



# Data Privacy - Protection from Trusted Users

**Scott Smith**

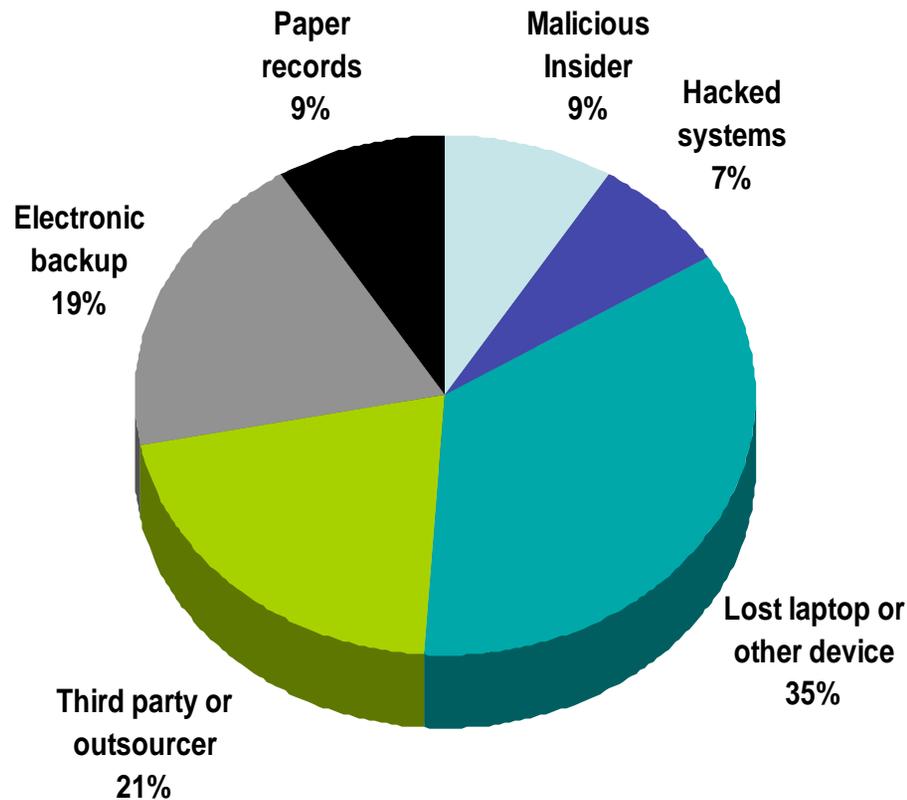
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September 19, 2007

# Data Privacy

## Most Common Data Losses

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***Ponemon Institute***

**2006 Annual Study: Cost of a Data Breach**

# Data Privacy

## Most Common Data Losses

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*“It is a serious mistake to think that mainframe applications are safe by default. They are not..... Enterprises should not experience a false sense of security simply because their mission-critical applications run on mainframes. Yet, they are often defenseless against insiders equipped with in - depth knowledge of the applications' logic and security policies — those using legitimate means to ill-exploit the system. **Most attacks on legacies come from inside the enterprises, committed by their own employees... Applications should be protected from the inside out.”***

*Joseph Feiman, Gartner Research, September 29 2006*

*Implementing Security for Mainframe Legacy Applications - Worth  
the Investment*

# Data Privacy

## Environmental Differences for data use

<b>Production Region</b>	<b>Test Region</b>
Live customer/account information	Live customer/account information
Access through applications with role based information accesses	Direct access to the raw data
Trained access to employees through policies and agreements	Wider exposure to non-employees or employees across the world
Usage of data monitored and traced for compliance	Higher potential for unauthorized viewing and usage
Successful usage requires 'live' data	Successful testing does not require 'live' data
Region security mature and robust, through tools and processes	Region security not as robust as production

# Test Data Privacy

How we see it being addressed

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- Signing non-disclosure agreements
- Restricting security access to sensitive/  
confidential data
- Applying minimal “de-identifying” rules
- Implementing a complete data  
disguise solution with processes and  
procedures

**Minimal  
Effectiveness**

**Low  
Effectiveness**

**Some  
Effectiveness**

**High  
Effectiveness**



# Test Data Privacy

## Internal Challenges

Organizational	Political	Technical
<ul style="list-style-type: none"><li>• Defining ownership of the data</li><li>• Disguise enforcement</li><li>• Defining disguise standards</li><li>• Business process management</li><li>• Designing and implementing corporate disguise policies and procedures</li></ul>	<ul style="list-style-type: none"><li>• Communication and agreement between different application groups</li><li>• Conflicts of interest</li><li>• External influences</li><li>• Interpretation of the compliance regulations</li></ul>	<ul style="list-style-type: none"><li>• Variety of platforms</li><li>• Variety of data types</li><li>• Data complexity</li><li>• Maintain shared relationships between multiple environments</li><li>• Coordination of physical implementation</li></ul>

# Test Data Privacy

## Requirements for Success

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- **Process**

- A clear strategy backed up by a methodology that serves as a roadmap or blueprint for an enterprise-wide data privacy initiative

- **Technology**

- Tools that can deliver quality data that meets the integrity, consistency and usability demands of your data privacy requirements

- **Expertise**

- The knowledge and experience to effectively manage the process and drive the technology to implement data privacy assurance in the application testing environment

# Test Data Privacy

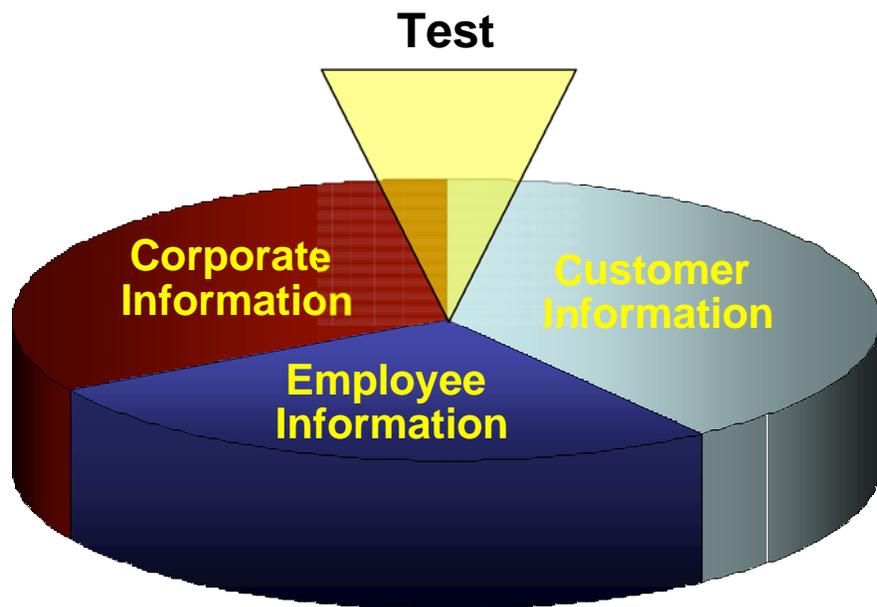
## Leadership

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- **Provide Products, Processes and People to disguise and generate data used for:**
  - Application testing
  - Data exchange
  - Internal reporting
  - Offshore / outsourced development
  - Departmental data processing

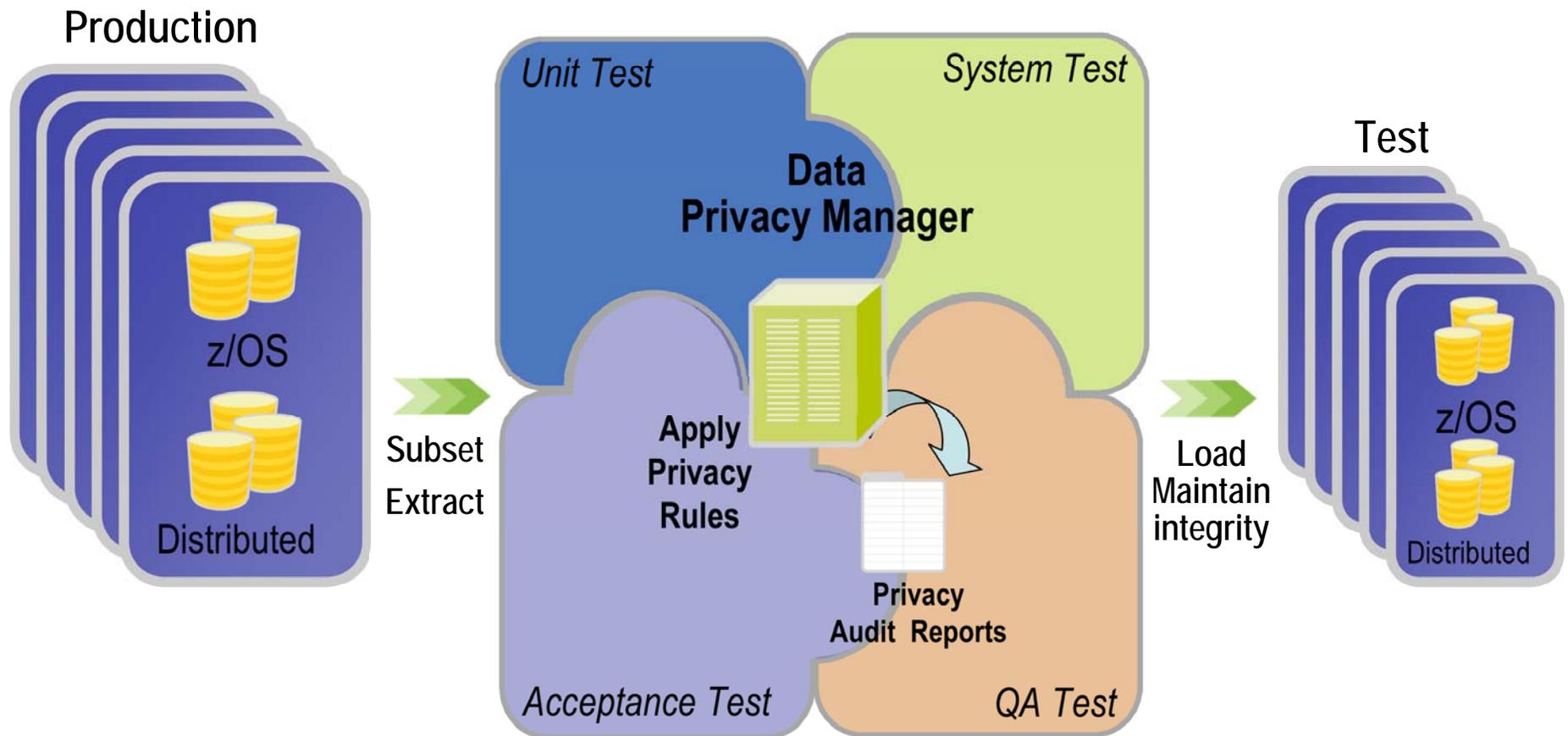
# Test Data Privacy Delivery

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- **Protect personal/sensitive data while maintaining:**
  - Data **Integrity** across application(s)
  - **Consistency**, regardless of data source, and repeatability
  - **Usability**, test data should be valid and meaningful

# Test Data Privacy Solution



# Test Data Privacy

## Process: Methodology

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**Analyze** – Understand each application's sensitive information

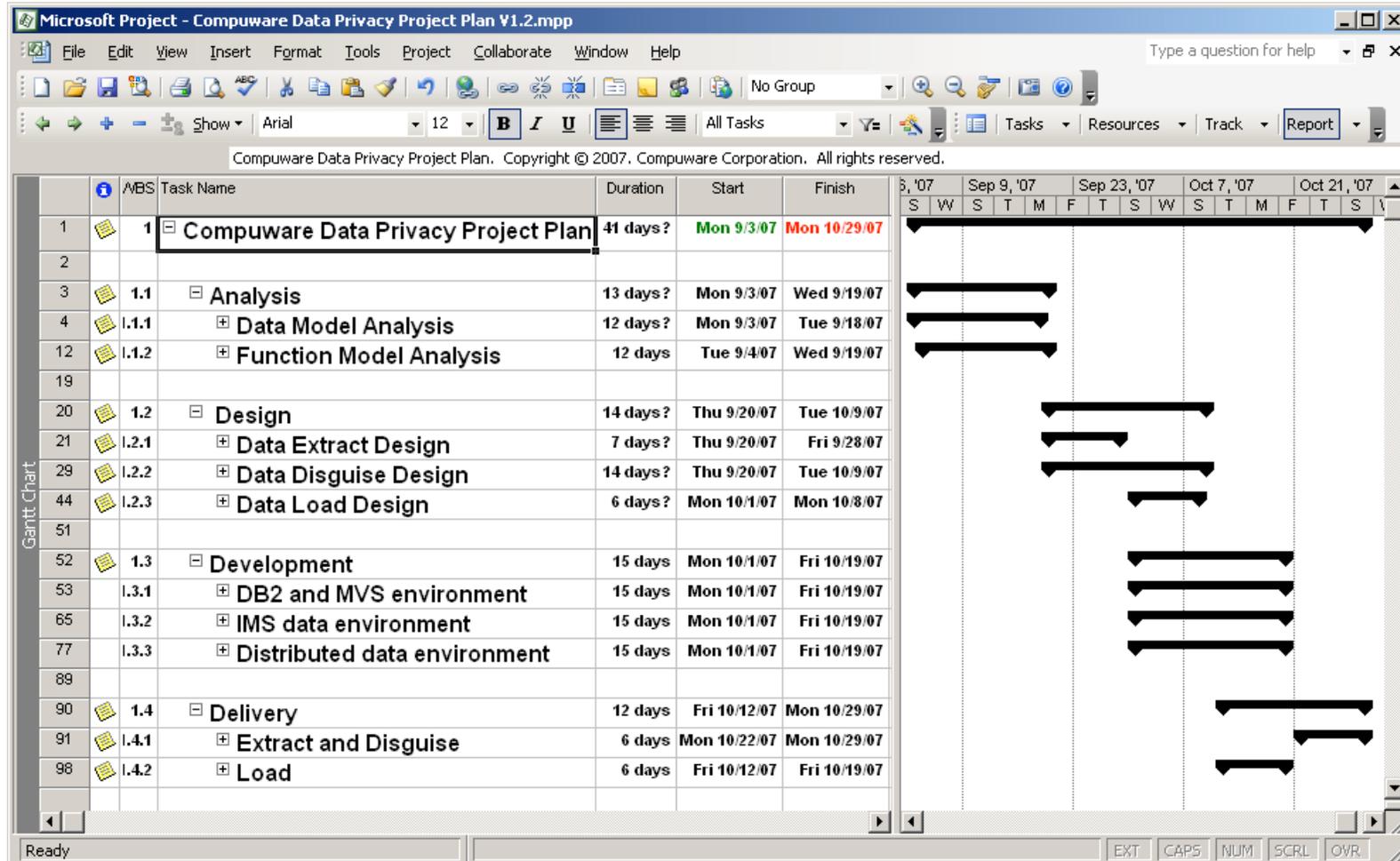
**Design** – Define strategies for disguising test data

**Develop** – Build the processes to disguise test data

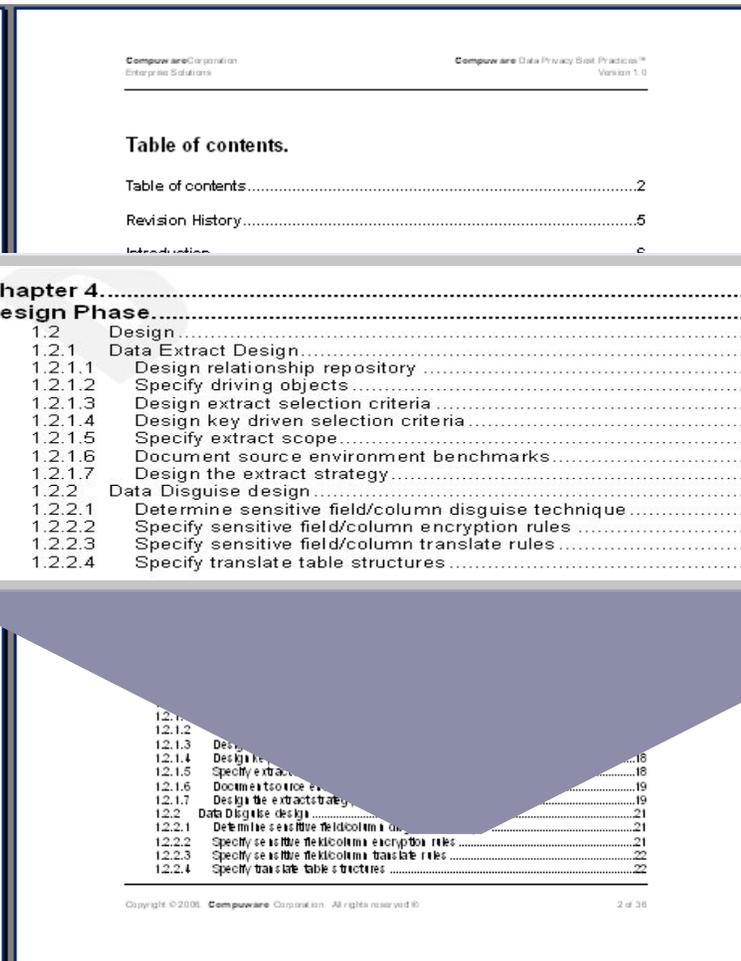
**Deliver** – Deploy and maintain data protection processes

# Test Data Privacy

## Process: Methodology



# Test Data Privacy Process: Best Practices



# Test Data Privacy Process: Best Practices

1.2.2 Data Disguise design

This entry in the projects work break down structure is an activity that wraps up the tasks to specify the disguise rules for privacy, as described below.

1.2.2.1 Determine sensitive field/column disguise technique

Once there is an understanding of the value domains for each sensitive field and their business rules, a fictionalization strategy needs to be determined, according to the different techniques available, such as Encrypt, Translate, Generate, Mask or Age.

A combination of these techniques allows maintaining data integrity, consistency and usability. Some techniques apply better to certain types of fields as illustrated below:

Name (First, Last, Middle, Maiden, Aliases, Prefixes, Suffixes)
Address (Street, City, State, Zip)
Social Security Number
Drivers License Number
Passport Number
Account Number
Credit Card Number
Birth date
Phone Number
Email addresses

1.2.2.2 Specify sensitive field/column translate rules

Define any special rules that need to be applied to similar numbers.

For example, most credit card processes and/or check digits, etc. Conditional techniques, for different card types.

Determine and document whether existing encryption will be allowed. Also consider...

1.2.2.3 Specify sensitive field/column translate rules

This task is about the definition of detailed translation properties for each of the data elements identified for this disguise technique. Translation of data is based upon using existing values stored on files to be used as replacements to sensitive data values.

Translation of data will be for fields that require resulting values to be meaningful for a user and yet valid for an application. For this reason, different translation methods need to be identified depending on the access method and organization of the translation tables being used.

As a guideline for the Translation design process the following table summarizes the conditions for each specific method:

Translate Method	Access Method	Translate File Type	Translate File Size	Unique Value Table	Reversible	Duplicate Pointers
Search	Binary Search	OSAM VSAM	999,999	No	Yes	No
			999,999	No	Yes	No
						Yes

1.2.2.1 Determine sensitive field/column disguise technique

Once there is an understanding of the value domains for each sensitive field and their business rules, a fictionalization strategy needs to be determined, according to the different techniques available, such as Encrypt, Translate, Generate, Mask or Age.

A combination of these techniques allows maintaining data integrity, consistency and usability. Some techniques apply better to certain types of fields as illustrated below:

Data element	Recommended Disguise Technique
Name (First, Last, Middle, Maiden, Aliases, Prefixes, Suffixes)	Translation, Generation
Address (Street, City, State, Zip)	Translation, Generation
Social Security Number	Encryption
Drivers License Number	Encryption
Passport Number	Encryption

# Test Data Privacy

## Analyze

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- **Gather and document information about:**
  - Applications to be treated
  - Data structures involved
  - Existing data relationships
  - Data Classification Scheme to understand sensitive data elements
  - Processes acting upon or impacting sensitive data

# Test Data Privacy

## Managing the Analysis Tasks

The screenshot displays the Microsoft Project interface for a project named 'Compuware Data Privacy Project Plan V1.2.mpp'. The main window shows a task list with columns for ID, WBS, and Task Name. The task 'Identify application data model' (ID 7, WBS 1.1.1.3) is selected. A 'Task Information' dialog box is open, showing details for this task. The dialog has tabs for General, Predecessors, Resources, Advanced, Notes, and Custom Fields. The 'General' tab is active, showing the task name 'Identify application data model', a duration of '1d?', and a checked 'Estimated' box. The 'Notes' section contains two paragraphs of text. Below the dialog, a Gantt chart shows the task as a blue bar with dependencies.

ID	WBS	Task Name
1	1	Compuware Data Privacy Project Plan. Copyright
2		
3	1.1	Analysis
4	1.1.1	Data Model Analysis
5	1.1.1.1	Identify source data environment
6	1.1.1.2	Identify target data environment and scope
7	1.1.1.3	Identify application data model
8	1.1.1.4	Document data stores/entities and relationships
9	1.1.1.5	Document data structures and layouts
10	1.1.1.6	Identify sensitive fields/columns
11	1.1.1.7	Cross reference sensitive fields/columns and data stores
12	1.1.2	Function Model Analysis
13	1.1.2.1	Identify application function model
14	1.1.2.2	Cross reference sensitive data stores and application pro
15	1.1.2.3	Analyze application code over sensitive data elements
16	1.1.2.4	Document business rules applied to sensitive fields/column
17	1.1.2.5	Identify current application test plans
18	1.1.2.6	Document current test requirements over sensitive fields

**Task Information**

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Identify application data model Duration: 1d?  Estimated

Notes:

Most applications have documentation about the data elements, structures, formats, relationships and dependencies. In many cases an application data model is already in electronic form via software engineering and data modeling tools.

This task is about obtaining such information for subsequent analysis of what is considered sensitive data. A Subject Matter Expert, Business Analyst, or Database Designer should be familiar with this information.

Help OK Cancel



# Test Data Privacy

## Managing the Analysis Tasks

### Compuware Program Analyzer for Abend-AID, Xpediter and Strobe

The screenshot displays the Compuware Program Analyzer interface. The main window shows a list of program elements on the left and a source code window on the right. A 'Find Indirect' dialog box is open, showing 22 data elements found, including REGION-SALARY, MGMT-COMPENSATION, and GRAND-TOTAL-MGMT. The 'Data Action' section is checked for 'Flow from', 'Flow to', and 'Compare'. The 'Structure Chart' at the bottom shows a hierarchical tree of program elements, with a central node connected to several sub-nodes, representing the program's architecture.

```
COMPUTE MGMT-COMPENSATION = CALC-COMMISSION +  
REGION-SALARY (REGION-SUB) .  
ADD MGMT-COMPENSATION TO GRAND-TOTAL-MGMT .  
MOVE MGMT-COMPENSATION TO REG-DTL-TOTAL .  
WRITE REPORT-RECORD FROM REGION-DETAIL .  
IF REGION-SUB = 4  
WRITE REPORT-RECORD FROM BLANK-LINE  
MOVE GRAND-TOTAL-MGMT TO MGMT-GRAND-TOTAL  
WRITE REPORT-RECORD FROM MGMT-TOTAL-DTL .  
ADD 1 TO REG-LINE-COUNT .  
ADD 1 TO REGION-SUB .
```

Find Indirect - REGION-SALARY

22 Data elements found:

- >> REGION-SALARY
- ..REGION-DETAIL
- ...REPORT-FILE
- ...REPORT-RECORD
- ...REG-DTL-SALARY
- ...TOTAL-FIELDS
- ..MGMT-COMPENSATION
- ...GRAND-TOTAL-FIELDS
- ...GRAND-TOTAL-MGMT
- ...MGMT-TOTAL-DTL
- ...MGMT-GRAND-TOTAL

Statements:

- 000581 COMPUTE

Structure Chart

For Help, press F1

# Test Data Privacy Analysis Deliverables

Microsoft Excel - Data Privacy\_1.1.2\_Function Model Analysis.xls

File Edit View Insert Format Tools Data Window Help

D:\FDM-QA\Sales Champion\Data Privacy Best Practices\Data Priv

D33

1	Compuware Corporation		THE LEADER IN IT VALUE			
2	Data Privacy Best Practices					
3	Business Analysis					
4	Function Model Analysis					
5						
6	Document current test requirements over sensitive fields					
7						
8	Process / Sensitive field	CONTACT_NAME	SOC_SEC_NUM	CREDIT_CARD_NUM	CONTACT_ADDRESS	PASSWORD
9	PROGRAM_001			First two digits are validated for each credit card type		
10	PROGRAM_002	No validations exist				Stored encrypted
11	PROGRAM_003					
12	PROGRAM_004					
13	PROGRAM_005				City, State and Zip must match	
14	PROGRAM_006		MOD-10 check digit validation			
15	PROGRAM_007					
16	PROGRAM_008	First name and last name are concatenated to be displayed on screen and written in reports		First two digits are validated for each credit card type		
17	PROGRAM_009					
18	PROGRAM_010				Street, City, State, a Zip passed to CODE validation function an return 1 for True, 0 for False	
19	PROGRAM_011					
20	PROGRAM_012					
21	PROGRAM_013	Last name, Comma, First Name, Comma, Middle Initial is format is validated		First two digits are validated for each credit card type		
22						
23						
24						
25						

Ready

Microsoft Excel - Data Privacy\_1.1.1\_Data Model Analysis\_v2.xls

File Edit View Insert Format Tools Data Window Help

D:\FDM-QA\Sales Champion\Data Privacy Best Practices>Data Priv

J9

1	Compuware Corporation		THE LEADER IN IT VALUE			
2	Data Privacy Best Practices					
3	Business Analysis					
4	Data Model Analysis					
5						
6	Document data stores/entities and relationships					
7						
8						
9	Object Type	Object name	Creator/Qualifier	Constraint Name / Description	Related Object	Relationship Type
10						
11	VSAM	CUSTOMER.MASTER FILE	PROD	CUSTOMER FILE TO CUSTOMER TABLE	CUSTOMER_TABLE	AR
12						
13	DB2	CUSTOMER_TABLE	PROD	CUSTCONT	CONTACT_TABLE	RI
14						
15	DB2	CUSTOMER_TABLE	PROD	CUSTOMER TO ORDER	ORDER_TABLE	AR
16						
17	DB2	ORDER_TABLE	PROD	ORDLINE	ORDER_LINE_TABLE	RI
18						
19	DB2	PART_TABLE	PROD	PART TABLE TO ORDER LINE TABLE	ORDER_LINE_TABLE	AR
20						
21	DB2	PART_TABLE	PROD	PART TABLE TO SUPPLIER TABLE	SUPPLIER_TABLE	AR
22						
23						
24						

Ready

# Test Data Privacy

## Design

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- **Define application disguise strategy and process**
  - Source extract criteria for data (filters, naming conventions, etc.)
  - Security rules for supporting files
  - Structure, value domain (content), population strategy for translate table(s)
  - Target environment(s) and load method(s) to be used
  - Field-level obfuscation rules (encrypt, translate, age, generate)

# Test Data Privacy

## Disguise Techniques

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### Encrypt

Replace sensitive values with formulated data based on a user-defined key

### Translate

Replace sensitive values with meaningful, readable data using a translation table

### Age

Replace sensitive dates consistently while maintaining the integrity of a date field

### Mask

Conceal partial fields

### Generate

Generate fictitious data from scratch or from some other source

# Test Data Privacy

## Managing the Design Tasks

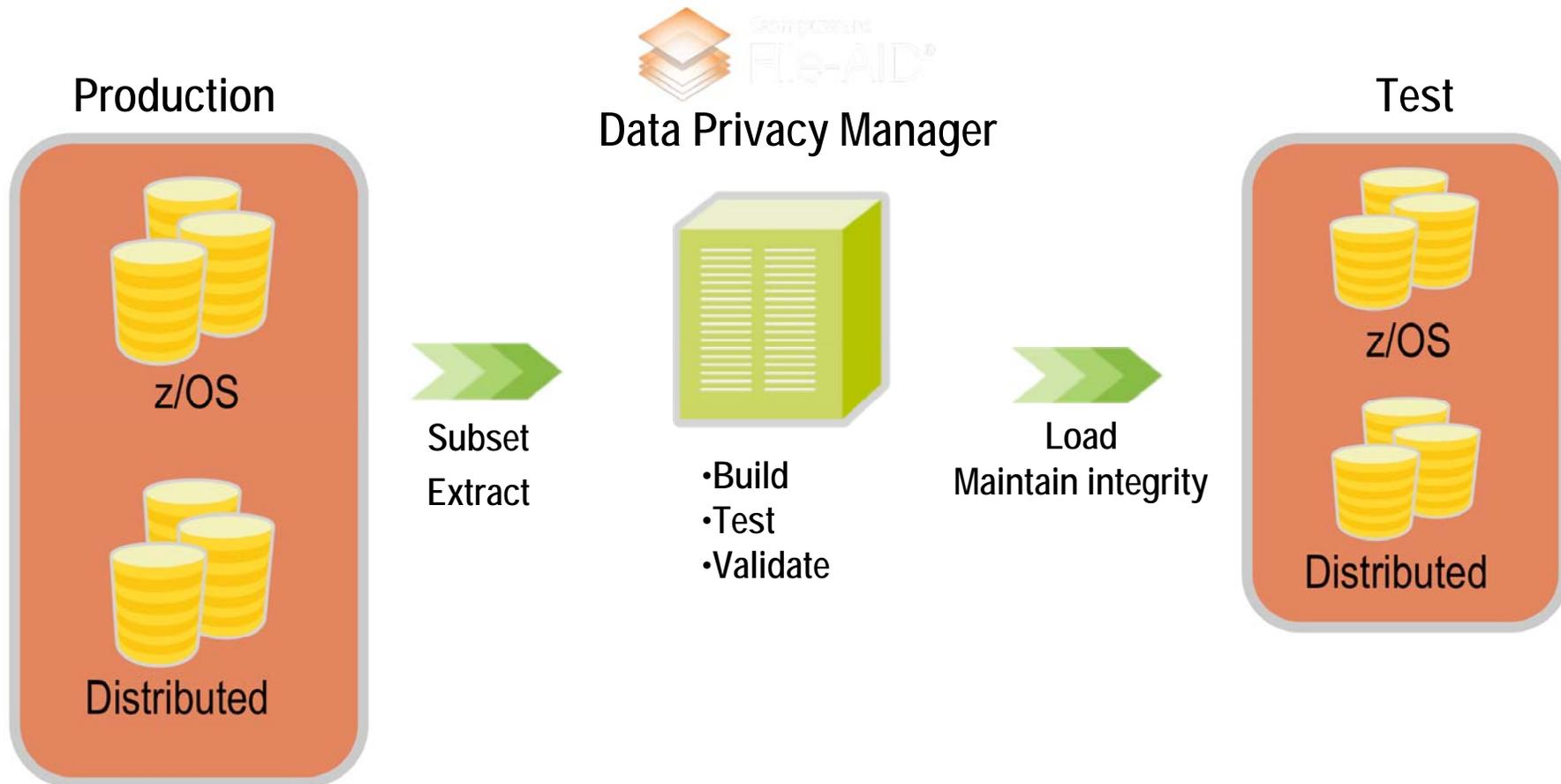
The screenshot displays the Microsoft Project interface for a project plan titled 'Compuware Data Privacy Project Plan V1.2.mpp'. The Gantt chart shows a task hierarchy starting with 'Design' (1.2) and 'Data Disguise Design' (1.2.2). The task 'Determine sensitive field/column disguise technique' (1.2.2.1) is highlighted, and its 'Task Information' dialog box is open. The dialog box shows the task name, duration (1d), and a checked 'Estimated' box. The 'Notes' tab contains the following text:

Once there is an understanding of the value domains for each field and their business rules a fictionalization strategy needs to be determined for each sensitive data element according to the different techniques available, such as Encrypt, Translate, Generate or Age.

A combination of these techniques allow to maintain data integrity, consistency and usability. Some techniques apply better to certain types of fields. For instance, names and addresses are usually translated, while phone numbers and codes are normally encrypted.

# Test Data Privacy

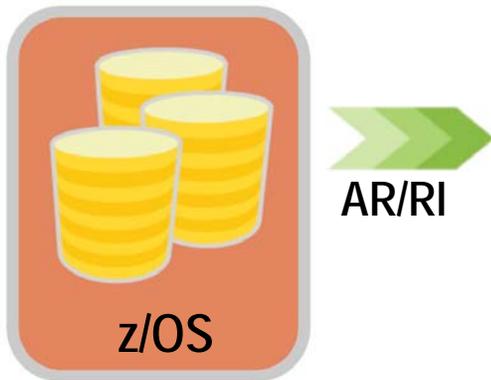
Develop



# Test Data Privacy

## Development tasks – z/OS Relationships

Production



```
File-AID/RDX ----- Relationship Detail ----- Row 1 to 5 of 5
Command ==> SCROLL ==> CSR

Base object: D701CW01.PROD.CUSTOMER_TBL

Line Commands: S = Select Relationship to Modify D = Delete Relationship
                A = Add Application Relationship I = Relationship Information

CMD      Parent/Dependent                                obj  Re1
          Parent/Dependent                                Type Type      Status
-----
- D701CW01.PROD.CUSTOMER_TBL                            DB2  RI
  D701CW01.PROD.CONTACT_TBL                             DB2
- D701CW01.PROD.CUSTOMER_TBL                            DB2  AR
  D701CW01.PROD.ORDER_TBL                               DB2
- 'SUSJDL0.FLEX.KEYFILE.EXTRACT'                        MVS  AR
  D701CW01.PROD.CUSTOMER_TBL                            DB2
- D701CW01.PROD.ORDER_TBL                               DB2  RI      ASSOCIATED REL.
  D701CW01.PROD.ORDER_LINE_TBL                         DB2
- D701CW01.PROD.PART_TBL                                DB2  RI      ASSOCIATED REL.
  D701CW01.PROD.ORDER_LINE_TBL                         DB2
***** Bottom of data *****
```

# Test Data Privacy

## Development tasks – z/OS Extract Scope

Production



```
File-AID/RDX ----- Graphical Relationship Display ----- Row 1 to 11 of 11
Command ==> █ SCROLL ==> PAGE

TAB to Table and press ENTER for an Option List
* Denotes the table is involved in additional relationships

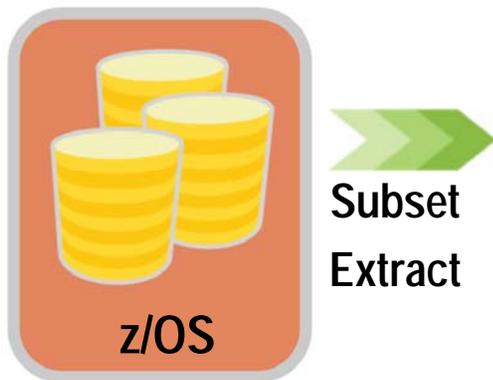
DB2-PART_20
|
|_ DB2-ORDER_LINE_20 *
|_ MVS- 'EU.TRANSFER.TRAIN.FDM.PART20.UNLOAD'

DB2-ORDER_TABLE
|
|_ DB2-ORDER_LINE_20 *
```

# Test Data Privacy

## Development tasks – Disguise z/OS Extract

### Production



```
File-AID/RDX ----- Extract Menu -----
Option ==>                                     USER Profile: ENCRYPT1
                                                SSID: D701

Primary commands: menu-number, ALL, REFERENCE, REQUEST, MODE
Line commands: S or / to create flow through selected options.

Description ==> USING ENCRYPTION DB2-TEST.CUSTOMER_TABLE

Current Values
- 1 Driving Object          DB2-TEST.CUSTOMER_TABLE
- 2 Extract Scope and      Dir=Y, Par=Y, Sib=Y, Ind=Y, Cycles=*
  Detailed Extract Views  5 of 5 Relationships Active
- 3 Unrelated Objects      None
- 4 External Key File       None
- 5 Selection Criteria      None
- 6 IMS Key File            There are no IMS Relationships defined
- 7 Extract File DISGUISED  SUSJDL0.V4R2M0.ENCRYPT1.EXTRACT
- 8 Continue with load     NO
- 9 Save Extract Request    SUSJDL0.V4R2M0.ENCRYPT1.REQUEST(CUSTOMER)
- 10 View JCL
- 11 Submit JCL
```

# Test Data Privacy

## Development tasks – Disguise Set Up

### Data Privacy Manager



- Build
- Test
- Validate

```
File-AID/Data Solutions ----- Criteria Menu --- TEMPORARY -----
OPTION ==> _

0  OPTIONS          - Selection criteria options  - Status -
1  DATE AGING       - Aging criteria              1  sets
2.1 EURO CONVERSION - Euro Conversion criteria    0  sets
2.2 TRIANGULATION   - Currency Triangulation     0  sets
3.1 DATE PATTERN ANALYSIS - Date Pattern criteria    0  sets
3.2 VALIDATION      - Validate criteria          0  sets
3.3 DATA ANALYSIS  - Data Analysis criteria     0  sets
4  TRANSLATOR       - Data Translator criteria    1  sets
5  GENERATOR        - Data Generator criteria     1  sets
6  FIELD EXITS      - Utilities criteria          0  sets
7  DATA ENCRYPTION - Data Encryption Criteria    1  sets

Member list description ==> _____
      Long      ==> _____
      Description ==> _____

Use ENTER to continue
Use VIEW to display criteria request  SAVE to write criteria request
Use END to return to Input Spec Panel  CANCEL to restart at Input Spec Panel
```

# Test Data Privacy

## Development tasks – z/OS Load

```
File-AID/RDX ----- Load Menu -----
Option ==> _                                USER Profile: RDXMENU

Primary commands: menu-number, ALL, REFERENCE, REQUEST, MODE
Line commands: S or / to create flow through selected options.

Extract File name ==> HFHSAS0.SCOTT.RDX.EXTRACT
Description        ==> DB2-FRSAMP.CUST_STUFF

Current Values
- 1 Load Object Specifications  SSID=D701, Load Method=SQL Insert
- 2 Source/Target Mapping       0 of 6 Objects are excluded
- 3 Target Environment          Create: Tables=6 + DB, Files=0
- 4 Existing Data Options
- 5 Insert Processing Options
- 6 Save Load Request           None
- 7 View JCL
- 8 Submit JCL
```



Disguised  
Extract



Load  
Maintain  
integrity

### Test



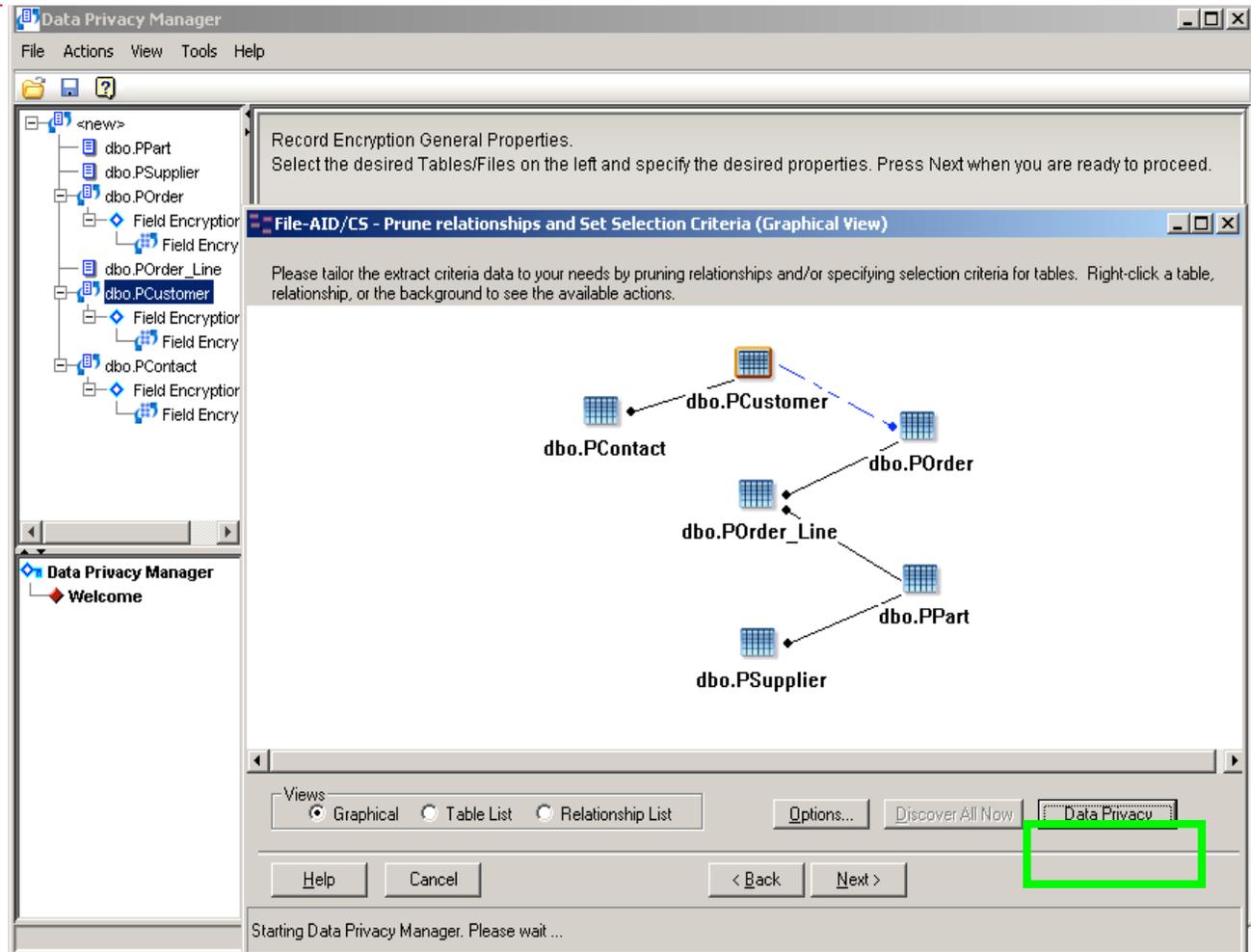
# Test Data Privacy

## Development tasks – Distributed Extract

Production



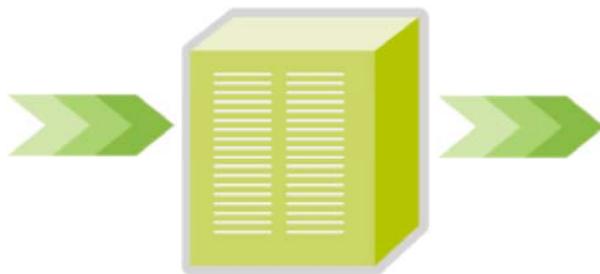
Subset  
Extract



# Test Data Privacy

## Development tasks – Distributed Disguise

### Data Privacy Manager



- Build
- Test
- Validate

File-AID/CS - Prune relationships and Set Selection Criteria (Graphical View)

Please tailor the extract criteria data to your needs by pruning relationships and/or specifying selection criteria for tables. Right-click a table, relationship, or the background to see the available actions.

dbo.PSupplier, dbo.PPart, dbo.PCustomer, dbo.POrder, dbo.PContact

Data Privacy Manager

File Actions View Tools Help

Record Layout

Record Layout	Type	Encoding	Size
dbo.PCustomer			
CUSTOMER_NUMBER	String	Display	6
Field Encryption			
COMPANY_NAME	String	Display	30
ADDRESS	String	Display	30
CITY	String	Display	25
STATE	String	Display	2
ZIP_CODE	String	Display	9
COUNTRY	String	Display	20
AREA_CODE	String	Display	3

Specify the desired parameters and Press Next to continue.

Protection Type: Field Encryption

Description: propagated\_customer\_number\_encryption

Status: Enabled

Utilize Selection Criteria

< Back Next > Apply Finish Cancel Help

ProjectView

# Test Data Privacy

## Development tasks – Distributed Disguise

**Load Specification - Untitled**

Source Table: dbo.CUSTOMER\_TABLE  
Target Table: dbo.CUSTOMER\_TABLE

Source Table: dbo.CONTACT\_TABLE  
Target Table: dbo.CONTACT\_TABLE

Source Table: dbo.ORDER\_TABLE  
Target Table: dbo.ORDER\_TABLE

Source Table: dbo.PART\_TABLE  
Target Table: dbo.PART\_TABLE

Source Table: dbo.SUPPLIER\_TABLE  
Target Table: dbo.SUPPLIER\_TABLE

Source Table: dbo.ORDER\_LINE\_TABLE  
Target Table: dbo.ORDER\_LINE\_TABLE

**File-AID/CS Related Loader - [SQL Insert Status: Untitled\_Load\_of\_demo]**

Table Name	Rows Deleted	Rows to be Loaded	Percent Processed	Rows Inserted	Rows Replaced	Rows Discarded	Rows Committed
dbo.CUSTOMER_TABLE	0	1	100	1	0	0	1
dbo.CONTACT_TABLE	0	3	100	3	0	0	3
dbo.ORDER_TABLE	0	5	100	5	0	0	5
dbo.PART_TABLE	0	8	100	8	0	0	8
dbo.ORDER_LINE_TABLE	0	10	100	10	0	0	10
dbo.SUPPLIER_TABLE	0	9	100	9	0	0	9

Load Completed! Check Load Log  
Untitled\_Load\_of\_demo-testLCH-FHSAS0-9-2005-03-  
for details.

Execution Server: DEFAULT

Extract Data Dir: [ ]

Buttons: Close, Details, Cancel, Help



Load  
Maintain  
integrity

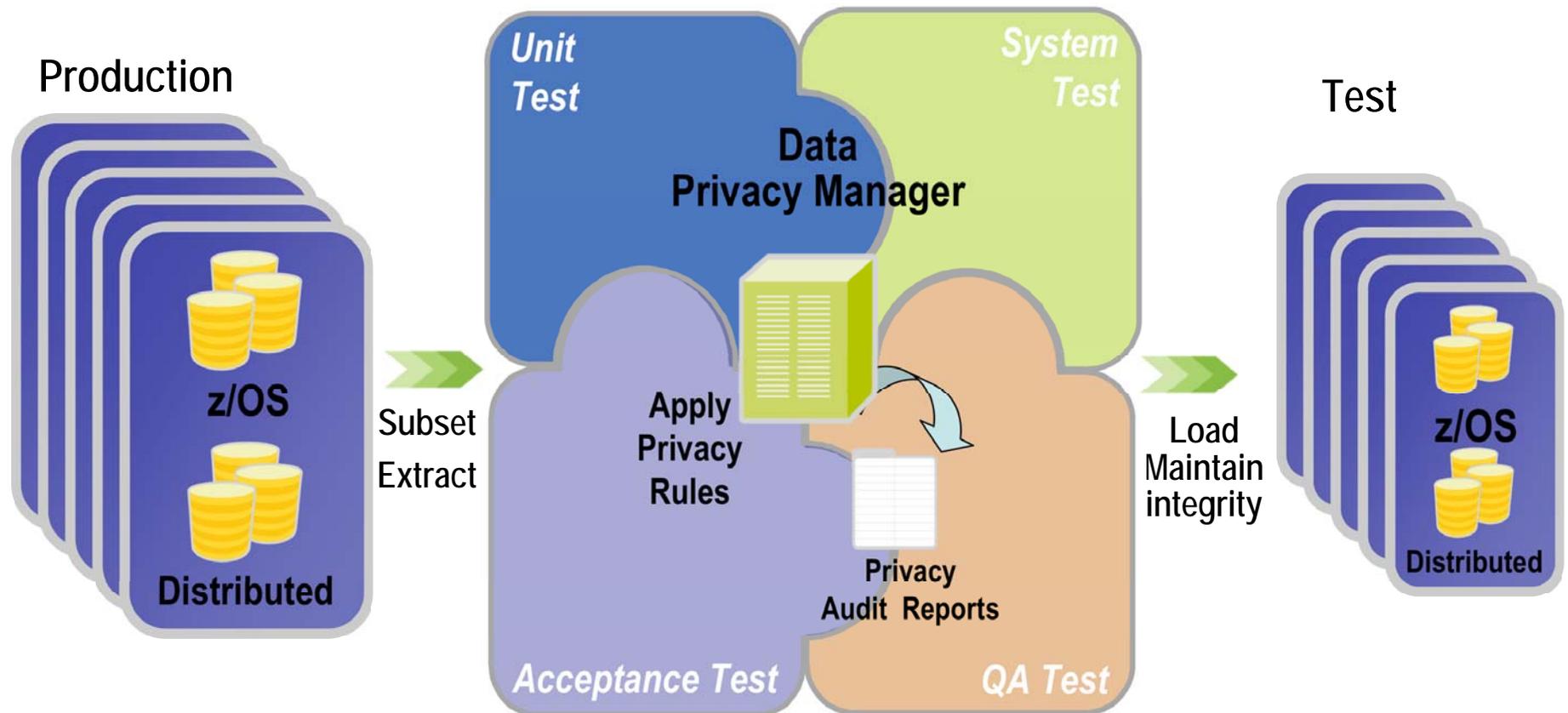


Distributed

Test

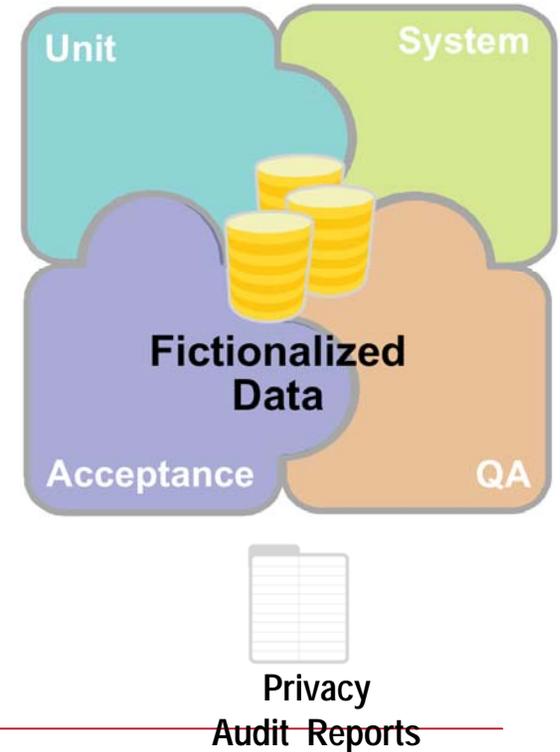
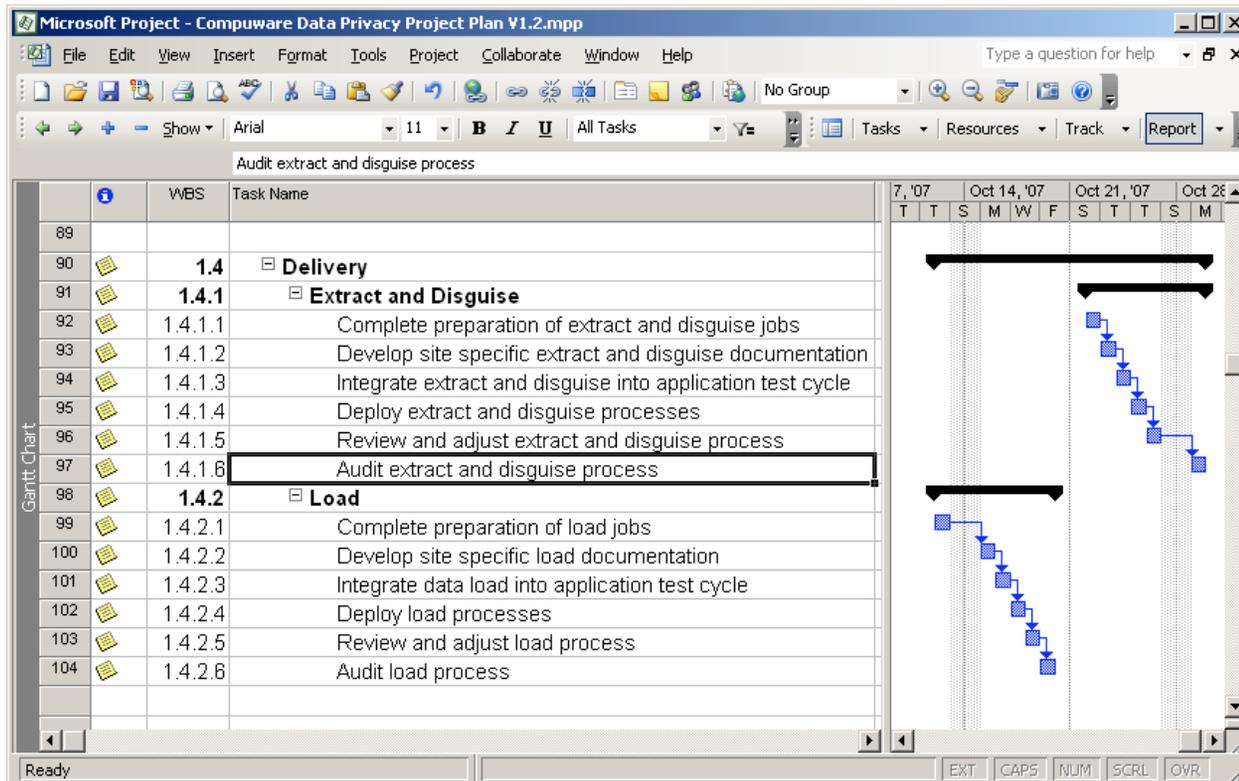


# Test Data Privacy Delivery



# Test Data Privacy

## Managing the Delivery Tasks



# Test Data Privacy

## Delivery – Output Results

Original Data	Disguised Data	Rule Applied
Mary Ward	Jill Jones	Translated
03-20-1962	04-18-1962	Aged
104 Main Street	111 State Avenue	Translated
Flint, MI 48025	Flint, MI 48025	Unchanged
370-55-2939	431-81-6492	Encrypted
4294 5730 5839 3037	42XX XXXX XXX9 3037	Masked
\$300,000	\$126,877	Encrypted
null	(810) 609-2873	Generated

# Test Data Privacy

## Delivery – Audit Reports

```

***** ***** Top of Data *****
000100 01 NOV 2005 13:03:36 FILE-AID/RDX 4.2 DISGUISE AUDIT TRAIL
000110 EXTRACT FILE : SUSJDLO.V4R2M0.EXTRACT.TRANS
000130 SOURCE OBJECT: D701CW01.PROD.ORDER_TBL
000140
000190 SUMMARY INFORMATION
000400
000500 AUDIT TRAIL FILE PRINTED: SUSJDLO.RDXA.D008.D051021.T140525
000600 UPDATE NUMBER: 1 ACTION: CHANGE
000611 DATA DISPLAYED -----1-----2-----3-----4-----+
000613 BEFORE POSITION 1 AA1111 CC3300 268-80-9611 WILLIAMS TO
000630 CHANGE---> ** **** *****
000650 AFTER POSITION 1 AA1111 CC3300 268-39-2877 JONES TO
000700 =====
***** ***** Bottom of Data *****
RECORD NUMBER: 1 ACTION: CHANGE RECORDED: 1 Nov 2005 AT 12:33:33
DATA DISPLAYED -----1-----2-----3-----4-----5-----+
Before: AA1111|CC3300|268-80-9611|WILLIAMS |TOM
Fields with DP Applied: ** **** *****
After: AA1111|CC9422|268-39-2877|JONES |TOM
  
```

# Test Data Privacy

## Delivery - Disguise Rule Administration

Data Privacy  
Manager



Disguise  
Rules

```
File-AID/RDX ----- Data Disguise - Object List ----- Row 1 to 5 of 5
Command ==> scroll ==> CSR

Primary Commands: ObjectIn, ObjectOut, Find, Size
Line Commands: S = select      I = Info
                O = ObjectOut  R = Related objects  L = List DB

SSID: D701 Location: D701CW01
Object Name      Disguised Columns/Fields  +
-----
- PROD CONTACT_TBL      CONTACT_NAME, CUSTOMER_NUMBER
- PROD CUSTOMER_TBL     CUSTOMER_NUMBER
- PROD ORDER_LINE_TBL
- PROD ORDER_TBL       SOC_SEC_NUM, CREDIT_CARD_NUM, CU
- PROD PART_TBL
***** Bottom of data *****
```

# Test Data Privacy

## Delivery - Disguise Rule Administration

Data Privacy  
Manager



Disguise  
Rules

The screenshot shows the Data Privacy Manager interface. On the left, a tree view shows the database structure with 'dbo.PCustomer' selected. Below it, the 'Field Encryption' configuration pane is open, showing 'General Properties'. The main area displays a 'Record Layout' table for 'dbo\_PCustomer' with columns for 'Type', 'Encoding', and 'Size'. The 'CUSTOMER\_NUMBER' field is highlighted, and its configuration is shown in the form below.

Record Layout	Type	Encoding	Size
CUSTOMER_NUMBER	String	Display	6
COMPANY_NAME	String	Display	30
ADDRESS	String	Display	30
CITY	String	Display	25
STATE	String	Display	2
ZIP_CODE	String	Display	9
COUNTRY	String	Display	20
AREA_CODE	String	Display	3

Specify the desired parameters and Press Next to continue.

Protection Type: Field Encryption

Description: propagated\_customer\_number\_encryption

Status: Enabled

Utilize Selection Criteria

< Back    Next >    Apply    Finish    Cancel    Help

# Test Data Privacy

## Delivery - Validation of Results

- Verify Disguised Data is Properly Testing:
  - New or modified code
  - Critical business logic
- Online and Printed Reports
- Risk Metrics
- Change Management Signoff Requirements
- Auditing Documentation

Original Data	Disguised Data	Rule Applied
Mary Ward	Jill Jones	Translated
03-20-1962	04-18-1962	Aged
104 Main Street	111 State Avenue	Translated
Flint, MI 48025	Flint, MI 48025	Unchanged
370-55-2939	431-81-6492	Encrypted
4294 5730 5839 30	42XX XXXX XXX9 3037	Masked
\$300,000	\$126,877	Encrypted
null	(810) 609-2873	Generated

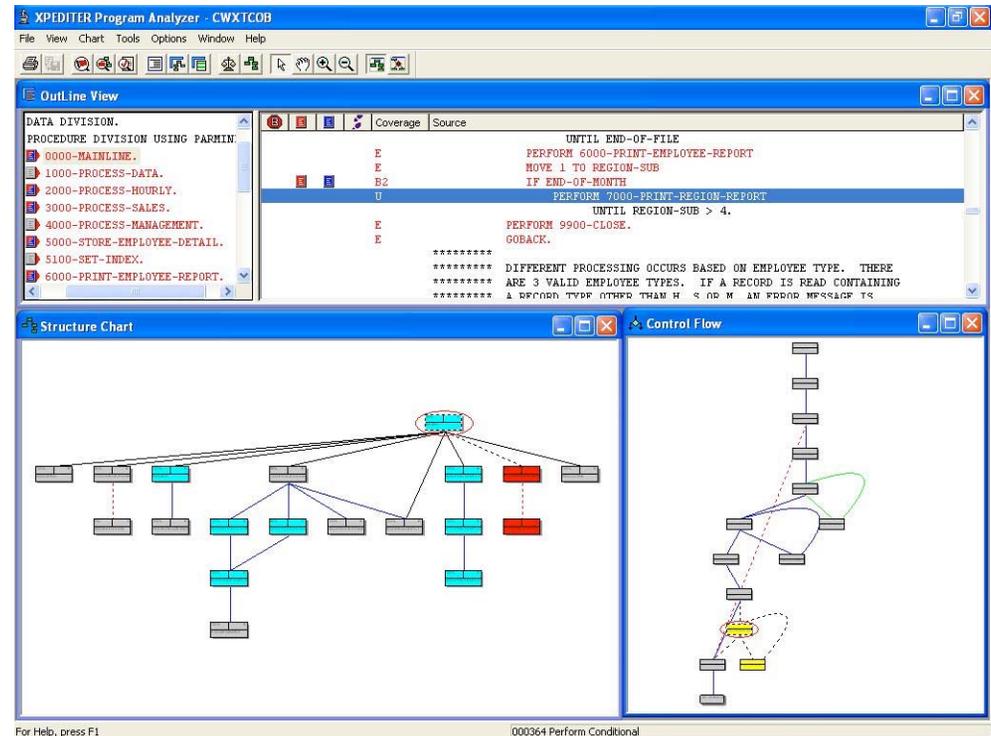


	Risk	Verbs Executed	Total Verbs	Branches Executed
System: PDASYSTEM	1007	3961(50%)	7816	867(49%)
Load Module: PDA001	482	159(48%)	328	34(50%)
Load Module: PDA002	478	135(55%)	243	36(66%)
Load Module: PDA003	483	114(37%)	303	23(35%)
Load Module: PDA004	918	157(48%)	326	36(51%)
PDA004 (11/04/04-06:24:59) Dpt=N,Debug=N	918	157(48%)	326	36(51%)
Load Module: PDA005	484	250(61%)	406	75(62%)
Load Module: PDA006	491	227(39%)	572	61(39%)
Load Module: PDA007	942	391(59%)	655	111(63%)
Load Module: PDA008	974	336(42%)	799	80(38%)
PDA008 (11/04/04-06:29:39) Dpt=N,Debug=N	974	336(42%)	799	80(38%)
Load Module: PDA009	939	451(58%)	777	92(51%)
Load Module: PDA010	489	325(50%)	646	83(53%)
Load Module: PDA011	485	156(38%)	410	27(35%)
Load Module: PDA012	486	241(48%)	495	68(62%)
Load Module: PDA014	480	190(61%)	310	29(48%)
Load Module: PDA016	486	274(56%)	487	48(46%)
Load Module: PDA017	488	367(50%)	720	43(39%)
Load Module: PDA018	483	188(55%)	339	21(35%)

# Test Data Privacy

## Delivery – Improved Test Data

- Improve Test Coverage
  - Data flow analysis
  - Program level analysis
- Know What is Needed
- Remove Redundant Test Data for Efficiency



# Test Data Privacy

Compuware experience across various industries

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## Financial Services Companies

- Large Australian Financial Institution
- Leading US SE Financial Services Company
- Global Financial Services Firm, Private Banking
- Midsize US Investment and Financial Firm
- US Life and Financial Services Co
- Large US / NE Investment Company
- Global Financial Services organization-Latin America

## Retail

- Large Provider of PC Equipment

## Manufacturing

- Financial Arm of Automotive Company

## Insurance Companies

- Global European Insurance Company
- Large US / NE Life Insurance Company
- US Midwest Property & Casualty/Life/Auto Ins. Co.
- US Leading Health Insurance Company

## Healthcare

- Large US Midwest Health Insurance Provider
- Leading US Integrated Healthcare Organization

# Test Data Privacy: Case Study

## Addressing HIPAA Compliance

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- **Large Health Management Organization**
  - Public scrutiny and huge corporate liability due to data breach
  - Many of their applications were offshore
  - Complex environment containing a variety of data types
- **Solution: Compuware's Data Privacy Solution**
  - Promoted internal communication and provided strategic implementation consulting
  - Used multi phased project templates and Compuware Experts to conduct pilot

*The end result: Successfully secured the test data for their initial 40 applications and continue to secure all 1500*

# Test Data Privacy: Case Study

## Reducing Risk of Exposure

- **Largest US Consumer and Small Business Bank**
  - Needed to transmit sensitive data to different locations around the company, as well as to an offshore partner
  - Complex, heterogeneous environment with many technologies and applications
  - Required a test bed with consistent data from all applications
- **Solution: Compuware's Data Privacy Solution**
  - Used a data model to simplify managing disguise data consistency across enterprise systems
  - Implemented top 8 high risk applications

*The end result: Successfully de-identified data for high risk applications, maintaining usability and integrity for internal and offshore use*

# Test Data Privacy: Case Study

## SOX/GLB Compliance

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- **Property & Casualty / Life / Auto Insurance Co.**
  - Executive Management saw internal risk
  - Wanted to disguise SSN, DL# and Last Name in Test & Dev.
  - Required disguising z/OS DB2, AS400/DB2 data
- **Solution: Compuware's Data Privacy Solution**
  - Defined disguise rules to sensitive field elements
  - Created extract disguise jobs to disguise sensitive data
  - Provide audit reports as needed to substantiate compliance

*The end result: Successfully automated a repeatable process for protecting sensitive data*

# Test Data Privacy: Case Study

## SOX/GLB/SEC Compliance

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- **Financial Services Firm**
  - Highly sensitive financial data
  - Millions of financial transactions containing sensitive customer data
  - Required disguising data enterprise wide
  - IT Risk and Security is top priority
- **Solution: Compuware's Data Privacy Solution**
  - Lower cost of regulatory compliance
  - Reduced risk and liability associated with data privacy
  - Deter misuse and exposure to unauthorized users

*The end result: Provided an auditable disguise process to substantiate compliance*

# Test Data Privacy: Case Study

## Reducing Risk of Exposure

- **Leading Direct Consumer Electronics Manufacturer**
  - Discovered liability of using production data in test
  - Accidentally sent out bogus invoices and emails during a test cycle
  - Responding to enterprise-wide business process improvement initiatives such as:
    - Test driven development
    - Automated quality assurance
    - Global data management
- **Solution: File-AID/CS**
  - Increased the frequency of test cycles while improving data quality
  - Prevents database and application downtime during test data preparation

*The end result: Sanitize PII to protect from privacy abuse and meet audit requirements*

# Test Data Privacy: Case Study

## Reducing Risk of Exposure

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- **\$2B Securities Company**
  - Dedicated to safe/secure test data for investment products
  - Passes client files to outside vendors and Off-shore exposure to critical data
  - Heavy IAM and Sybase usage requiring cross-platform consistency
  - Stringent Sr. Management security expectations
- **Solution: Compuware's Data Privacy Solution**
  - Analyzed critical fields for consistency/symmetry
  - Utilization of multiple disguise techniques
  - Provides test data cleansing, consistency and congruency across platforms, audit trails, and the ability to handle volume processing

*The end result: Delivered Phase-1 of the disguise project within their timeframes, on-budget*

# Test Data Privacy: Case Study

## SOX/GLB/Insurance Compliance

- **Large Mutual Life Insurance Company**
  - Executive Management saw internal risk of exposing sensitive production data
  - Were impacted by various state insurance laws
  - Requirement to disguise the Consumer System application first which included z/OS and Oracle data
- **Solution: Compuware Test Data Privacy Solution**
  - Data Disguise routines needed to be reversible during early phases of implementation so downstream systems would not be impacted
  - Defined disguise rules for consistent results on z/OS and Oracle data
  - Translate tables were populated from data in the distributed environment and moved to the mainframe for consistent disguise

*The end result: Created a repeatable process to subset and disguise data which included audit reports for validation*

# Test Data Privacy

Why Compuware?

Our Solution is Comprehensive!

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## **We deliver a comprehensive solution that includes:**

- Integrated and proven technology
  - File-AID/Data Solutions, File-AID/RDX, and File-AID/CS
- Defined, repeatable processes for automated product execution
- Project templates that fully document the tasks for each step in the process
- Documentation to substantiate compliance
- Product-generated, standardized reports for ongoing auditability
- People with project management and data privacy implementation experience

# Test Data Privacy

Why Compuware?

We are Experienced!

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- **We have assisted with implementation of nearly 40 Data Privacy Projects in the US and Canada over the past 3 years**
  - Several Test Data Privacy customers also in Europe, Australia, Latin American, Brazil and South Africa
  - Companies are mostly Insurance, Financial Services, Retail and Health Care organizations
- **We can assist with any stage of the project; analysis, design, development or delivery**
- **We have the ability to adapt to out of the box scenarios and situations**

# Test Data Privacy

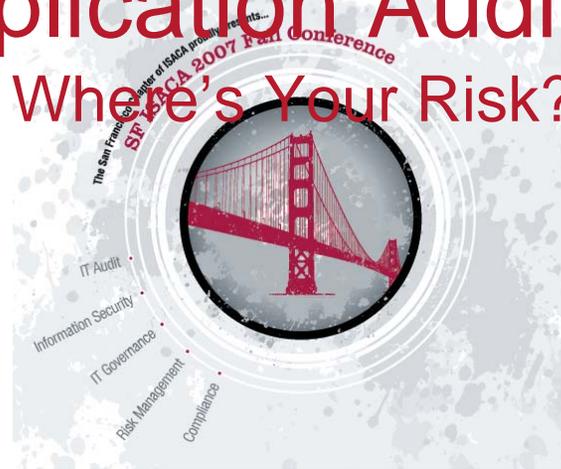
## The Value Proposition

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- **Lowers cost** of regulatory compliance
- **Reduces risk** and liability associated with data privacy
- **Improves test data quality** while maximizing testing efficiency
- **Provides an end-to-end solution** from a single company

# Application Auditing

## Where's Your Risk?

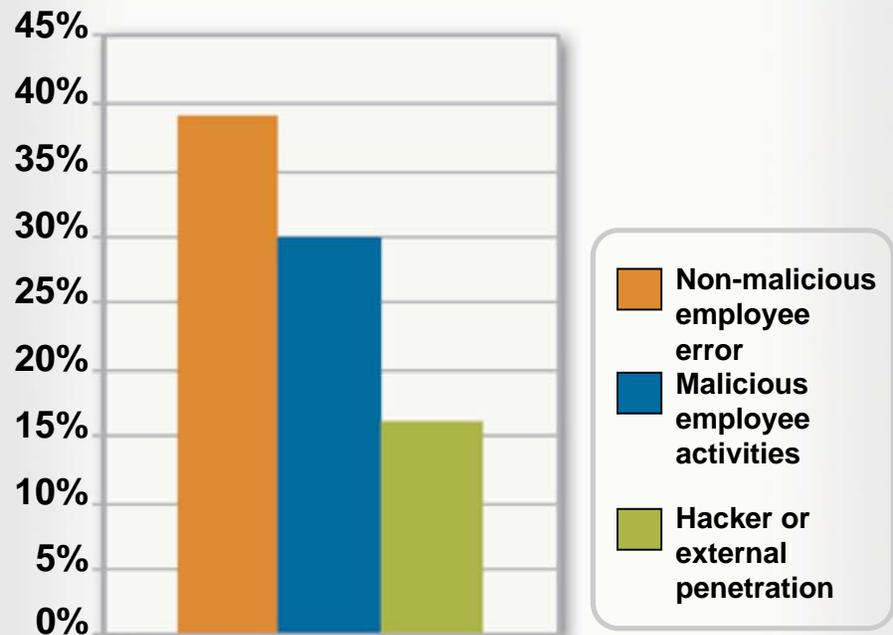


How do you protect against sensitive data breaches where users **are authorized** to access the data?

# Application Auditing

## Where's Your Risk?

**Ponemon Institute's 2004  
Data Security Tracking Study –  
Leading Cause of Data Security  
Breach**



“Contrary to what most people believe, the majority of identity thefts are inside jobs.”

**Judith Collins**

*Michigan State University  
Identity Theft Survey*

“Gartner estimates that more than 70% of unauthorized access to information systems is committed by employees, as are more than 95% of intrusions that result in significant financial losses.”

**Richard Mogull**

*Gartner Senior Analyst*

# Application Auditing

## Defined

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Compuware's solution for Application Auditing acts **like a surveillance camera** for your applications by efficiently recording internal activity between users and their applications. Not only does this deter inappropriate activities, but it also **provides an audit trail that can be retrieved to investigate details** of a data breach—and limit its impact.

# Application Auditing

Methods currently used to prevent unauthorized access

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RACF, ACF2 or Top Secret **authenticate the user at login.**

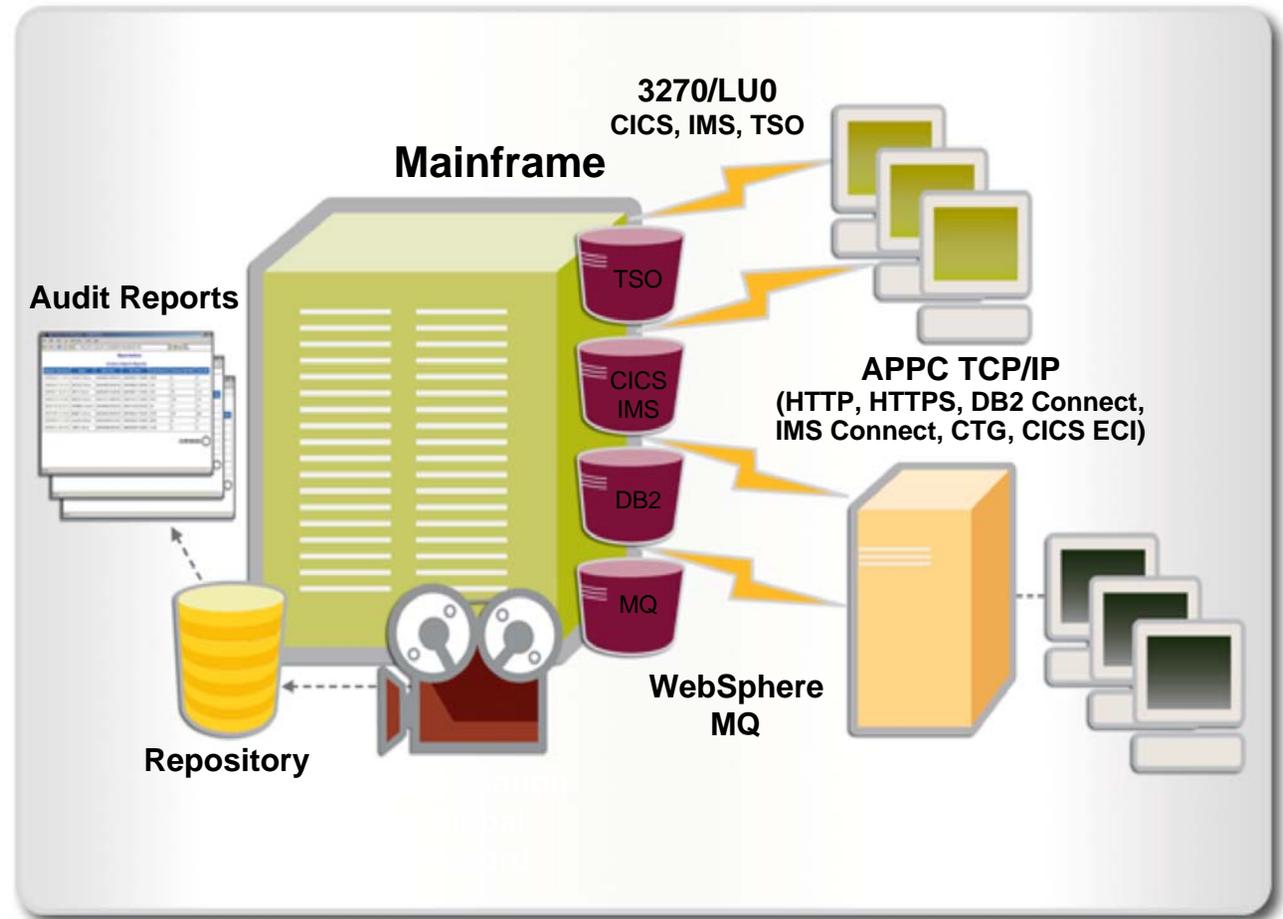
If this is done properly, you will lock out external users, but **trusted internal users still have access to the application** and a breach could still occur.

RACF, ACF2 or Top Secret **secure access to the application and data.**

# Application Auditing

## What we do: Record End-User Activity

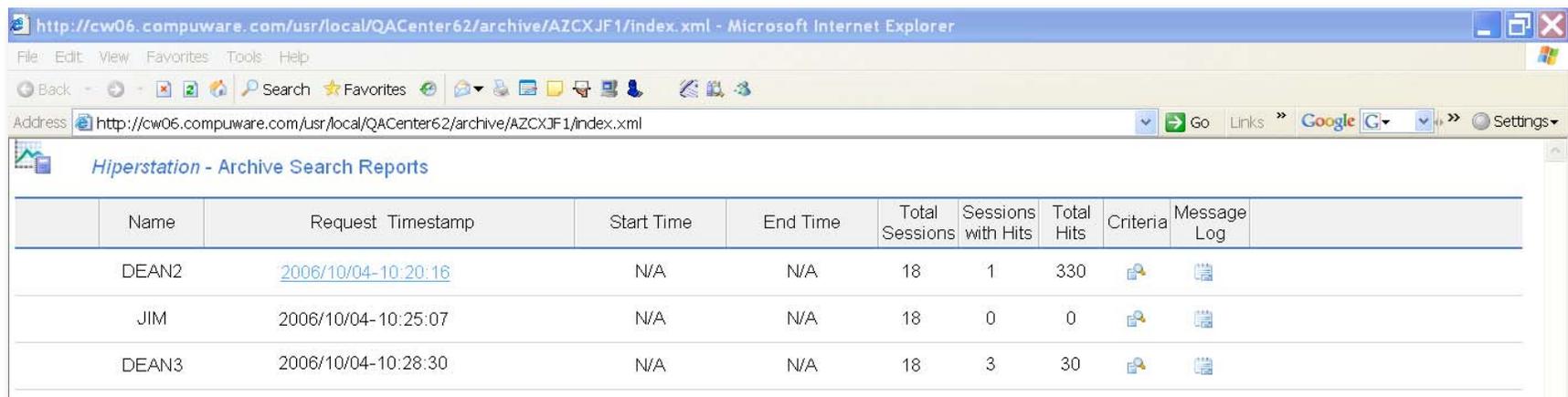
- End-users are notified that all their application activity is being recorded
- Key application communication is recorded
- Repository of Audit Trail information is saved, protected and ready for use



# Application Auditing

## Example of Investigating Suspicious Activity

- An end-user is suspected of misusing client data
- Reports are created to pull up that user's activity from the repository
- Results are shown in a web browser
- Can focus within a date range or other criteria

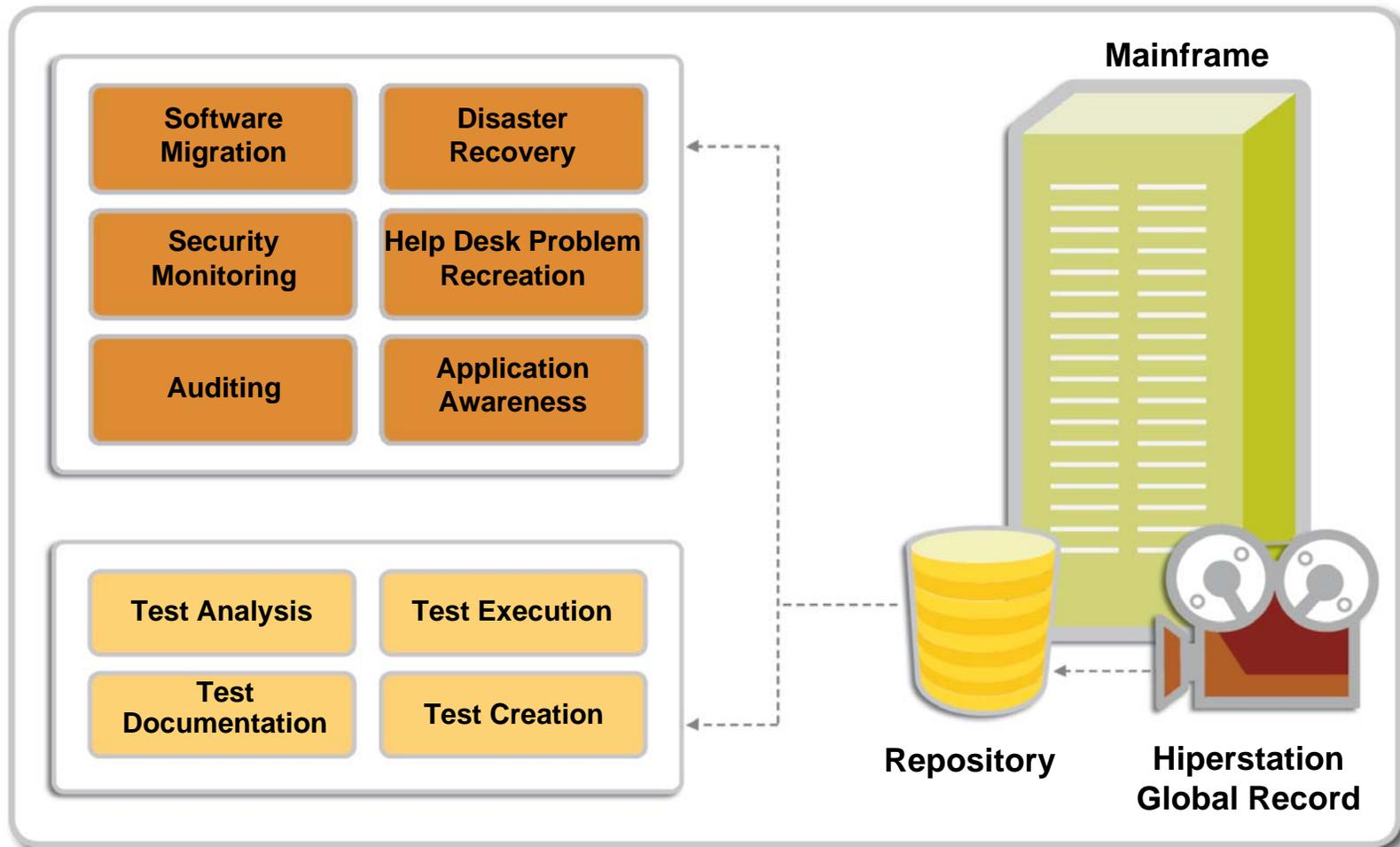


The screenshot shows a Microsoft Internet Explorer browser window displaying a search report. The address bar shows the URL: <http://cw06.compuware.com/usr/local/QACenter62/archive/AZCXJF1/index.xml>. The page title is "Hiperstation - Archive Search Reports". The report is a table with the following data:

Name	Request Timestamp	Start Time	End Time	Total Sessions	Sessions with Hits	Total Hits	Criteria	Message Log
DEAN2	<a href="#">2006/10/04-10:20:16</a>	N/A	N/A	18	1	330		
JIM	2006/10/04-10:25:07	N/A	N/A	18	0	0		
DEAN3	2006/10/04-10:28:30	N/A	N/A	18	3	30		

# Application Auditing

The Global Record Repository: *Valuable, Reusable Assets*



# Application Auditing

## An IT Auditor's Perspective

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**"As an IT Auditor, I see Compuware Hiperstation for Application Auditing as a 'proactive defense' tool. By recording end-user application activity, a company can prevent and investigate fraud and data security breaches - helping to reduce the potential for significant damage. Hiperstation's detailed forensic information and audit reports are indispensable tools that provide indisputable proof that can be used to detect problems or policy violations; prevent incidents from becoming larger; and reduce the scope of an incident response."**

***Paul L. Haley  
IT Auditor, CISA***

# Application Auditing

## Case Study Example: *An Audit Trail of Evidence*

- **Large Federal Government Agency**
  - Highly sensitive online transactions
  - Hundreds of end users all over the world producing 8+ million daily transactions
  - IT security is top priority
- **Solution: Hiperstation**
  - Record and save all application traffic
  - Search repository for suspected misuse
  - Use information for legal proceedings



# Application Auditing: Savings With a Targeted Notification

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**Example:** You have 100 CSR's supporting 100,000 customers; avg. customer acquisition cost is \$200; expected lifetime revenue is \$1,000 per customer

## Notify All Customers

- 100,000 Customers X
- 1% Lost Customer Rate =
- 1,000 Lost Customers

\$1,200,000

vs.

## Limit Notification

- 1,000 Customers X
- 1% Lost Customer Rate =
- 10 Lost Customers

\$12,000

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