

# Oracle Security

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# Agenda

- ☒ Security Challenges
- ☒ 21 CFR Part 11
- ☒ HIPAA
- ☒ Oracle Security

# Security Challenges

☒ Privacy of Communications

☒ Sensitive Data Storage

☒ Granular Access Control

☒ Scalability

☒ Ease of Use

☒ Know your Users

☒ Audit trail, eRecords &

eSignatures

☒ *Is your query result read or modified in transit?*

☒ *Is your patient privacy needs met at your site?*

☒ *Can you secure certain parts of a medical record?*

☒ *Can you support 100,000s of users?*

☒ *Is it easy to use for users & administrators?*

☒ *Who is accessing the data from the web?*

☒ *Can you comply with FDA requirements?*

# 21 CFR Part 11

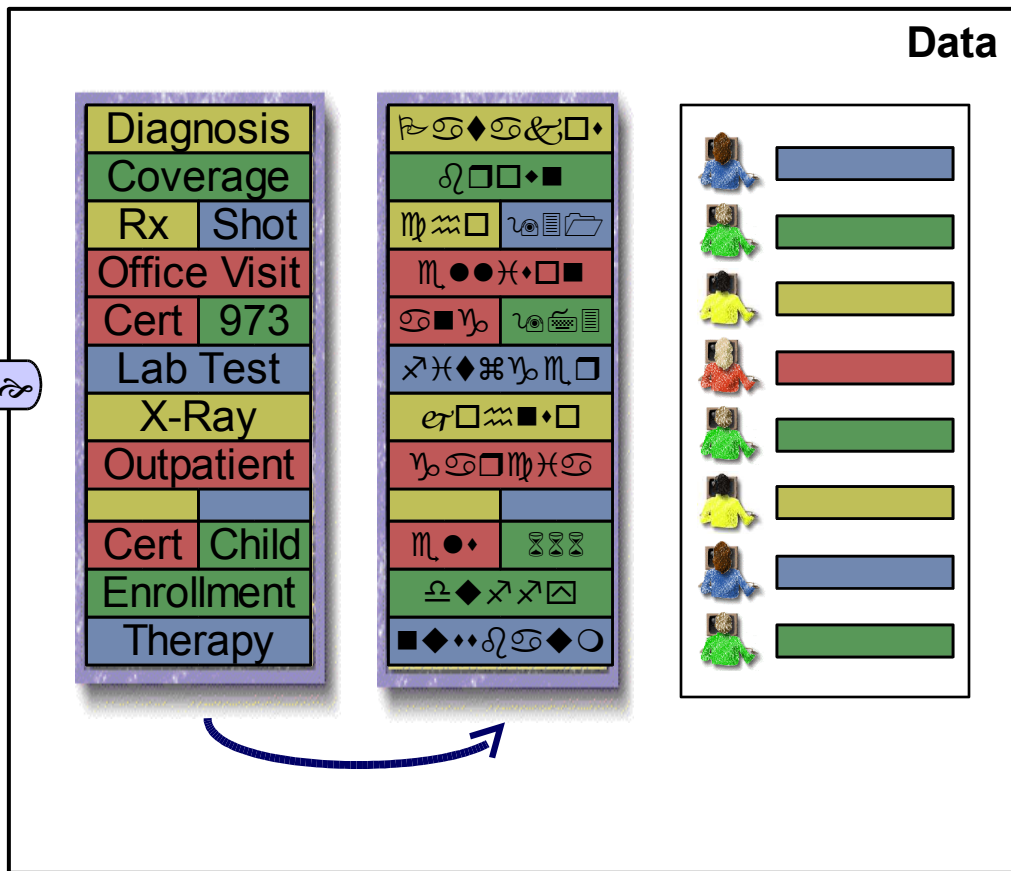
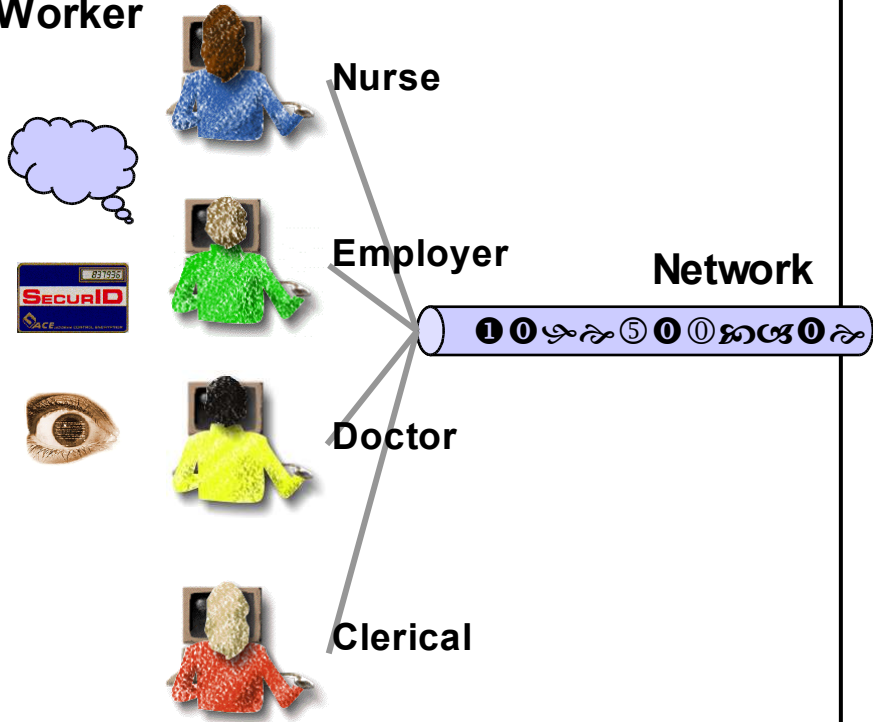
- ☒ Regulations that provide criteria for acceptance by FDA of electronic records, electronic signatures, and handwritten signatures executed to electronic records as equivalent to paper records and handwritten signatures executed on paper
- ☒ Requirements:
  - **Strong Security - to ensure the authenticity, integrity, and confidentiality of electronic records.**
  - **Audit Trail**
  - **Operational System Checks**
  - **Electronic Signatures – to ensure that the signer cannot readily repudiate he signed record.**

# What is HIPAA?

- ❌ Health Insurance Portability and Accountability Act of 1996, Public Law 104-191 (HIPAA)
  - aka Kennedy-Kassenbaum Bill
- ❌ Administrative Simplification Act
  - Privacy Rule: “what” individual health information must be protected
  - Security Rule: “how” healthcare organizations need to protect health-related information
- ❌ Noncompliance would put you in jail.

# Security & Privacy

Healthcare Worker



Identify & Authenticate

Privacy & integrity of communications

Access control

Privacy & integrity of data

Comprehensive auditing



# Identification & Authentication

- ❌ Something you know
  - name/password
- ❌ Something you have
  - Smart cards (e.g. Secure ID card, ActivCard)
  - X.509v3 compliant digital certificates over SSL
- ❌ Something you are
  - Biometric (e.g. fingerprint reader)
- ❌ Two-factor authentication
- ❌ Support industry standards:
  - Kerberos, RADIUS, DCE.



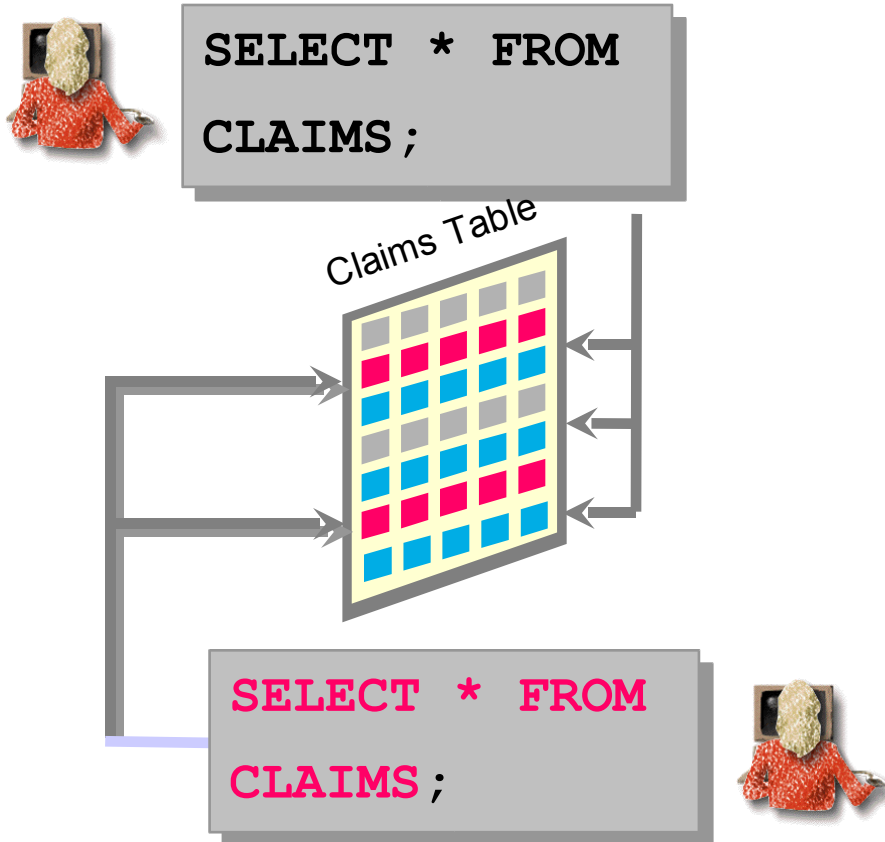
# Privacy & Integrity of Communications

- ❌ Network Encryption – Protects data privacy.
  - Oracle Advanced Security provides these algorithms to encrypt Oracle Net traffic
    - Triple DES
    - RC4
    - Advanced Encryption Standard
  - ❌ Users do not need to use SSL or digital certificates.
  - SSL support (standards based encryption)
- ❌ Checksumming – Ensure data integrity
  - Verifies that data have not been tampered with during transmission
  - Supports Message Digest 5 (MD5) and Security Hashing Algorithm (SHA-1).

# Access Control – Protect Data

- ❑ Virtual Private Database
- ❑ Label Security
- ❑ Selective Data Encryption

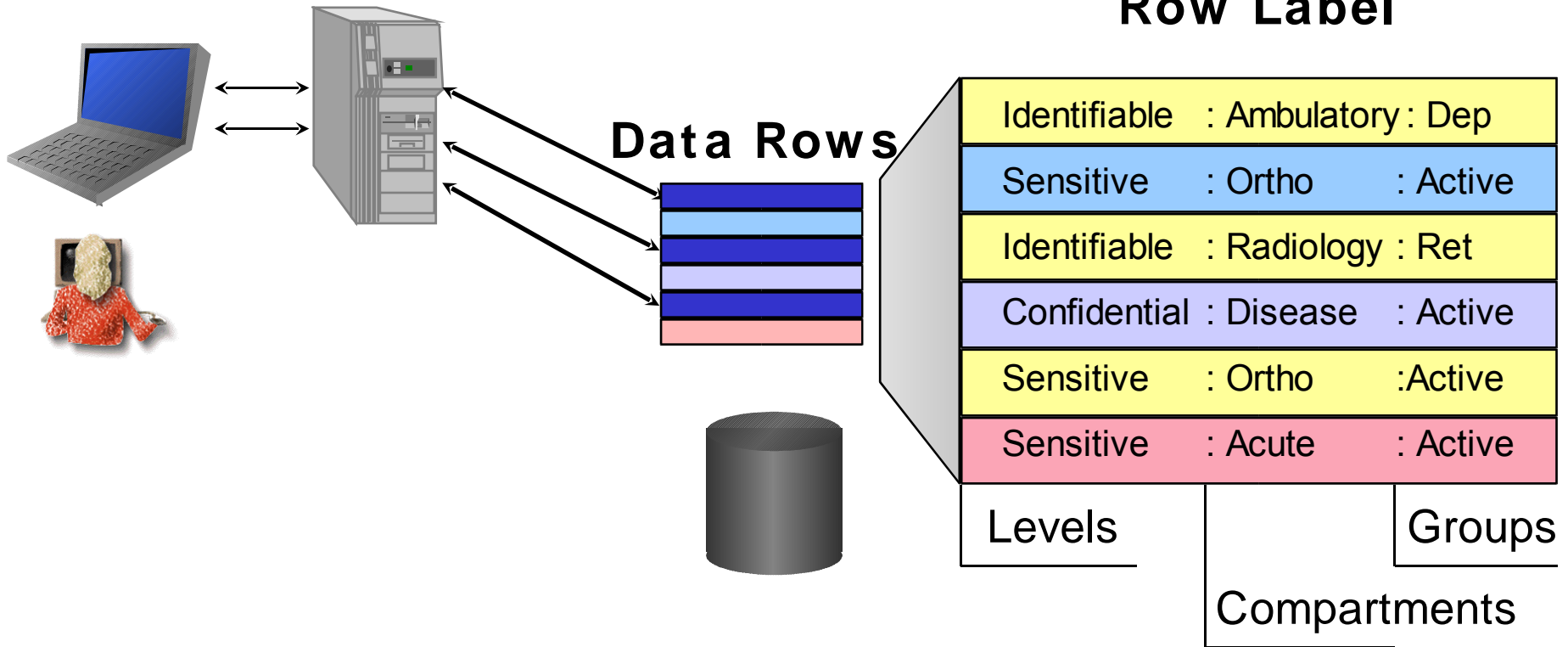
# Virtual Private Database (VPD)



- Enables, within a single database, per-user data access with the assurance of physical data separation
- Associate security policies implemented by functions with tables or views
- Server automatically enforces security policies no matter how data is accessed

# Oracle Label Security

User	Label
Dr. Murphy	Sensitive : Ortho, Acute : Active



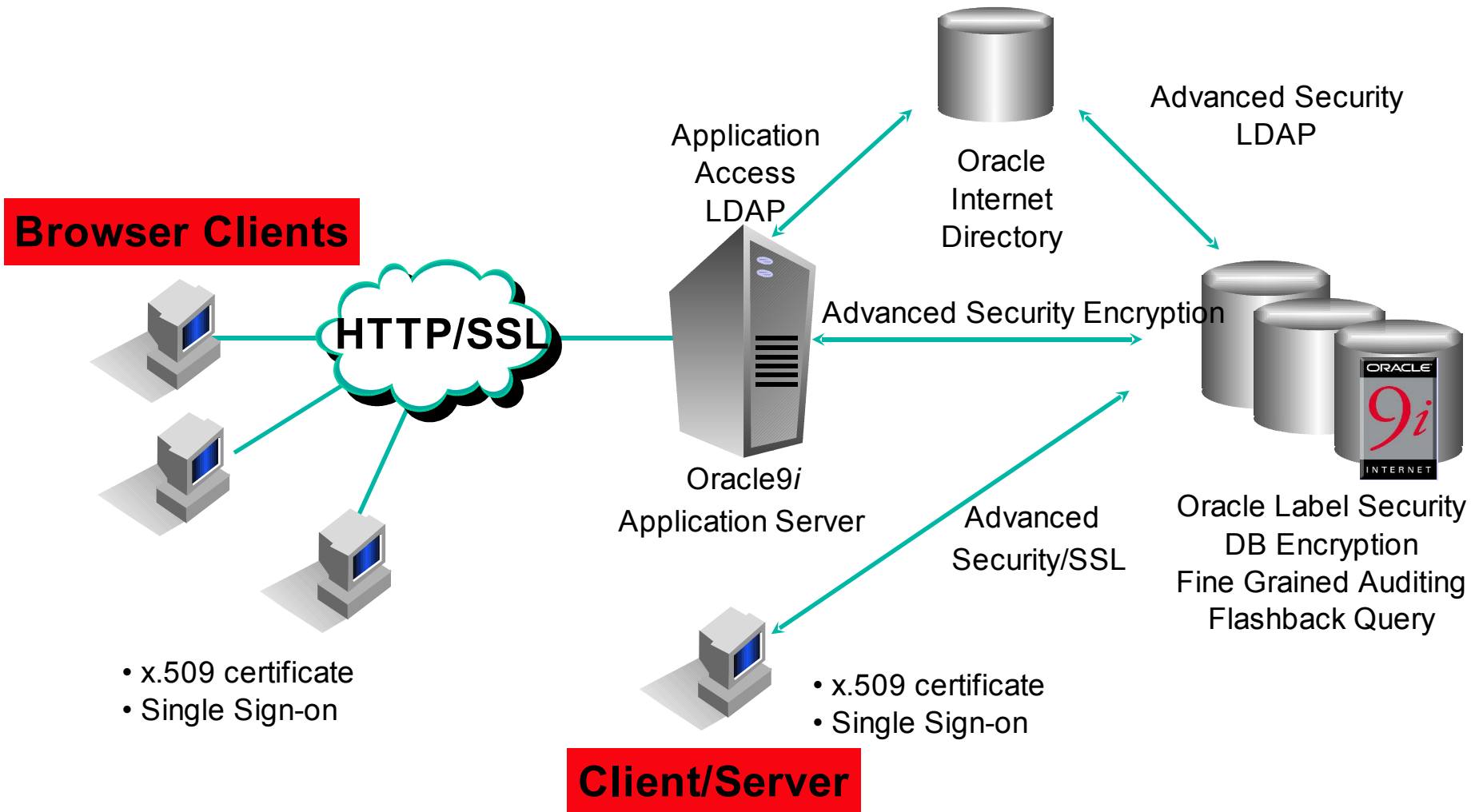
# Selective Data Encryption

- ❑ Protect select data via encryption in the database
- ❑ Examples:
  - Credit card numbers, patient's SSN
- ❑ DBMS\_OBFUSCATION\_TOOLKIT package
  - Supports Data Encryption Standard (DES) and 3DES algorithms
  - Supports MD5 to ensure data integrity

# Auditing - Provides Accountability

- ❌ Auditing by statement, by use of system privilege, by object, or by user.
- ❌ Customizes auditing with triggers
- ❌ Enables organizations to define specific audit policies that can alert administrators and serve as an intrusion detection system.
- ❌ Captures exact SQL statement. Together with Flashback Query, auditing can recreate the exact records returned to a user.
- ❌ Audits SYSDBA and SYSOPER – separate auditors and DBAs.

# Oracle Secure 3-Tier Architecture



# Security Feature Comparison

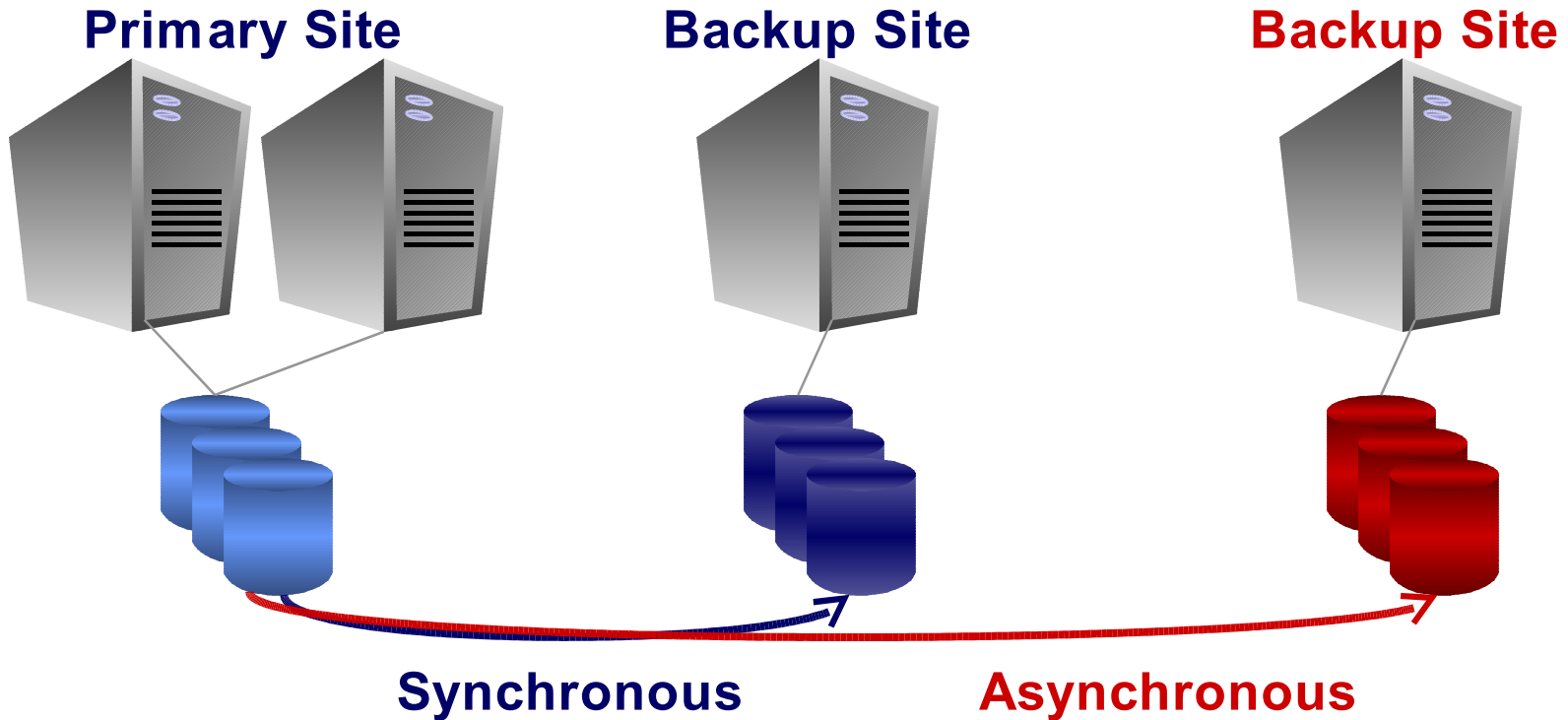
Security Features	Oracle	IBM DB2	Microsoft SS2000
Virtual Private Database	Yes	No	No
Label-based Access Control	Yes	No	No
Data Encryption	Yes	Limited	No
Fine-grained Auditing	Yes	No	No



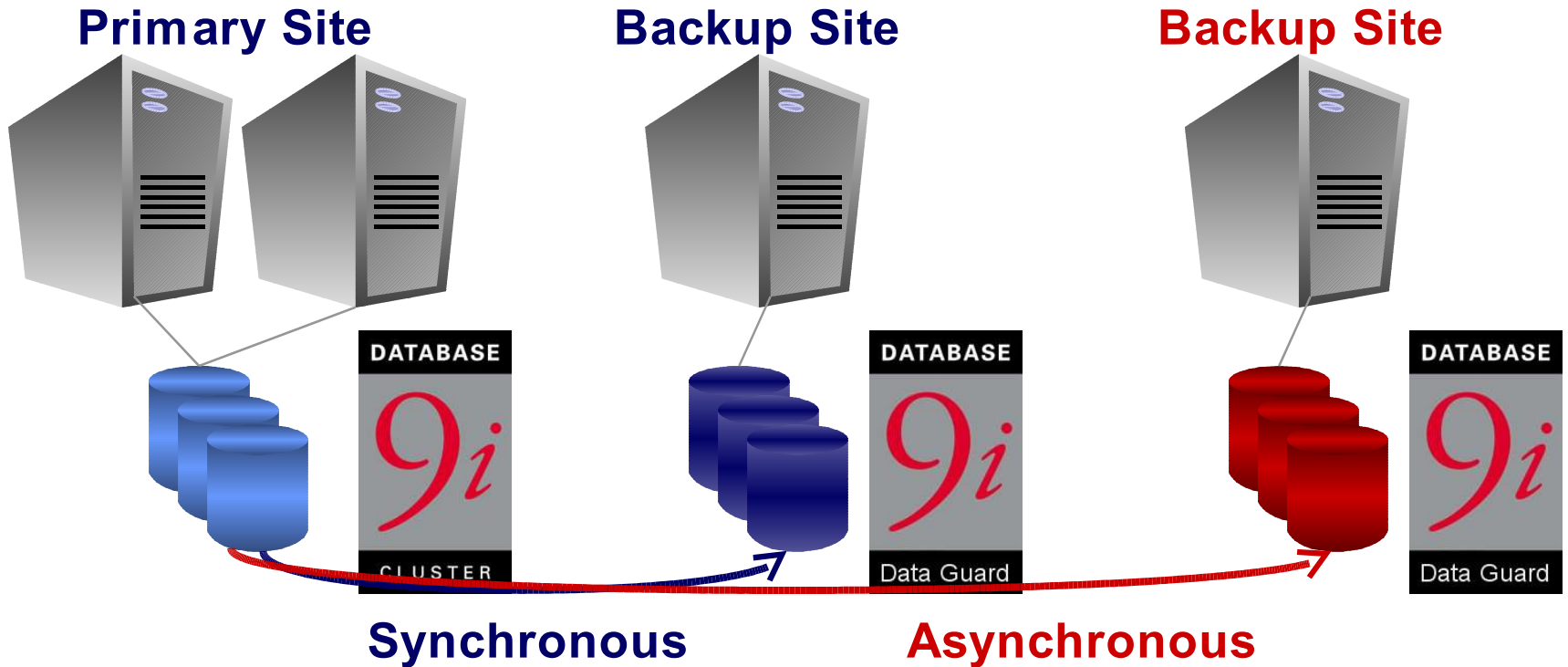
# 15 Independent Security Evaluations

Security Criteria	Oracle	IBM DB2	Microsoft SS2000
TCSEC, Level B1	1	0	0
TCSEC, Level C2	1	0	1
ITSEC, levels E3/F-C2	3	0	0
ITSEC, levels E3/F-B1	3	0	0
Common Criteria, level EAL-4	4	0	0
Russian Criteria, levels III, IV	2	0	0
FIPS 140-1, level 2	1	0	0
<b>TOTAL</b>	<b>15</b>	<b>0</b>	<b>1</b>

# Availability & Business Continuity



# Availability & Business Continuity



# PCASSO Project

(Patient Centered Access to Secure Systems Online)

- ❌ SAIC and UCSD – Patient and health care providers access patients' complete medical records over the Internet
- ❌ 178,000 patients
- ❌ “In defining those levels, we needed to separately protect highly sensitive information that – by law- requires special protection. ...Label-based access control is ideal for this purpose”
  - Dixie Baker, corporate VP of technology and CTO for SAIC's healthcare practice

# Summary: Oracle features to achieve HIPAA goals

Oracle9i Features	Data Privacy	Data Security	User Identity	Auditing
Network Encryption	Yes	Yes		
Database Encryption	Yes	Yes		
Restricts Data Access	Yes	Yes		
Data Sensitivity Labels	Yes	Yes		
Comprehensive Auditing	Yes	Yes		Yes
User Management	Yes	Yes	Yes	
Single Sign-on	Yes	Yes	Yes	
User Authentication	Yes	Yes	Yes	
Independent Evaluation Assurance	Yes	Yes	Yes	Yes

# Resources

Bookmarks Location: <http://otn.oracle.com/deploy/security/content.html>

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## Security

The Oracle Database Server provides a comprehensive, integrated set of security mechanisms to enable secure data access and storage. Learn about the latest security practice innovations and technologies being developed and used by Oracle and its partners through this website.

The newest flagship release of the Oracle database server is Oracle9iR2, Release 9.2.0.1

If you have discovered what you believe to be a potential security vulnerability in any of Oracle's products, please submit a *Security Alert* by clicking on the link provided on the left hand navigation menu.

### Oracle9i Database Security Survey

Oracle continues to lead the industry in security evaluations. Oracle Label Security's evaluation by security experts marks Oracle's 15th successfully completed security evaluation. In comparison, IBM DB2 scores 0 and Microsoft SQLServer only 1. Please take a moment to complete a short survey focusing on security issues. This survey will help us better understand our customers' concerns and requirements.

### Technical Overview

[HTML](#) **Oracle9iR2**  
A technical overview of Oracle9iR2 security features.

[HTML](#) **Oracle9iAS**  
A technical overview of Oracle9iAS security features.

[HTML](#) **Oracle9i**

# Discussion Forums: Security & Security Sample Code



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Messages: **756** Topics: **354** Las

	SUBJECT	REPLIES	AUTHOR	
<b>NEW</b>	<a href="#">Column Level Security in Oracle 8.1.7</a>	2	244592	Apr 23, 2003 3:3
<b>NEW</b>	<a href="#">Performance Implications of using Oracle Label Security &amp; VPD</a>	3	VIPUL MISHRA	Apr 22, 2003 12:
	<a href="#">row leve security</a>	6	Ashish k Tanuku	Apr 18, 2003 1:0
	<a href="#">Connection Manager</a>	0	Vandana Mishra	Apr 17, 2003 4:1
	<a href="#">DBMS_OBFUSCATION_TOOLKIT UTF8 giving junk results ORA-28232: invalid input</a>	0	pothula srinivas	Apr 10, 2003 3:2
	<a href="#">Oracle 8i dbms_obfucation_toolkit</a>	12	244592	Apr 8, 2003 4:56
	<a href="#">Insuring OC4J requests went through Apache with SSL</a>	0	Jean Vaillancourt	Apr 7, 2003 1:33
	<a href="#">Row Level Security for INSERT's</a>	1	Philipp Pott	Apr 7, 2003 7:33

# Sept 10, 2003 Life Sciences User Group Meeting at Oracle World, San Francisco

## ☒ Security Presentations:

- Johnson & Johnson,  
Building a Secure Infrastructure with Oracle in Life Sciences - J & J PKI and Secure Connectivity to Oracle
- Massachusetts General Hospital  
Secure Enterprise Access for Phenotypic Research at Mass General Hospital & HIPAA
- Wyeth  
21 CFR Part 11 via Oracle Auditing at Wyeth Research



# For More Information

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