



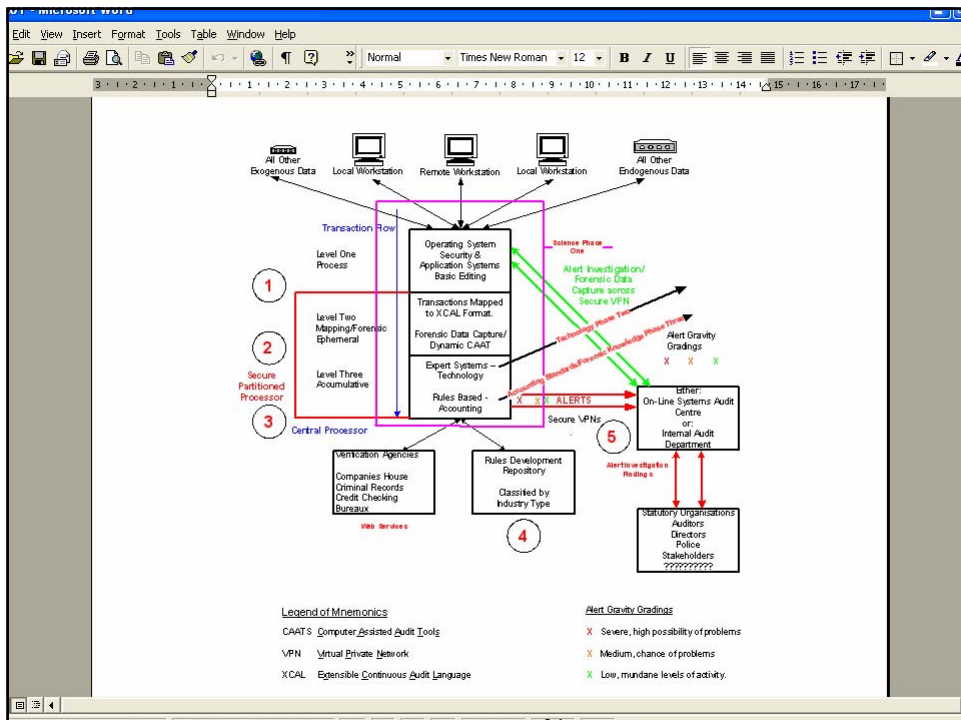
**DIGITAL ACCOUNTING RESEARCH CONFERENCE
(2005) OCTOBER 13-14, 2005, La Huelva.**

Robert Onions

**Researcher - Information Systems Security
Research Group, The University of Salford,
England.**

Two things: 1. A £250,000 fraud at a client.

**2. How it could have been prevented.
(if the technology had been available)
- it is now!**



SQL CAPTION: COLUMN HIERARCHY

Edit Tools Data Help

rusxml1

IIMAL

Columns

- *{All}
- Delete Flag
- Batch_Number
- Product_Code
- Stock_Point
- Quantity
- Line Number

IIMAH

Columns

- Batch Number
- Batch_Date
- Edit/Accept Flag
- Type
- Workstation
- Reference
- Nominal 1

IIMST

Columns

- *{All}
- Delete Flag
- Product Code
- Stock Point
- Physical Stock
- STW/SOR
- STCORD

bin Relationships Selected Columns

Schema	Table Name	Column Name	Type	Output	Criteria	Sort	Gr/Fn
dbo	IIMAL	Batch_Number	Number	Yes			
dbo	IIMAH	Batch_Date	Number	Yes			
dbo	IIMAH	Type	Text	Yes			
dbo	IIMAH	Workstation	Text	Yes			
dbo	IIMAH	Reference	Text	Yes			
dbo	*Computed	Nominal	Text	Yes			
dbo	IIMAH	User	Text	Yes			
dbo	IIMAH	Time	Number	Yes			
dbo	IIMAH	Reason_Code	Text	Yes			
dbo	IIMAL	Product_Code	Text	Yes			
dbo	IIMAL	Stock_Point	Text	Yes			
dbo	IIMAL	Quantity	Number	Yes			

ble(s) Selected

MS EXCEL: SHEET1

File Edit View Insert Format Tools Data Window Help

A1 = Batch_Number

Batch Date	Type	Workstation	Reference	Nominal	User	Time	Reason Code	Product Code	Stock Point	Quantity	Unit Cost	Adjust
1040625	A	QPADEV000P	R	92 700 101	ROBERT	150500 001		12345678	01	500.000	0.0000	0.
1031203	C	QPADEV000P	ROBB	15 100	ANITA	130627 001		7777777REDSML	01	1171.000	10.5000	12295.
1040708	A	QPADEV000P	JHGHJKHGVGH	92 700 100	ROBERT	100005 001		7777777REDSML	01	5.000	10.5000	52.
1040625	A	QPADEV000N	Y	92 700 101	ROBERT	92501 001		RLO	01	5.000	0.0000	0.
1050409	A	QPADEV000L	R	92 700 102	ROBERT	100210 001		33345001007	01	5.000	17.6900	88.
1050409	A	QPADEV000L	R	92 700 102	ROBERT	100210 001		00700002ONE	01	7.000	78.6300	550.
1050409	A	QPADEV000L	R	92 700 102	ROBERT	100210 001		69696001003	01	110.000	28.0000	3080.
1050411	A	QPADEV000N	STOCK TAKE	92 700 104	JOHN	111012 001		71717001008	01	11.000	50.0000	550.
1050411	A	QPADEV000N	STOCK TAKE	92 700 104	JOHN	111012 001		71717003008	01	20.000	35.0000	700.

Sheet1 / Sheet2 / Sheet3

```

Program Files\Xant\Data\Chorusxml1.xml - Microsoft Internet Explorer provided by Wanadoo - [Working Offline]
Edit View Favorites Tools Help
Back Forward Stop Home Search Favorites Media
C:\Program Files\Xant\Data\Chorusxml1.xml
Search Web 8 blocked AutoFill Options Web assistant
rs:maybenull="false" />
</s:AttributeType>
- <s:AttributeType name="AdjustValue" rs:number="14" rs:nullable="true">
<s:datatype dt:type="number" rs:dbtype="numeric" dt:maxLength="19" rs:scale="7" rs:precision="23" rs:fixedlength="true" />
</s:AttributeType>
<s:extends type="rs:rowbase" />
</s:ElementType>
</s:Schema>
<rs:data>
<z:row ALBATN="2" AHDATE="1040625" AHTYPE="A" AHWSID="QPADEV000P" AHREF="R" Nominal="92 700 101" AHUSER="ROBERT"
AHTIME="150500" AHRSCD="001" ALPROD="12345678" ALSTKP="01" ALQTY="500.000" STSTNC=".0000" AdjustValue=".0000000" />
<z:row ALBATN="1" AHDATE="1031203" AHTYPE="C" AHWSID="QPADEV000P" AHREF="ROBB" Nominal="15 100" AHUSER="ANITA"
AHTIME="130627" AHRSCD="001" ALPROD="7777777REDSML" ALSTKP="01" ALQTY="1171.000" STSTNC="10.5000"
AdjustValue="12295.5000000" />
<z:row ALBATN="5" AHDATE="1040708" AHTYPE="A" AHWSID="QPADEV000P" AHREF="JHGJKHGVGH" Nominal="92 700 100"
AHUSER="ROBERT" AHTIME="100005" AHRSCD="001" ALPROD="7777777REDSML" ALSTKP="01" ALQTY="5.000" STSTNC="10.5000"
AdjustValue="52.5000000" />
<z:row ALBATN="4" AHDATE="1040625" AHTYPE="A" AHWSID="QPADEV000N" AHREF="Y" Nominal="92 700 101" AHUSER="ROBERT"
AHTIME="92501" AHRSCD="001" ALPROD="RLO" ALSTKP="01" ALQTY="5.000" STSTNC=".0000" AdjustValue=".0000000" />
<z:row ALBATN="6" AHDATE="1050409" AHTYPE="A" AHWSID="QPADEV000L" AHREF="R" Nominal="92 700 102" AHUSER="ROBERT"
AHTIME="100210" AHRSCD="001" ALPROD="33345001007" ALSTKP="01" ALQTY="5.000" STSTNC="17.6900"
AdjustValue="88.4500000" />
<z:row ALBATN="6" AHDATE="1050409" AHTYPE="A" AHWSID="QPADEV000L" AHREF="R" Nominal="92 700 102" AHUSER="ROBERT"
AHTIME="100210" AHRSCD="001" ALPROD="00700002ONE" ALSTKP="01" ALQTY="7.000" STSTNC="78.6300"
AdjustValue="550.4100000" />
<z:row ALBATN="6" AHDATE="1050409" AHTYPE="A" AHWSID="QPADEV000L" AHREF="R" Nominal="92 700 102" AHUSER="ROBERT"
AHTIME="100210" AHRSCD="001" ALPROD="69696001003" ALSTKP="01" ALQTY="110.000" STSTNC="28.0000"
AdjustValue="3080.0000000" />
<z:row ALBATN="8" AHDATE="1050411" AHTYPE="A" AHWSID="QPADEV000N" AHREF="STOCK TAKE" Nominal="92 700 104"
AHUSER="JOHN" AHTIME="111012" AHRSCD="001" ALPROD="71717001008" ALSTKP="01" ALQTY="11.000" STSTNC="50.0000"
AdjustValue="550.0000000" />
<z:row ALBATN="8" AHDATE="1050411" AHTYPE="A" AHWSID="QPADEV000N" AHREF="STOCK TAKE" Nominal="92 700 104"
AHUSER="JOHN" AHTIME="111012" AHRSCD="001" ALPROD="71717003008" ALSTKP="01" ALQTY="20.000" STSTNC="35.0000"
AdjustValue="700.0000000" />
</rs:data>
</xml>

```

Edit Tools Data Help
 rusxml2

IIMAL

Columns

(All)

Delete Flag

Batch_Number

Product_Code

Stock_Point

Quantity

Line Number

IIMAH

Columns

Batch_Number

Batch_Date

Edit/Accept Flag

Type

Workstation

Reference

Nominal 1

IIMST

Columns

(All)

Delete Flag

Product Code

Stock Point

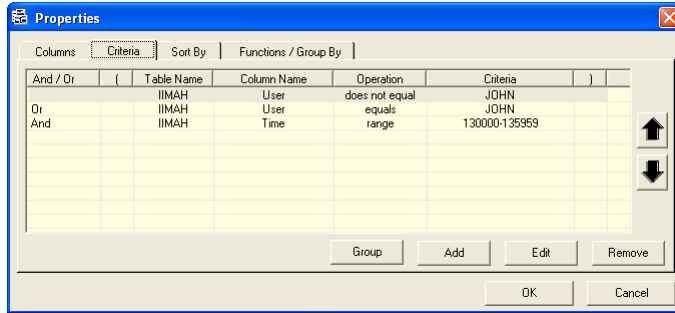
Physical Stock

STWSOR

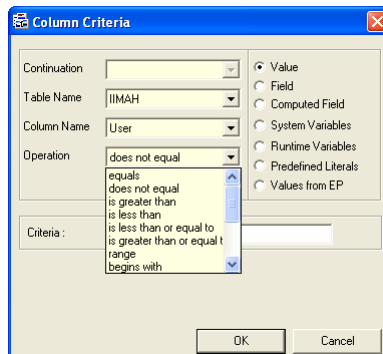
STCORD

Schema	Table Name	Column Name	Type	Output	Criteria	Sort	Gr/Fn
dbo	IIMAL	Batch_Number	Number	Yes			
dbo	IIMAH	Batch_Date	Number	Yes			
dbo	IIMAH	Type	Text	Yes			
dbo	IIMAH	Workstation	Text	Yes			
dbo	IIMAH	Reference	Text	Yes			
dbo	*Computed	Nominal	Text	Yes			
dbo	IIMAH	User	Text	Yes	Y=		
dbo	IIMAH	Time	Number	Yes	Y=		
dbo	IIMAH	Reason_Code	Text	Yes			
dbo	IIMAL	Product_Code	Text	Yes			
dbo	IIMAL	Stock_Point	Text	Yes			
dbo	IIMAL	Quantity	Number	Yes			

ble(s) Selected



7



8

Column Criteria

Continuation: []

Table Name: IIMAH

Column Name: User

Operation: does not equal
 begins with
 does not begin with
 ends with
 does not end with
 contains
 does not contain
 list
 not in the list

Criteria: []

Value
 Value
 Field
 Computed Field
 System Variables
 Runtime Variables
 Predefined Literals
 Values from EP

OK Cancel

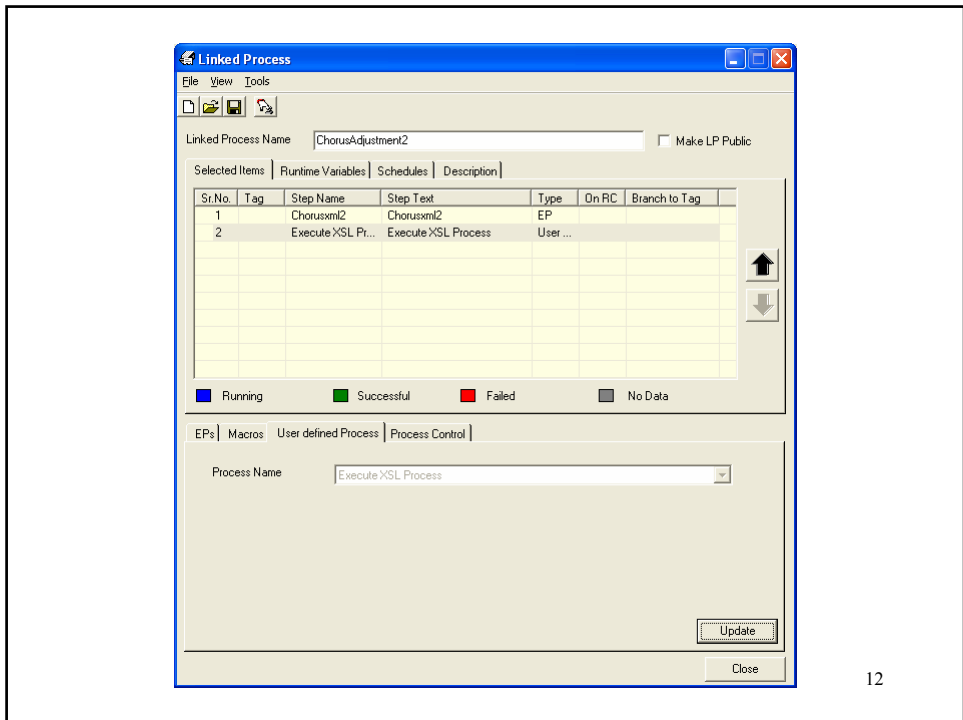
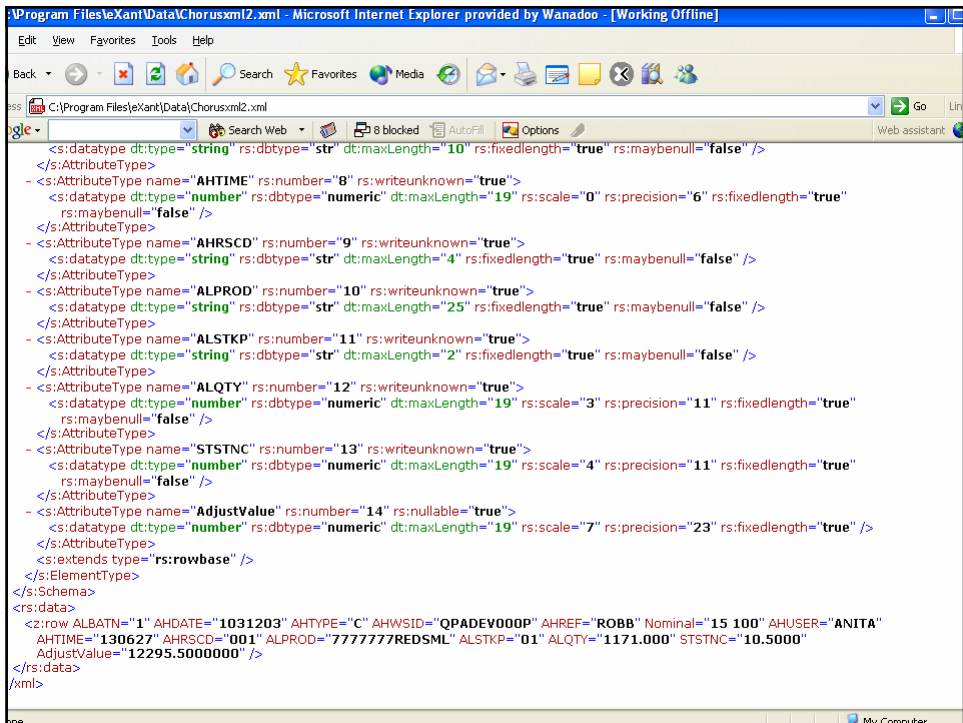
Microsoft Excel - C:\Program Files\Microsoft Office\Office12\Excel.exe

File Edit View Insert Format Tools Data Window Help

Batch_Number

Batch Date	Type	Workstation	Reference	Nominal	User	Time	Reason Code	Product Code	Stock Point	Quantity	Unit Cost	Adjust Value
1031203	C	QPADEV000P	ROBB	15 100	ANITA	130627	001	7777777REDSML	01	1171.000	10.5000	12295.5000000

Sheet1 / Sheet2 / Sheet3 /



```
Documents and Settings\Robert\Desktop\stockadjust1.xml - Microsoft Internet Explorer provided by Wanadoo - [Working Off]
Edit View Favorites Tools Help
Back - Search Web - 8 blocked AutoFill Options
C:\Documents and Settings\Robert\Desktop\stockadjust1.xml
C:\Documents and Settings\Robert\Desktop\stockadjust1.xml
</xsl:template>
<xsl:template match="z:row">
  <xsl:text disable-output-escaping="yes"><row></xsl:text>
  <xsl:for-each select="@*">
    <xsl:if test="name()='ALBATN'">
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Batch_Number</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
      <xsl:value-of select="."/ >
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Batch_Number</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
    </xsl:if>
    <xsl:if test="name()='AHDATE'">
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Batch_Date</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
      <xsl:value-of select="."/ >
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Batch_Date</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
    </xsl:if>
    <xsl:if test="name()='AHTYPE'">
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Rectype</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
      <xsl:value-of select="."/ >
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Rectype</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
    </xsl:if>
    <xsl:if test="name()='AHWSID'">
      <xsl:text disable-output-escaping="yes"></xsl:text>
      <xsl:text disable-output-escaping="yes">Workstation</xsl:text>
      <xsl:text disable-output-escaping="yes">></xsl:text>
    </xsl:if>
  </xsl:for-each>
</xsl:template>
```

```
Robert\XCAL\Schemas\Inventory\Stock Adjustment\stockadjust2.xml - Microsoft Internet Explorer provided by Wanadoo - [Working
Edit View Favorites Tools Help
Back - Search Web - 8 blocked AutoFill Options
D:\Robert\XCAL\Schemas\Inventory\Stock Adjustment\stockadjust2.xml
XCAL_Stock_Adjustment_File_R0001.000
<row>
  <Batch_Number>1</Batch_Number>
  <Batch_Date>1031203</Batch_Date>
  <Rectype>C</Rectype>
  <Workstation>QPADEV000P</Workstation>
  <Reference>ROBB</Reference>
  <Nominal_Code>15 100</Nominal_Code>
  <User>ANITA</User>
  <Time>130627</Time>
  <Reason_Code>001</Reason_Code>
  <Product_Code>7777777REDSML</Product_Code>
  <Quantity>1171.000</Quantity>
  <STSTNC>10.5000</STSTNC>
  <Stock_Point>12295.5000000</Stock_Point>
</row>
/XCAL_Stock_Adjustment_File_R0001.000
```



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Benford's Law/1st Digit Law

Predicts that the first digit of any number..

Is = 1, ..30%

Is = 2, ..17%

Is = 3, ..12%

Is = 4, ..10%

Is = 5, .. 8%

Is = 6, .. 7%

Is = 7, .. 6%

Is = 8, .. 5%

Is = 9, .. 4%

Included, tested on live data, found 3 illegal transaction.



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In development. Has to be low cost < £200

Started with Sage – 54% UK software market

**Details of eXtended Continuous Auditing Language
(XCAL)schemas can be found at:**

www.xcal.eu.tt/xcalschemas

**Now moving on to more complex analysis of transaction
patterns and latency.**

Any questions?