

ORACLE SECURITY OPTIONS

PEOUG' 2009

2009 Lima, Peru

dbisTM
DATABASE
INTEGRATED
SOLUTIONS

www.dbis.co.pe
www.dbisonline.com

HOME

At DBISTM we know in house database administration is an ongoing battle. Hiring, training and retaining database administrators is time consuming and expensive. When hired, a DBA often has to manage the day-to-day system while tackling more strategic IT initiatives, so their time is spread too thin. And given his or her holiday, vacation and work schedules, a staff DBA, or even a team of DBAs, cannot possibly monitor and provide 24/7 support for the system. As a result, your mission-critical data may be in danger.

DBISTM is a global network of recognized DBAs around the world, ready to take care of your mission-critical data. Some of our DBAs are recognized members of Oracle OTN and SQL Server forums, helping other fellow DBAs with their problems and questions at daily basis.

Our Mission

Our goal is to reduce your database administration costs and increase the level of efficiency, security and performance in the supported environment. Your company will have an entire team of certified Oracle, SQL Server, Sybase and MySQL specialists at your service, a proactive and efficient monitoring and checklist, solving the problems before they happen and a 24/7 monitoring and support service to solve any incident any time, any day.

We focus on the enterprise database tier, especially on Oracle, SQL Server and MySQL. Our services also extend one layer up with outsourced support for Oracle E-Business Suite, J2E, OAS, PeopleSoft and several other major application servers and ERP applications.

Our model is unique in that it allows our larger customers to outsource some or all of the management of entire environments while still allowing our smaller customers to tap the subject matter expertise and 24/7 access to resources normally only available in very large enterprise infrastructure teams.

For our customers that already have a DBA or even a team of DBAs, and for clients in search of special expertise in areas such as RAC, Streams, RMAN, DataGuard,

- Home
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- The Insider
- Client Login
- FAQ

By:
Francisco Munoz Alvarez 🇵🇪



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DATABASE
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SOLUTIONS

ORACLE SECURITY OPTIONS

(Based on Oracle EMEA Security Workshop)

Francisco Munoz Alvarez 🏆

Oracle ACE Director

President CLOUG, LAOUC & NZOUG

8/9/10g/11g OCP, RAC OCE, AS OCA, E-Business OCP, SQL/PLSQL OCA, Oracle 7 OCM

Oracle 7 & 11GR2 Beta Tester

ITIL Certified

Blog: www.oraclenz.com - Email: franciscoa@dbisonline.com – Twitter : [fcomunoz](https://twitter.com/fcomunoz)

Blog: www.oracleenespanol.com - Comunidad Oracle: www.oraclemania.ning.com

CEO at DBIS TM

Database Integrated Solutions

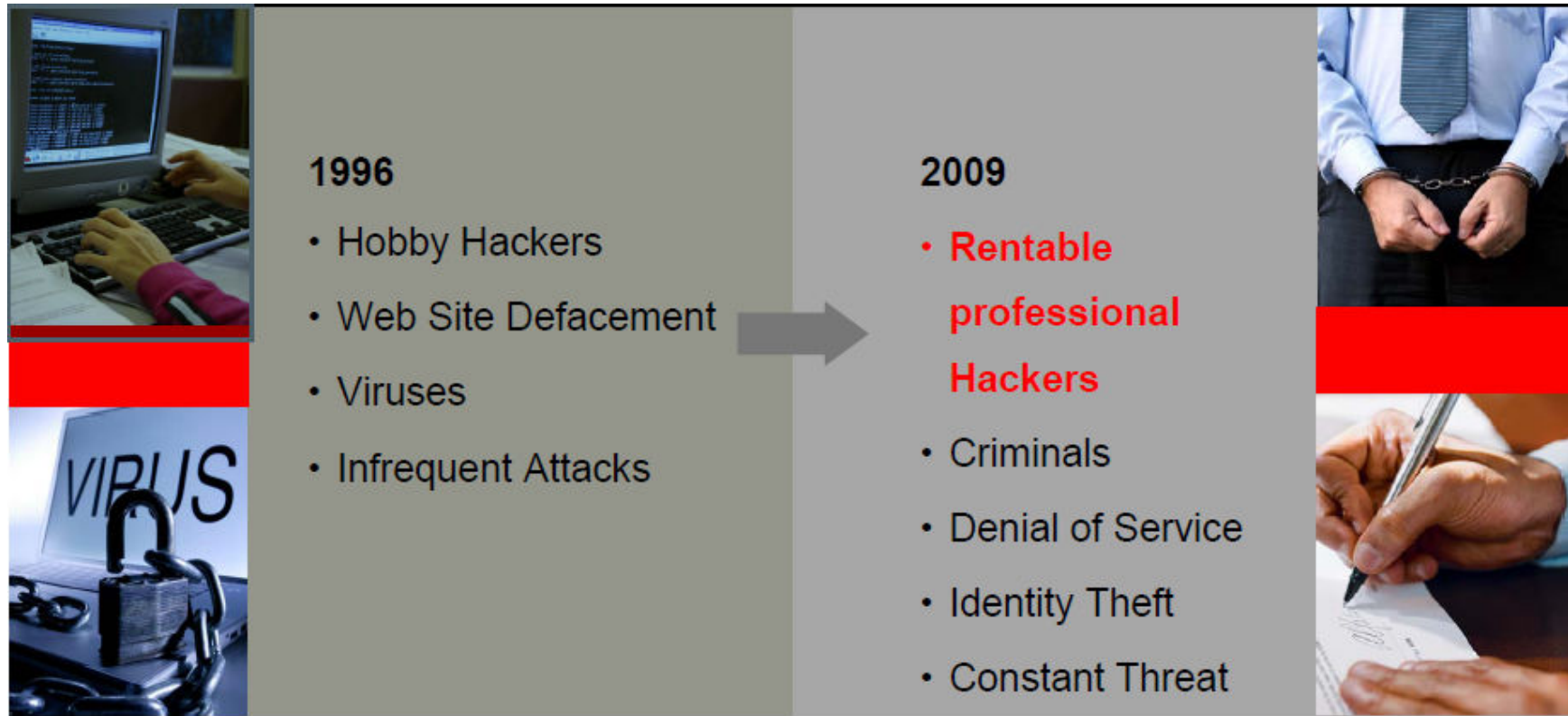
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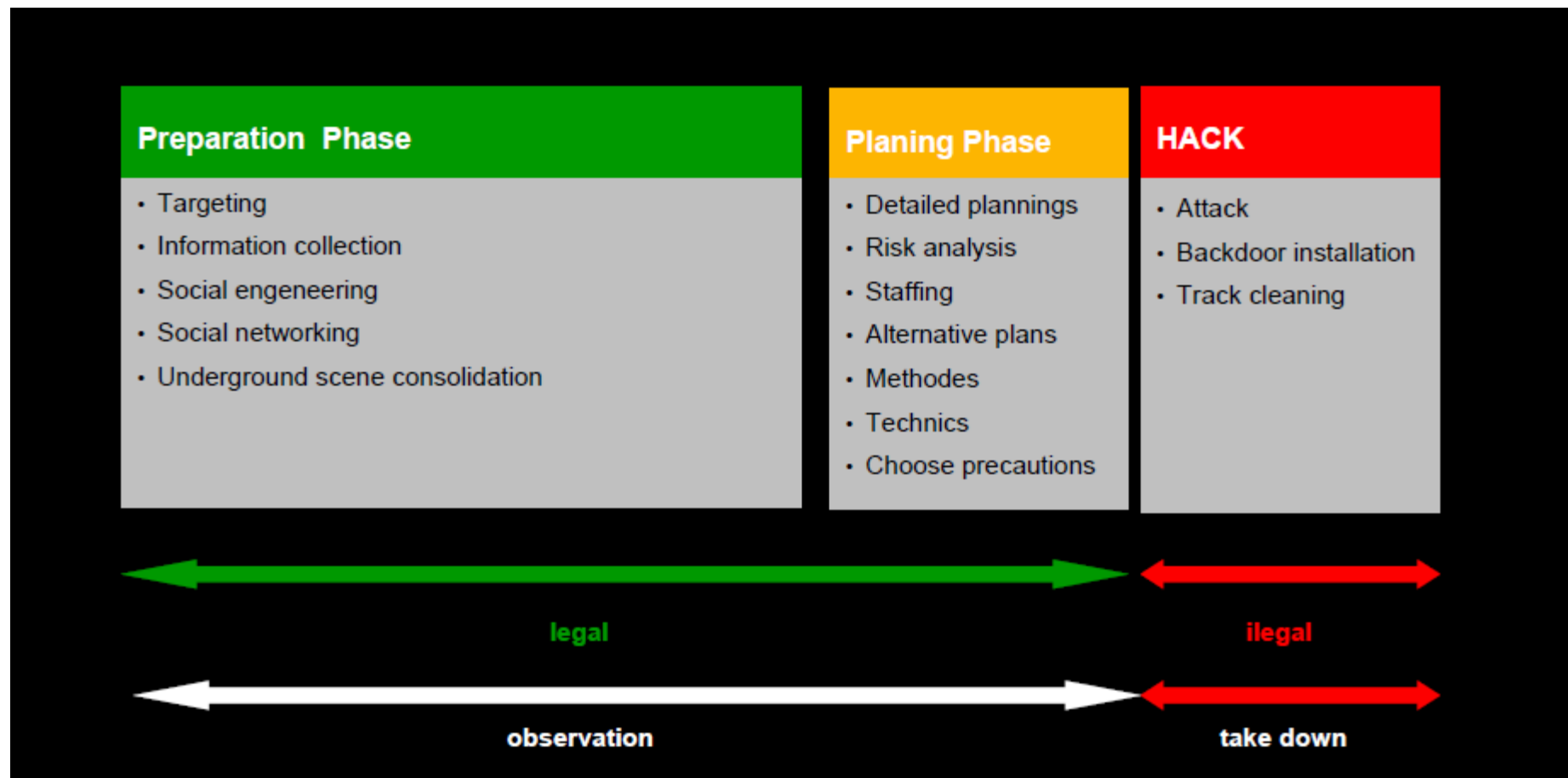


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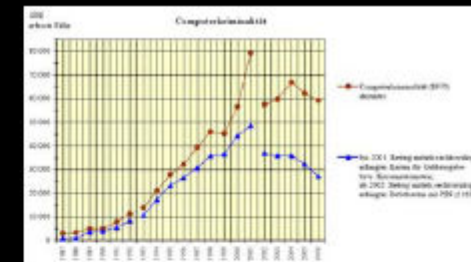
Information Security Has Changed



Hacking Steps



OFFICIAL STATISTICS from Secret Service Germany

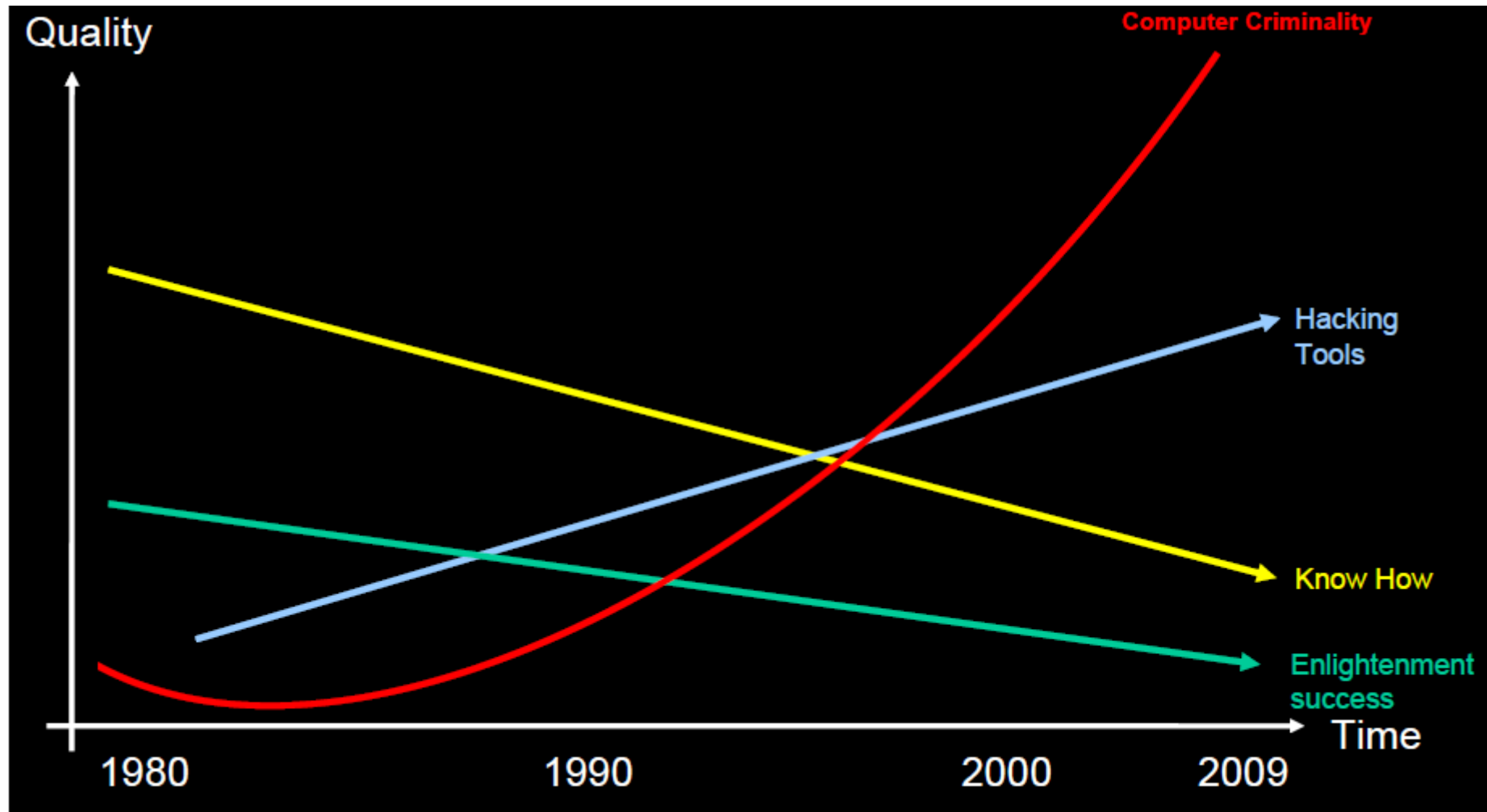


Jahr	Verfahren	Anzahl		
		absolut	relativ (%)	absolut
1979	Computeranwendung Daten	39 141	42,638	17 357
1980	Bewertung techn. Entwicklung in kleineren Unternehmen am PPS	20 747	37,335	9 881
1981	Computeranwendung (VGA-Micro)	33 211	10,875	3 866
1982	Bewertung von Entwicklungsleistungen in Kommunikationsunternehmen	3 862	5,988	346
1983	Forschung in verschiedenen Branchen, Finanzierung in den verschiedenen Prozessstufen (1.209, 276 MioG)	2 400	1,012	1 848
1984	Demographische, Computeranwendung im VWA, VGA-Micro	1 487	1,408	43
1985	Anwendung von Daten	2 966	7,848	424
1986	Computeranwendung (System-Anwendung z.B. Computergraphik)	1 935	2 065	141
1987	Softwareentwicklung in Firmensystemen in kleinen Unternehmen	721	657	342

Gezeiten und Abflussverhältnisse (Tabelle 3): Kernstille 3-Baukörper ausgemittelt								
Station	Strömungsrichtung	max. mitt. min.	Tidezeitung					
			Zeit in h	max. in h	mitt. in h	min. in h	Veränderung in h	
8778	gegenströmend Binn	18:59	76,5	27,0	3,3	9,9	12,1	94,9
1343	Recht nach mit schwachem ebbigen Nachstromen 190	7:11	72,8	28,0	2,9	11,8	14,9	89,1
1376	Compenströmung 11:40 10:10	4:44	70,1	29,8	3,2	8,3	10,8	89,9
1378	Recht mit Zugspiegelveränderungen Vollkommentidezeitung	2:53	70,1	29,1	8,0	6,0	12,1	81,1
1426	Pfählung bei Tidenveränderung; Dem; Tidenzeit in Recken-ebne bei Tidenveränderung -1 20, 17, 10 h	8:00	76,3	27,7	8,9	9,3	18,7	78,4
4787	Tidenveränderung; Compenströmung -11:59, 10:10 10:10	18:47	70,1	16,1	1,0	9,2	7,1	72,4
6791	Ausstrom von Binn	10:13	82,3	18,7	3,4	1,8	8,7	71,1
7132	Unvollständige gegenströmend; all Compenströmung	1:25	85,0	12,0	8,0	9,9	5,7	86,0
7132	Unvollständige in Front gegenströmend Hochzeit	10:17	86,3	18,7	8,0	1,6	7,6	86,1

Bei den Compenströmungen wurden mindestens zwei verschiedene Tidezeitungen ab 21 Stationen.

COMPUTER CRIME DEVELOPMENT



SOME SHORT FACTS

87 % of all Databases are compromised over the **operating system**

80 % of the damage is caused by **insiders**

1 % of all professional hacks are only **recognized**

10 % of all “standard hacks” are made **public**

HIGH SCORE LIST

Source: **Black Hat Convention 2008**

40sec Windows XP SP2

55sec Windows Vista

63sec Windows NT4.0 WKST, SP4

70sec Windows 2003 Server

140sec Linux Kernel 2.6.

190sec Sun Solaris 5.9 with rootkit

...

List includes also **AIX, HPUX, OS2, OSX, IRIX, ...**

2007/2008 SHOPPING LIST

50.000 \$ Windows Vista Exploit (4000\$ for WMF Exploit in Dec2005)

7 \$ per ebay-Account

20.000 \$ medium size BOT network

30.000 \$ unknown security holes in well known applications

25-60 \$ per 1000 BOT clients / week

CRISIS SHOPPING LIST 2009

100.000 \$ Destruction of competitor image

250.000 \$ Full internal competitor database

25 \$ per credit card account (+sec code + valid date)

20.000 \$ medium size BOT network (buy or rent)

2000 \$ stolen VPN connection

5000 \$ contact to “turned around” insider

HACKING METHODS AND TECHNIQUES

Over **80%** of
all hacks are
done from
internal



At the moment one
of the **dangerous and
effectives methode**
in the scene

INSIDER ATTACKS EXAMPLES

European Headlines 2008

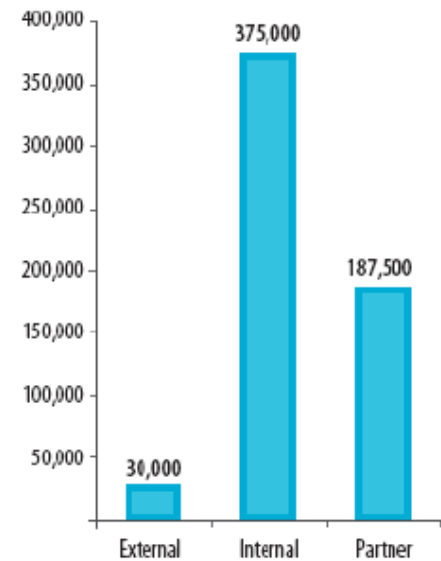
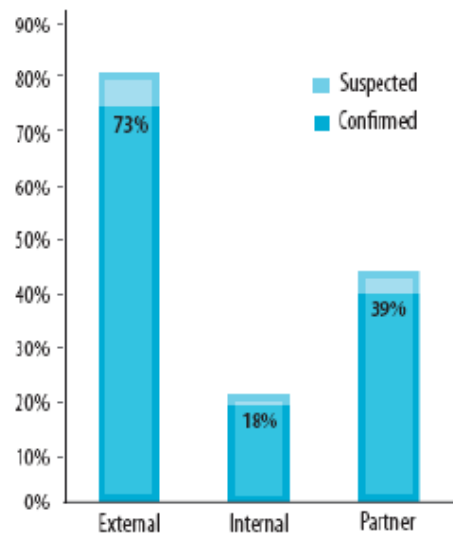
- lost top secret document about Al Quaida (public train)
- stolen data of thousand prisoners and prison guards
- personal information of 70Mio people unencrypted on DVD's lost
- bank employee gambled with 5.4Bio US\$
- 88% of admins would steal sensitive corporate informations
- Industry espionage by insiders increased dramatically
- biggest criminal network (RBN) still operating
- Tousands of stolen hardware equipement @ US Army
- US Army lost 50.000 personal data of former soliers
- Chinas „Red Dragon“ organization cracked german gov network
- Lichtenstein Affaire – Insider vs. Secret Service

THE INSIDER THREAT

- Outsourcing and off-shoring trend becomes now a governmental problem (judgement decision)
- Large percentage of threats go undetected
 - huge internal know how
 - powerful privileges
 - track cleaning
 - „clearance“ problem
 - foreign contact persons / turnovers
- Easier exchange of sensitive data
(hacker's ebay, RBN, paralell internet, dead postboxes...)

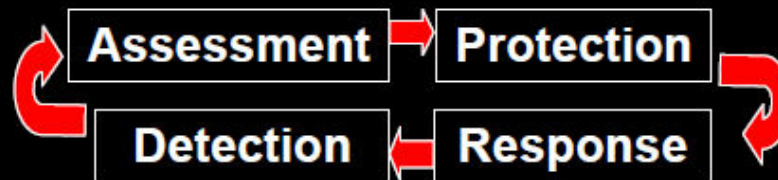
OFFICIAL STATISTICS

EXTERNAL/INTERNAL THREAT



CONCLUSION



- Security is a „**race**“, if you stop running you'll lose
- Security **IS NOT** a product; it's an ongoing living process



- Security **IS** an intelligent combination of more areas -> „Big picture“
- **Focus** on your data, not only on the technic



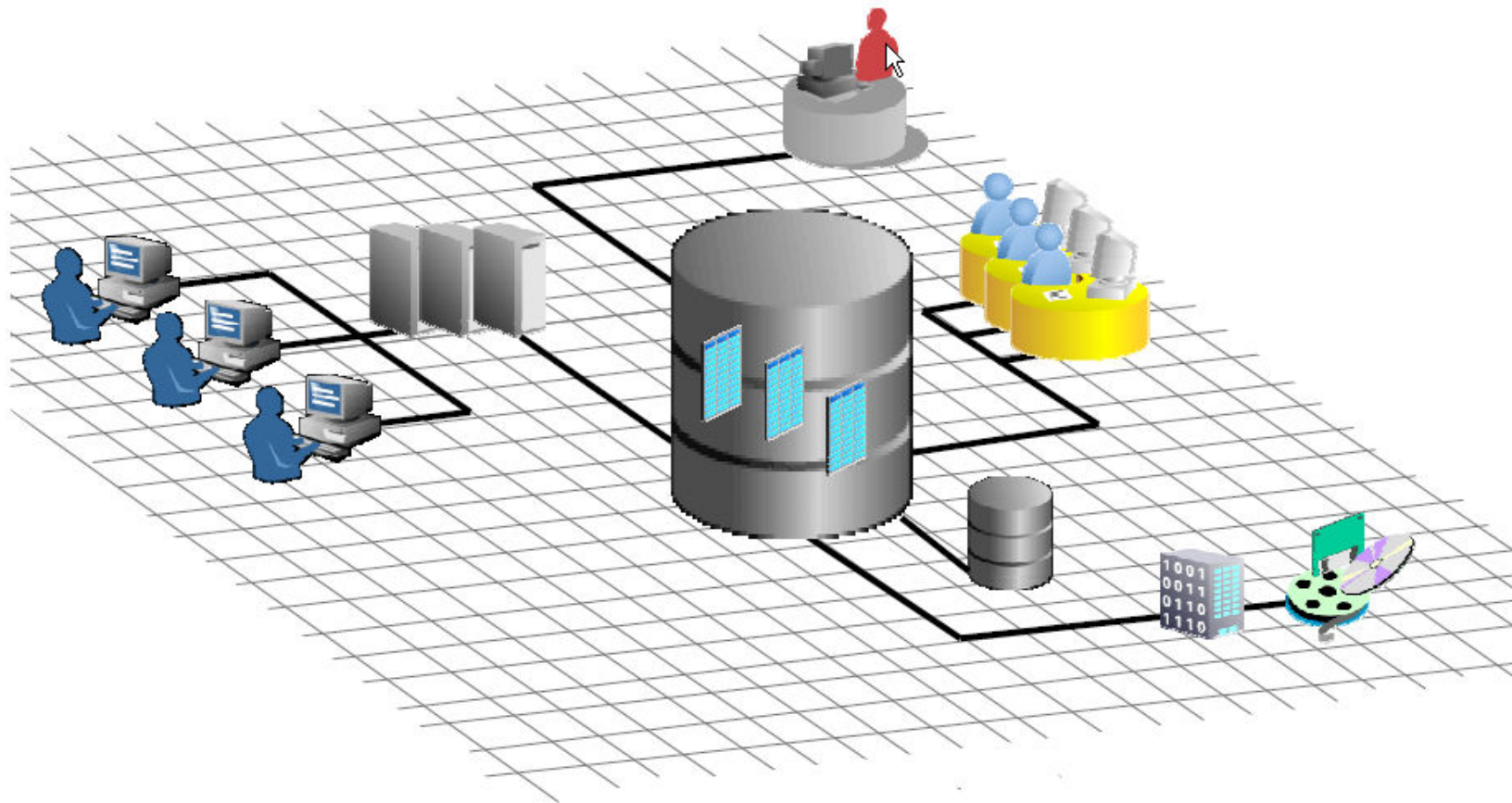
Oracle Security Solutions

Problem	Oracle Solution	Oracle Security Product
<ul style="list-style-type: none">• External Attackers• Internal Threats• Image Damage• Internal Security Regulations• ...• ..• .	<ul style="list-style-type: none">• Separation of duties• Insider threat protection• Strong access authentication• Strong encryption (DB/OS/Net)• Fine grained real time external auditing• Data consolidation control• High availability + Security combination	<ul style="list-style-type: none">• Advanced Security Options (ASO) • Network encryption• Transparent data encryption• Strong authentication• Database Vault • Audit Vault• Secure Backup• Virtual Privat Database (VPD)• Oracle Label Security (OLS)• Data Masking• Total Recall

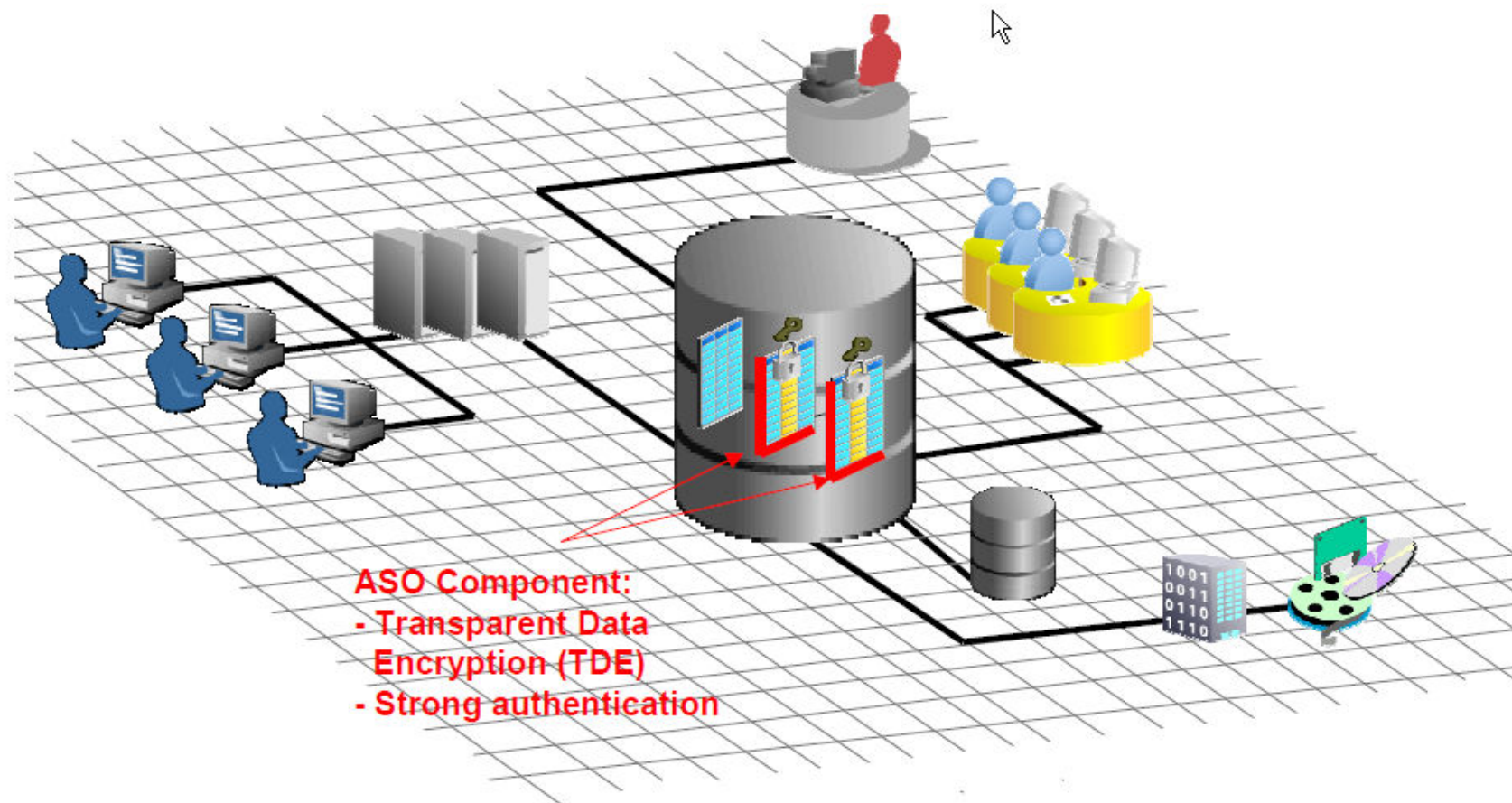
Oracle Security Components

Shortcut	Name	Description	Insider	Compl
OLS	Oracle Label Security	Row level security		○
VPD	Virtual Private Database	Row level security		○
ASO	Advanced Security Options	Security package includes:	○	○
TDE	Transparent Data Encryption	Column encryption (DB & OS)	○	○
NE	Network Encryption	Network traffic encryption	○	○
SA	Strong Authentication	Strong (Two factor) authentication	○	○
DBV	Database Vault	Separation of duties / Data privacy	○	○
AV	Audit Vault	Logging / Monitoring / Reporting	○	○
OSB	Oracle Secure Backup	Backup encryption	○	○
CPU	Critical Patch Update	Necessary security patches		○
DM	Data Masking	„Scrambling“ of production data	○	○

DB ENVIRONMENT



Security Data in Rest/Access Control



WHAT IS ASO?

- **ASO = Advanced Security Option**
- **an Oracle Database option**
- **a package of 3 security features:**
 - **TDE (Transparent Data Encryption)**
 - **Network Encryption**
 - **Strong Authentication against DB**
- **available for all 10g / 11g databases**

What Security Problems does ASO solve?

- **Insider Threats**

- Strong encryption (network/DB/file level)
- Strong authentication

- **Regulatory compliances (external / internal)**

- **Separation of duty**

ASO BENEFITS

- Easy installation (database component)
- Easy to use
- **NO NEED TO CHANGE THE DB STRUCTURE OR APPLICATION**
- Bundel of important security components

TDE – Transparent Data Encryption

ID	AMEX Nr.	Expenses
01	83929843700	50.320
02	54220494833	29.872
03	00428274712	33.432

Name	Job	ID	Salary
King	CEO	01	850.000
Blake	CFO	02	700.000
Custodes	CSO	03	550.000
McLord	CIO	04	570.000
Smith	DBA	05	50.000

FY	Q1	Q2	Q3	Q4
04	1.3M	1.8M	4.9M	10.1M
05	2.2M	3.5M	6.5M	14.4M
06	3.0M	3.9M	6.7M	16.5M
07	3.8M	5.5M	12.2M	20.4M

TDE – Transparent Data Encryption

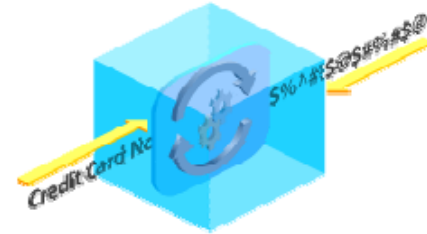
ID	AMEX Nr.	Expenses
01	•✂✎✎✎✎✎✎✎✎✎✎	50.320
02	•✎✎✎✎✎✎✎✎✎✎	29.872
03	•✎✎✎✎✎✎✎✎✎✎	33.432

Name	Job	ID	Salary
King	CEO	01	•✎✎✎✎✎✎✎✎✎✎
Blake	CFO	02	•✎✎✎✎✎✎✎✎✎✎
Custodes	CSO	03	•✎✎✎✎✎✎✎✎✎✎
McLord	CIO	04	✎✎✎✎✎✎✎✎✎✎
Smith	DBA	05	•✎✎✎✎✎✎✎✎✎✎

FY	Q1	Q2	Q3	Q4
04	1.3M	1.8M	4.9M	✎✎✎✎✎✎✎✎✎✎
05	2.2M	3.5M	6.5M	•✎✎✎✎✎✎✎✎✎✎
06	3.0M	3.9M	6.7M	✎✎✎✎✎✎✎✎✎✎
07	3.8M	5.5M	12.2M	✎✎✎✎✎✎✎✎✎✎

TDE – Transparent Data Encryption

- Integrated into DB-Kernel
 - Alter table encrypt column ...
- Transparent for all applications
 - No need for database triggers or views
- Performance
 - Works with existing index
- Data are also encrypted on file level (OS)
 - 3DES, AES (128, 192, and 256 bit)
- Uses Oracle wallet technology



(Network encryption / ASO)

Virtual Private Database
Oracle Label Security
Encryption (TDE)
Strong authentication

Virtual Private Database
Oracle Label Security
Encryption (TDE)
Strong authentication

NETWORK ENCRYPTION



sqlnet.ora (Client)

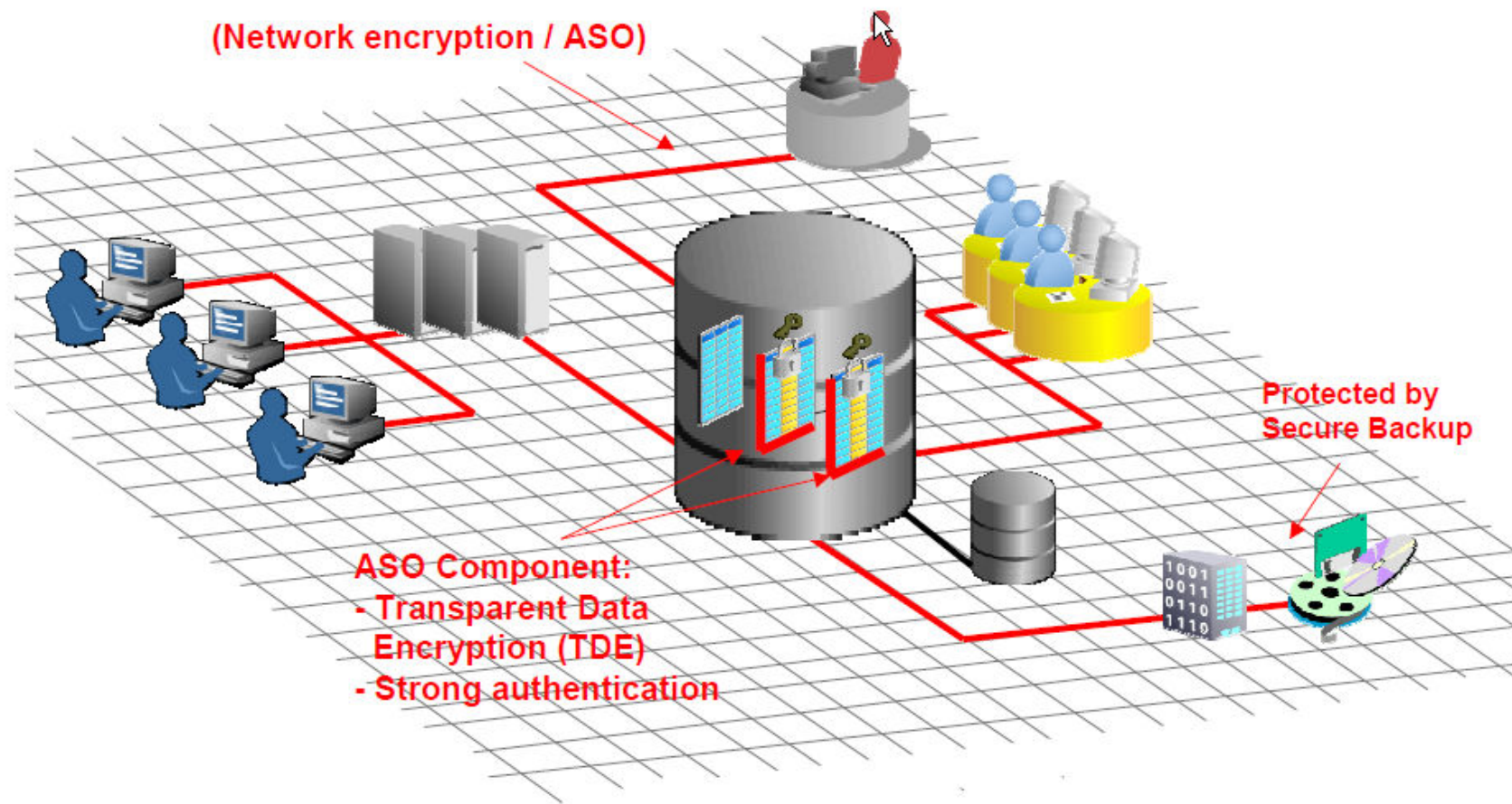
1. sqlnet.crypto_seed=„salkdjfaoiwjoiejllksjflksajuoiwjllks“
2. sqlnet.encryption_client = required
3. sqlnet.encryption_types_client = (RC4_40)
4. sqlnet.crypto_checksum_client = requested
5. sqlnet.crypto_checksum_types_client = (MD5)

sqlnet.ora (Server)

1. sqlnet.crypto_seed=„salkdjfaoiwjoiejllksjflksajuoiwjllks“
2. sqlnet.encryption_server = required
3. sqlnet.encryption_types_server = (RC4_40)
4. sqlnet.crypto_checksum_server = requested
5. sqlnet.crypto_checksum_types_client = (MD5)

Note: RC4_40, RC4_56, RC4_128, DES, DES_40, Accepted, Rejected, Requested, Required

SECURING BACKUP

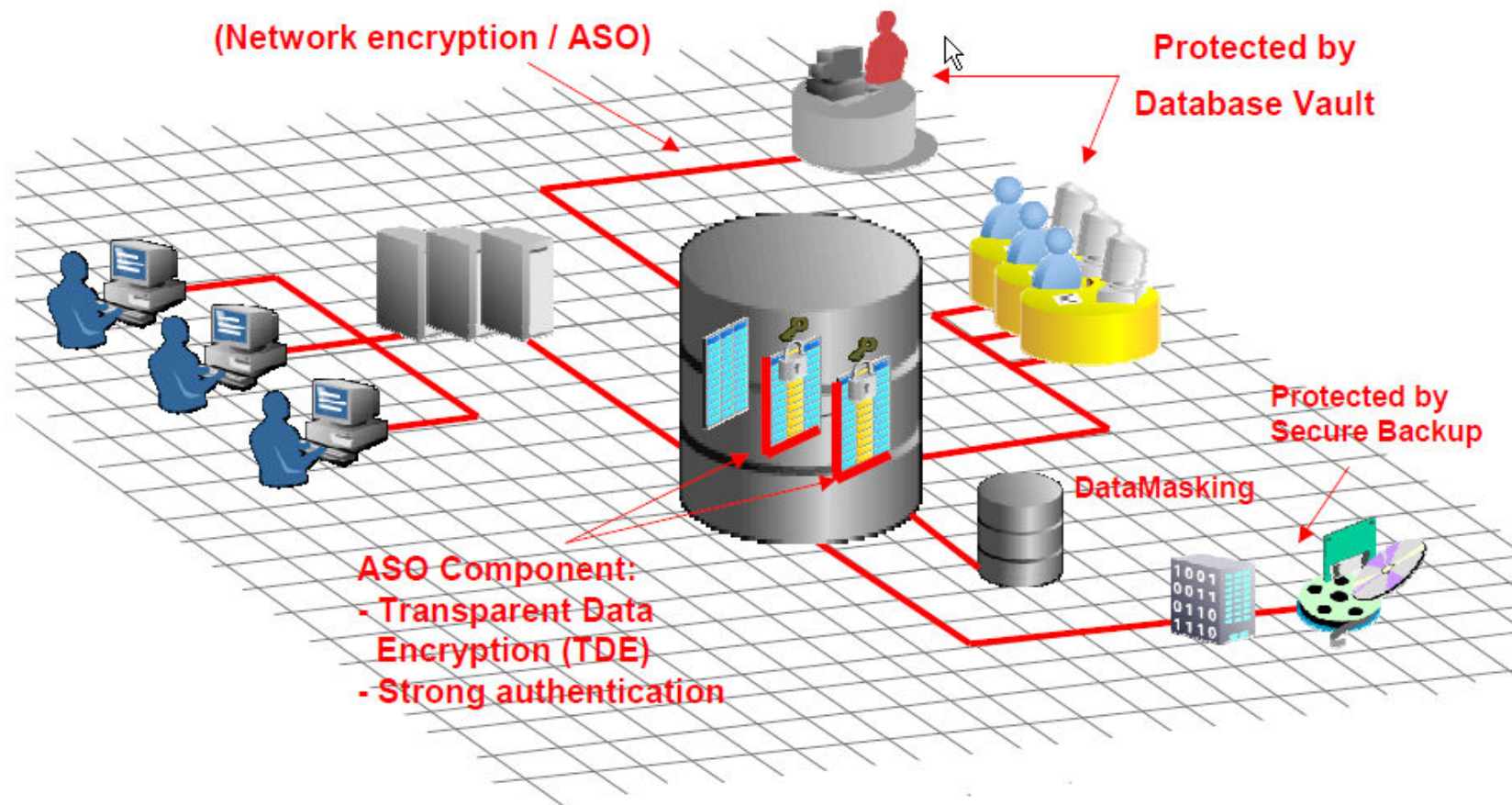


SECURING BACKUP

Examples

- Works with RMAN
- Encrypts data before it leaves the database
- Encrypts data on backup media
- Fastest Oracle Database backups to tape
- Singel point of control with Oracle Enterprise Manager

DATAMASKING



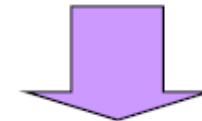
WHAT IS DATAMASKING?

Key Drivers

- Application Development & QA
 - Offshore / in-house
- Data Sharing
 - Claims processing
 - Marketing analysis of customer data
- Regulations
 - PCI
 - Sarbanes-Oxley
 - HIPAA
 - Graham-Leach-Bliley
 - EU Data Protection Directive

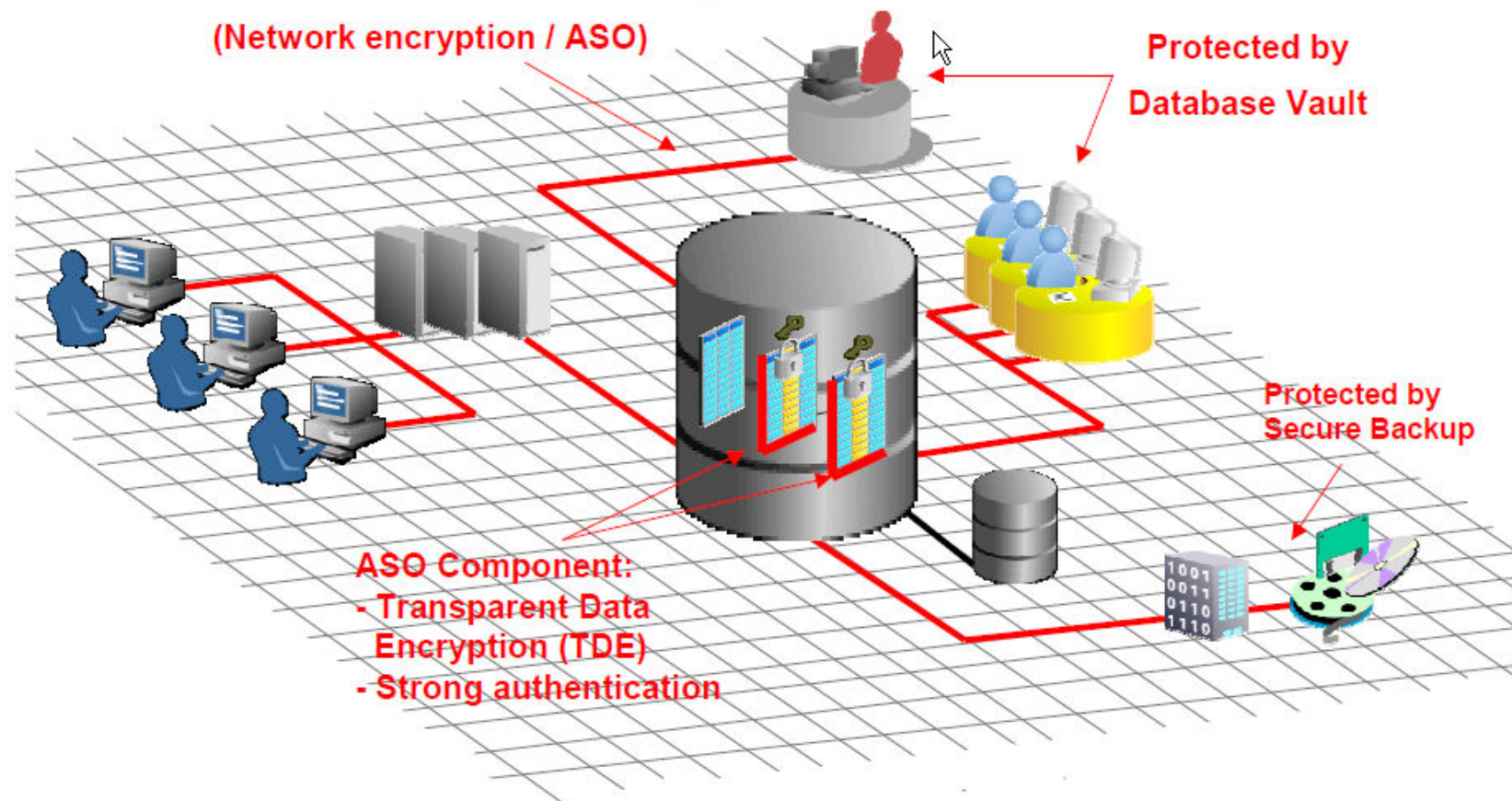


LAST_NAME	SSN	SALARY
AGUILAR	203-33-3234	40,000
BENSON	323-22-2943	60,000
D'SOUZA	989-22-2403	80,000
FIORANO	093-44-3823	45,000



LAST_NAME	SSN	SALARY
ANSKEKSL	111—23-1111	40,000
BKJHHEIEDK	111-34-1345	60,000
KDDEHLHESA	111-97-2749	80,000
FPENZXIEK	111-49-3849	45,000

PREVENT MODIFICATIONS BY UNAUTHORIZED USERS



WHAT IS DATA VAULT?

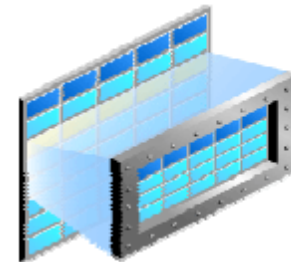
- Database component (installable within 20min)
- One of our „strongest security weapon“ (no competition)
- An easy configureable (GUI/sqlplus) „tool box“
 - to reach a high level of security
 - fulfill internal / external compliances
 - implemented auditing/reporting function
- available for all 9i /10g /11g databases

DATA VAULT HELP TO SOLVE:

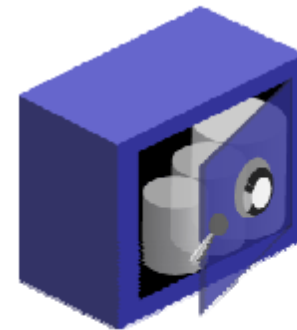
- **Internal threats** require enforcement of operational security policies - who, what, when and where can data be accessed?
- Database consolidation can result in **Multiple All Powerful (DBA)** users in the database
- Regulations **Strong Internal Controls** and **Separation of Duty** (such as Sarbanes-Oxley and Basel II etc)

DATA VAULT Vs VPD and OLS

- Virtual Private Database (VPD):
 - Restricts access to certain **rows** for user by modifying the **WHERE** clause
- Oracle Label Security (OLS):
 - Mediates access to a given **row**, based on the **label** on the row and the security level of the user



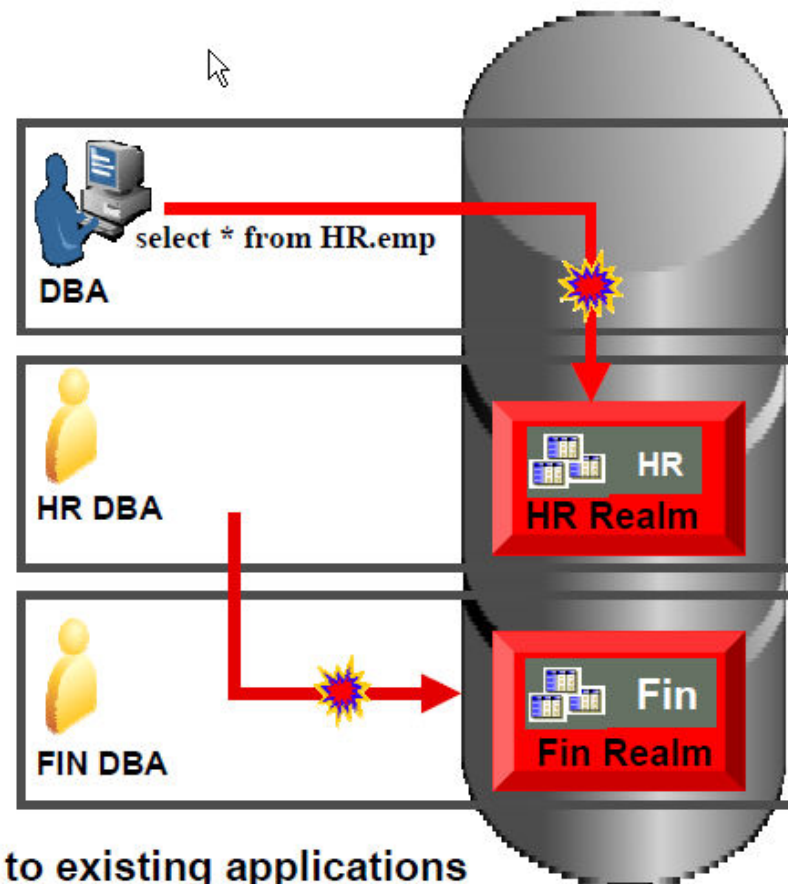
VPD and OLS restrict access at the row level, while Database Vault restricts access at the **object and **command** levels.**



DATABASE VAULT Realms and Rule

- Database DBA views HR data
Compliance and protection from insiders

- HR DBA views Fin. data
Eliminates security risks from server consolidation



Realms can be easily applied to existing applications
with minimal performance impact

DATA VAULT REPORTS

ORACLE Data Vault

Help Logout
Database

Logged in as DVOWNER

Database Instance: orcl

Administration **Data Vault Reports** General Security Reports Monitor

Use this screen to run reports about potential Data Vault configuration issues and Data Vault audit events.

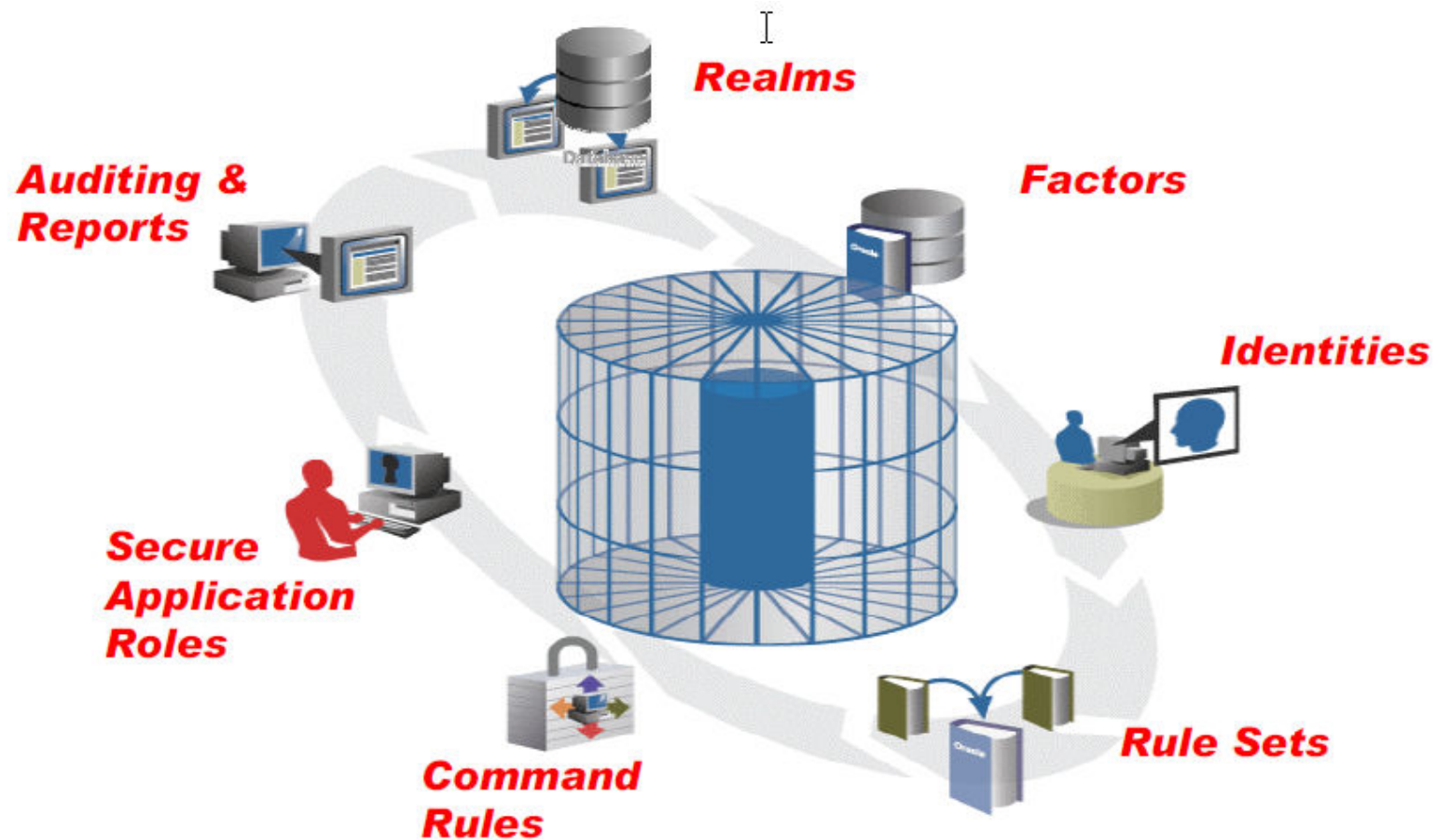
Run Report

Expand All | Collapse All

⊕ Reports

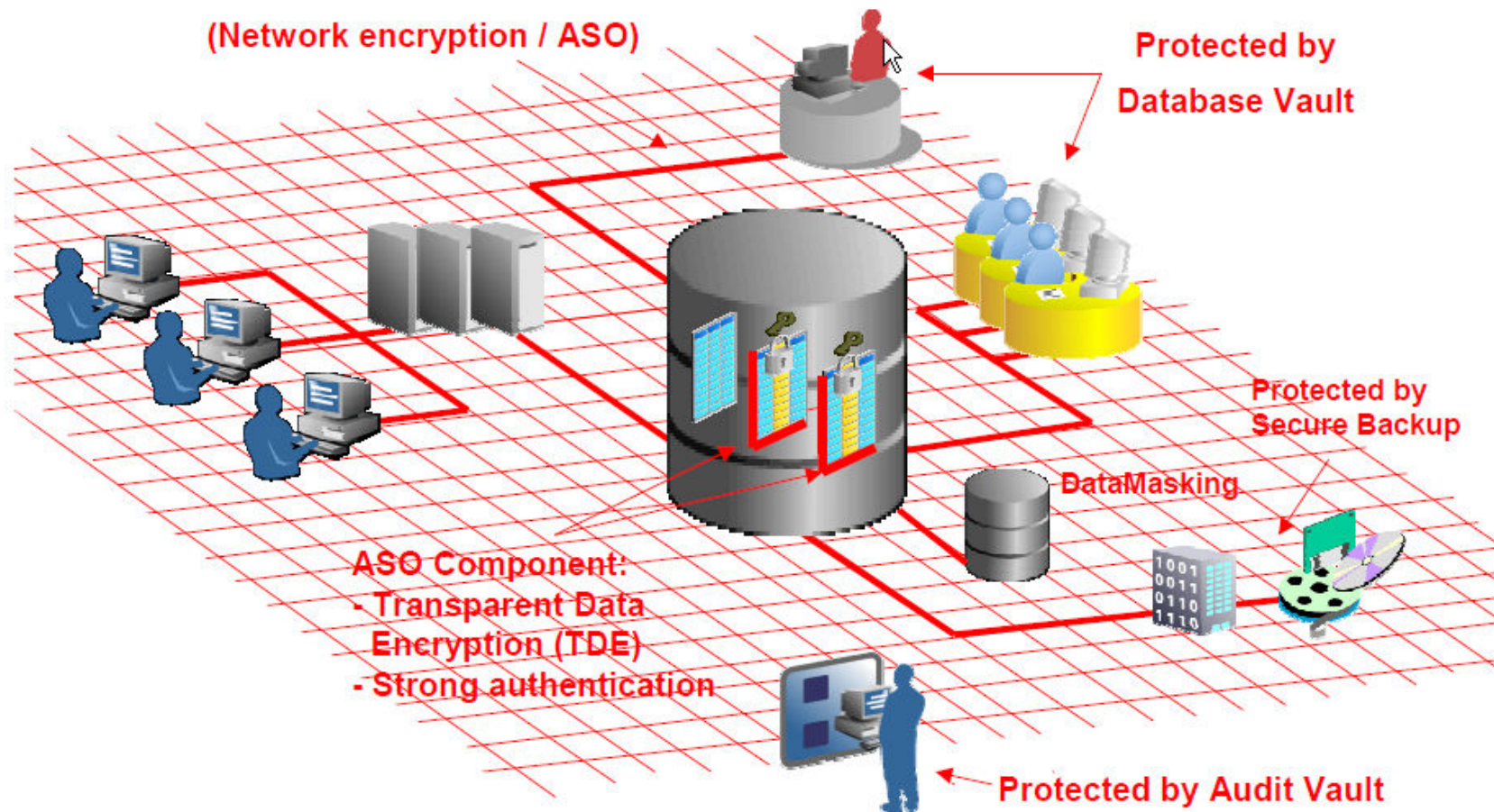
Select	Focus	Report Title
<input type="radio"/>		▼ Reports
<input type="radio"/>	<input checked="" type="radio"/>	▼ Data Vault Configuration Issues Reports
<input checked="" type="radio"/>		Command Rule Configuration Issues
<input type="radio"/>		Factor Configuration Issues
<input type="radio"/>		Factors Without Identities
<input type="radio"/>		Identity Configuration Issues
<input type="radio"/>		Realm Authorization Configuration Issues
<input type="radio"/>		Rule Set Configuration Issues
<input type="radio"/>		Secure Application Configuration Issues
<input type="radio"/>	<input checked="" type="radio"/>	▼ Data Vault Auditing
<input type="radio"/>		Realm Audit
<input type="radio"/>		Command Rule Audit
<input type="radio"/>		Factor Audit

DATA VAULT EXAMPLES



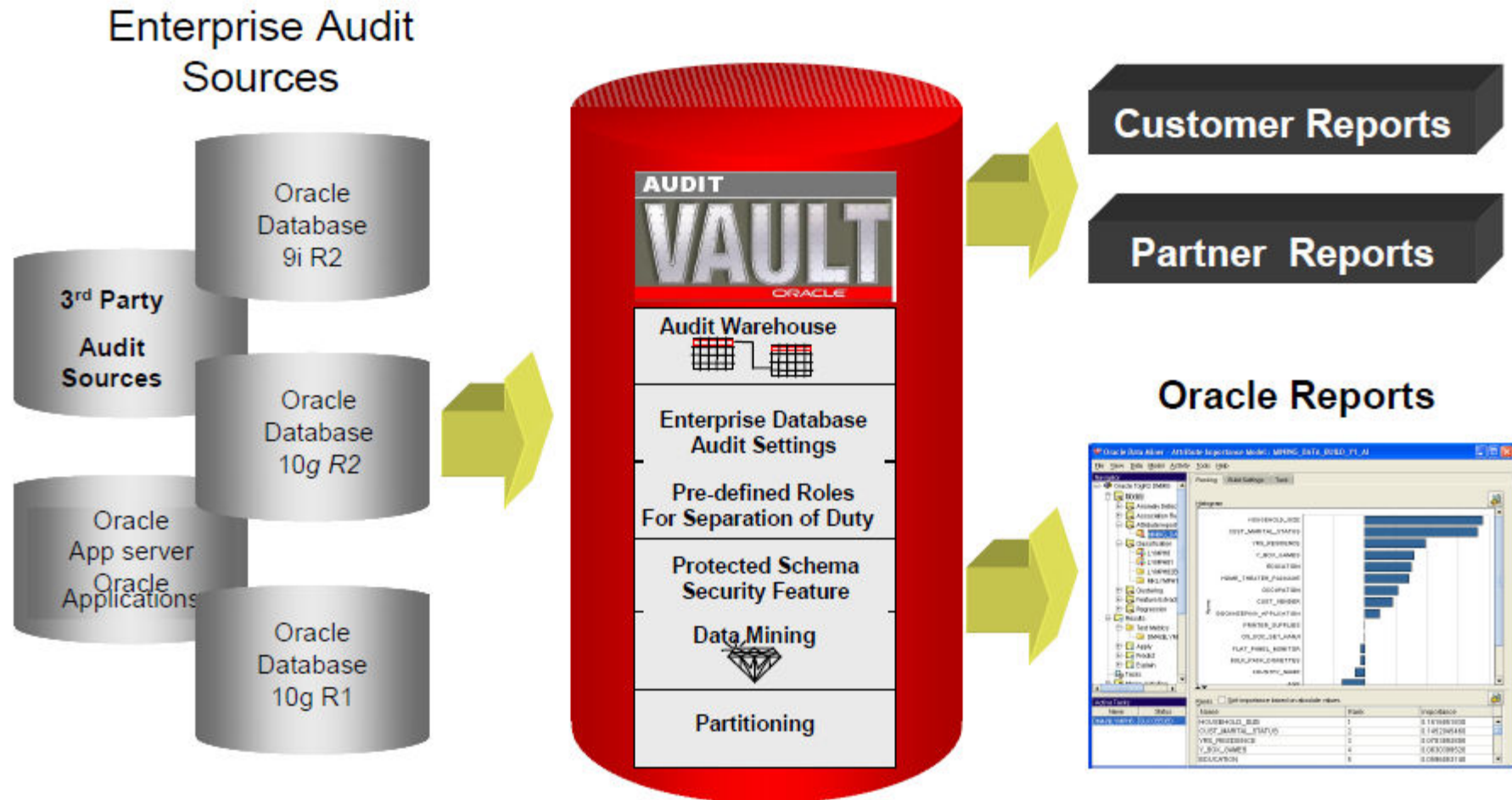
HIGHLY SECURED ENVIROMENTS

AUDIT VALT



AUDIT VAULT EXAMPLES

Specialized Warehouse for Audit Data



AUDIT VAULT REPORTS

Who, What, When, Where

User	VSHAH
OS User	oracle
End User	
Terminal	ORCLDB
Host	oel4upd4.oracle.vm
Host	transaction
Subr	SQL Bind
Dom	SQL Text
	update oe.orders set order_total=order_total*1.5 where order_id=2458
	Undo SQL text
	SCN 668999

Column	Old Value	New value
ORDER_TOTAL	264193.65	396290.48

Collection Time	2007-09-12 10:34:51
Object	OE.ORDERS
Owner	OE

AUDIT VAULT DASHBOARD



AUDIT VAULT SUMMARY

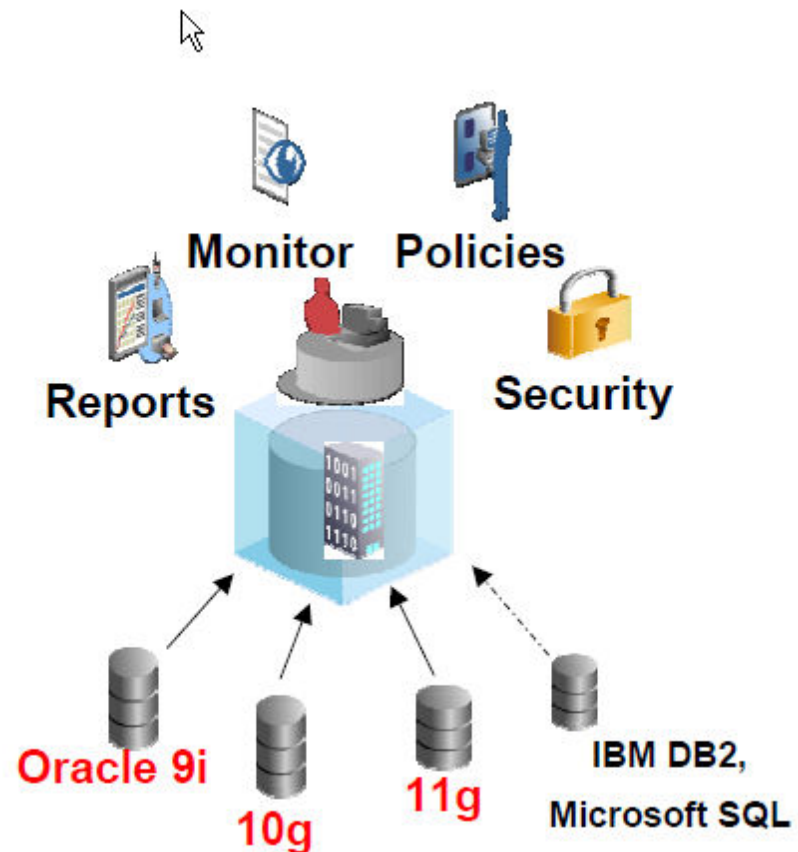
**Collect and Consolidate
Audit Data**

**Simplify Compliance
Reporting**

**Detect and Prevent
Insider Threats**

**Lower IT Costs With
Audit Policies**

Scale and Security



Oracle ACE PROGRAM 🃏 🃠

The [Oracle ACE Program](#) is designed to recognize and reward members of the Oracle Technology and Applications communities for their contributions to those communities. These individuals are technically proficient (when applicable) and willingly share their knowledge and experiences.



The program comprises two levels: **Oracle ACE and Oracle ACE Director.**

The former designation is Oracle's way of saying "thank you" to community contributors for their efforts; we (and the community) appreciate their enthusiasm. The latter designation is for community enthusiasts who not only share their knowledge (usually in extraordinary ways), but also want to increase their community advocacy and work more proactively with Oracle to find opportunities for the same. In this sense, Oracle ACE is "backward looking" and Oracle ACE Director is "forward looking."

Oracle ACE PROGRAM ♠️

ORACLE

Find Oracle ACEs

Search Display  ACE
 ACE Director

Name	Company	Location	Expertise	Home Page
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 Murali Vallath	Summersky Enterprises	India	Database Management & Performance	Profile
 Padma Ramesh	Tata Consultancy Services	India	Middleware & SOA	Profile
 Parameswar Das	Tata Consultancy Services Ltd (TCS	India	Middleware & SOA	Profile
 Srinivas Rao Polsani	Zensar Technologies	India	Middleware & SOA	Profile
 Yeddu Prasad	Wipro Technologies	India	Middleware & SOA	Profile

Spread Sheet | PDF

1 - 6

Oracle ACE PROGRAM ♠️👑

The Oracle ACE Program - Windows Internet Explorer

http://www.oracle.com/technology/community/oracle_ace/index.html

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Oracle ACE THE ORACLE ACE PROGRAM

Oracle ACEs and Oracle ACE Directors are known for their strong credentials as Oracle community enthusiasts and advocates, with candidates nominated by anyone in the Oracle Technology and Applications communities. The baseline requirements are the same for both designations; however, Oracle ACE Directors work more closely and formally with Oracle in terms of their community activity. [Read the FAQ](#) for more details!

Look for the ♠️ (signifies ACE) and 👑 (signifies ACE Director) on Oracle Web sites and discussion forums; it signifies "ACE-dom" for the designated name.

[Find an Oracle ACE](#) [Nominate an Oracle ACE](#)

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- ❑ [Twitter Meets Oracle: ORA_Tweet](#) (Lewis Cunningham)
- ❑ [Creating and Using Custom JCA Adapters](#) (Ronald van Luttikhuizen)
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Oracle ACE THE ORACLE ACE PROGRAM - Qualifications and Nominations

The [Oracle ACE Program](#) is designed to recognize and reward Oracle customers for advocating Oracle Technology and Applications. Oracle ACE recipients are chosen based on their significant contributions to, and activity in, their respective community. The program currently has two levels: Oracle ACE and Oracle ACE Director.

For more information, read the [FAQ](#).

Oracle ACE Qualifications

To qualify for the Oracle ACE award, candidates should meet as many of the following qualifications as possible.

- Technical proficiency
- Oracle-related blog
- Oracle discussion forum activity
- Published white paper(s) and/or article(s)
- Presentation experience
- Beta program participant
- Oracle user group member
- Oracle certification

Benefits of the program include:

- Promotion of Oracle ACEs as "official" experts on Oracle Web sites/at events
- Publication of articles and papers on OTN (with compensation)
- Speaking opportunities at Oracle and/or 3rd party events

Oracle ACE Nomination Process

Anyone in the Oracle community is eligible to nominate a potential Oracle ACE award; only non-employees may receive them. As nominations are received the nomination committee will review them within a 2-week period. Award recipients will be selected based on their qualifications. Oracle reserves the right to final judgment on all nominations.

Download [Oracle ACE Nomination Form](#)

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