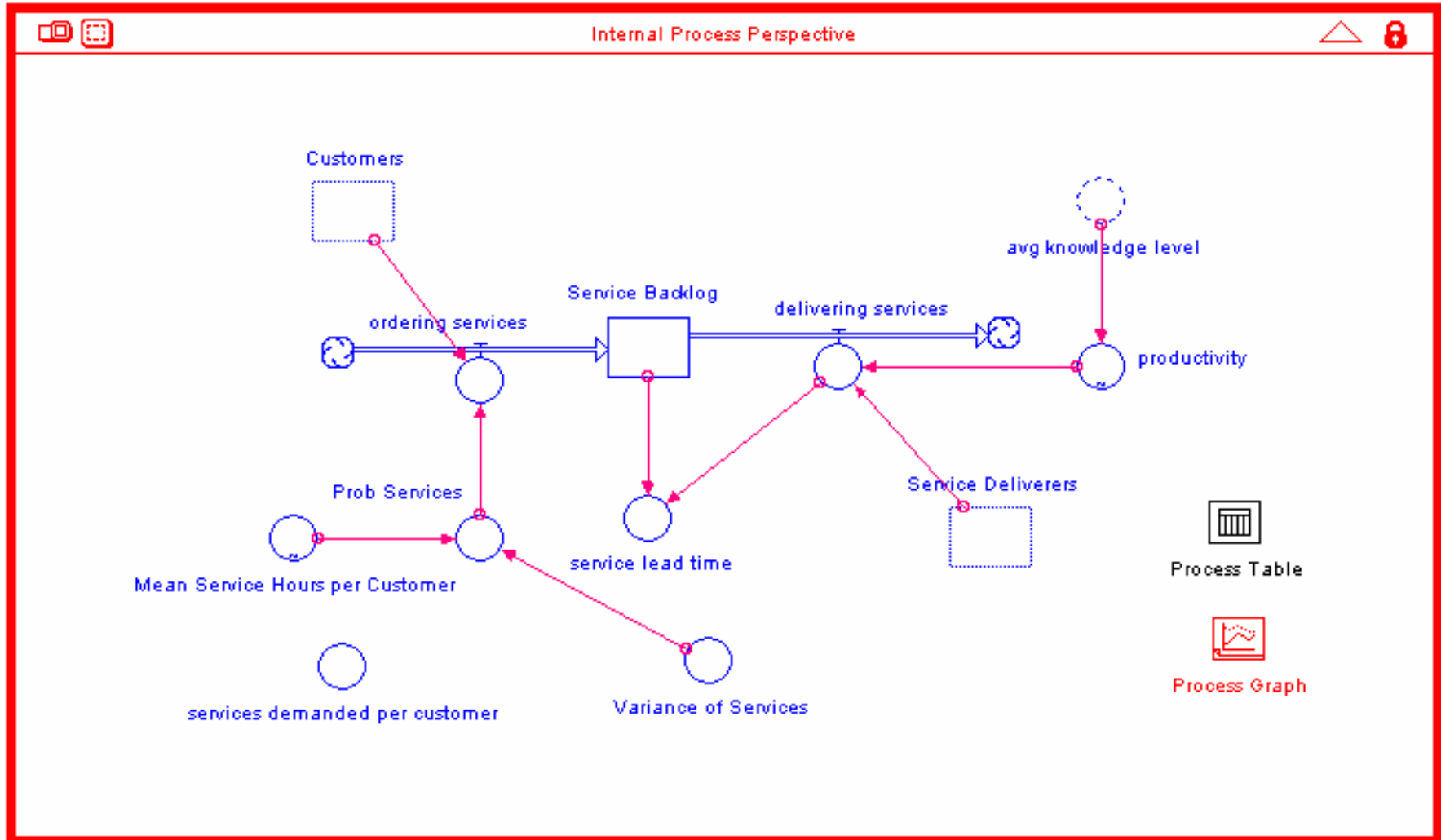
# BALANCED SCORECARD ANALYSIS MODEL



# BALANCED SCORECARD ANALYSIS MODEL

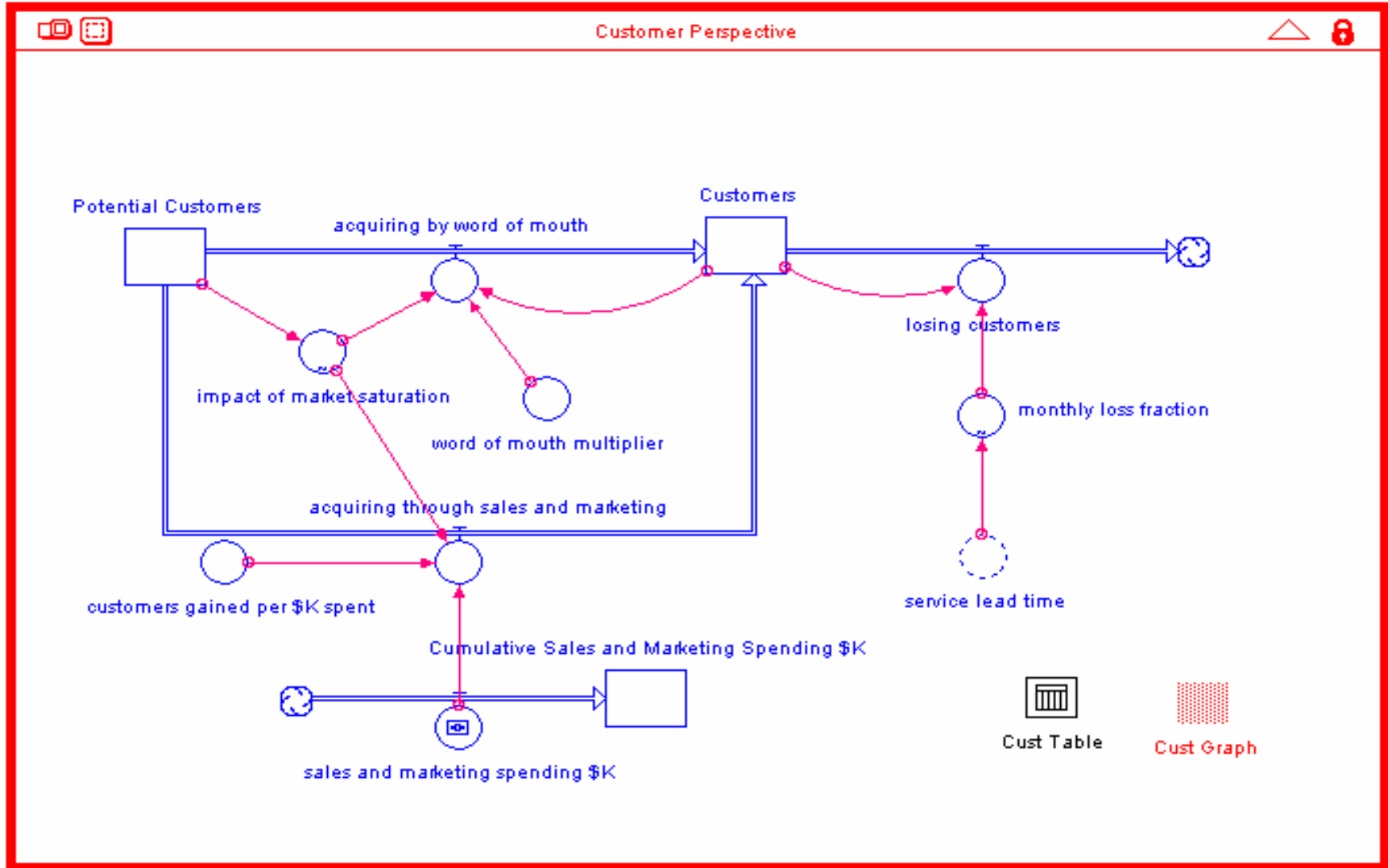


# BALANCED SCORECARD ANALYSIS MODEL

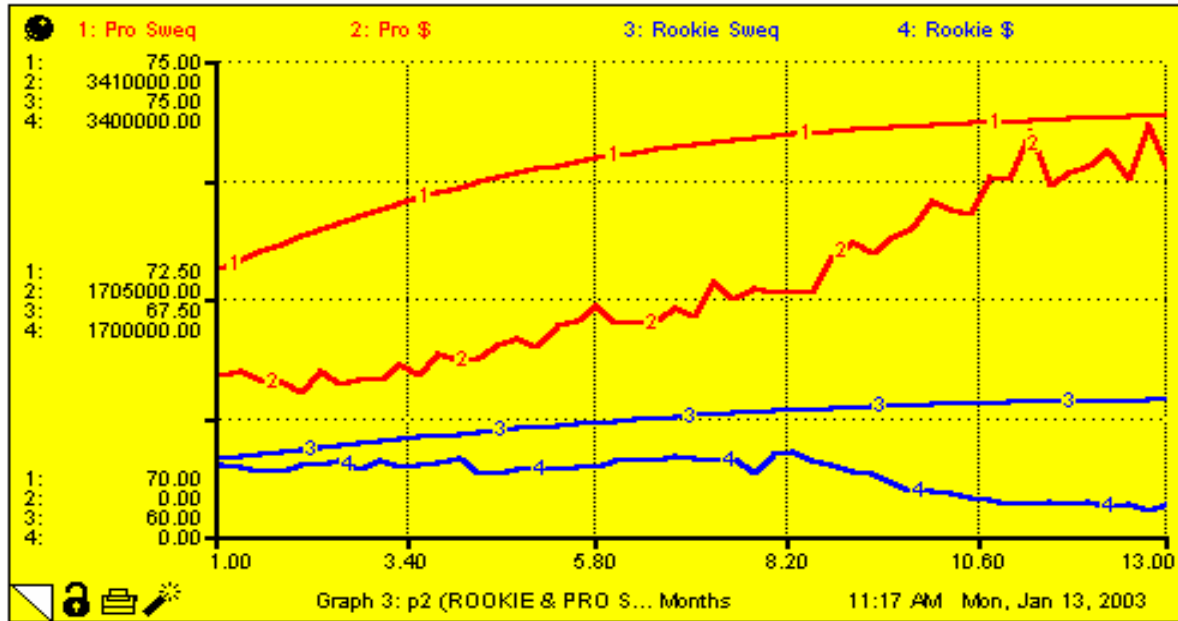




# BALANCED SCORECARD ANALYSIS MODEL



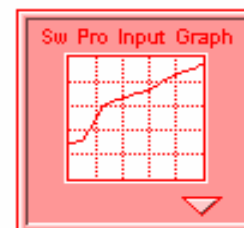
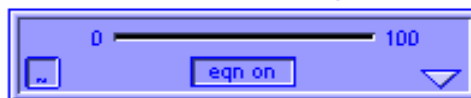
# BALANCED SCORECARD SIMULATION OUTPUT



Rookie SW EQ or Graph



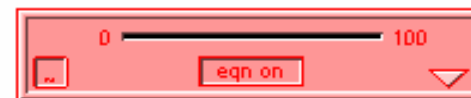
Mean Rookie Sw Graph



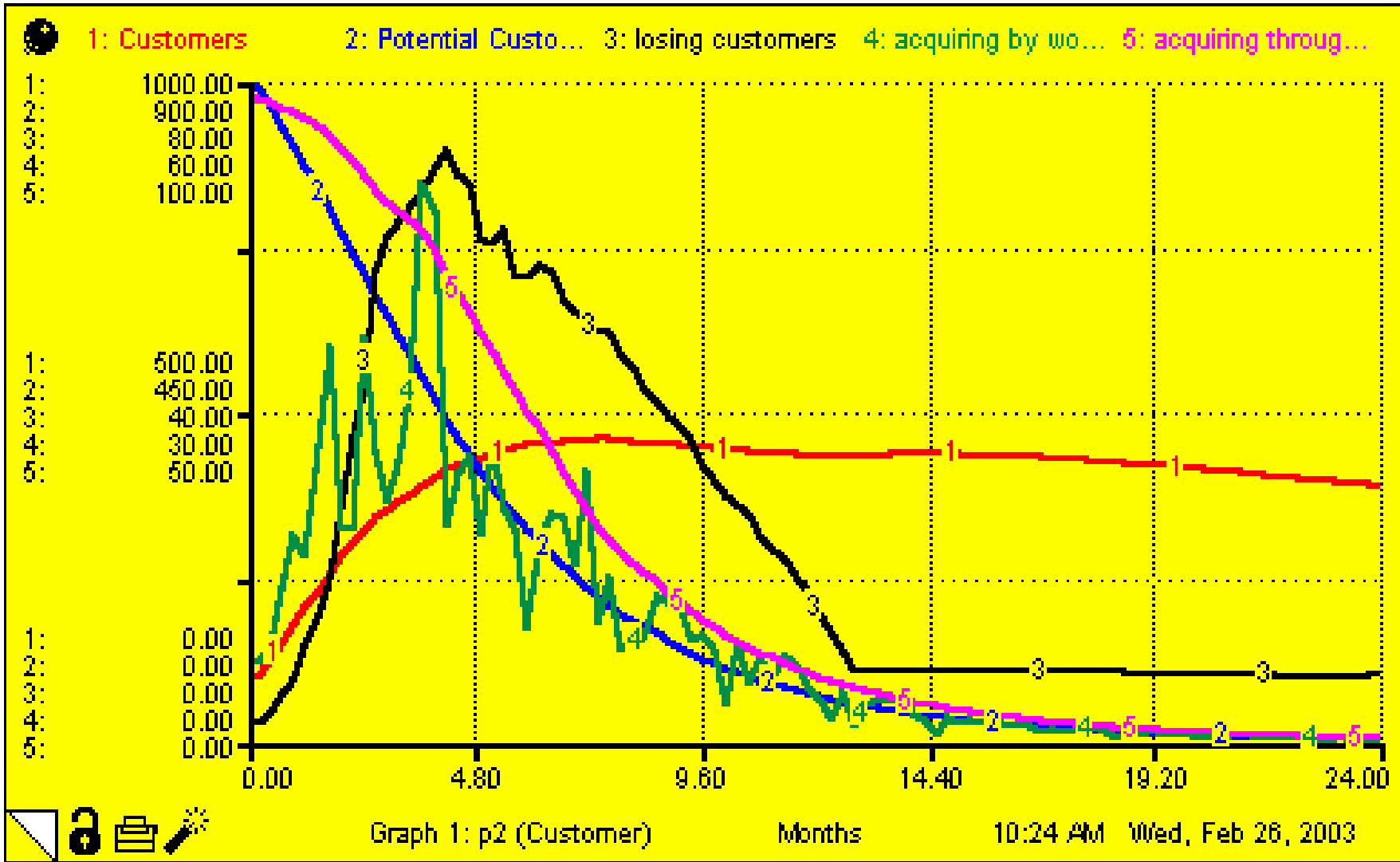
Pro SW EQ or Graph



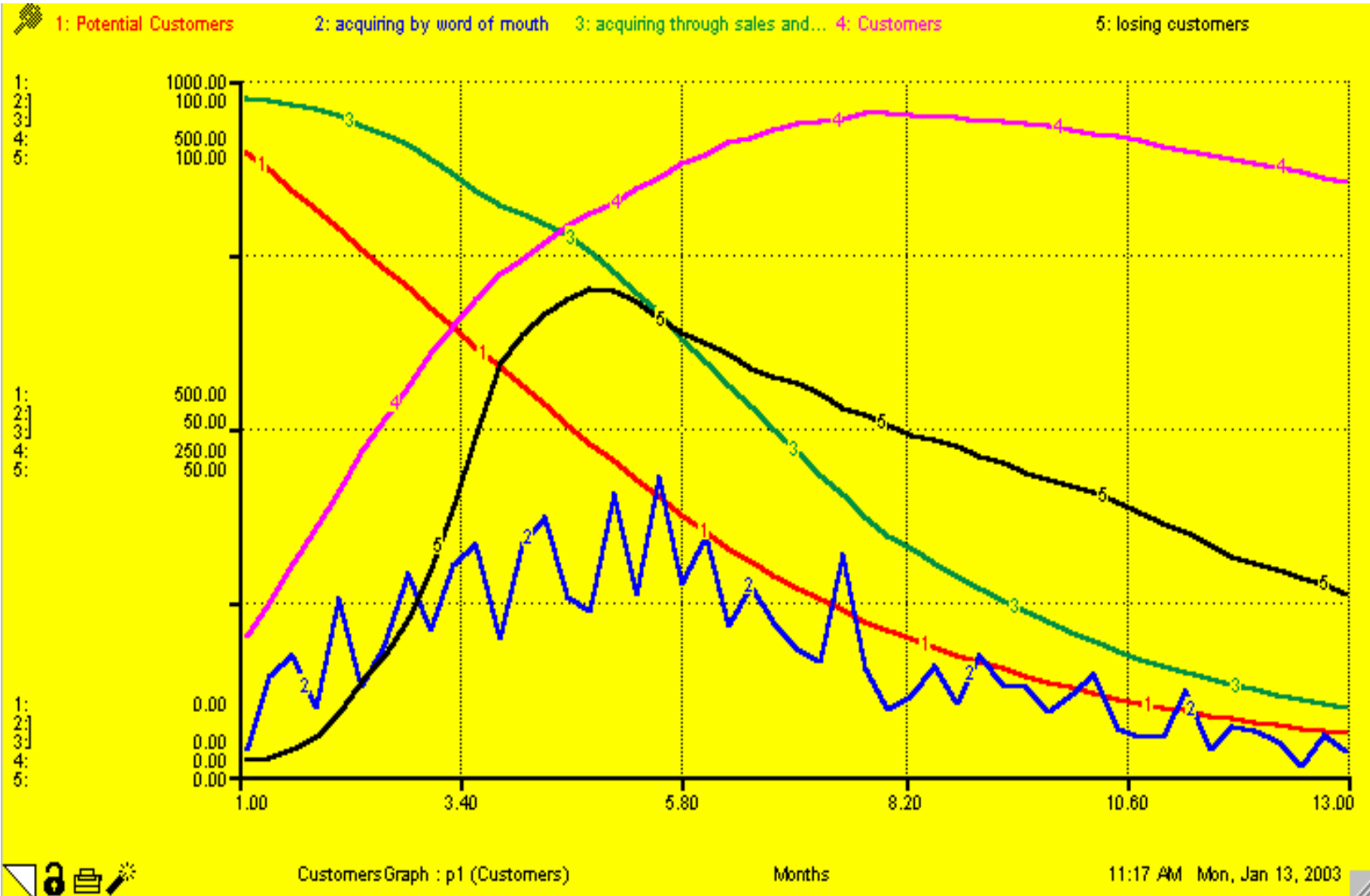
Mean Pro Sw Graph



# BALANCED SCORECARD SIMULATION OUTPUT



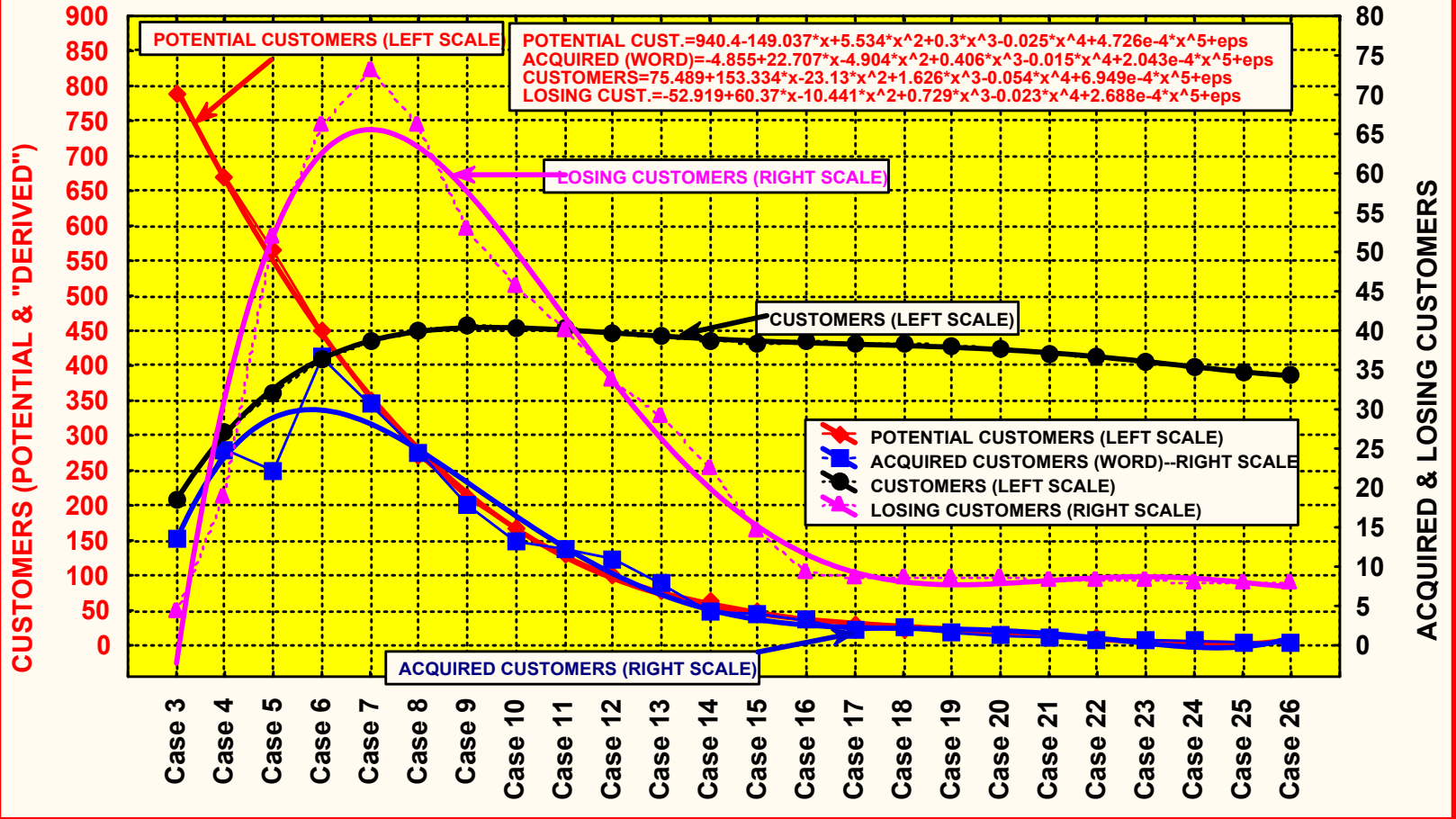
# BALANCED SCORECARD SIMULATION OUTPUT



# BALANCED SCORECARD SIMULATION ANALYSIS

DR. AARON N. SILVER--BALANCED SCORECARD--DATA(CUSTAB01.STA)

REGRESSION MODEL--FILE#:BALLIN01.STG--DECEMBER 13, 2002



# BALANCED SCORECARD "OPM" OUTPUT



Engineering Center Summary																6-May-03
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
People	Customer	Customer	Customer	People	Productivity	Productivity	Productivity	Productivity	People	People	Productivity	Customer	Productivity	Customer	0	
Staffing	Engr. Direct Labor	Labor Utilization	Engineering OH	Training	IPDS Deployment	Gating Execution Status	Measurement Maturity	Process Capability Maturity	Communications	Diversity	Six Sigma	QPI	Engineering Productivity	Partnership (Internal Customers)	Meas 16	
x	x	x	x	x	x	x		x		x	x	x				
5.0	7.0	9.0	10.0	7.0	7.0	7.0	0.0	2.0	0.0	4.0	3.0	6.0	0.0	0.0	0.0	
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9%	9%	9%	9%	9%	9%	9%	0%	9%	0%	9%	9%	9%	0%	0%	0%	
0.45	0.64	0.82	0.91	0.64	0.64	0.64	-	0.18	-	0.36	0.27	0.55	-	-	-	

Performance



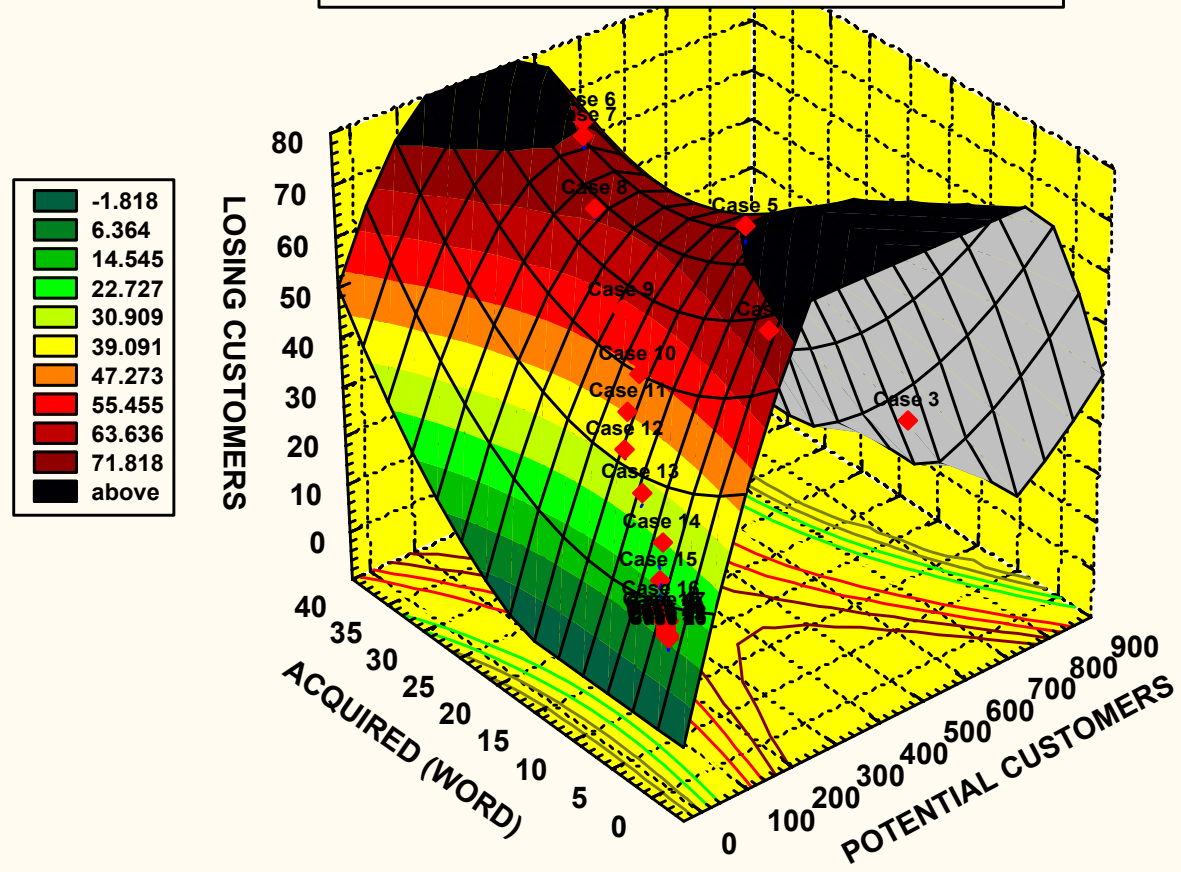
Weighting 100%  
Score 6.1

Performance Level = **6.1**

# BALANCED SCORECARD SIMULATION ANALYSIS

DR. AARON N. SILVER--BALANCED SCORECARD--DATA(CUSTAB01.STA)  
 QUADRATIC PREDICTION MODEL--FILE#:BAL3D1A.STG--DECEMBER 13, 2002

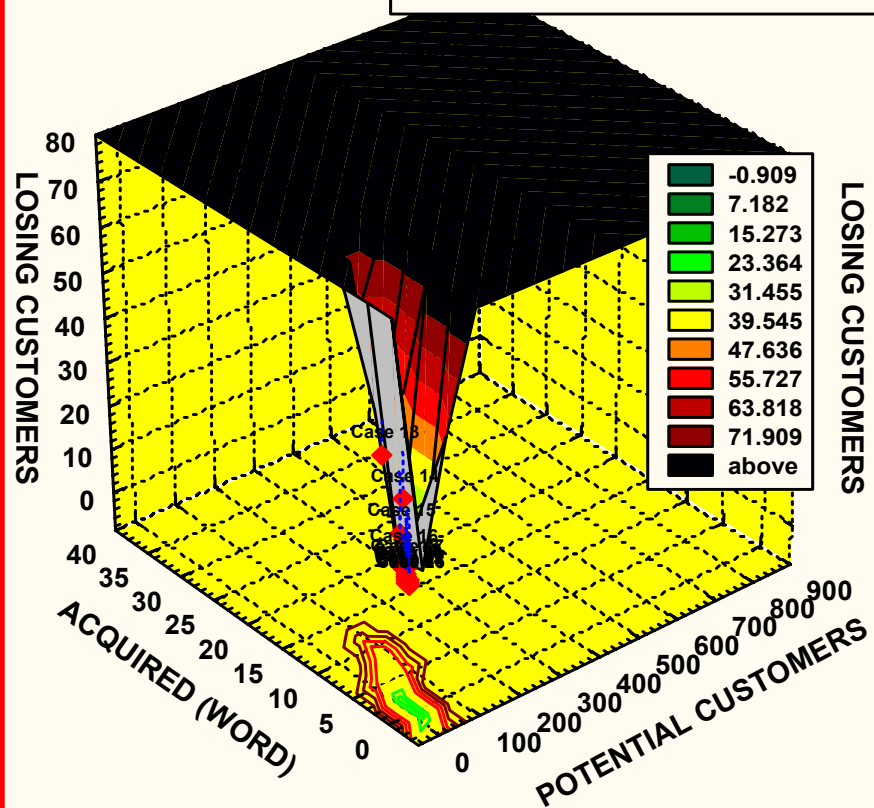
$$z=3.406+0.4*x-0.787*y-4.322e-4*x*x-0.004*x*y+0.051*y*y$$



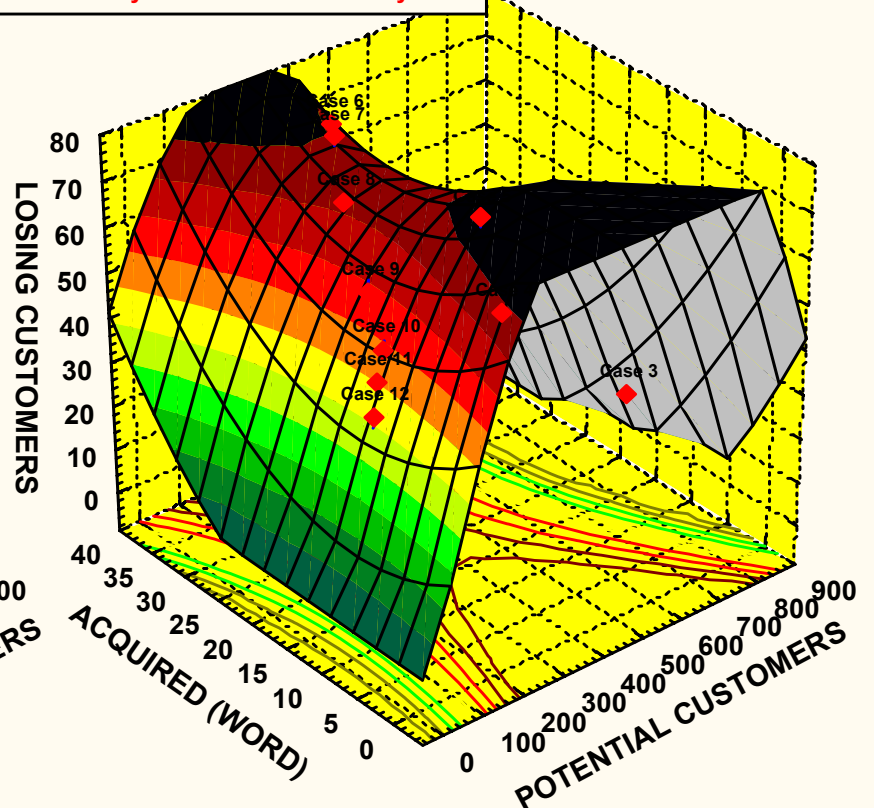
# BALANCED SCORECARD SIMULATION ANALYSIS

DR. AARON N. SILVER--BALANCED SCORECARD--DATA(CUSTAB01.STA)  
 QUADRATIC PREDICTION MODEL--FILE#:BAL4D1A.STG--DECEMBER 13, 2002

POTENTIAL CUST.: <= 90  $z=9.078-0.5*x+3.95*y+0.026*x*x-0.401*x*y+1.878*y*y$   
 POTENTIAL CUST.: > 90  $z=0.171+0.441*x-0.869*y-4.722e-4*x*x-0.004*x*y+0.051*y*y$



POTENTIAL CUST.: <= 90



POTENTIAL CUST.: > 90