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Integrating Operational and Financial Risks

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KPA Ltd., Raanana
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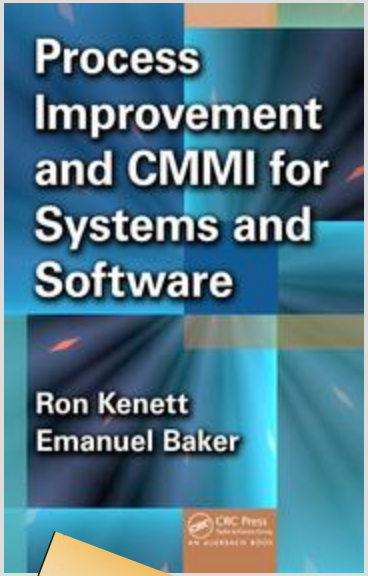
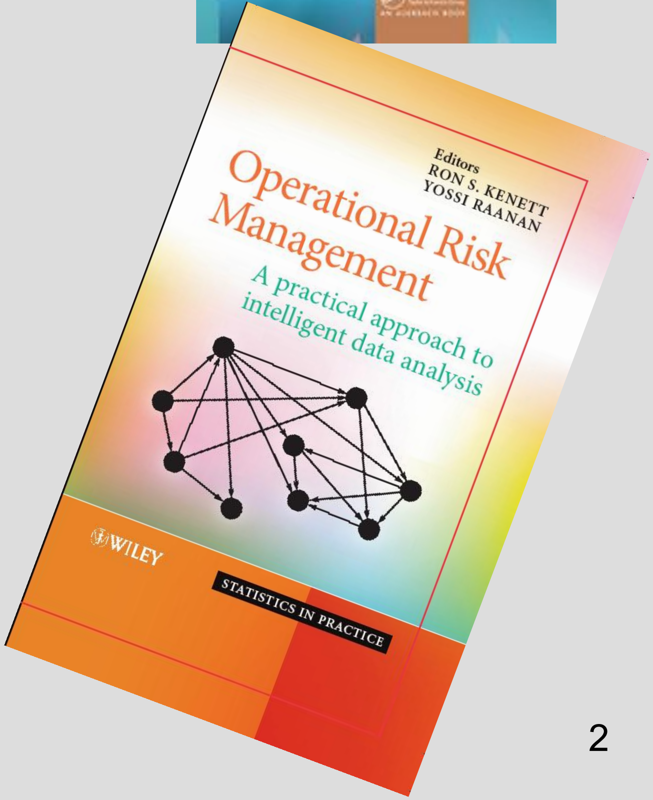
Center for Finance and Risk Engineering, NYU-Poly, New York

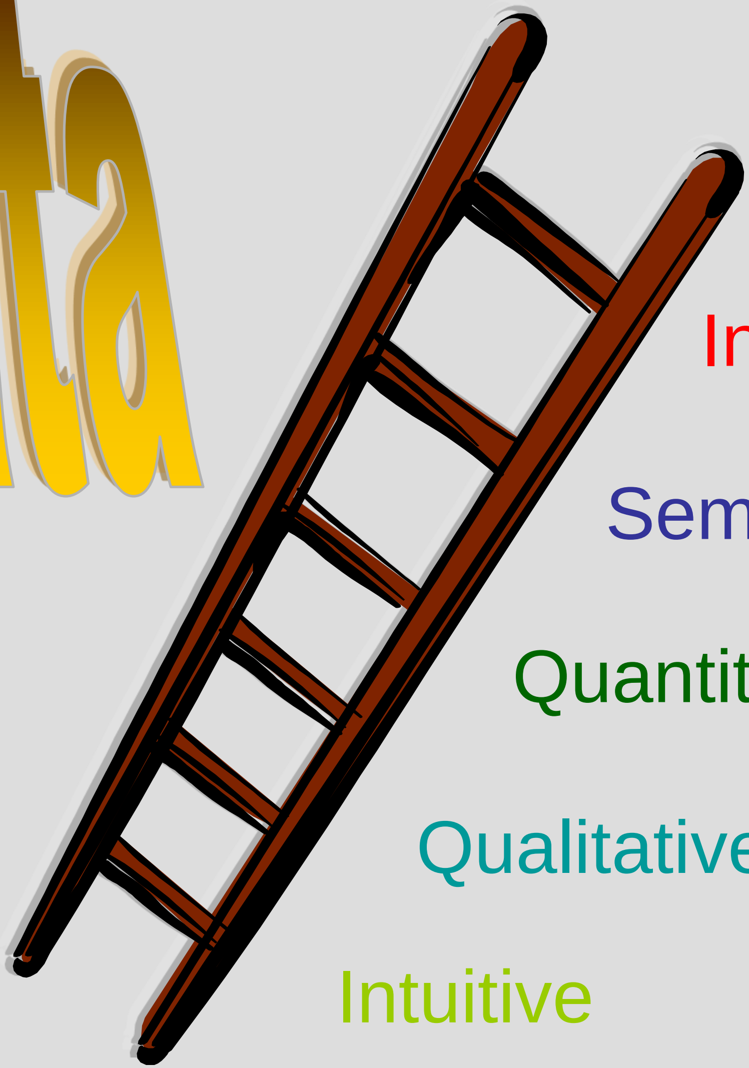
Agenda

1. Risk data
    - Qualitative Data
    - Semantic Daa
    - Financial data
    - Operational data
2. Case studies
3. Integrating risks


Process Improvement and CMMI for Systems and Software
Ron Kenett
Emanuel Baker
CRC Press


Editors
RON S. KENETT
YOSSI RAANAN
Operational Risk Management
A practical approach to intelligent data analysis
WILEY
STATISTICS IN PRACTICE

Risk Data



Integrated

Semantic

Quantitative

Qualitative

Intuitive

FMEA

Function FCTN	Failure Mode FAILURE MODE	Failure Effects EFFECT	Severity (S)	Causes of Failure CAUSE	Occurrence (O)	Controls CONTROL	Detection (D)	RPN (Risk)	Plan PLAN
HPLC DS Impurities Method	Unknown Impurity is quantified which is not present in batch	Repeat Testing (if specification initially fails or atypical result is observed)	3	Contamination - glassware	4	Method states that Wheaton vial should be used in preference to volumetric flasks. Blank Injections	4	48	Develop wash procedure for Volumetric flasks (Detergent could react with Drug Substance)
		Repeat Testing (if specification initially fails or atypical result is observed)	3	Contamination - sample handling	2	Blank Injections should pick up any aberrant peaks	2	12	Ensure Blank Solutions are prepared exactly the same way as for samples
		Repeat Testing (if specification initially fails or atypical result is observed)	3	Contamination - solvents	3	Blank Injections should pick up any aberrant peaks	2	18	Ensure Blank Solutions are prepared exactly the same way as for samples
		Report invalid results	10	Contamination - glassware	4	Method states that Wheaton vial should be used in preference to volumetric flasks. Blank Injections	4	160	Develop wash procedure for Volumetric flasks
		Report invalid results	10	Contamination - sample handling	2	Blank Injections should pick up any aberrant peaks	2	40	Ensure Blank Solutions are prepared exactly the same way as for samples
		Report invalid results	10	Contamination - solvents	3	Blank Injections should pick up any aberrant peaks	2	60	Ensure Blank Solutions are prepared exactly the same way as for samples
		Report invalid results	10	HPLC method cannot detect it	2	Orthogonal analytical techniques should pick up other unknowns	3	60	Brainstorm what potential impurities can be produced by process. Assess whether current methodology would pick these up
		Report invalid results	10	Co-elution with another named peak	2	None although considerable elevation in named impurity would lead to repeat testing	3	60	Assess impurity profile against historical batches
		Repeat Testing (if specification initially fails or atypical result is observed)	3	Poor quantification of peaks (setting of RT window)	2	Test mixture with elevated imps.	2	12	Improve HPLC training

Qualitative

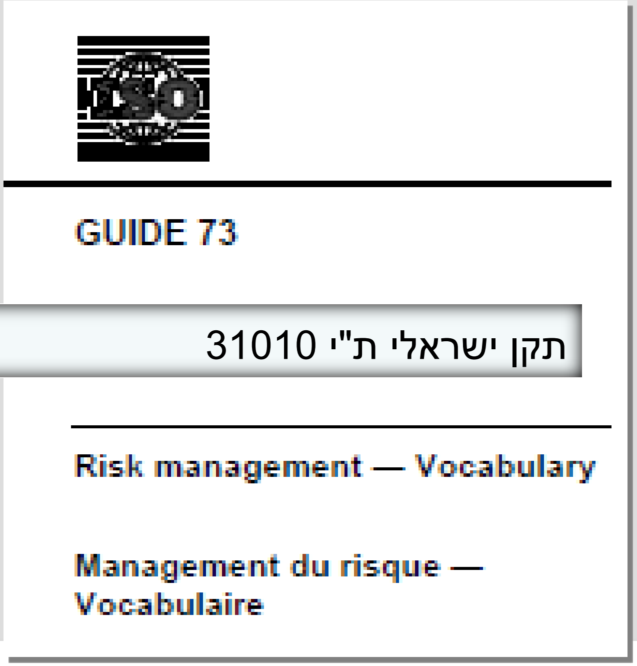
INTERNATIONAL STANDARD

ISO 31000

First edition
2009-11-15

Risk management — Principles and guidelines

Management du risque — Principes et lignes directrices

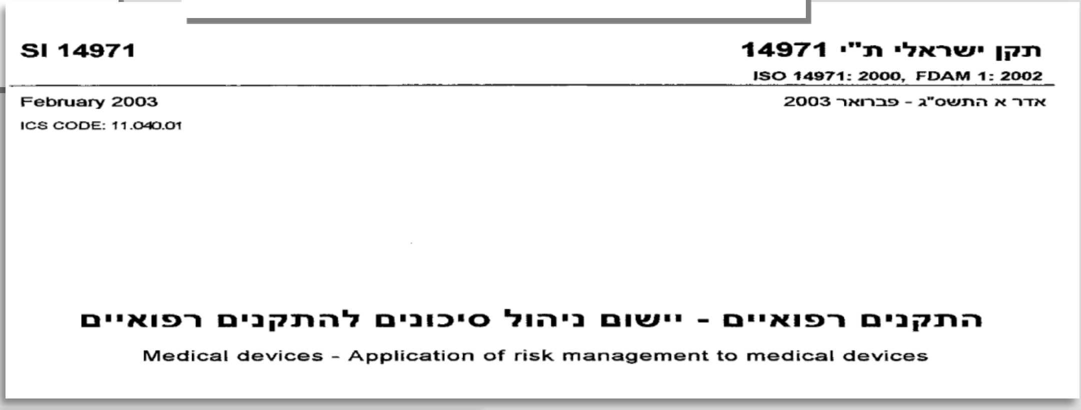


GUIDE 73

Risk management — Vocabulary

Management du risque — Vocabulaire

SI 31010 | תקן ישראלי ת"י 31010



SI 14971 | **תקן ישראלי ת"י 14971**

ISO 14971: 2000, FDAM 1: 2002

February 2003 | אדר א התשס"ג - פברואר 2003

ICS CODE: 11.040.01

התקנים רפואיים - יישום ניהול סיכונים להתקנים רפואיים

Medical devices - Application of risk management to medical devices

IEC/ISO 31010

Edition 1.0 2009-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

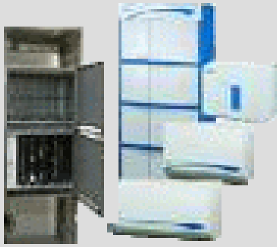
Risk management – Risk assessment techniques

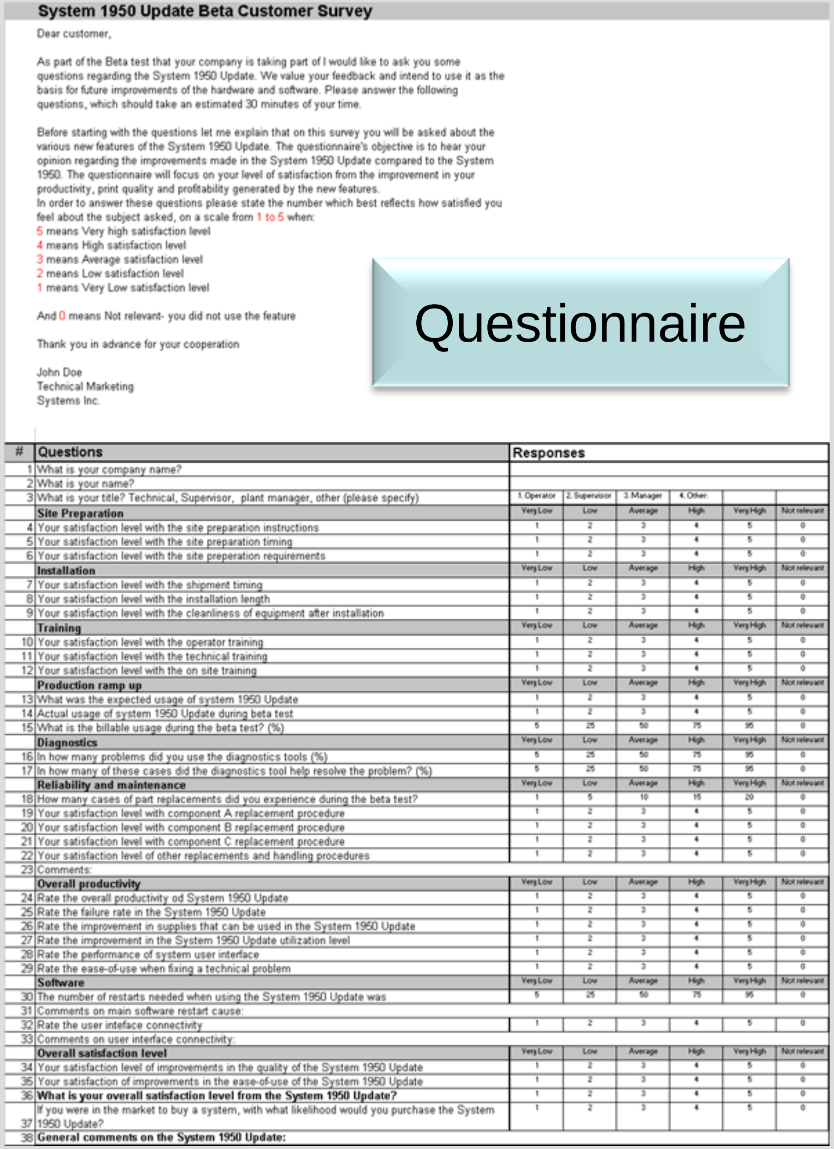
Gestion des risques – Techniques d'évaluation des risques

BS 31100:2011

Risk management – Code of practice and guidance for the implementation of BS ISO 31000

Beta Testing of a System





System 1950 Update Beta Customer Survey

Dear customer,

As part of the Beta test that your company is taking part of I would like to ask you some questions regarding the System 1950 Update. We value your feedback and intend to use it as the basis for future improvements of the hardware and software. Please answer the following questions, which should take an estimated 30 minutes of your time.

Before starting with the questions let me explain that on this survey you will be asked about the various new features of the System 1950 Update. The questionnaire's objective is to hear your opinion regarding the improvements made in the System 1950 Update compared to the System 1950. The questionnaire will focus on your level of satisfaction from the improvement in your productivity, print quality and profitability generated by the new features.
In order to answer these questions please state the number which best reflects how satisfied you feel about the subject asked, on a scale from 1 to 5 when:
5 means Very high satisfaction level
4 means High satisfaction level
3 means Average satisfaction level
2 means Low satisfaction level
1 means Very Low satisfaction level

And 0 means Not relevant- you did not use the feature

Thank you in advance for your cooperation

John Doe
Technical Marketing
Systems Inc.

#	Questions	Responses					
1	What is your company name?						
2	What is your name?						
3	What is your title? Technical, Supervisor, plant manager, other (please specify)	1. Operator	2. Supervisor	3. Manager	4. Other:		
	Site Preparation	Very Low	Low	Average	High	Very High	Not relevant
4	Your satisfaction level with the site preparation instructions	1	2	3	4	5	0
5	Your satisfaction level with the site preparation timing	1	2	3	4	5	0
6	Your satisfaction level with the site preperation requirements	1	2	3	4	5	0
	Installation	Very Low	Low	Average	High	Very High	Not relevant
7	Your satisfaction level with the shipment timing	1	2	3	4	5	0
8	Your satisfaction level with the installation length	1	2	3	4	5	0
9	Your satisfaction level with the cleanliness of equipment after installation	1	2	3	4	5	0
	Training	Very Low	Low	Average	High	Very High	Not relevant
10	Your satisfaction level with the operator training	1	2	3	4	5	0
11	Your satisfaction level with the technical training	1	2	3	4	5	0
12	Your satisfaction level with the on site training	1	2	3	4	5	0
	Production ramp up	Very Low	Low	Average	High	Very High	Not relevant
13	What was the expected usage of system 1950 Update	1	2	3	4	5	0
14	Actual usage of system 1950 Update during beta test	1	2	3	4	5	0
15	What is the billable usage during the beta test? (%)	5	25	50	75	95	0
	Diagnostics	Very Low	Low	Average	High	Very High	Not relevant
16	In how many problems did you use the diagnostics tools (%)	5	25	50	75	95	0
17	In how many of these cases did the diagnostics tool help resolve the problem? (%)	5	25	50	75	95	0
	Reliability and maintenance	Very Low	Low	Average	High	Very High	Not relevant
18	How many cases of part replacements did you experience during the beta test?	1	5	10	15	20	0
19	Your satisfaction level with component A replacement procedure	1	2	3	4	5	0
20	Your satisfaction level with component B replacement procedure	1	2	3	4	5	0
21	Your satisfaction level with component C replacement procedure	1	2	3	4	5	0
22	Your satisfaction level of other replacements and handling procedures	1	2	3	4	5	0
23	Comments:						
	Overall productivity	Very Low	Low	Average	High	Very High	Not relevant
24	Rate the overall productivity od System 1950 Update	1	2	3	4	5	0
25	Rate the failure rate in the System 1950 Update	1	2	3	4	5	0
26	Rate the improvement in supplies that can be used in the System 1950 Update	1	2	3	4	5	0
27	Rate the improvement in the System 1950 Update utilization level	1	2	3	4	5	0
28	Rate the performance of system user interface	1	2	3	4	5	0
29	Rate the ease-of-use when fixing a technical problem	1	2	3	4	5	0
	Software	Very Low	Low	Average	High	Very High	Not relevant
30	The number of restarts needed when using the System 1950 Update was	5	25	50	75	95	0
31	Comments on main software restart cause:						
32	Rate the user inteface connectivity	1	2	3	4	5	0
33	Comments on user interface connectivity:						
	Overall satisfaction level	Very Low	Low	Average	High	Very High	Not relevant
34	Your satisfaction level of improvements in the quality of the System 1950 Update	1	2	3	4	5	0
35	Your satisfaction of improvements in the ease-of-use of the System 1950 Update	1	2	3	4	5	0
36	**What is your overall satisfaction level from the System 1950 Update?**	1	2	3	4	5	0
37	If you were in the market to buy a system, with what likelihood would you purchase the System 1950 Update?	1	2	3	4	5	0
38	**General comments on the System 1950 Update:**						

Questionnaire

Heavy/Light Workload
SME/Large Company
Basic/Sophisticated Usage

Group	Workload	Size	Usage
1	HW	SME	B
2	LW	SME	B
3	HW	LC	B
4	LW	LC	B
5	HW	SME	S
6	LW	SME	S
7	HW	LC	S
8	LW	LC	S

1 site per run
8 systems
9 respondents per site:

- 3 decision makers
- 3 technical experts
- 3 operations staff

Group	Workload	Size	Usage
2	LW	SME	B
3	HW	LC	B
5	HW	SME	S
8	LW	LC	S

2 sites per run
8 systems
9 respondents per site

Qualitative

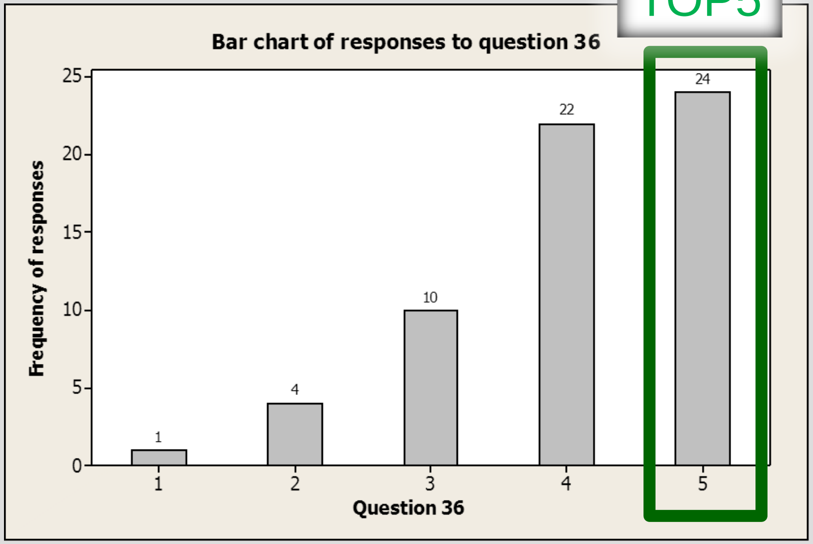
Beta Testing of a System

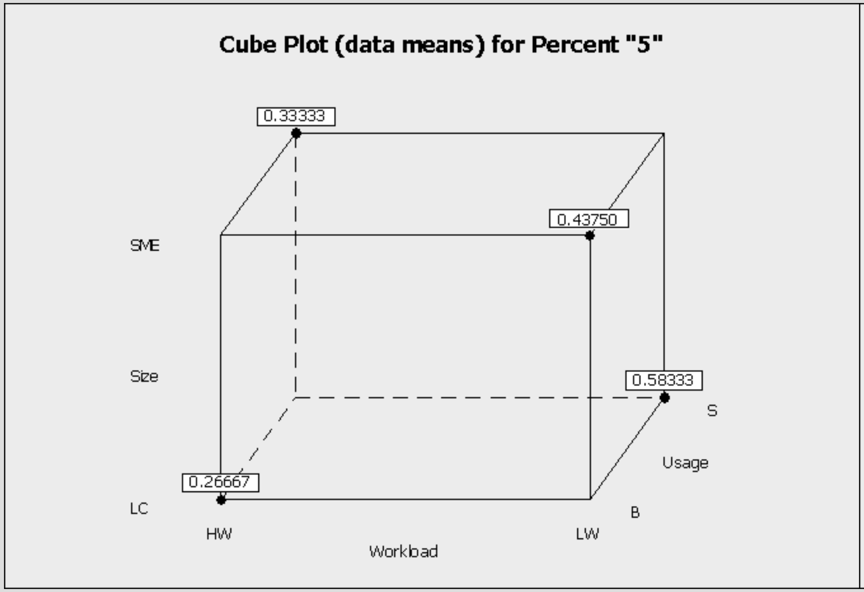
What is your overall level of satisfaction from the system under test:

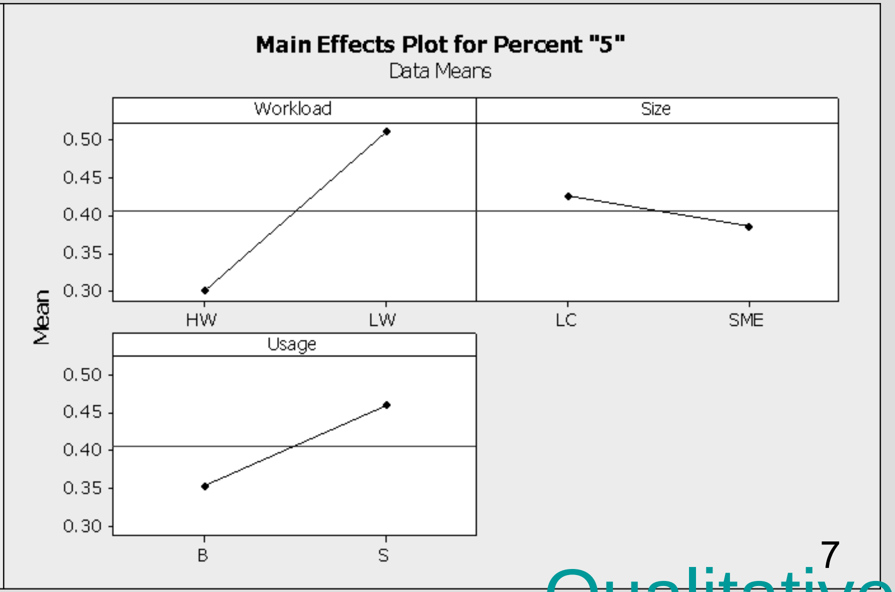
Very Low
Low
Average
High
Very High

TOP5

TOP5



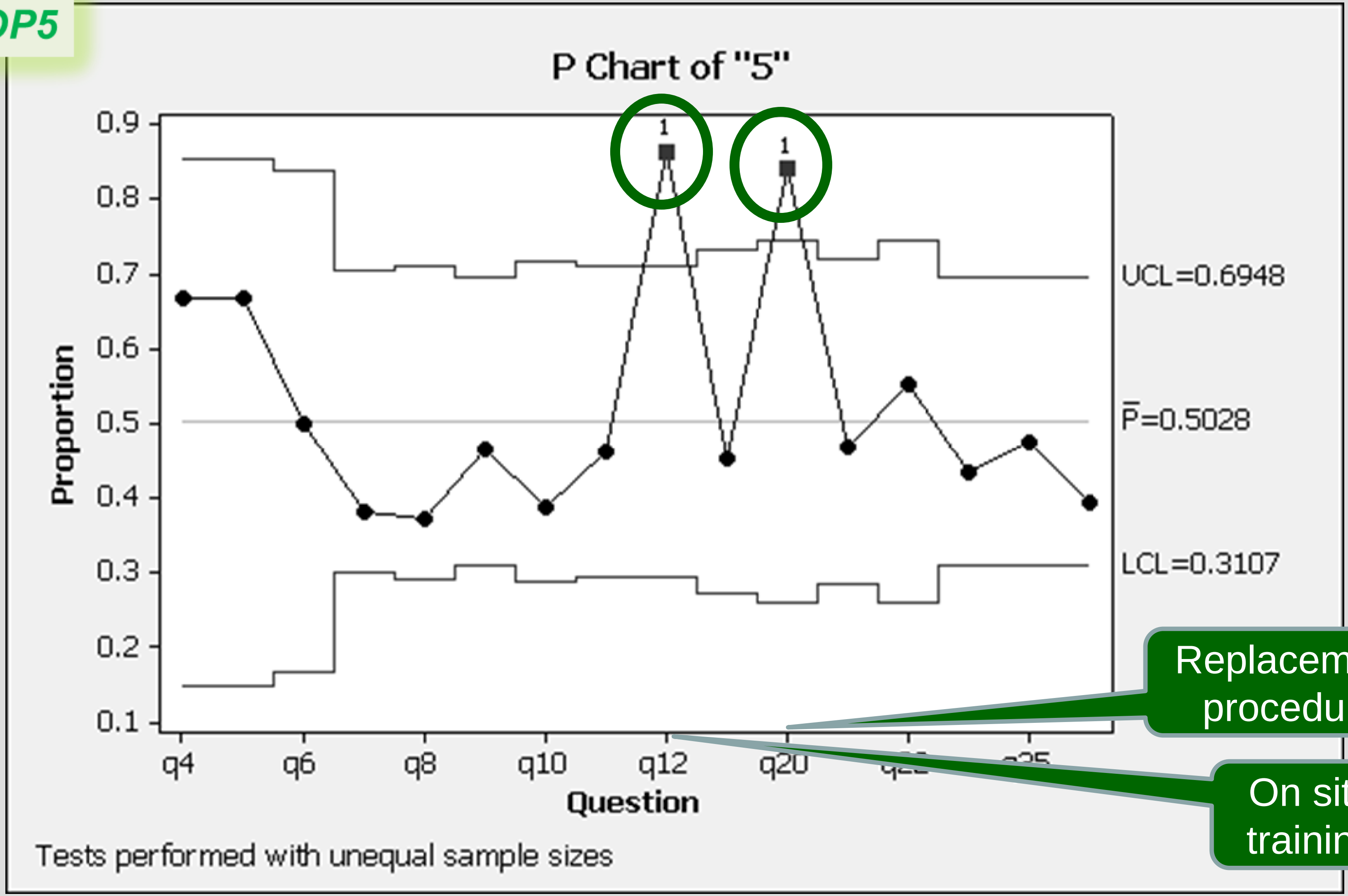




Qualitative

Beta Testing of a System

TOP5

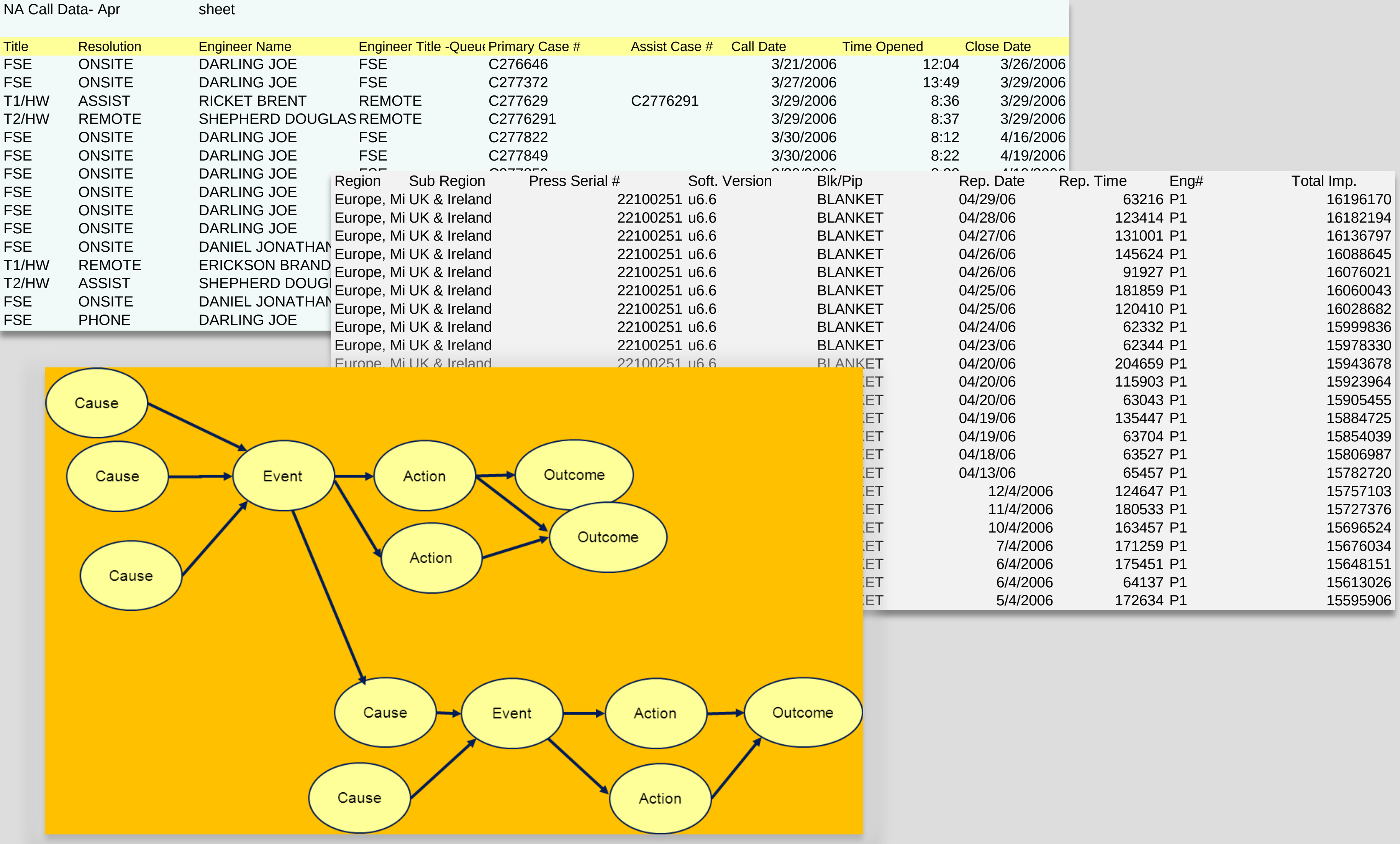


Replacement procedure

On site training

Qualitative

Beta Testing of a System



NA Call Data- Apr sheet

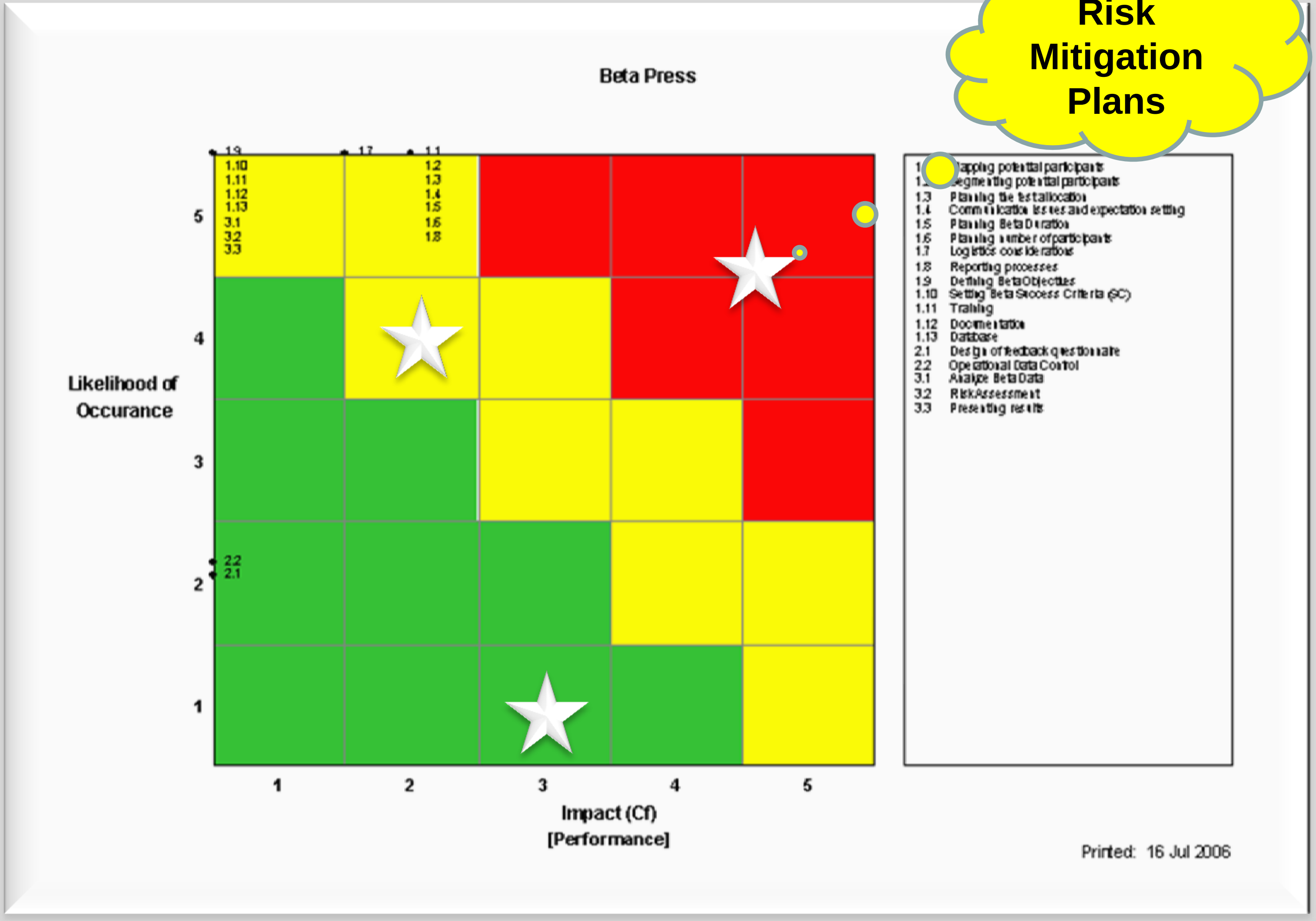
Title	Resolution	Engineer Name	Engineer Title -Queu	Primary Case #	Assist Case #	Call Date	Time Opened	Close Date
FSE	ONSITE	DARLING JOE	FSE	C276646		3/21/2006	12:04	3/26/2006
FSE	ONSITE	DARLING JOE	FSE	C277372		3/27/2006	13:49	3/29/2006
T1/HW	ASSIST	RICKET BRENT	REMOTE	C277629	C2776291	3/29/2006	8:36	3/29/2006
T2/HW	REMOTE	SHEPHERD DOUGLAS	REMOTE	C2776291		3/29/2006	8:37	3/29/2006
FSE	ONSITE	DARLING JOE	FSE	C277822		3/30/2006	8:12	4/16/2006
FSE	ONSITE	DARLING JOE	FSE	C277849		3/30/2006	8:22	4/19/2006
FSE	ONSITE	DARLING JOE						
FSE	ONSITE	DARLING JOE						
FSE	ONSITE	DARLING JOE						
FSE	ONSITE	DARLING JOE						
FSE	ONSITE	DANIEL JONATHAN						
T1/HW	REMOTE	ERICKSON BRAND						
T2/HW	ASSIST	SHEPHERD DOUG						
FSE	ONSITE	DANIEL JONATHAN						
FSE	PHONE	DARLING JOE						

Region	Sub Region	Press Serial #	Soft. Version	Blk/Pip	Rep. Date	Rep. Time	Eng#	Total Imp.
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/29/06	63216	P1	16196170
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/28/06	123414	P1	16182194
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/27/06	131001	P1	16136797
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/26/06	145624	P1	16088645
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/26/06	91927	P1	16076021
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/25/06	181859	P1	16060043
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/25/06	120410	P1	16028682
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/24/06	62332	P1	15999836
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/23/06	62344	P1	15978330
Europe, Mi	UK & Ireland	22100251	u6.6	BLANKET	04/20/06	204659	P1	15943678
				ET	04/20/06	115903	P1	15923964
				ET	04/20/06	63043	P1	15905455
				ET	04/19/06	135447	P1	15884725
				ET	04/19/06	63704	P1	15854039
				ET	04/18/06	63527	P1	15806987
				ET	04/13/06	65457	P1	15782720
				ET	12/4/2006	124647	P1	15757103
				ET	11/4/2006	180533	P1	15727376
				ET	10/4/2006	163457	P1	15696524
				ET	7/4/2006	171259	P1	15676034
				ET	6/4/2006	175451	P1	15648151
				ET	6/4/2006	64137	P1	15613026
				ET	5/4/2006	172634	P1	15595906

Quantitative

Beta Testing of a System

Risk Mitigation Plans

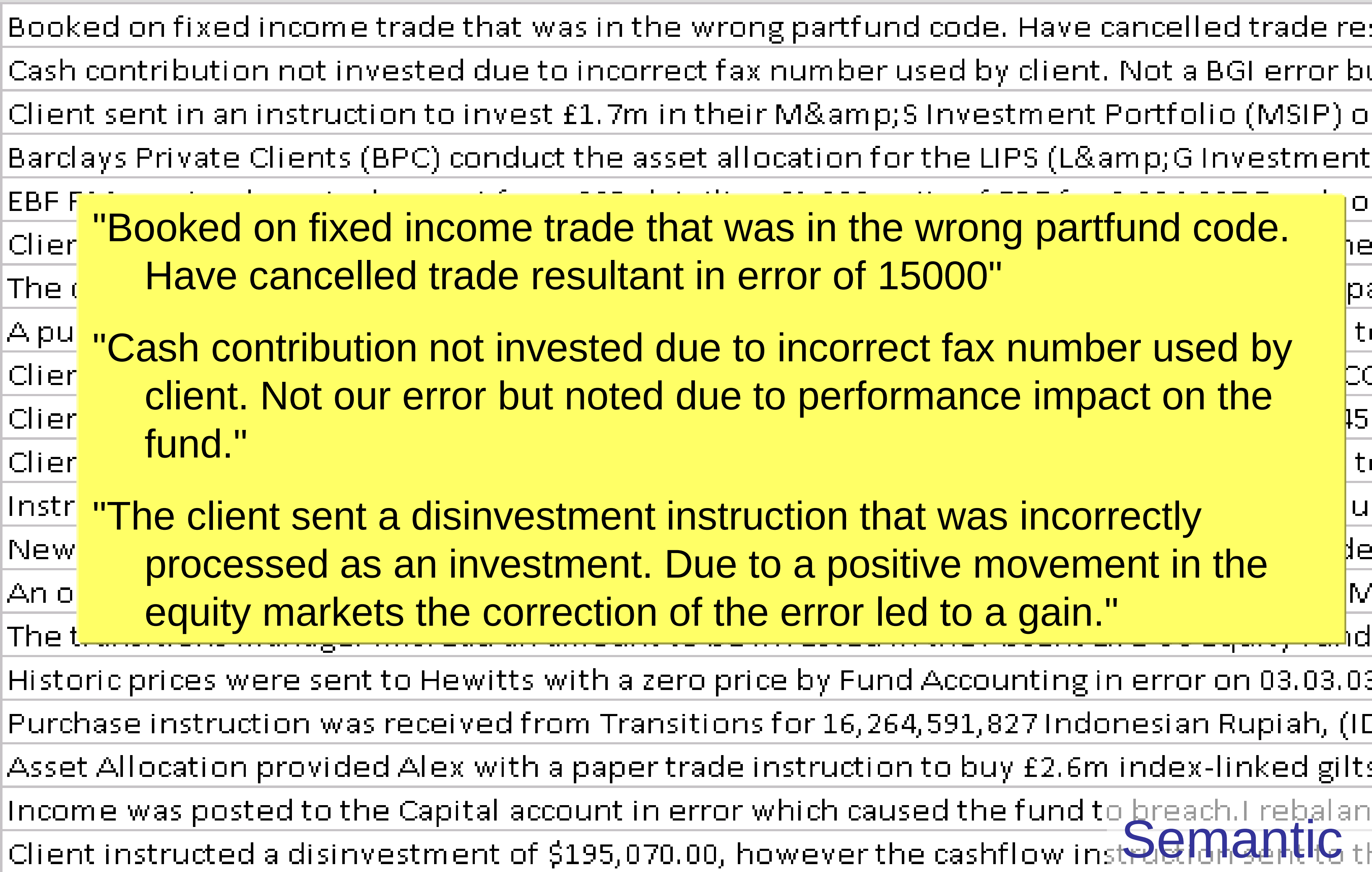


1	apping potential participants
1.	egmenting potential participants
1.3	Planning the test allocation
1.4	Communication issues and expectation setting
1.5	Planning Beta Duration
1.6	Planning number of participants
1.7	Logistics considerations
1.8	Reporting processes
1.9	Defining Beta Objectives
1.10	Setting Beta Success Criteria (SC)
1.11	Training
1.12	Documentation
1.13	Database
2.1	Design of feedback questionnaire
2.2	Operational Data Control
3.1	Analyze Beta Data
3.2	Risk Assessment
3.3	Presenting results

Printed: 16 Jul 2006

Qualitative/Quantitative

Semantic Data in a Bank Logbook



Booked on fixed income trade that was in the wrong partfund code. Have cancelled trade res

Cash contribution not invested due to incorrect fax number used by client. Not a BGI error bu

Client sent in an instruction to invest £1.7m in their M&amp;S Investment Portfolio (MSIP) o

Barclays Private Clients (BPC) conduct the asset allocation for the LIPS (L&amp;G Investment

EBF F o

Clier ne

The c pa

A pu t

Clier CC

Clier 45

Clier t

Instr u

New de

An o M

The t nd

Historic prices were sent to Hewitts with a zero price by Fund Accounting in error on 03.03.03

Purchase instruction was received from Transitions for 16,264,591,827 Indonesian Rupiah, (ID

Asset Allocation provided Alex with a paper trade instruction to buy £2.6m index-linked gilts

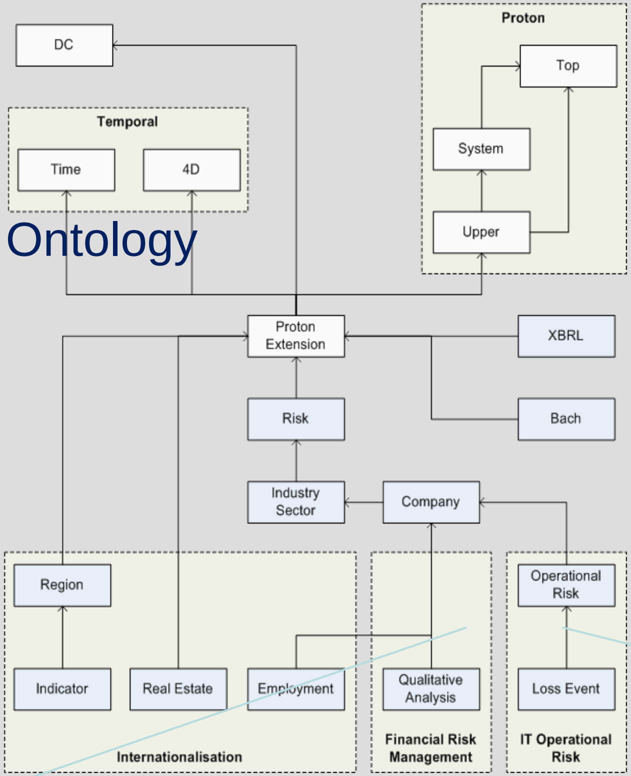
Income was posted to the Capital account in error which caused the fund to breach. I rebalan

Client instructed a disinvestment of $195,070.00, however the cashflow instruction sent to th

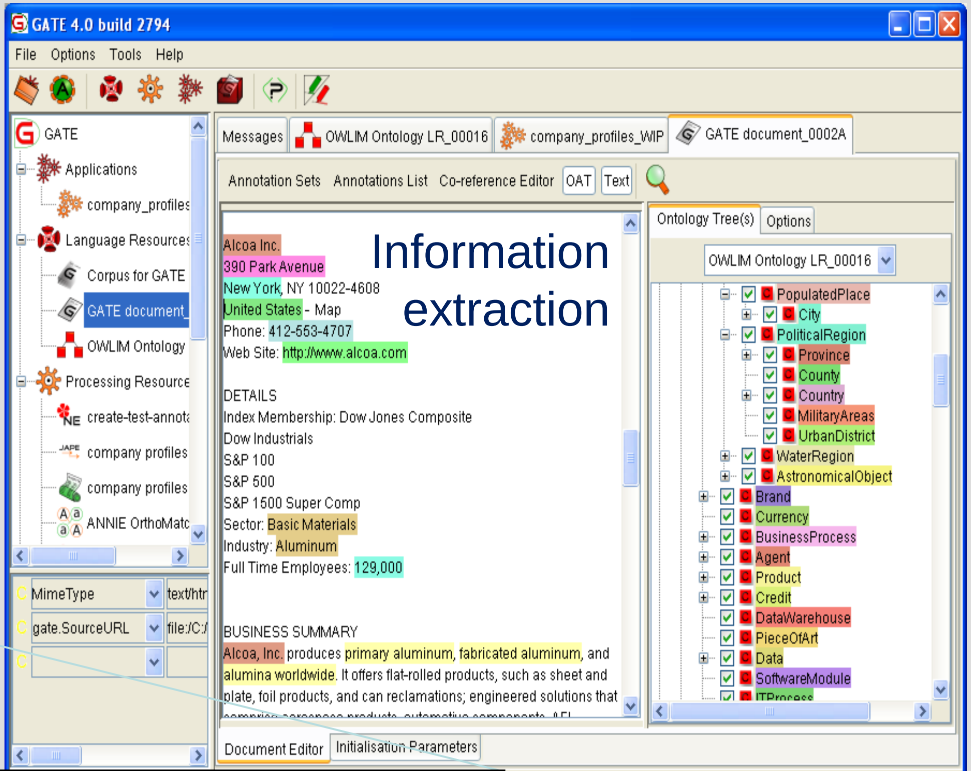
"Booked on fixed income trade that was in the wrong partfund code. Have cancelled trade resultant in error of 15000"

"Cash contribution not invested due to incorrect fax number used by client. Not our error but noted due to performance impact on the fund."

"The client sent a disinvestment instruction that was incorrectly processed as an investment. Due to a positive movement in the equity markets the correction of the error led to a gain."


DC
Proton
Top
System
Upper
Temporal
Time
4D
Proton Extension
XBRL
Risk
Bach
Industry Sector
Company
Region
Indicator
Real Estate
Employment
Internationalisation
Qualitative Analysis
Financial Risk Management
Operational Risk
Loss Event
IT Operational Risk

Ontology

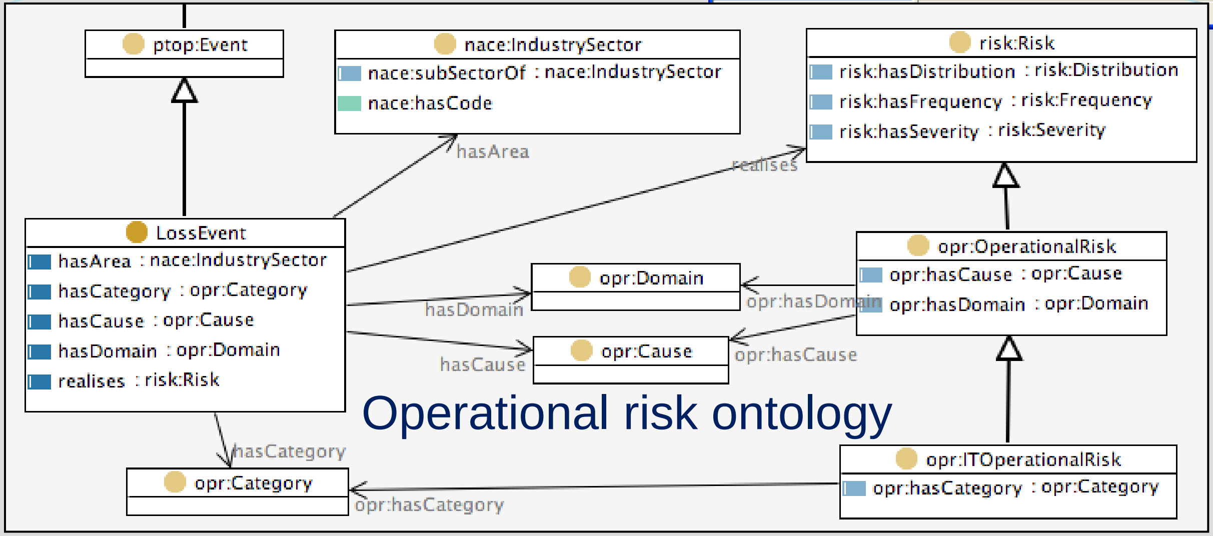

GATE 4.0 build 2794
File Options Tools Help
GATE
Applications
company_profiles
Language Resources
Corpus for GATE
GATE document_
OWLIM Ontology
Processing Resources
create-test-annota
company profiles
company profiles
ANNIE OrthoMatc
MimeType
text/htm
gate.SourceURL
file:/C:/
Messages
OWLIM Ontology LR_00016
company_profiles_WIP
GATE document_0002A
Annotation Sets
Annotations List
Co-reference Editor
OAT
Text
Ontology Tree(s)
Options
OWLIM Ontology LR_00016
PopulatedPlace
City
PoliticalRegion
Province
County
Country
MilitaryAreas
UrbanDistrict
WaterRegion
AstronomicalObject
Brand
Currency
BusinessProcess
Agent
Product
Credit
DataWarehouse
PieceOfArt
Data
SoftwareModule
ITProcess
Document Editor
Initialisation Parameters

Alcoa Inc.
390 Park Avenue
New York, NY 10022-4608
United States - Map
Phone: 412-553-4707
Web Site: http://www.alcoa.com

DETAILS
Index Membership: Dow Jones Composite
Dow Industrials
S&P 100
S&P 500
S&P 1500 Super Comp
Sector: Basic Materials
Industry: Aluminum
Full Time Employees: 129,000

BUSINESS SUMMARY
Alcoa, Inc. produces primary aluminum, fabricated aluminum, and alumina worldwide. It offers flat-rolled products, such as sheet and plate, foil products, and can reclamations; engineered solutions that

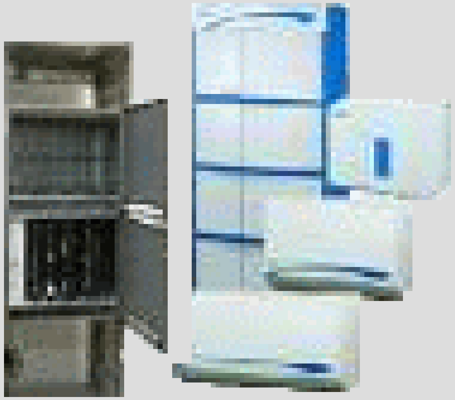
Information extraction


ptop:Event
nace:IndustrySector
nace:subSectorOf : nace:IndustrySector
nace:hasCode
risk:Risk
risk:hasDistribution : risk:Distribution
risk:hasFrequency : risk:Frequency
risk:hasSeverity : risk:Severity
hasArea
realises
LossEvent
hasArea : nace:IndustrySector
hasCategory : opr:Category
hasCause : opr:Cause
hasDomain : opr:Domain
realises : risk:Risk
opr:Domain
opr:OperationalRisk
opr:hasCause : opr:Cause
opr:hasDomain : opr:Domain
hasDomain
opr:hasDomain
opr:Cause
hasCause
opr:hasCause
hasCategory
opr:Category
opr:hasCategory
opr:ITOperationalRisk
opr:hasCategory : opr:Category

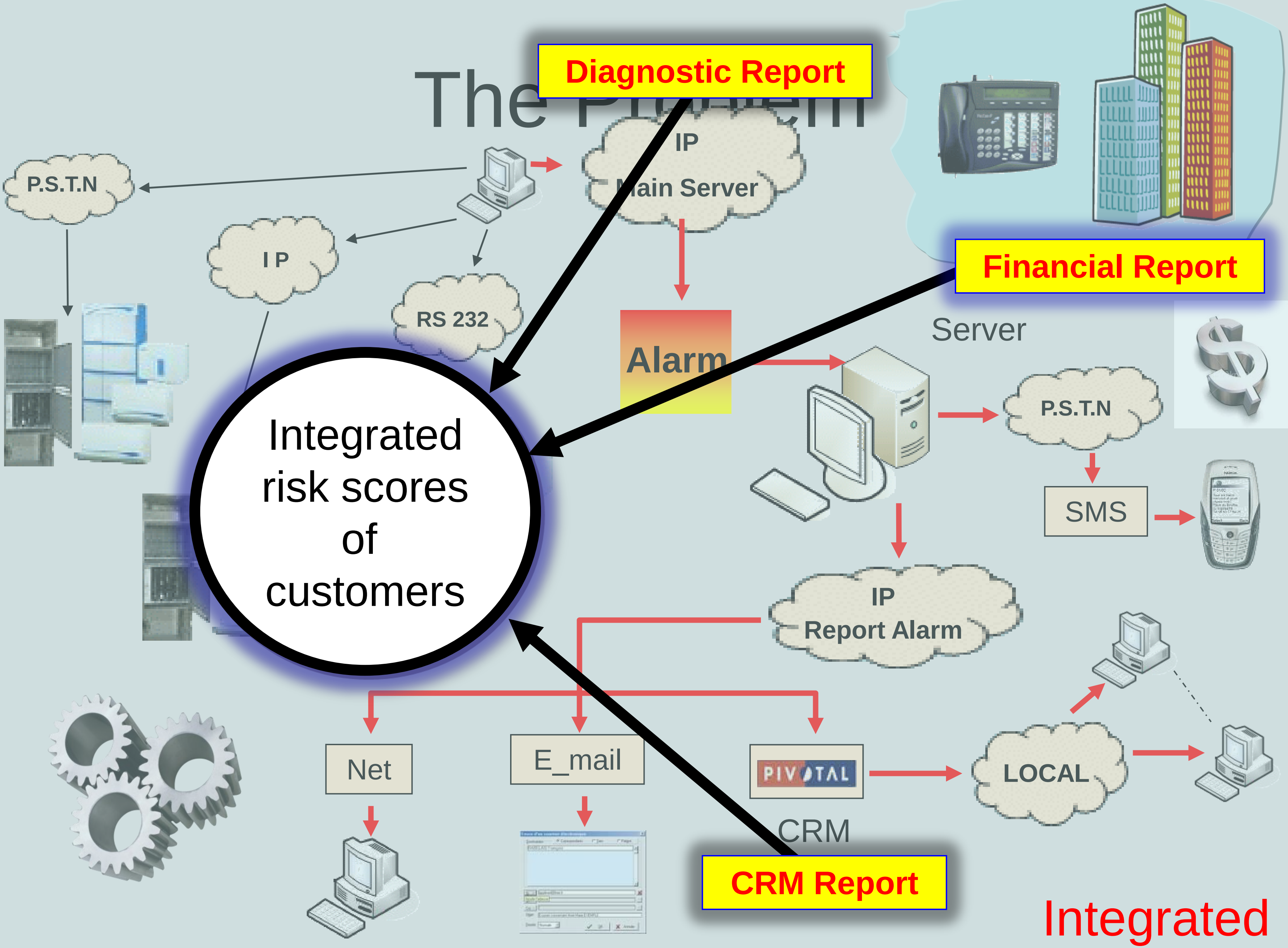
Operational risk ontology

A Telcom Operator Case Study

- Compute **operational risk scores** by combining information from PBX logs with CRM and technical data.
- Combine XBRL data to determine **credit scores**.
- Integrate risk scores for overall **integrated risk management**.



The Problem



Diagnostic Report

Financial Report

CRM Report

Integrated risk scores of customers

P.S.T.N

IP

RS 232

IP

Main Server

Alarm

Server

P.S.T.N

SMS

IP

Report Alarm

Net

E_mail

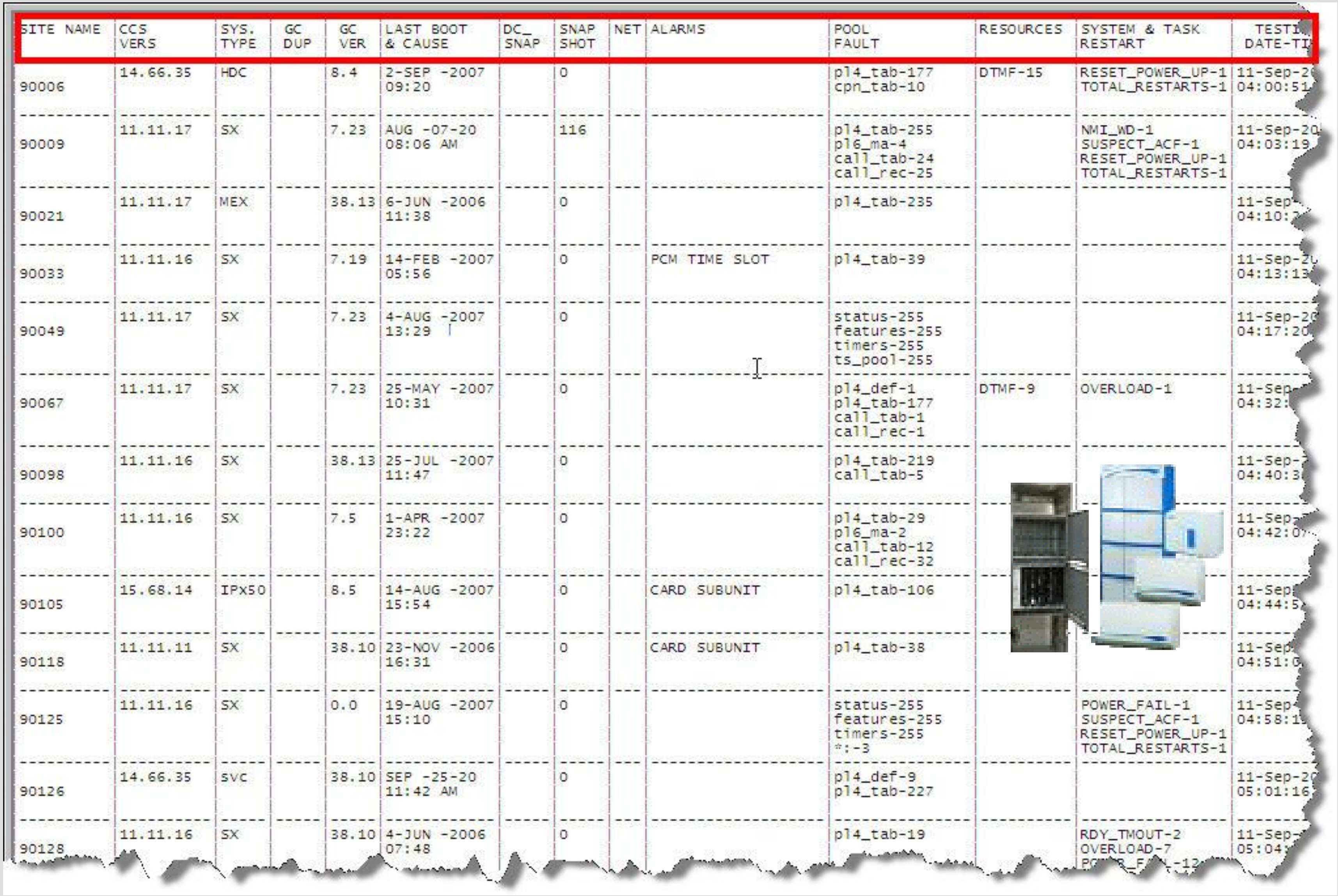
PIVOTAL

CRM

LOCAL

Integrated

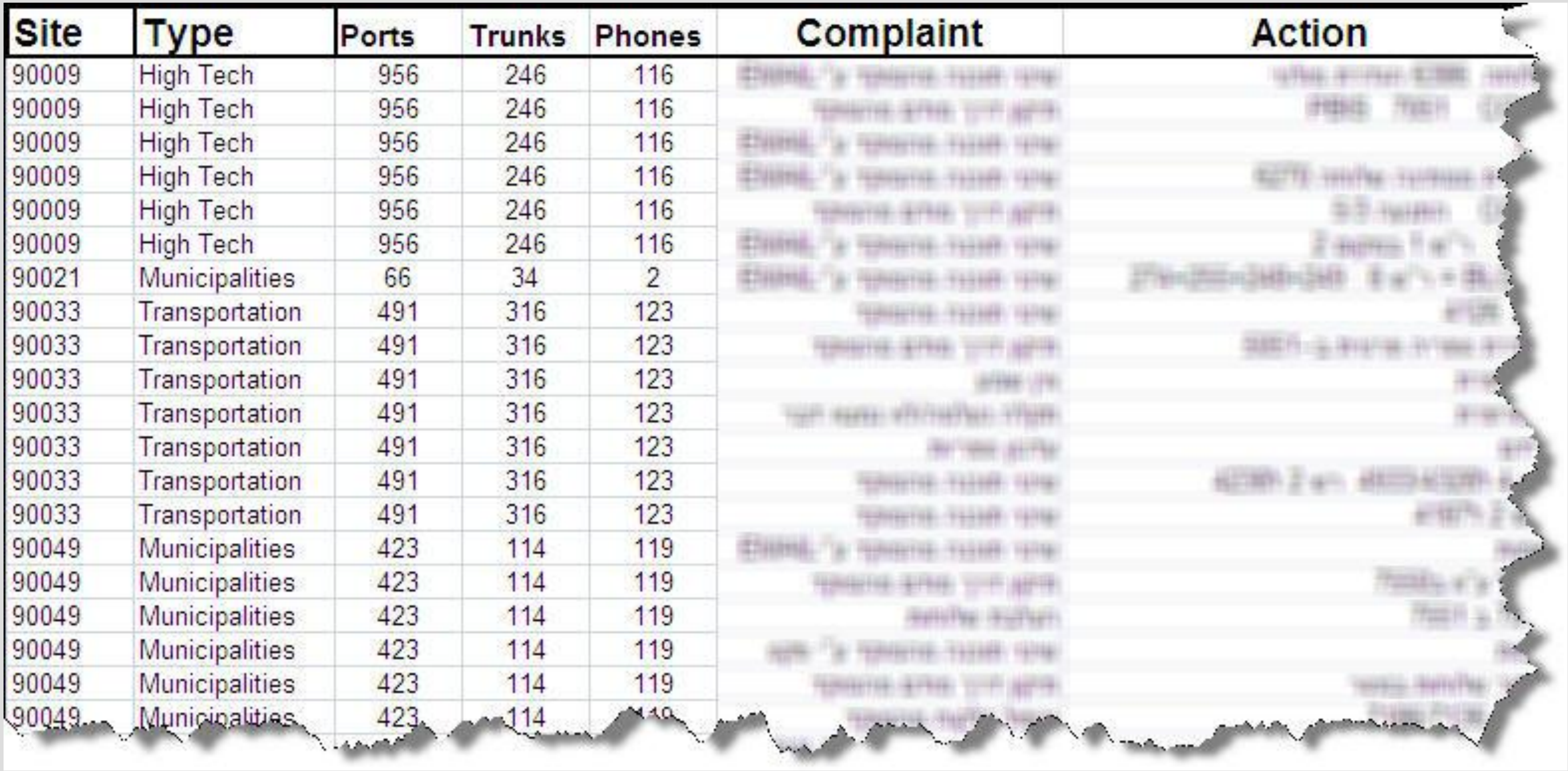
Logs of Telecom System



SITE NAME	CCS VERS	SYS. TYPE	GC DUP	GC VER	LAST BOOT & CAUSE	DC_ SNAP	SNAP SHOT	NET	ALARMS	POOL FAULT	RESOURCES	SYSTEM & TASK RESTART	TESTI DATE-TI
90006	14.66.35	HDC		8.4	2-SEP -2007 09:20		0			pl4_tab-177 cpn_tab-10	DTMF-15	RESET_POWER_UP-1 TOTAL_RESTARTS-1	11-Sep-2 04:00:51
90009	11.11.17	SX		7.23	AUG -07-20 08:06 AM		116			pl4_tab-255 pl6_ma-4 call_tab-24 call_rec-25		NMI_WD-1 SUSPECT_ACF-1 RESET_POWER_UP-1 TOTAL_RESTARTS-1	11-Sep-20 04:03:19
90021	11.11.17	MEX		38.13	6-JUN -2006 11:38		0			pl4_tab-235			11-Sep 04:10:
90033	11.11.16	SX		7.19	14-FEB -2007 05:56		0		PCM TIME SLOT	pl4_tab-39			11-Sep-2 04:13:13
90049	11.11.17	SX		7.23	4-AUG -2007 13:29		0			status-255 features-255 timers-255 ts_pool-255			11-Sep-2 04:17:20
90067	11.11.17	SX		7.23	25-MAY -2007 10:31		0			pl4_def-1 pl4_tab-177 call_tab-1 call_rec-1	DTMF-9	OVERLOAD-1	11-Sep 04:32:
90098	11.11.16	SX		38.13	25-JUL -2007 11:47		0			pl4_tab-219 call_tab-5			11-Sep- 04:40:3
90100	11.11.16	SX		7.5	1-APR -2007 23:22		0			pl4_tab-29 pl6_ma-2 call_tab-12 call_rec-32			11-Sep 04:42:0
90105	15.68.14	IPX50		8.5	14-AUG -2007 15:54		0		CARD SUBUNIT	pl4_tab-106			11-Sep 04:44:5
90118	11.11.11	SX		38.10	23-NOV -2006 16:31		0		CARD SUBUNIT	pl4_tab-38			11-Sep 04:51:0
90125	11.11.16	SX		0.0	19-AUG -2007 15:10		0			status-255 features-255 timers-255 *:-3		POWER_FAIL-1 SUSPECT_ACF-1 RESET_POWER_UP-1 TOTAL_RESTARTS-1	11-Sep 04:58:1
90126	14.66.35	svc		38.10	SEP -25-20 11:42 AM		0			pl4_def-9 pl4_tab-227			11-Sep-2 05:01:16
90128	11.11.16	SX		38.10	4-JUN -2006 07:48		0			pl4_tab-19		RDY_TMOUT-2 OVERLOAD-7 POWER_FAIL-12	11-Sep- 05:04:

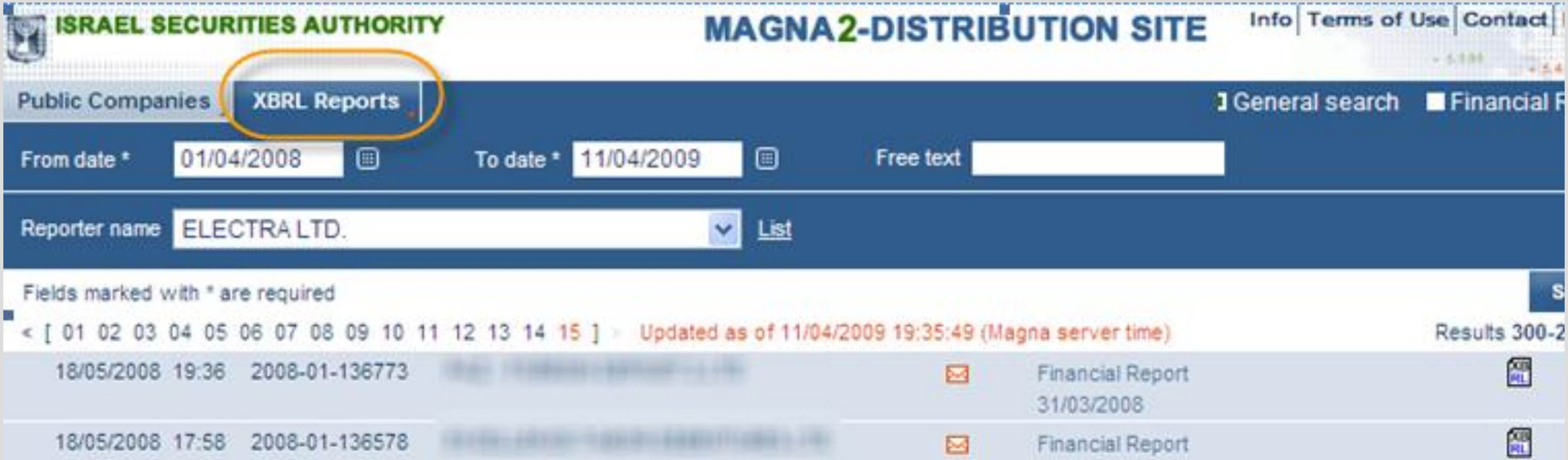
Semantic

CRM Data



Site	Type	Ports	Trunks	Phones	Complaint	Action
90009	High Tech	956	246	116	[illegible]	[illegible]
90009	High Tech	956	246	116	[illegible]	[illegible]
90009	High Tech	956	246	116	[illegible]	
90009	High Tech	956	246	116	[illegible]	[illegible]
90009	High Tech	956	246	116	[illegible]	[illegible]
90009	High Tech	956	246	116	[illegible]	[illegible]
90021	Municipalities	66	34	2	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90033	Transportation	491	316	123	[illegible]	[illegible]
90049	Municipalities	423	114	119	[illegible]	[illegible]
90049	Municipalities	423	114	119	[illegible]	[illegible]
90049	Municipalities	423	114	119	[illegible]	[illegible]
90049	Municipalities	423	114	119	[illegible]	[illegible]
90049	Municipalities	423	114	119	[illegible]	[illegible]
90049	Municipalities	423	114	[illegible]	[illegible]	[illegible]

Israel Security Authority Site



ISRAEL SECURITIES AUTHORITY
MAGNA2-DISTRIBUTION SITE
Info
Terms of Use
Contact
Public Companies
XBRL Reports
General search
Financial R

From date * 01/04/2008

To date * 11/04/2009

Free text

Reporter name ELECTRA LTD.

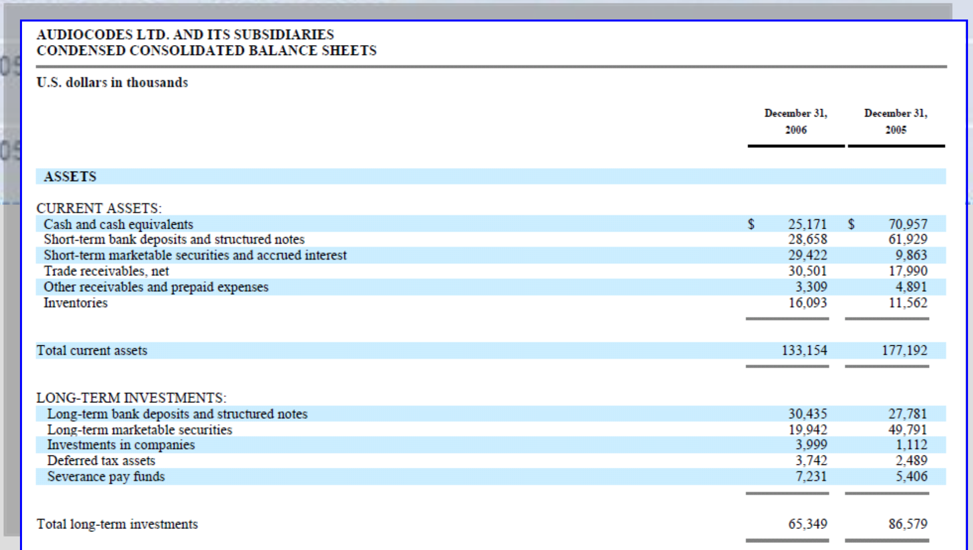
List

Fields marked with * are required

< [01 02 03 04 05 06 07 08 09 10 11 12 13 14 15] > Updated as of 11/04/2009 19:35:49 (Magna server time)

Results 300-2

18/05/2008	19:36	2008-01-136773	[redacted]	Financial Report 31/03/2008
18/05/2008	17:58	2008-01-136578	[redacted]	Financial Report 31/03/2008
18/05				Financial Report
18/05				



AUDIOCODES LTD. AND ITS SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS

U.S. dollars in thousands

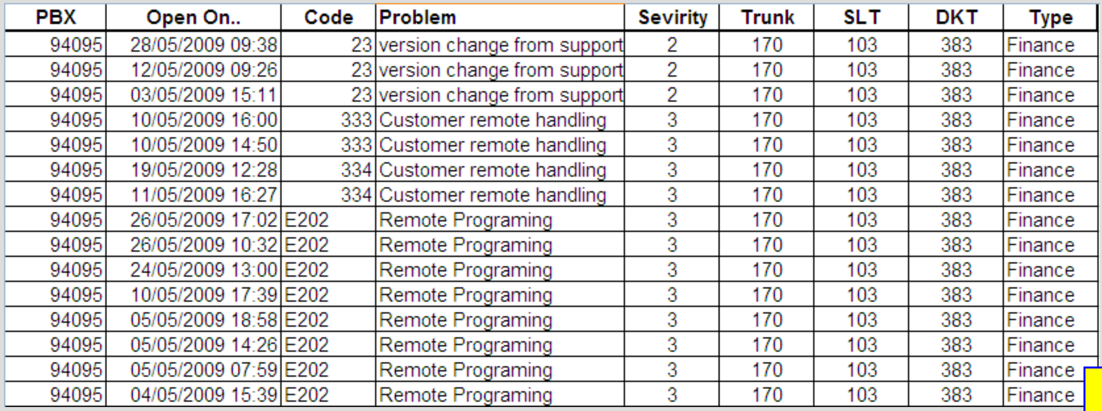
	December 31, 2006	December 31, 2005
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 25,171	$ 70,957
Short-term bank deposits and structured notes	28,658	61,929
Short-term marketable securities and accrued interest	29,422	9,863
Trade receivables, net	30,501	17,990
Other receivables and prepaid expenses	3,309	4,891
Inventories	16,093	11,562
Total current assets	133,154	177,192
LONG-TERM INVESTMENTS:		
Long-term bank deposits and structured notes	30,435	27,781
Long-term marketable securities	19,942	49,791
Investments in companies	3,999	1,112
Deferred tax assets	3,742	2,489
Severance pay funds	7,231	5,406
Total long-term investments	65,349	86,579

XBRL®
eXtensible Business Reporting Language

Quantitative

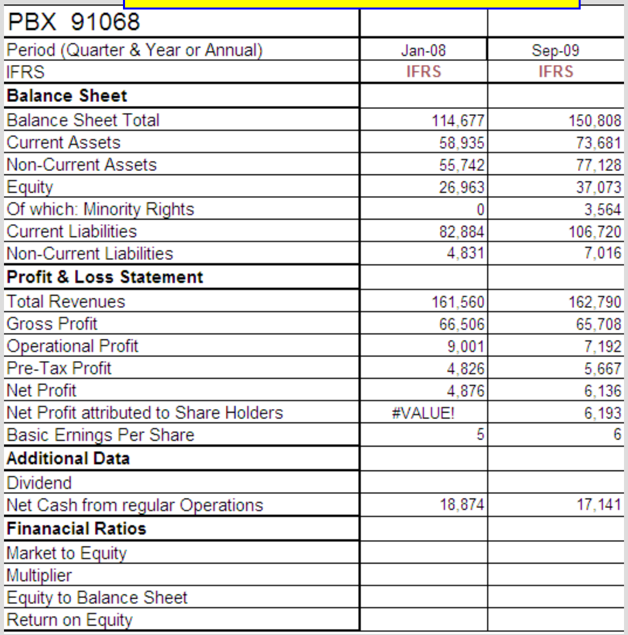
The Data

CRM Report



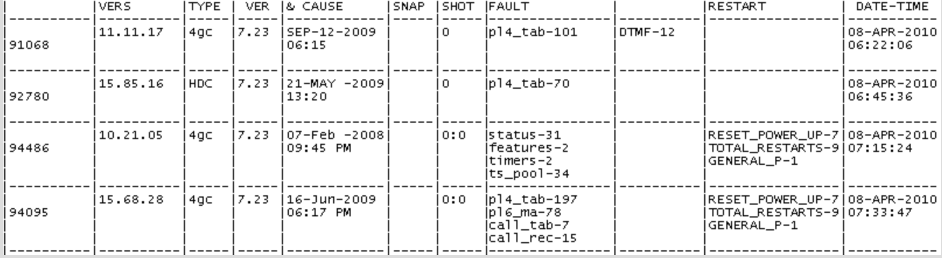
PBX	Open On..	Code	Problem	Sevirity	Trunk	SLT	DKT	Type
94095	28/05/2009 09:38	23	version change from support	2	170	103	383	Finance
94095	12/05/2009 09:26	23	version change from support	2	170	103	383	Finance
94095	03/05/2009 15:11	23	version change from support	2	170	103	383	Finance
94095	10/05/2009 16:00	333	Customer remote handling	3	170	103	383	Finance
94095	10/05/2009 14:50	333	Customer remote handling	3	170	103	383	Finance
94095	19/05/2009 12:28	334	Customer remote handling	3	170	103	383	Finance
94095	11/05/2009 16:27	334	Customer remote handling	3	170	103	383	Finance
94095	26/05/2009 17:02	E202	Remote Programing	3	170	103	383	Finance
94095	26/05/2009 10:32	E202	Remote Programing	3	170	103	383	Finance
94095	24/05/2009 13:00	E202	Remote Programing	3	170	103	383	Finance
94095	10/05/2009 17:39	E202	Remote Programing	3	170	103	383	Finance
94095	05/05/2009 18:58	E202	Remote Programing	3	170	103	383	Finance
94095	05/05/2009 14:26	E202	Remote Programing	3	170	103	383	Finance
94095	05/05/2009 07:59	E202	Remote Programing	3	170	103	383	Finance
94095	04/05/2009 15:39	E202	Remote Programing	3	170	103	383	Finance

Financial Report



PBX 91068		
Period (Quarter & Year or Annual)	Jan-08	Sep-09
IFRS	IFRS	IFRS
Balance Sheet		
Balance Sheet Total	114,677	150,808
Current Assets	58,935	73,681
Non-Current Assets	55,742	77,128
Equity	26,963	37,073
Of which: Minority Rights	0	3,564
Current Liabilities	82,884	106,720
Non-Current Liabilities	4,831	7,016
Profit & Loss Statement		
Total Revenues	161,560	162,790
Gross Profit	66,506	65,708
Operational Profit	9,001	7,192
Pre-Tax Profit	4,826	5,667
Net Profit	4,876	6,136
Net Profit attributed to Share Holders	#VALUE!	6,193
Basic Ernings Per Share	5	6
Additional Data		
Dividend		
Net Cash from regular Operations	18,874	17,141
Finanacial Ratios		
Market to Equity		
Multiplier		
Equity to Balance Sheet		
Return on Equity		

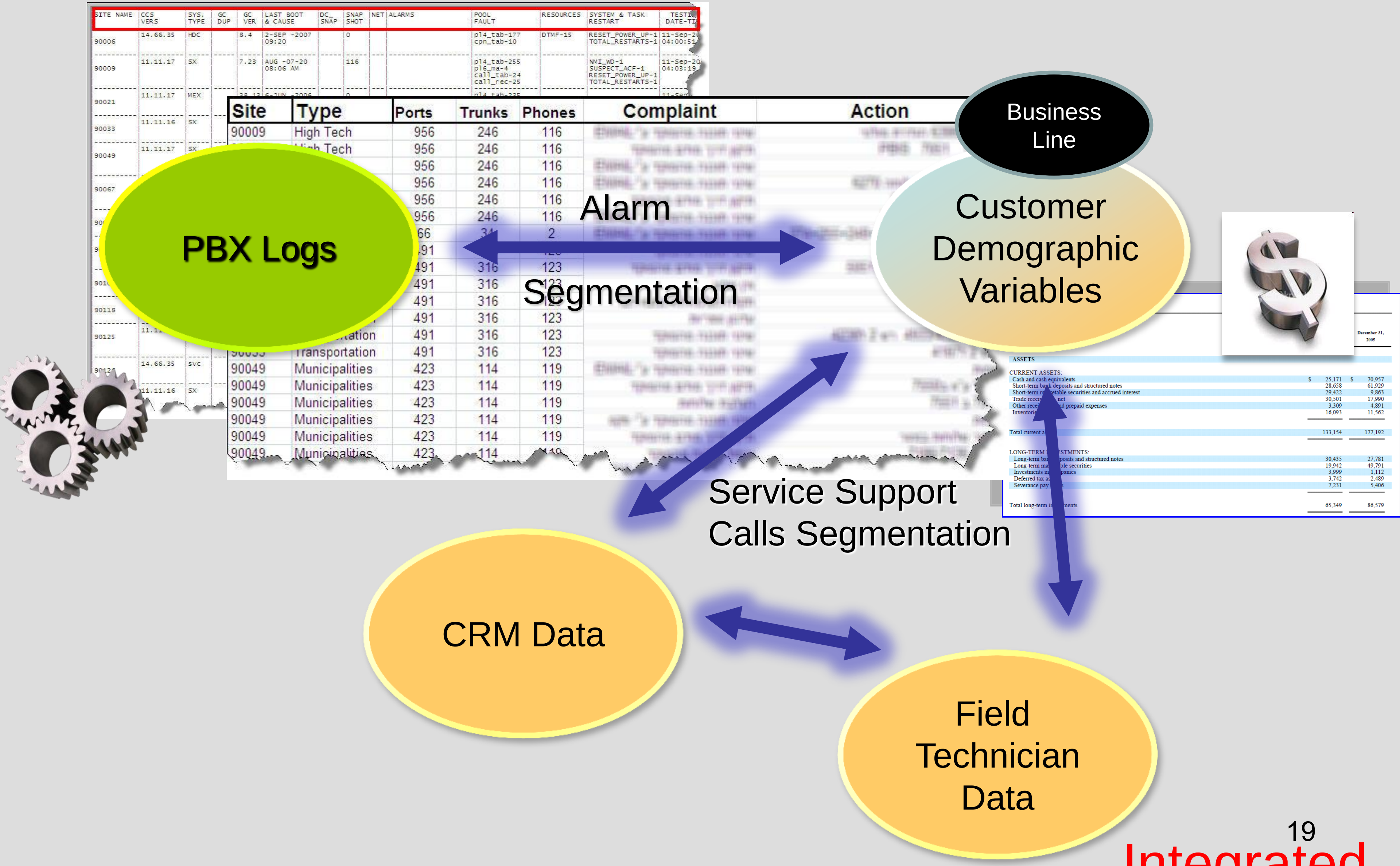
Diagnostic Report



SITE NAME	CCS VERS	SYS. TYPE	GC VER	LAST BOOT & CAUSE	DC_ SNAP	SNAP SHOT	POOL FAULT	RESOURCES	SYSTEM & TASK RESTART	TESTING DATE-TIME
91068	11.11.17	4gc	7.23	SEP-12-2009 06:15		0	pl4_tab-101	DTMF-12		08-APR-2010 06:22:06
92780	15.85.16	HDC	7.23	21-MAY -2009 13:20		0	pl4_tab-70			08-APR-2010 06:45:36
94486	10.21.05	4gc	7.23	07-Feb -2008 09:45 PM		0:0	status-31 features-2 timers-2 ts_pool-34		RESET_POWER_UP-7 TOTAL_RESTARTS-9 GENERAL_P-1	08-APR-2010 07:15:24
94095	15.68.28	4gc	7.23	16-Jun-2009 06:17 PM		0:0	pl4_tab-197 pl6_ma-78 call_tab-7 call_rec-15		RESET_POWER_UP-7 TOTAL_RESTARTS-9 GENERAL_P-1	08-APR-2010 07:33:47

Integrated

ETL Integration



```
SITE NAME  CCS       SYS.  GC   GC    LAST BOOT      DC_   SNAP  NET  ALARMS   POOL         RESOURCES  SYSTEM & TASK      TESTI
           VERS      TYPE  DUP  VER   & CAUSE        SNAP  SHOT              FAULT                   RESTART            DATE-TI
90006      14.66.35  HDC        8.4   2-SEP -2007          0                 pl4_tab-177  DTMF-15    RESET_POWER_UP-1   11-Sep-20
                                      09:20                                  cpn_tab-10              TOTAL_RESTARTS-1   04:00:51
90009      11.11.17  SX         7.23  AUG -07-20           116               pl4_tab-255             NMI_WD-1           11-Sep-20
                                      08:06 AM                               pl6_ma-4                SUSPECT_ACF-1      04:03:19
                                                                             call_tab-24             RESET_POWER_UP-1
                                                                             call_rec-25             TOTAL_RESTARTS-1
90021      11.11.17  MEX
90033      11.11.16  SX
90049      11.11.17  SX
90067
90118
90125
           14.66.35  SVC
           11.11.16  SX
```

Site	Type	Ports	Trunks	Phones	Complaint	Action
90009	High Tech	956	246	116		
	High Tech	956	246	116		
		956	246	116		
		956	246	116		
		956	246	116		
		956	246	116		
		66	34	2		
		491				
		491	316	123		
		491	316	123		
		491	316	123		
		491	316	123		
		491	316	123		
	tation	491	316	123		
	Transportation	491	316	123		
90049	Municipalities	423	114	119		
90049	Municipalities	423	114	119		
90049	Municipalities	423	114	119		
90049	Municipalities	423	114	119		
90049	Municipalities	423	114	119		
90049	Municipalities	423	114			

PBX Logs

Business Line

Customer Demographic Variables

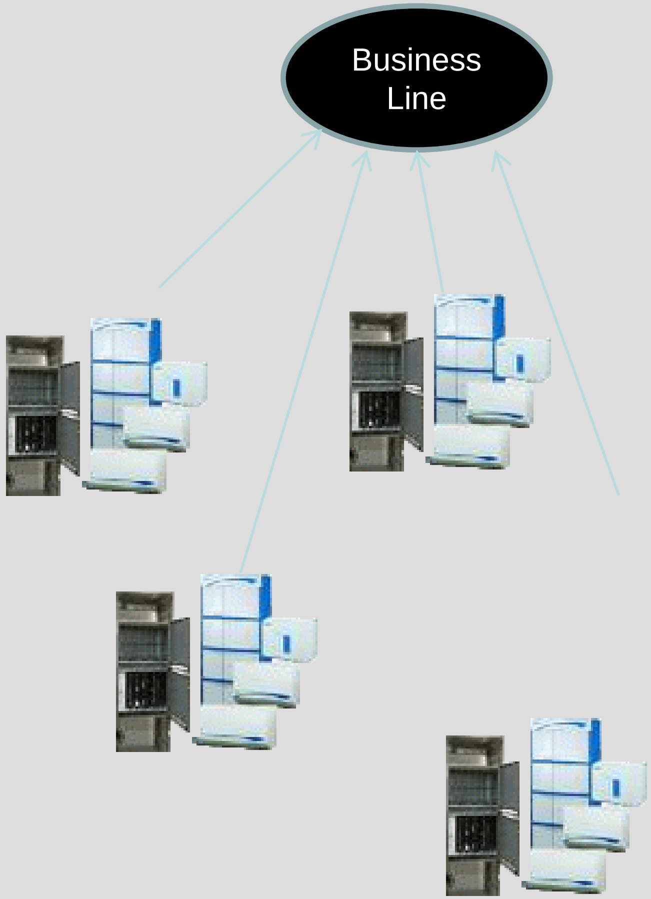
Alarm Segmentation

Service Support Calls Segmentation

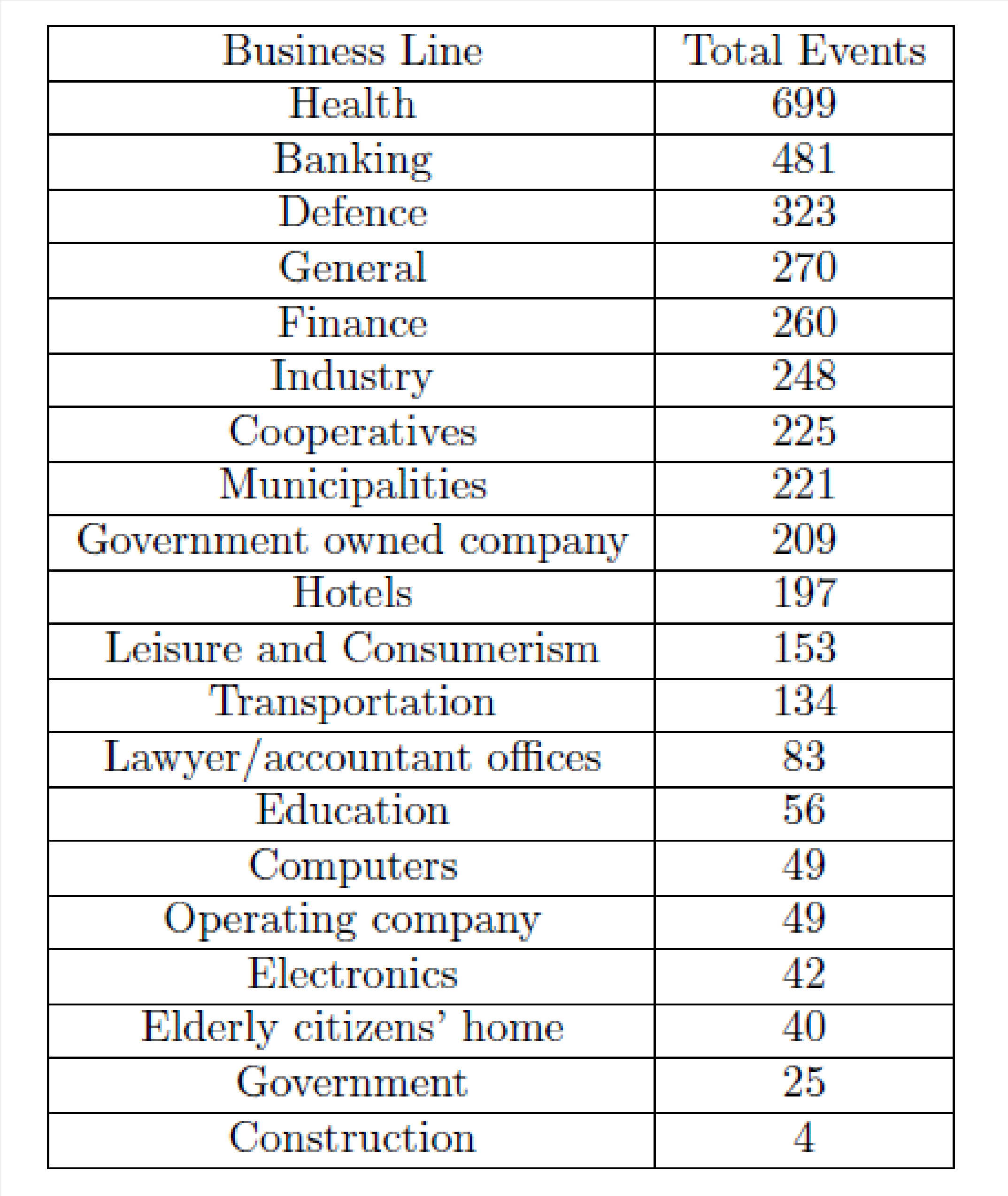
CRM Data

Field Technician Data

Integrated

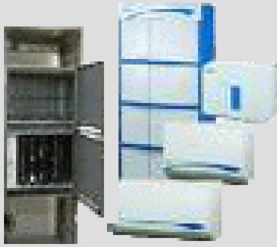


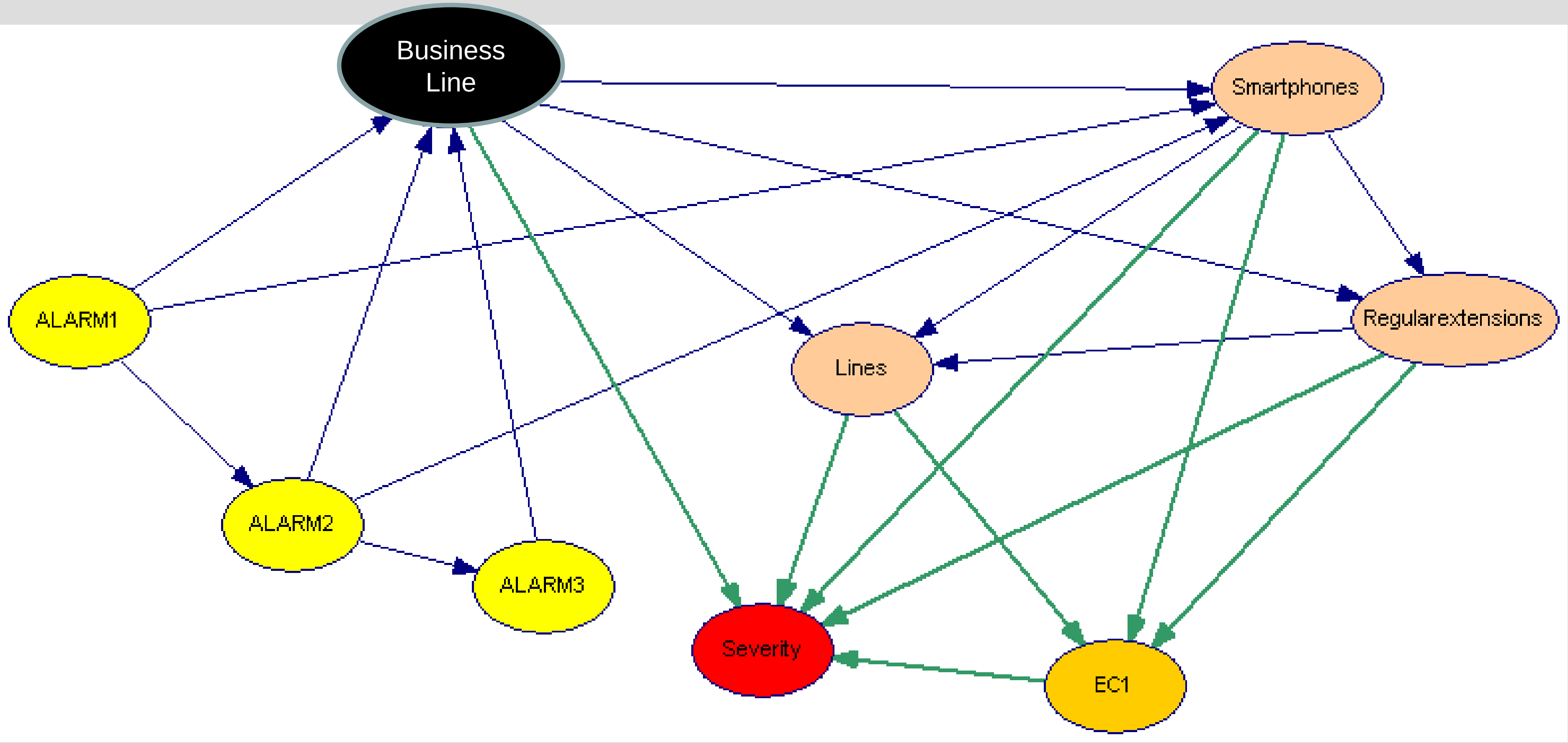
Business Line



Business Line	Total Events
Health	699
Banking	481
Defence	323
General	270
Finance	260
Industry	248
Cooperatives	225
Municipalities	221
Government owned company	209
Hotels	197
Leisure and Consumerism	153
Transportation	134
Lawyer/accountant offices	83
Education	56
Computers	49
Operating company	49
Electronics	42
Elderly citizens' home	40
Government	25
Construction	4

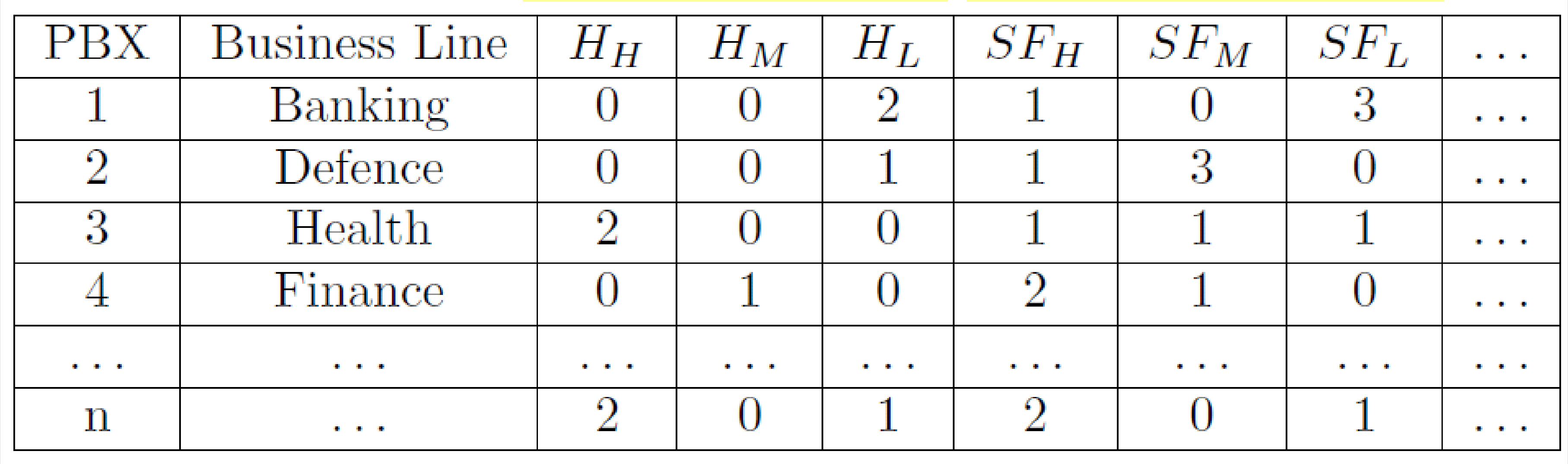
Bayesian Network
Cause and Effect Analysis



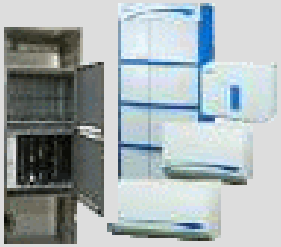


Business Line
Smartphones
ALARM1
Lines
Regularextensions
ALARM2
ALARM3
Severity
EC1

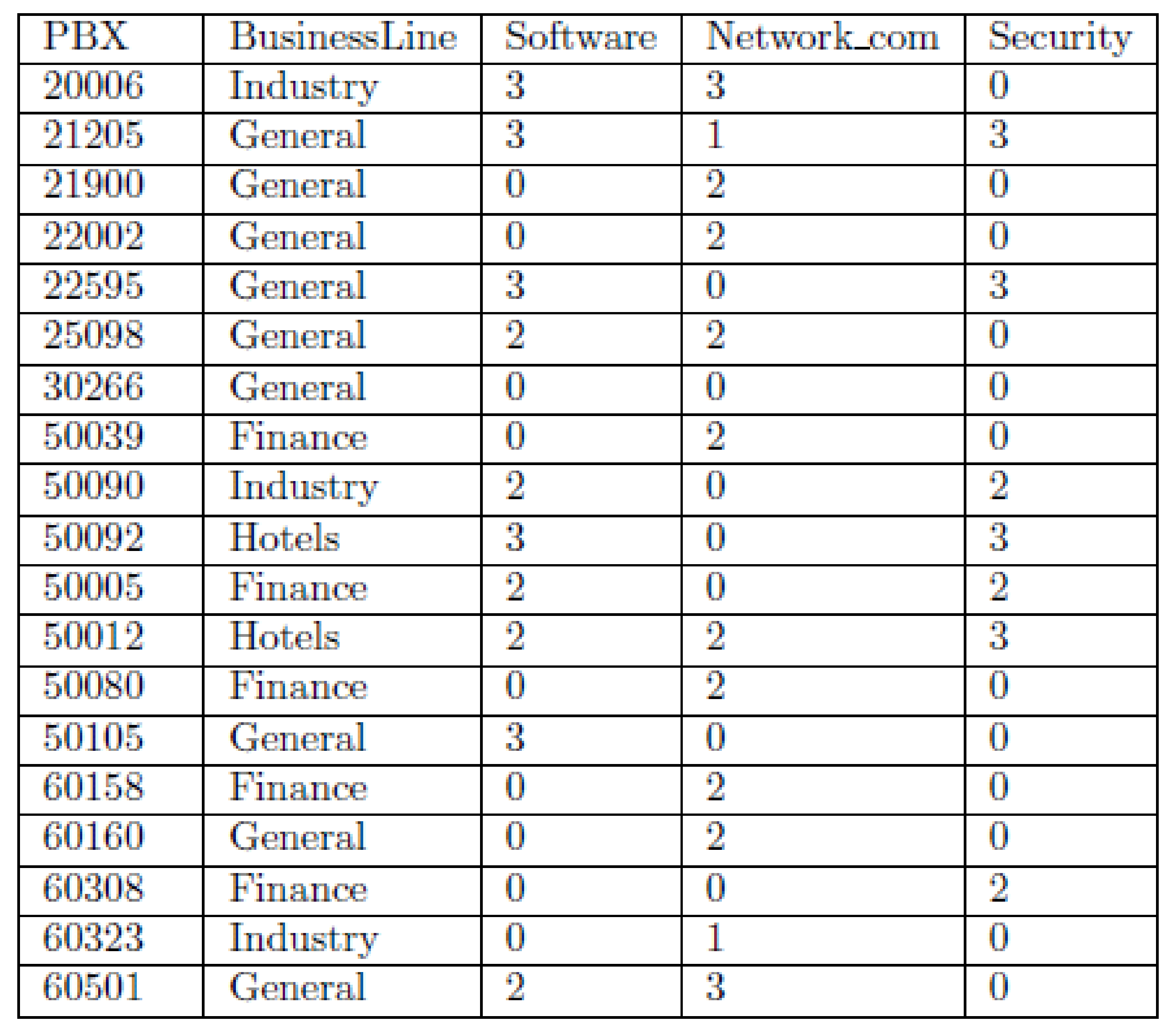
OpR Data - by problem severity



		Hardware			***Software***			
PBX	Business Line	H_H	H_M	H_L	SF_H	SF_M	SF_L	$\ldots$
1	Banking	0	0	2	1	0	3	$\ldots$
2	Defence	0	0	1	1	3	0	$\ldots$
3	Health	2	0	0	1	1	1	$\ldots$
4	Finance	0	1	0	2	1	0	$\ldots$
$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$
n	$\ldots$	2	0	1	2	0	1	$\ldots$

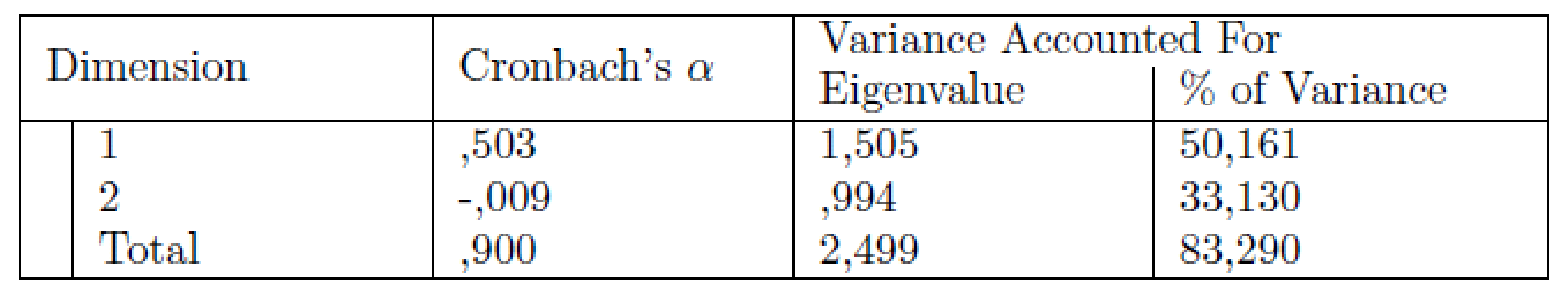


OpR Data - by max severity

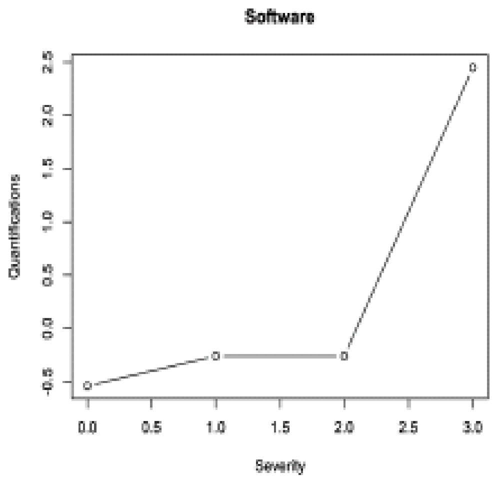


PBX	BusinessLine	Software	Network_com	Security
20006	Industry	3	3	0
21205	General	3	1	3
21900	General	0	2	0
22002	General	0	2	0
22595	General	3	0	3
25098	General	2	2	0
30266	General	0	0	0
50039	Finance	0	2	0
50090	Industry	2	0	2
50092	Hotels	3	0	3
50005	Finance	2	0	2
50012	Hotels	2	2	3
50080	Finance	0	2	0
50105	General	3	0	0
60158	Finance	0	2	0
60160	General	0	2	0
60308	Finance	0	0	2
60323	Industry	0	1	0
60501	General	2	3	0

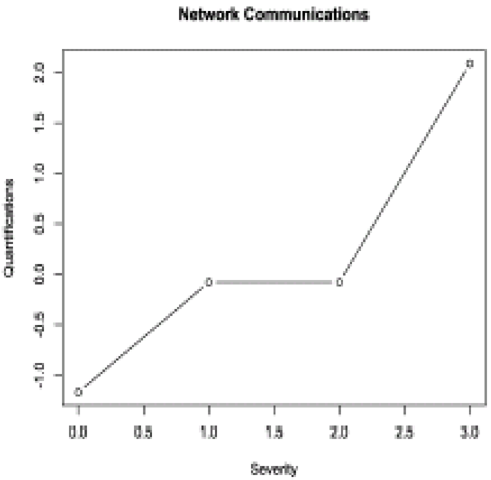
Non Linear Principal Components Analysis



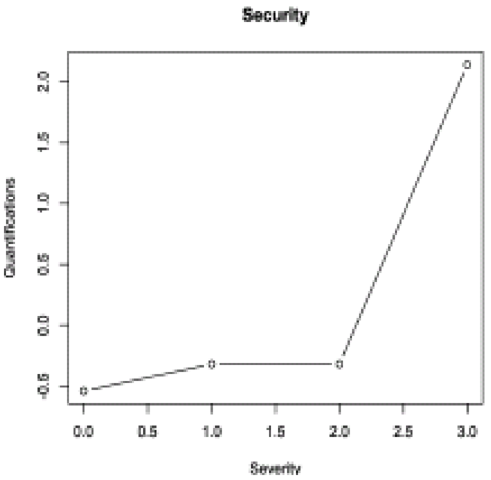
Dimension	Cronbach's α	Variance Accounted For	
		Eigenvalue	% of Variance
1	,503	1,505	50,161
2	-,009	,994	33,130
Total	,900	2,499	83,290



Impact of software failures



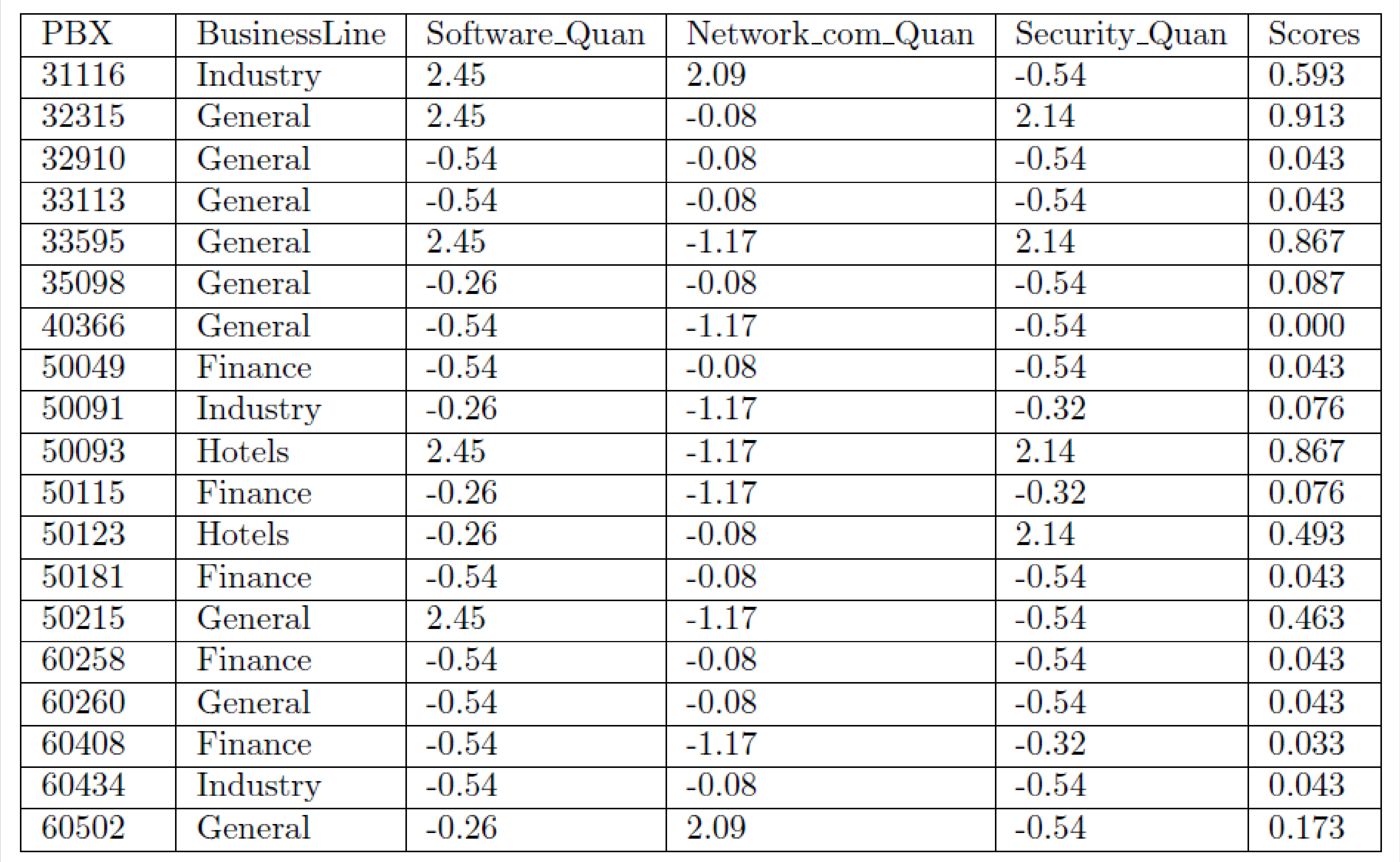
Impact of Netcom failures



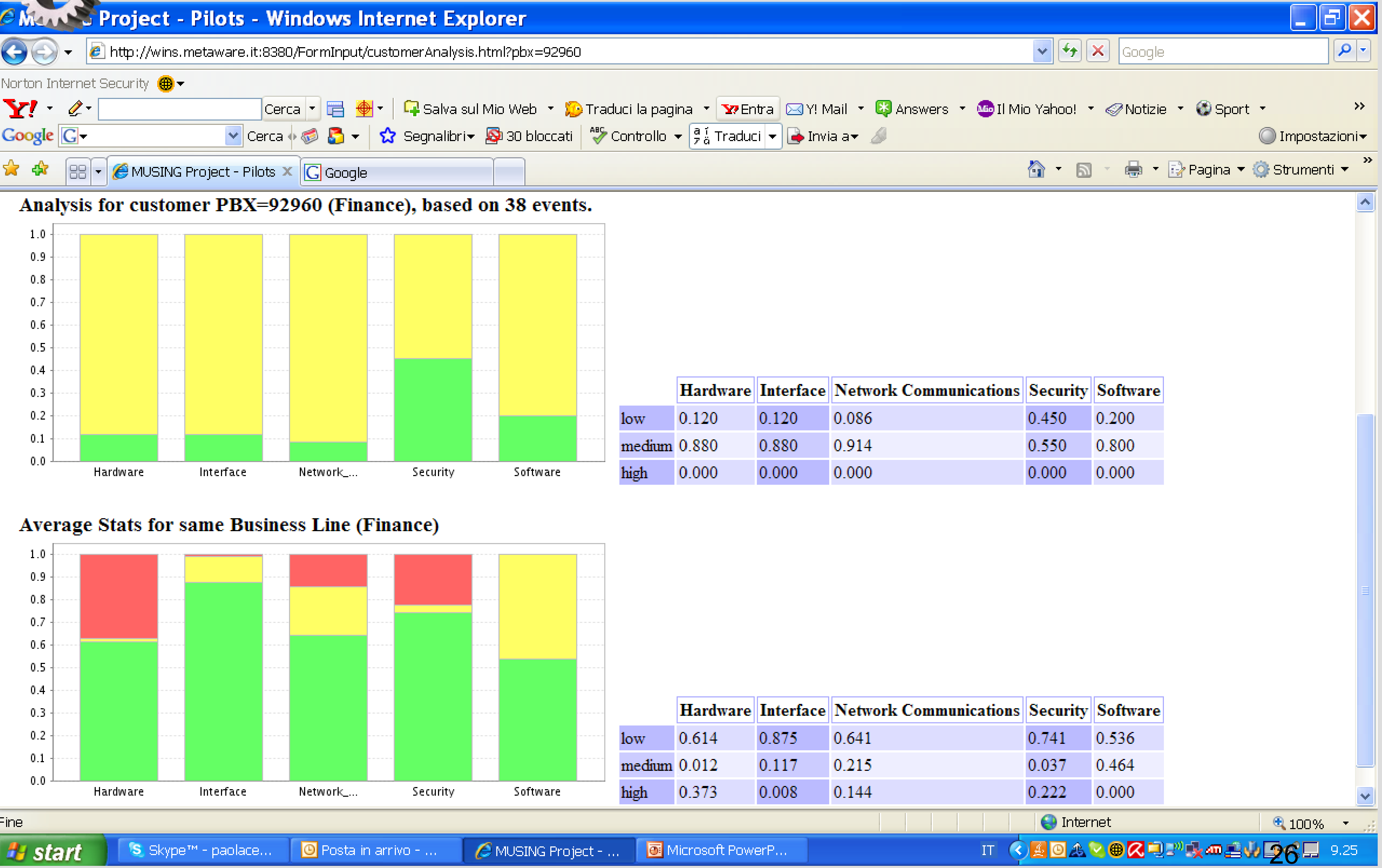
Impact of Security failures

Non Linear Principal Components Analysis

1st dim. ↓



PBX	BusinessLine	Software_Quan	Network_com_Quan	Security_Quan	Scores
31116	Industry	2.45	2.09	-0.54	0.593
32315	General	2.45	-0.08	2.14	0.913
32910	General	-0.54	-0.08	-0.54	0.043
33113	General	-0.54	-0.08	-0.54	0.043
33595	General	2.45	-1.17	2.14	0.867
35098	General	-0.26	-0.08	-0.54	0.087
40366	General	-0.54	-1.17	-0.54	0.000
50049	Finance	-0.54	-0.08	-0.54	0.043
50091	Industry	-0.26	-1.17	-0.32	0.076
50093	Hotels	2.45	-1.17	2.14	0.867
50115	Finance	-0.26	-1.17	-0.32	0.076
50123	Hotels	-0.26	-0.08	2.14	0.493
50181	Finance	-0.54	-0.08	-0.54	0.043
50215	General	2.45	-1.17	-0.54	0.463
60258	Finance	-0.54	-0.08	-0.54	0.043
60260	General	-0.54	-0.08	-0.54	0.043
60408	Finance	-0.54	-1.17	-0.32	0.033
60434	Industry	-0.54	-0.08	-0.54	0.043
60502	General	-0.26	2.09	-0.54	0.173



MUSING Project - Pilots - Windows Internet Explorer
http://wins.metaware.it:8380/FormInput/customerAnalysis.html?pbx=92960
Google
Norton Internet Security
Cerca
Salva sul Mio Web
Traduci la pagina
Entra
Y! Mail
Answers
Il Mio Yahoo!
Notizie
Sport
Google
Cerca
Segnalibri
30 bloccati
Controllo
Traduci
Invia a
Impostazioni
MUSING Project - Pilots
Google
Pagina
Strumenti
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Hardware
Interface
Network_...
Security
Software
Fine
Internet
100%
start
Skype™ - paolace...
Posta in arrivo - ...
MUSING Project - ...
Microsoft PowerP...
IT
9.25

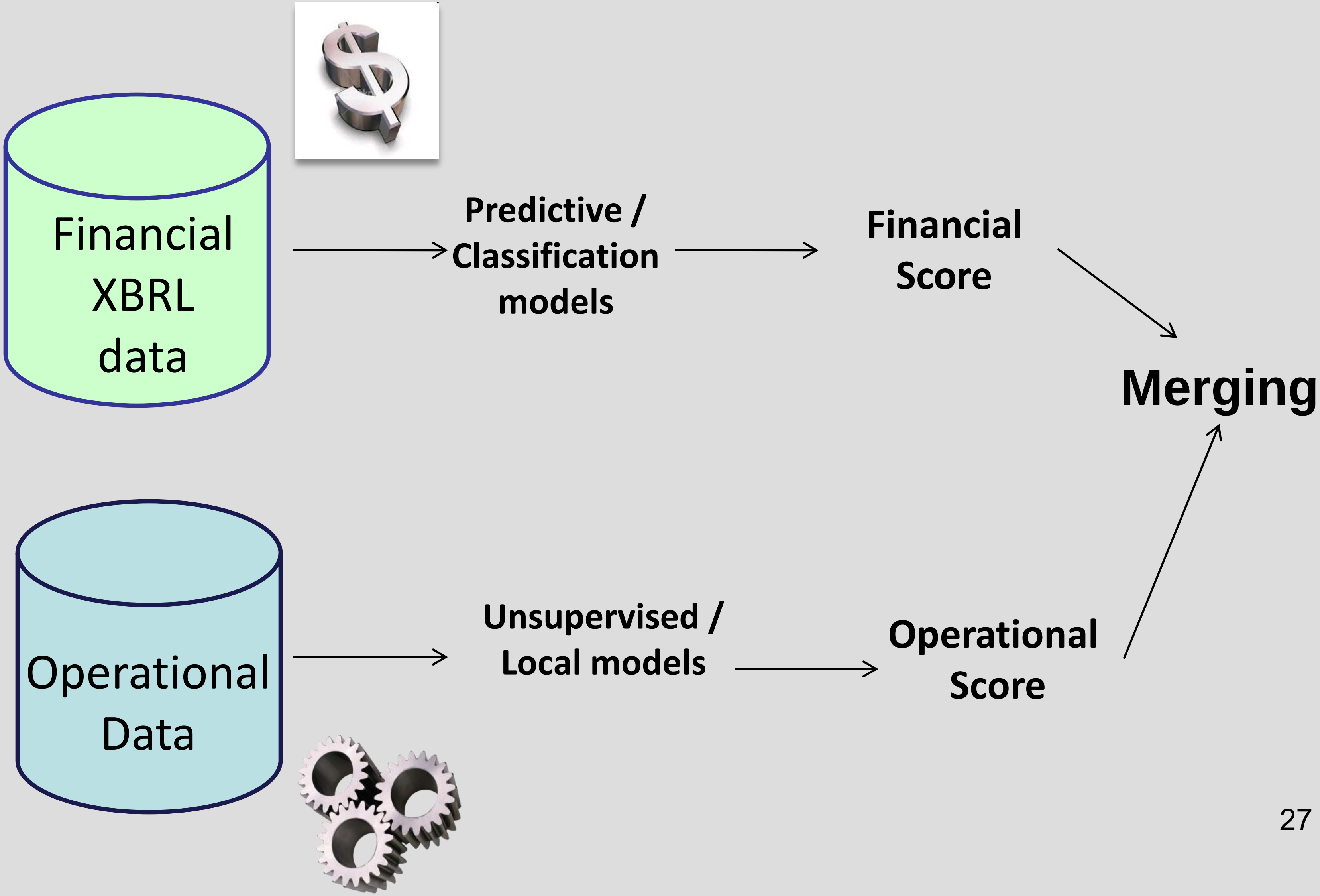
Analysis for customer PBX=92960 (Finance), based on 38 events.

	Hardware	Interface	Network Communications	Security	Software
low	0.120	0.120	0.086	0.450	0.200
medium	0.880	0.880	0.914	0.550	0.800
high	0.000	0.000	0.000	0.000	0.000

Average Stats for same Business Line (Finance)

	Hardware	Interface	Network Communications	Security	Software
low	0.614	0.875	0.641	0.741	0.536
medium	0.012	0.117	0.215	0.037	0.464
high	0.373	0.008	0.144	0.222	0.000

Risk assessment



Financial XBRL data

Predictive / Classification models

Financial Score

Merging

Operational Data

Unsupervised / Local models

Operational Score

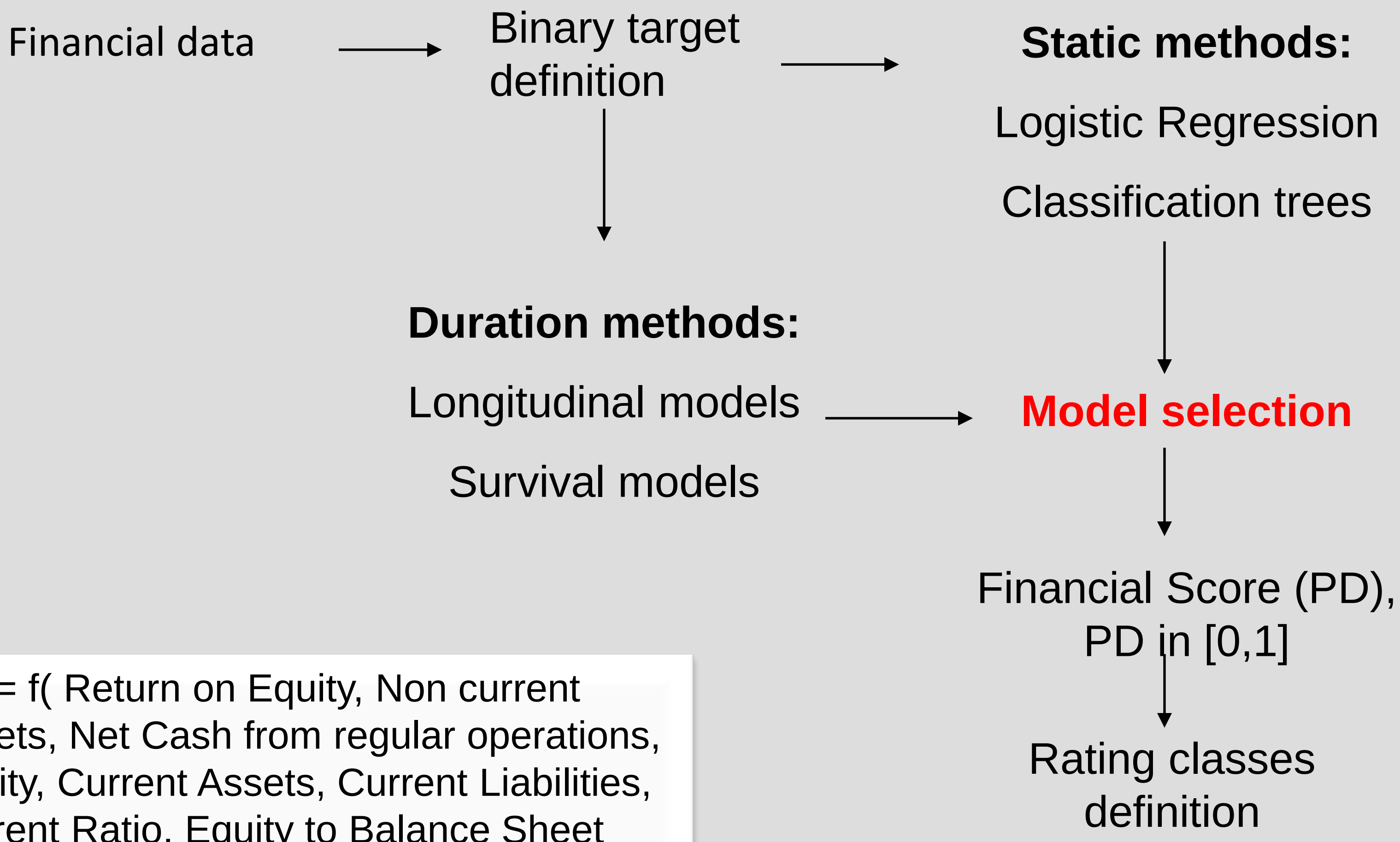
Financial data

- Collect Balance Sheets
- Extract quantitative information from XBRL balance sheets data
- Derive financial ratios useful to predict the default probabilities of companies
- The target variable is binary (0: good,1: bad)
- The final data matrix is composed of n companies and p covariates

Financial data: an example

Customer	**Financial Ratio 1**	**Financial Ratio 2**	**Financial Ratio 3**	**Financial Ratio p**
1	11794200	10921774	393717	627750
2	47947	34813	13134	27058
…	519440	130111	389330	62568
…	111200	94573	16627	12914
…	160747	120877	39870	111038
…	2303915	1101978	1201937	591154
…	97970	70909	27061	34268
n	127953	75586	52367	16526

Predictive/Classification models



Financial data

Binary target definition

Static methods:

Logistic Regression

Classification trees

Duration methods:

Longitudinal models

Survival models

Model selection

Financial Score (PD), PD in [0,1]

Rating classes definition

PD = f(Return on Equity, Non current Assets, Net Cash from regular operations, Equity, Current Assets, Current Liabilities, Current Ratio, Equity to Balance Sheet Total, Pre-tax Prot, Net Prot).

Financial score

Customer	LogReg 1	LogReg 2	LogReg 3
1	0.590413725	0.483517201	0.60105205
…	1	1	1
…	0.198422752	0.288418151	0.193413586
…	0.311519917	0.25348666	0.4165347
…	0.58567025	0.481172502	0.59679867
…	0.593873953	0.487455978	0.604682691
…	0.606705681	0.499173616	0.616373138
n	0.59845664	0.492608605	0.609354881

The resulting PD are based on logistic regression. More precisely, Reg 1, Reg 2 and Reg 3 consider backward, forward and stepwise selection respectively.

Financial and Operational scores

Customer	Financial Score	Operational Score
1	0.60105205	0.453472222
2	1	1
...	0.193413586	0.440277778
...	0.4165347	0.247916667
...	0.59679867	0.534722222
...	0.604682691	0.360416667
...	0.616373138	0.417361111
n	0.609354881	0.472222222

Financial Score

Operational Score

$$\pi_r^*$$

$$\pi_r$$

$$\delta_r = \frac{\sigma^2(\pi_r^*)}{\sigma^2(\pi_r)+\sigma^2(\pi_r^*)}$$

Precision Indicator in group r

r=1,…K

$$I_r = \delta_r \pi_r + (1-\delta_r)\pi_r^*$$

Integrated Score

The precision indicator is derived on the basis of the variances estimated across “r” bootstrapped data sets.

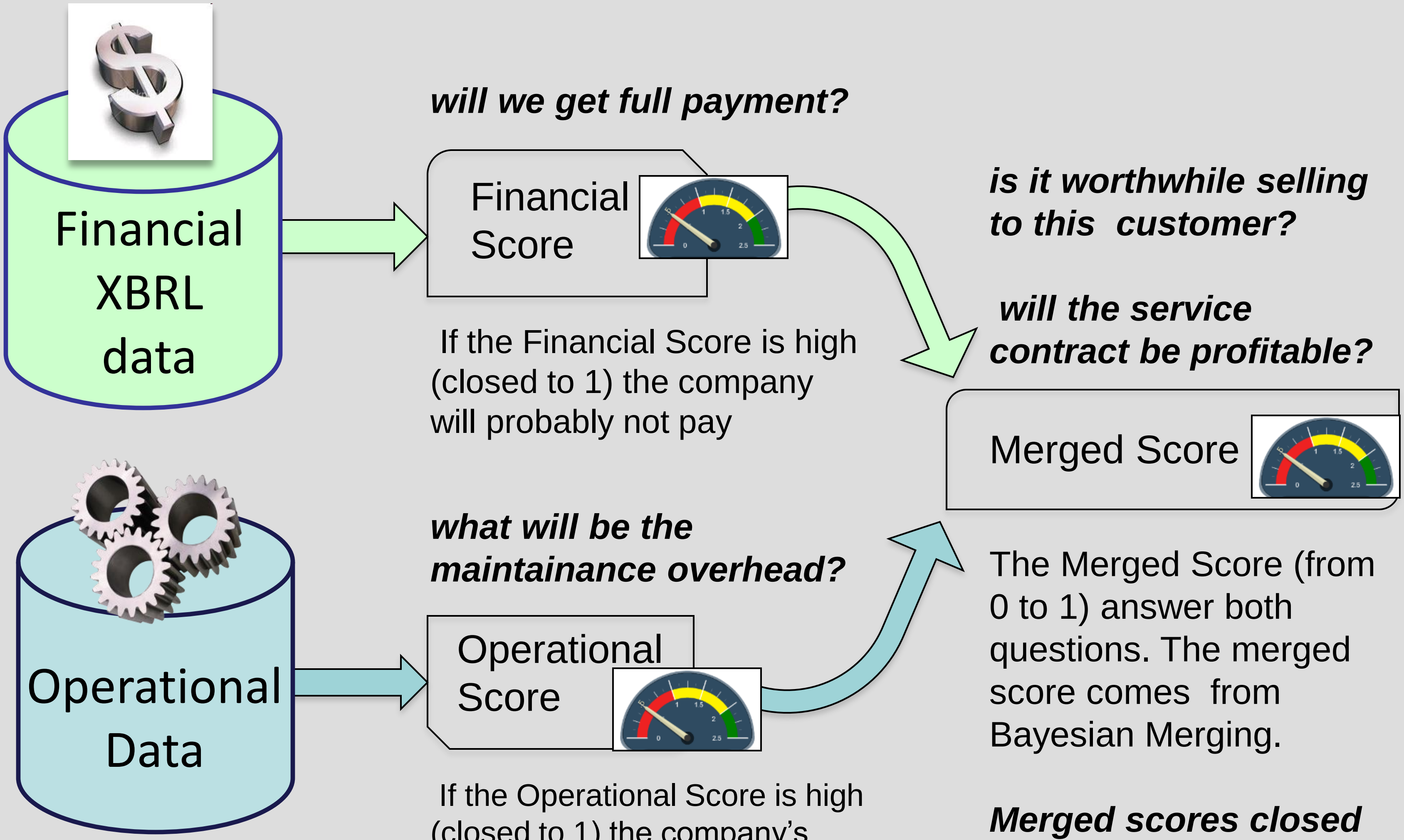
Integrated

Bayesian merging

Customer	Financial Score	Operational Score	Delta	Merged Score
1	0,60105205	0,453472222	0,78431851	0,569221813
2	1	1	1	1
…	0,19341359	0,440277778	0,35931949	0,351574662
…	0,4165347	0,247916667	0,76715999	0,377273676
…	0,59679867	0,534722222	0,4185012	0,56070129
…	0,60468269	0,360416667	0,86303567	0,571226958
…	0,61637314	0,417361111	0,75822335	0,568256677
n	0,60935488	0,472222222	0,52974872	0,544868073

Integrated

Results



Financial XBRL data
Operational Data
Financial Score
Operational Score
Merged Score
0
.5
1
1.5
2
2.5

will we get full payment?

If the Financial Score is high (closed to 1) the company will probably not pay

what will be the maintainance overhead?

If the Operational Score is high (closed to 1) the company's PBX will need maintainance

is it worthwhile selling to this customer?

will the service contract be profitable?

The Merged Score (from 0 to 1) answer both questions. The merged score comes from Bayesian Merging.

Merged scores closed to 1: answer is NO

Integrated

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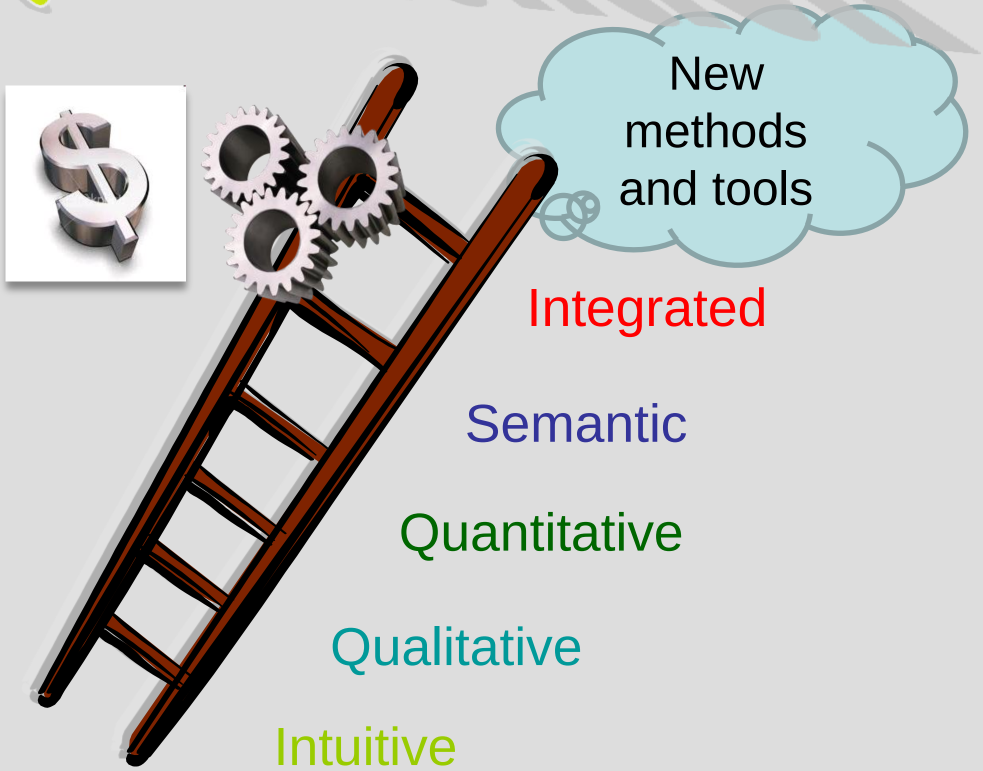
Thank you for your attention

Risk Data



New methods and tools

Integrated

Semantic

Quantitative

Qualitative

Intuitive