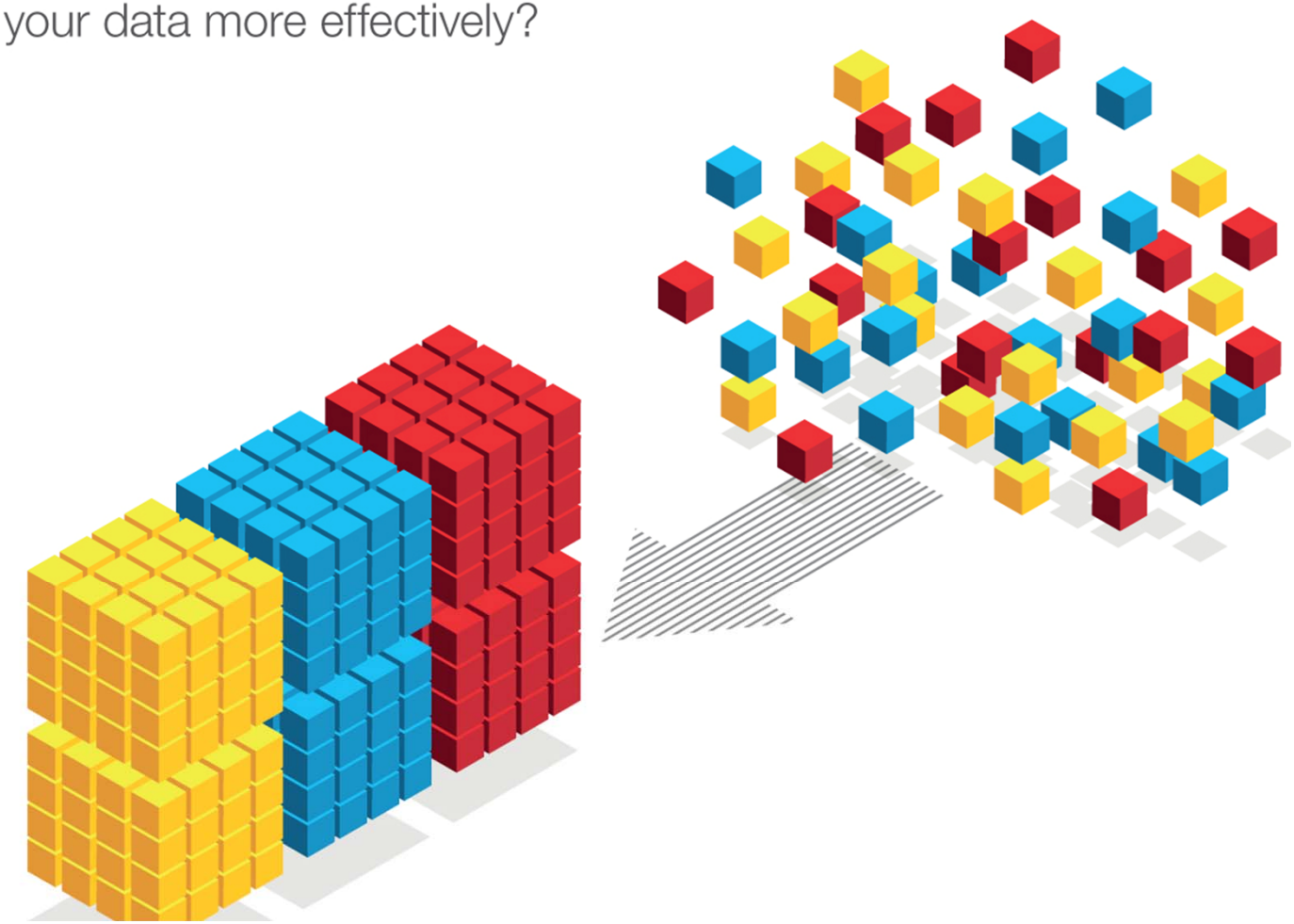
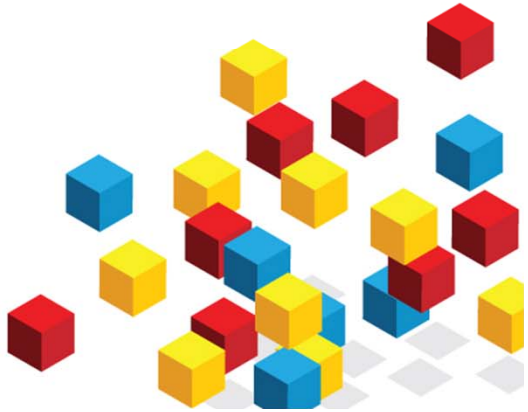
Turn the data you have into the information you need

How will you manage your data more effectively?

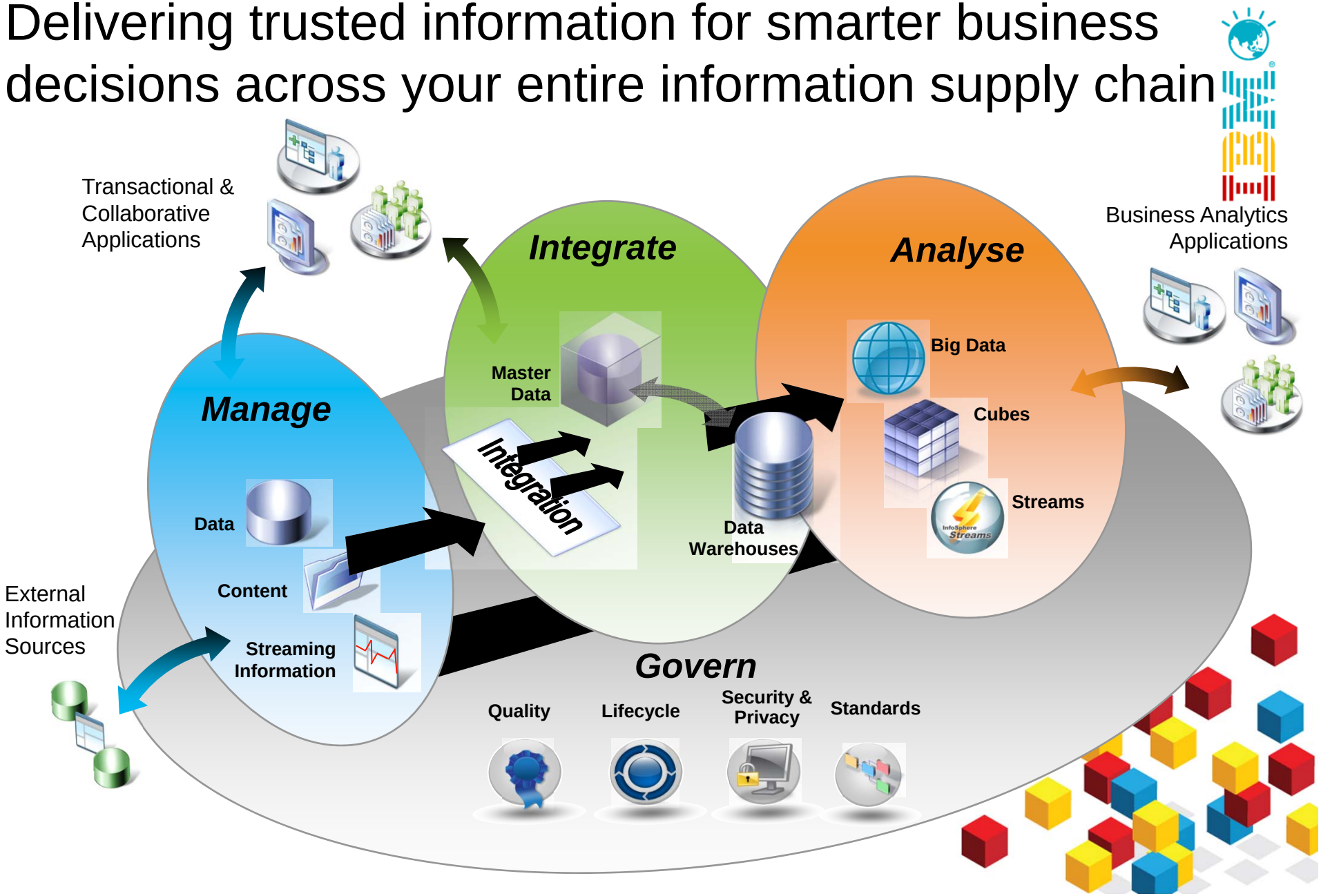


IBM Data Governance

1.30 – 3.00 pm



Delivering trusted information for smarter business decisions across your entire information supply chain



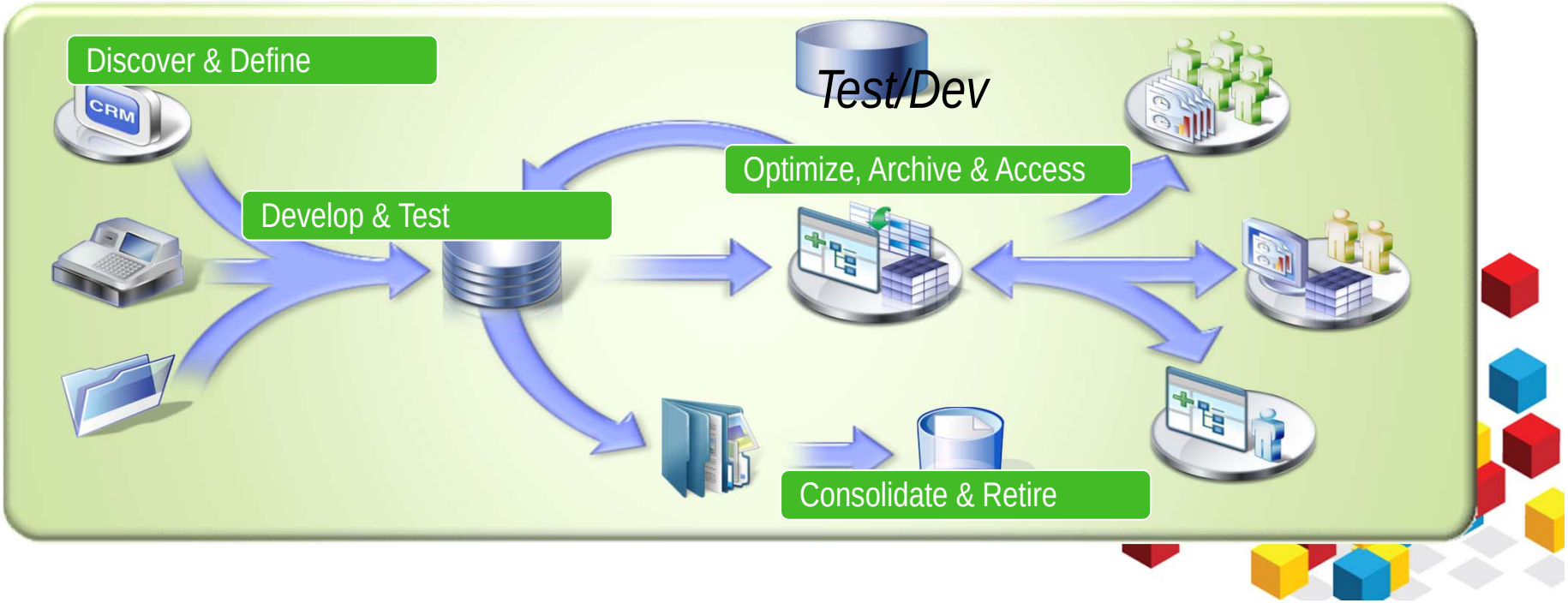
Can today’s organisations successfully protect their information?

- Where does your sensitive data reside?
- Can you protect from both authorized and unauthorized access?
- Is confidential data in documents safeguarded?
- How can access to your enterprise databases be protected, monitored and audited?
- Can data in your non-production environments be protected, yet still be usable?

> *Larry Ponemon, founder of the group that bears his name, said that survey shows a shift in the way C-level executives think about security software. Investing in data protection, he said, is now seen as less expensive than recovering from a data breach.*
>
> InformationWeek

Managing the Lifecycle of Data in the Information Supply Chain

- Understanding the “what and where” of enterprise data
- Developing models and code to store and access enterprise data including configuration of data for test environments
- Optimizing the performance of applications through identification of bottlenecks and building the right strategy for managing data growth
- Implementing a consistent process for retiring or consolidating applications as their usage expires

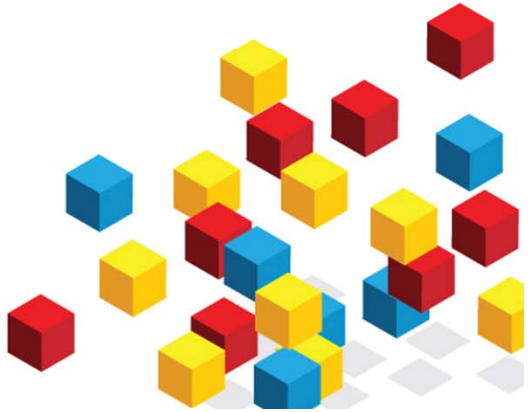


Guardium Data Security
Audit, Access Control and Alerting

Steve Gibson

Data Security & Compliance

13th July 2011



An Insider Tale

- Certegy – US Public Company
  - Cheque verification & Credit Card services
- Senior DBA sold 8.5 million customer records to data broker
  - Names, addresses, birth dates, bank account & credit card info – was paid $580K
- Data theft came to light after retailer reported correlation between transactions and receipt of external marketing offers by its customers
  - U.S. Secret Service found data came from separate company owned by the DBA
  - "Why did it take Certegy ***more than five years to find out*** that confidential consumer information was being sucked out of its database?" *(St. Petersburg Times)*
- Settled class-action suit for $4 million
  - Plus $975,000 in fines from Attorney General
  - Plus mandatory security audit every year
  - Plus 2 years of credit monitoring services ($180 per customer)
- Rogue DBA sentenced to over five years in prison

Protecting and securing data is no longer optional

42%

of all cases involved third-party mistakes and flubs … magnitude of breach events ranged from about 5,000 to 101,000 lost or stolen customer records

Fifth Annual U.S. Cost of Data Breach Study", Ponemon Institute, Jan 2010

73%

of security professionals anticipate the volume of database security attacks will continue to increase

Enterprise Strategy Group, Databases at Risk, September 2009

$90 to $305

cost per lost record per security breach

Forrester Research, 2007

92%

of compromised records originated in database servers

Data Breach Investigations Report, Verizon Business, 2010

Over 82%

of firms surveyed have had more than one data breach in the past year involving loss or theft of 1,000+ records with personal information

2009 Annual Study: Cost of a Data Breach, Ponemon Institute LLC., January 2010

The Real Cost of Doing Nothing

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EMC's RSA Security Breach May Cost Bank Customers $100 Million

By Rachael King - Jun 9, 2011 3:35 AM ET

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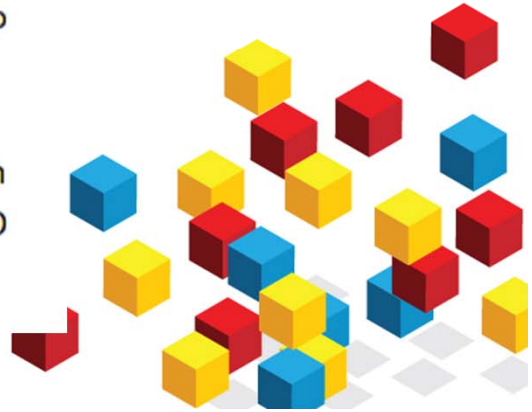
The security breach at EMC Corp.'s RSA unit may cost the banking industry as much as $100 million to replace identification tokens that left their computers vulnerable to spying.

Banks may be forced to pay $50 million to $100 million to distribute new RSA SecurID devices that employees use to securely log onto corporate networks, according to a Gartner Inc. research analyst. RSA clients include Wells Fargo & Co. (WFC) and Northwest Bancshares Inc. (NWBI) as well as defense contractor Lockheed Martin Corp. (LMT), which said a May 21 cyberattack on its computers is linked to the March breach of RSA's SecurID database.



Won’t Happen To Me? Think Again…

Data Breach Threat to Businesses Rises to Statistical Certainty: Survey

By: Fahmida Y. Rashid
2011-06-23
Article Rating: ☆☆☆☆☆ / 0

12 Share | 4 Share | 33 tweets retweet

The latest Ponemon Institute study called the chances of an organization being hacked in a 12-month period a "statistical certainty."

Rate This Article:
Poor ○ ○ ○ ○ ● Best
Rate

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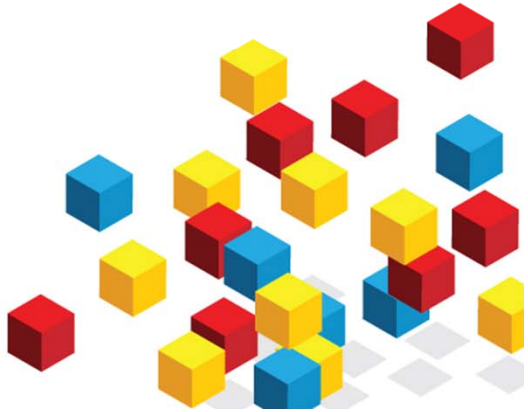
Cyber-attacks are becoming more frequent and severe with the vast majority of businesses suffering as least one data breach in the past year, according to a new Ponemon Institute survey.

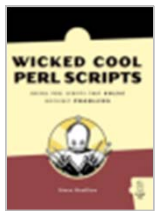
Businesses of all sizes are being hit by cyber-attacks, as 90 percent of surveyed businesses reported at least one IT security breach in the past 12 months, the Ponemon Institute found in its latest report, published June 22. More than half of those respondents, or 90 percent, claimed two or more breaches over the same period. Nine percent reported five or more network intrusions in the past year.

More than half of the respondents had little confidence of being able to prevent another cyber-attack over the next 12 months, according to the survey. About 43 percent of the respondents in the study said there was a significant rise in the frequency of cyber-attacks during the past year and 77 percent said the attacks had become more severe or difficult, to contain, the study found.



What Solutions are in use today?

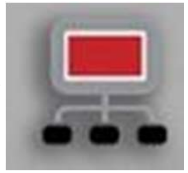
- Native database logging
- Homegrown scripts
- Scrape and parse the data
- Fill repositories with log data
- Stove-piped approach

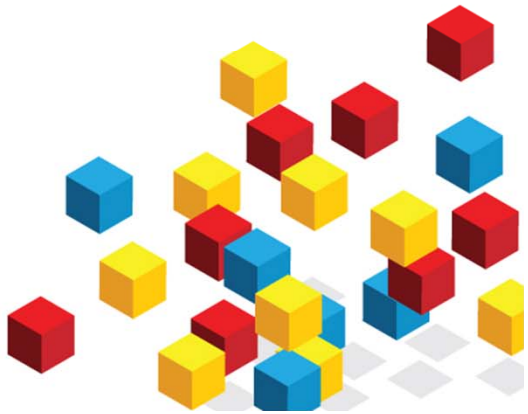


Create reports

Manual review

Manual remediation, dispatch and tracking





What are the Challenges with this Approach?

Expense

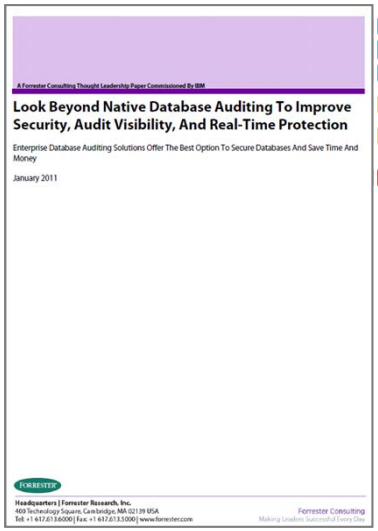
- Performance impact of native logging on the DBMS
- Another data store to secure and manage ($$$)
- Lack of DBMS expertise on security teams
- Significant complexity & labor cost to analyze audit data, maintain homegrown scripts as compliance audit requirements change

Weak Security Controls

- No separation of duties -- DBAs & hackers can easily modify logs
- Not real-time
- No preventive controls

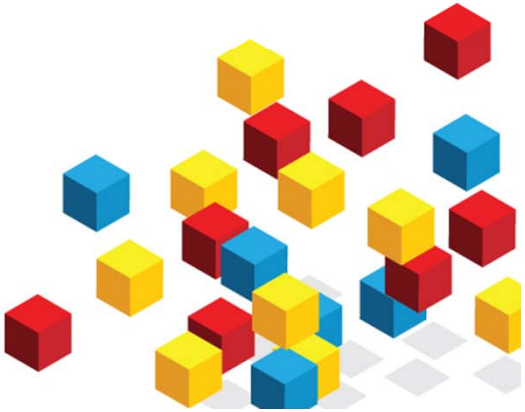
Compliance Audit Failures

- Limited scope & granularity of log data
- Inconsistent policies across applications, DBMS platforms, compliance initiatives
- Can't identify end-user fraud for connection-pooled applications that use generic service accounts (SAP, etc.)



Forrester Consulting – Commissioned Report

"If we didn't have [our enterprise database auditing and monitoring solution], we would need an army of additional IT people." (CISO)



The Objectives of Database Activity Monitoring

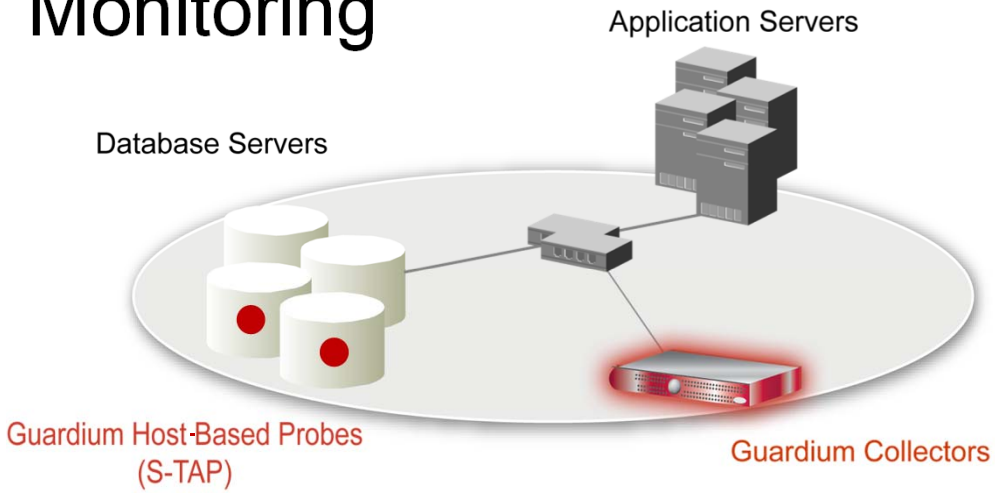
1. **Prevent data breaches & fraud**
   - Mitigate external & internal threats
   - Secure customer & credit card data, sales pipeline, strategic plans & IP

2. **Assure data governance**
   - Prevent unauthorized changes to financial & ERP data

3. **Reduce cost of compliance**
   - Automate & centralize controls
   - Simplify processes

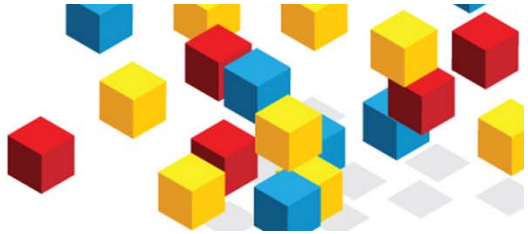
…Without performance impact or changes to databases & applications!

Non-Invasive, Real-Time Database Security & Monitoring

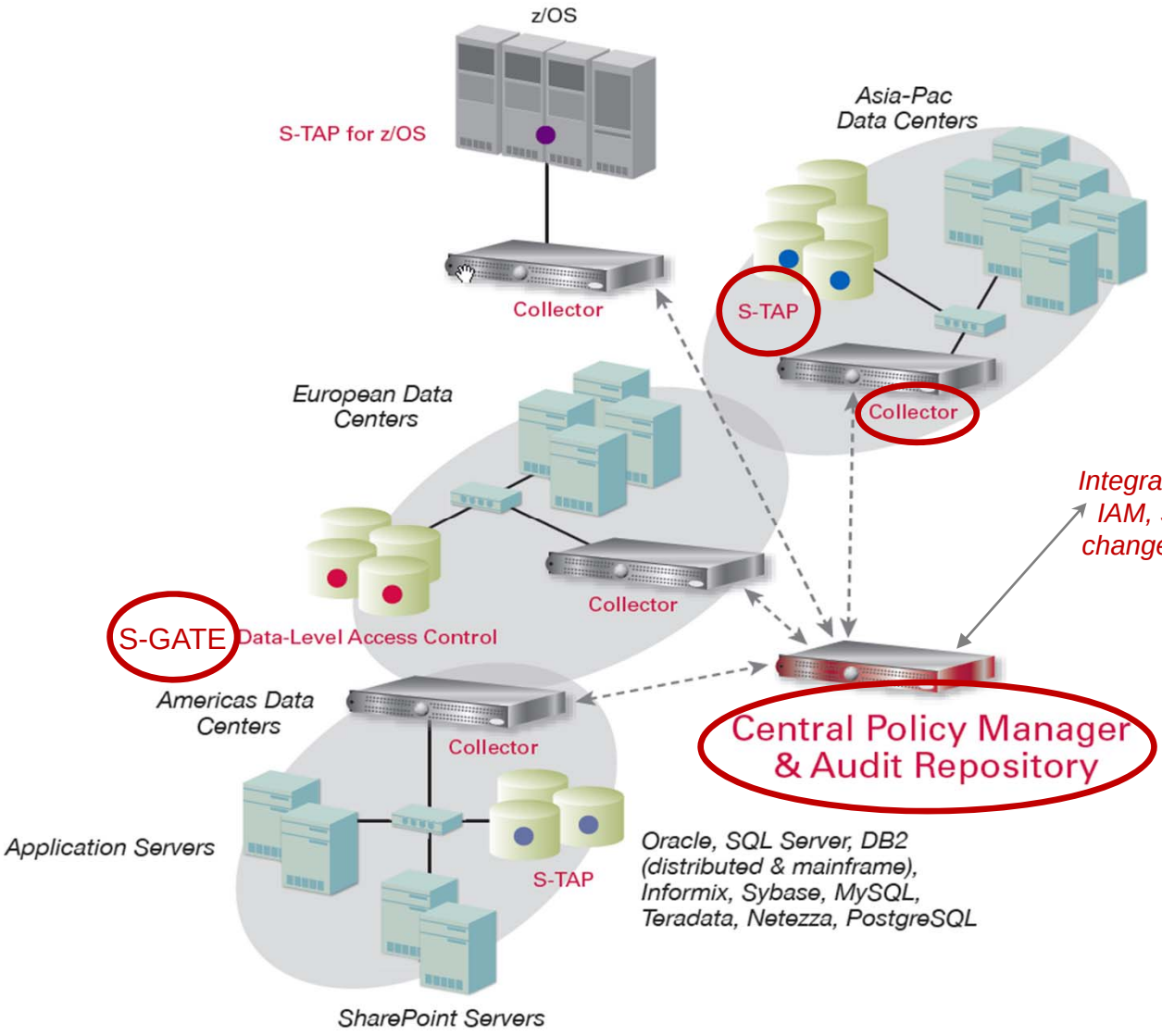


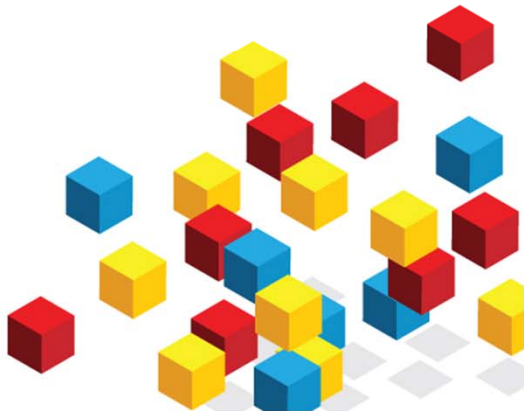
- Continuously monitors <u>all</u> database activities (including local access by superusers)
- Heterogeneous, cross-DBMS solution
- Does not rely on native DBMS logs
- Minimal performance impact
- No DBMS or application changes
- Supports Separation of Duties

- Supports Separation of Duties
- Activity logs can't be erased by attackers or DBAs
- Automated compliance reporting, sign-offs & escalations (SOX, PCI, NIST, etc.)
- Granular, real-time policies & auditing

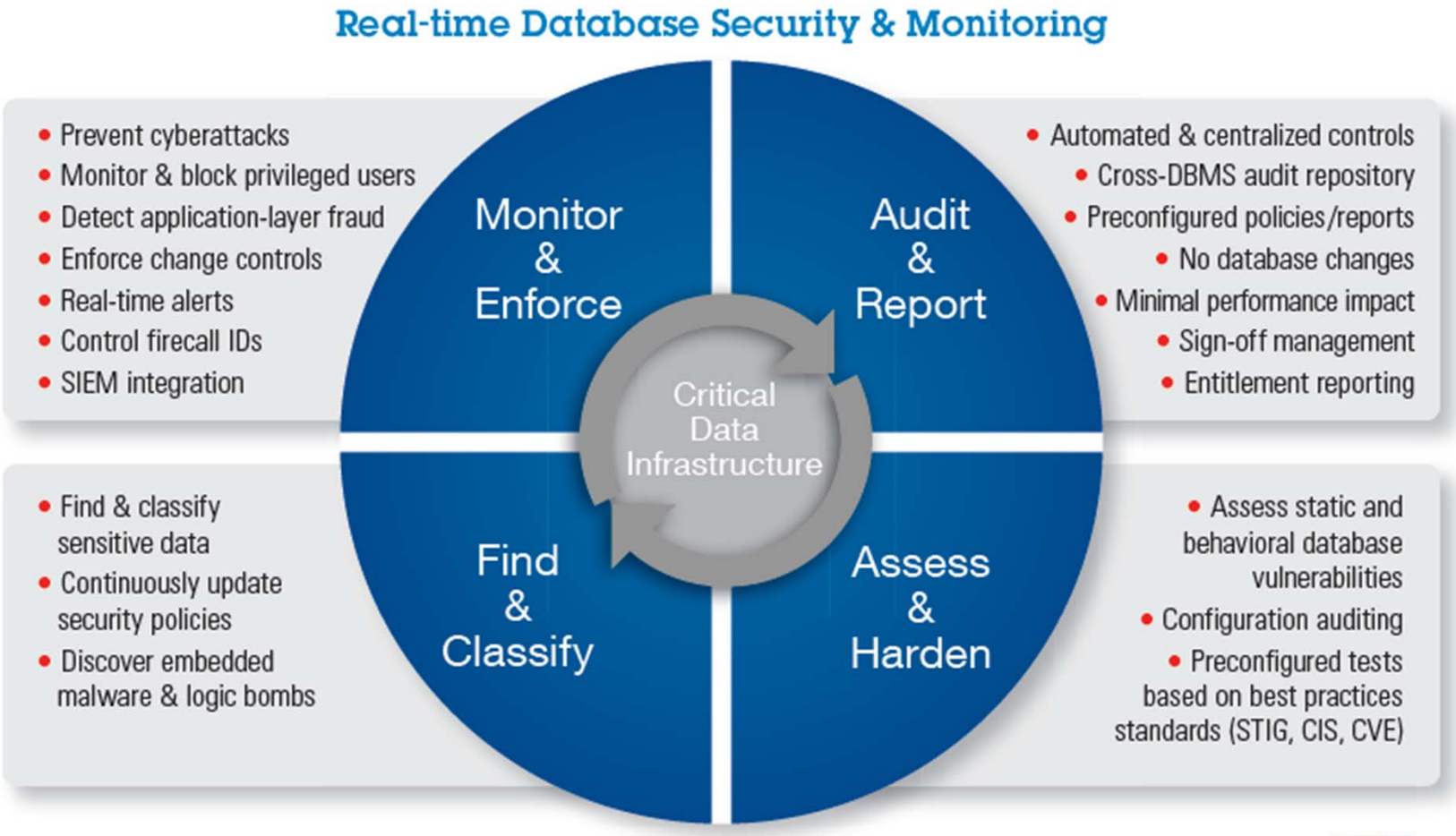


Scalable Multi-Tier Architecture



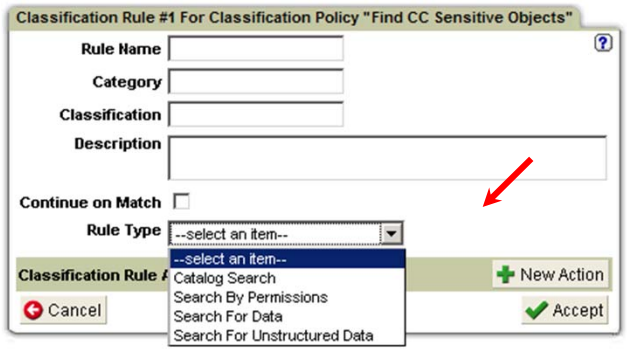


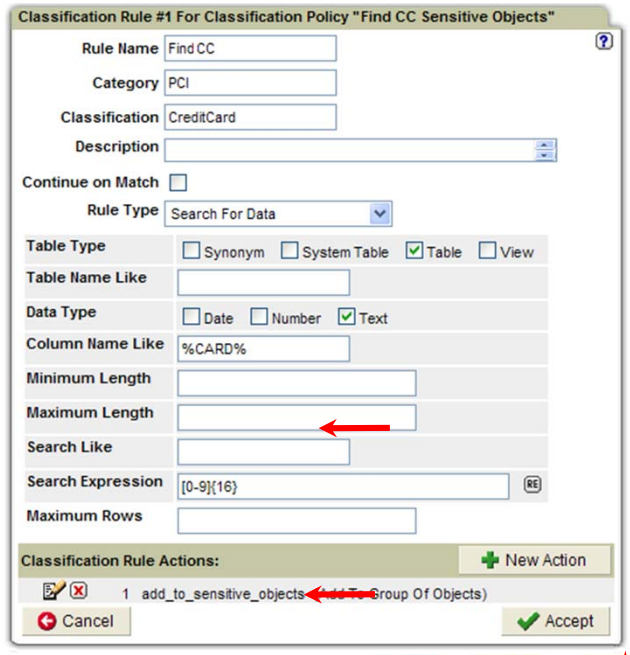
Addressing the Full Lifecycle of Database Security



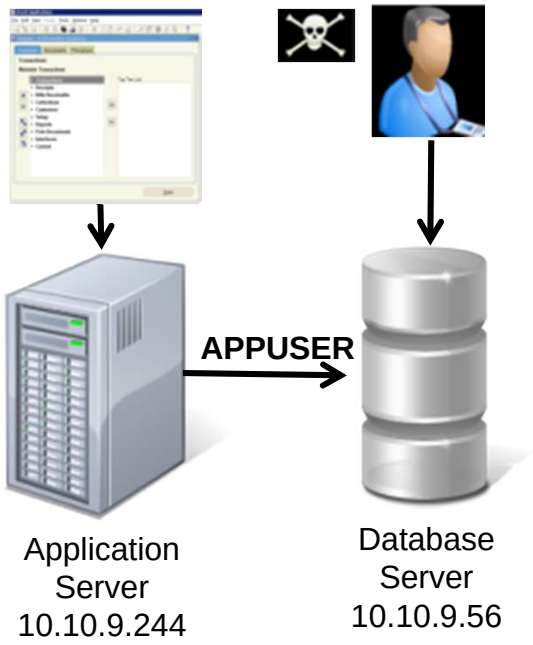
Discovering Sensitive Data in Databases

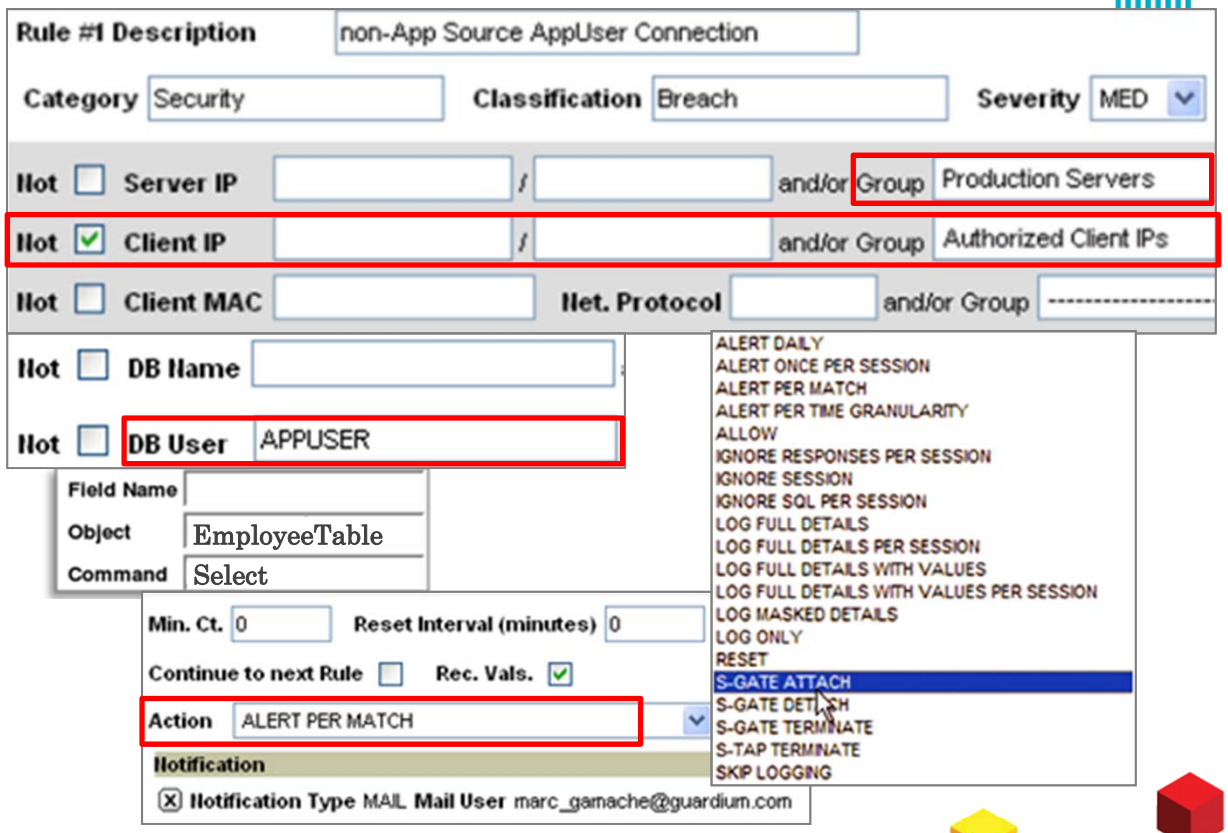
- *Discover database instances on network*
- *Catalog Search*: Search the database catalog for table or column name
  - Example: Search for tables where column name is like “%card%”
- *Search by Permission*: Search for the types of access that have been granted to users or roles
- *Search for Data*: Match specific values or patterns in the data
  - Example: Search for objects matching *guardium://CREDIT_CARD* (a built-in pattern defining various credit card patterns)
- *Search for Unstructured Data*: Match specific values or patterns in an unstructured data file (CSV, Text, HTTP, HTTPS, Samba)



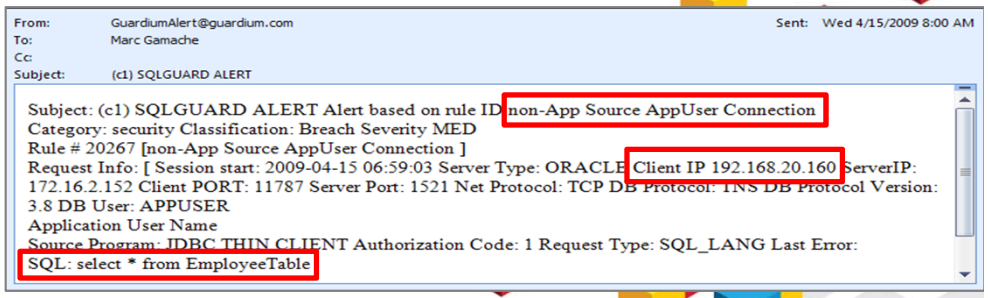


Granular Policies with Detective & Preventive Controls





Sample Alert



Reporting & Forensic Drill-Down Info

Timestamp	Client IP	Server IP	Network Protocol	Database Name	DB User Name	Application User	Full Sql
2010-09-22 17:16:44.0	10.10.10.10	10.10.10.10	SHARED MEMORY	E6A	SAPE6A	DDIC	INSERT INTO "USR04" VALUES('000' , 'JOE' , '20100922' , '171641' , 'DDIC' , 2 , 'C') SAPLSUU2 , 1292) -- SYSTEM(E6A , SAPE6A)

IBM® InfoSphere™ Guardium®

Drill down: show all tables that were accessed by this user

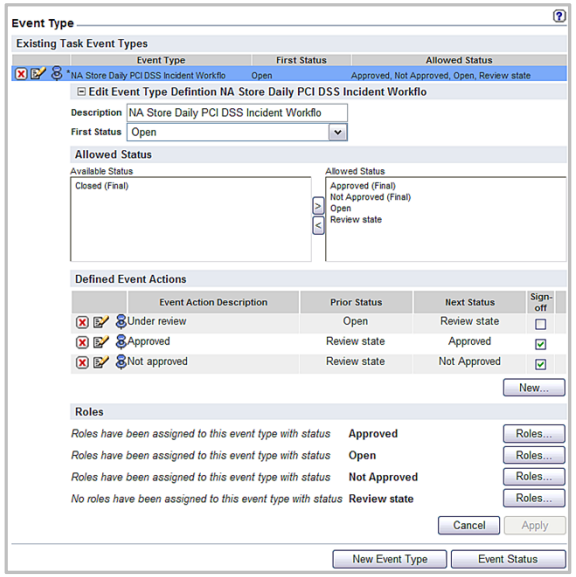
Client IP	Source Program	SQL Verb	Depth	Object Name	Total access
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADCNTRYQU	2
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADCP	2
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADCP	9
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADR3	25
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADR3	2
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADR7	2
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADR7	2
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRC	18
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADRCOMC	3
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRCT	4
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRG	5
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRGP	5
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADRP	6
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRP	5
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRT	30
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRU	25
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADRU	5
10.10.10.10	DISP+WORK.EXE	SELECT	0	ADRVP	15
10.10.10.10	DISP+WORK.EXE	INSERT	0	ADRVP	4
10.10.10.10	DISP+WORK.EXE	SELECT	0	AGR_AGRS	144

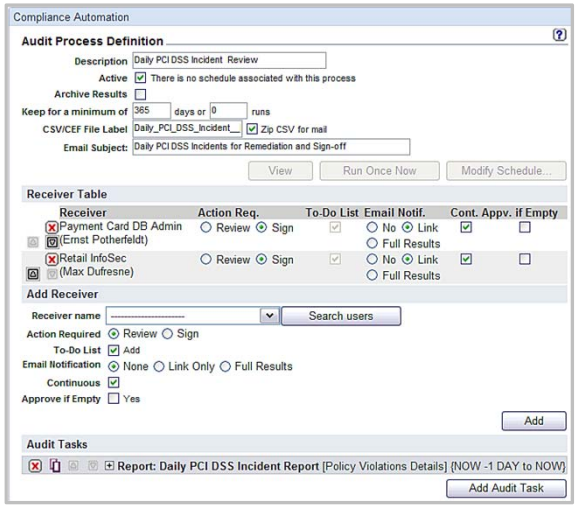
Records: 1 to 20 of 394

- 0FullDetails
- 0OpenStapSessions
- 0ShowSQLs
- Admin Users Sessions
- Basel II - DDL Distribution
- Basel II - DML Distribution
- Client IP Activity Summary
- DB Predefined Users Sessions
- DB Server Throughput-Chart
- Detailed Sessions List
- Exceptions Type Distribution
- Full SQL By Client IP
- Full SQL By DB User
- SOX - DDL Distribution
- SOX - DML Distribution
- Throughput-Chart
- **User Activity Summary**
- Alias Definition
- Show SQL
- Show SQL with Values

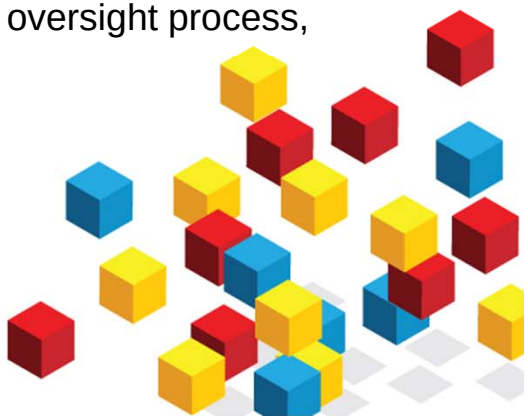
Who accessed the ADRP table (which contains PII data)?

Advanced Compliance Workflow Automation

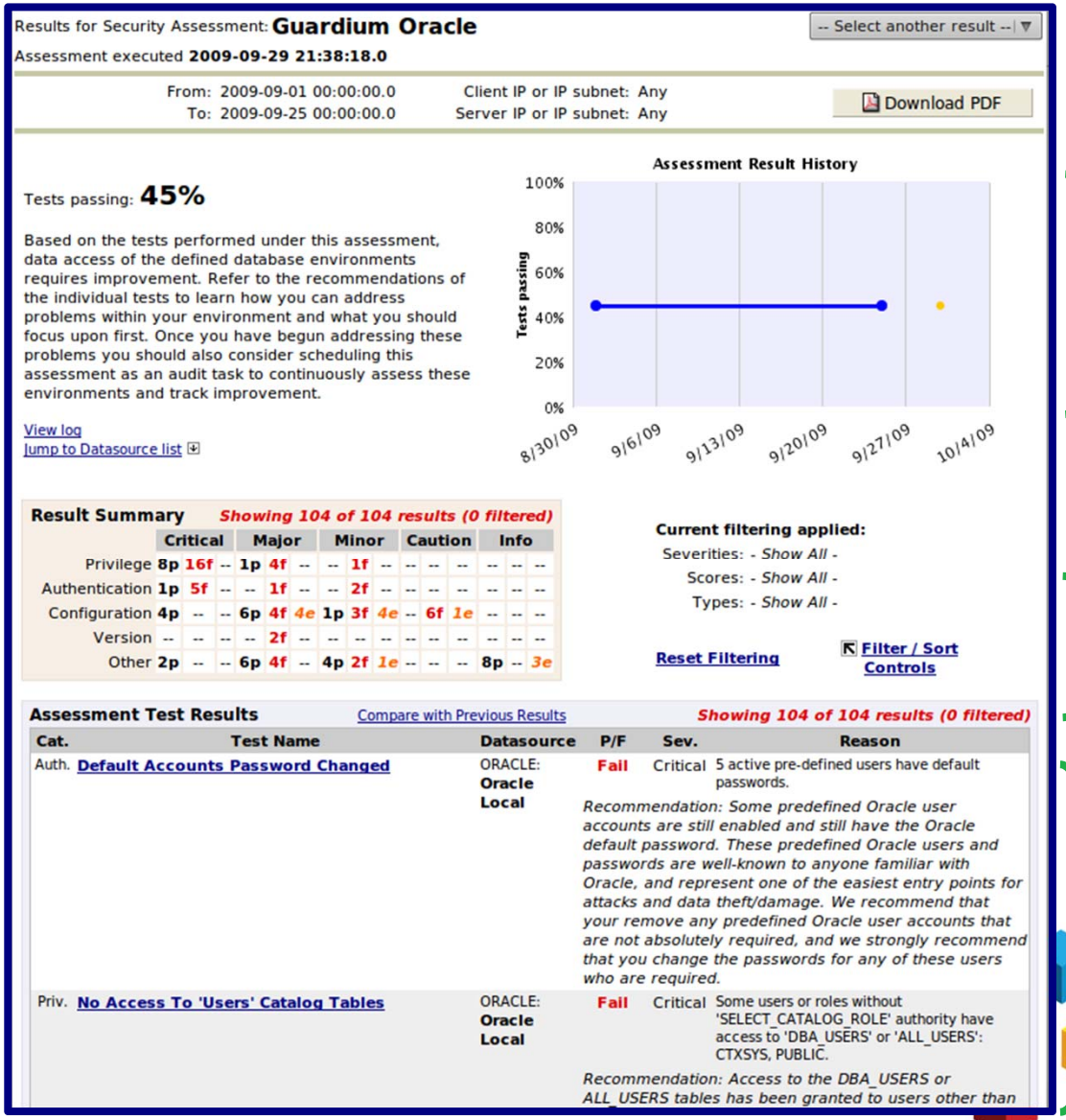




- Easily create custom processes by specifying unique combination of workflow steps, actions and users
  - Use case: Different oversight processes for financial servers than PCI servers. Different workflows in NA vs. EU.
  - Enables cost benefits of automation to be realized in large, complex organizations
- Supports automated execution of oversight processes on a report line item basis, maximizing efficiency without sacrificing security
  - Use case: Daily exception report contains 4 items I know about and have resolved, but one that needs detailed investigation. Send 4 on for sign-off; hold one
  - Increases efficiency of overall oversight process, and each individual



Identifying Unpatched & Misconfigured Systems



Summary Outlining Results

Result History

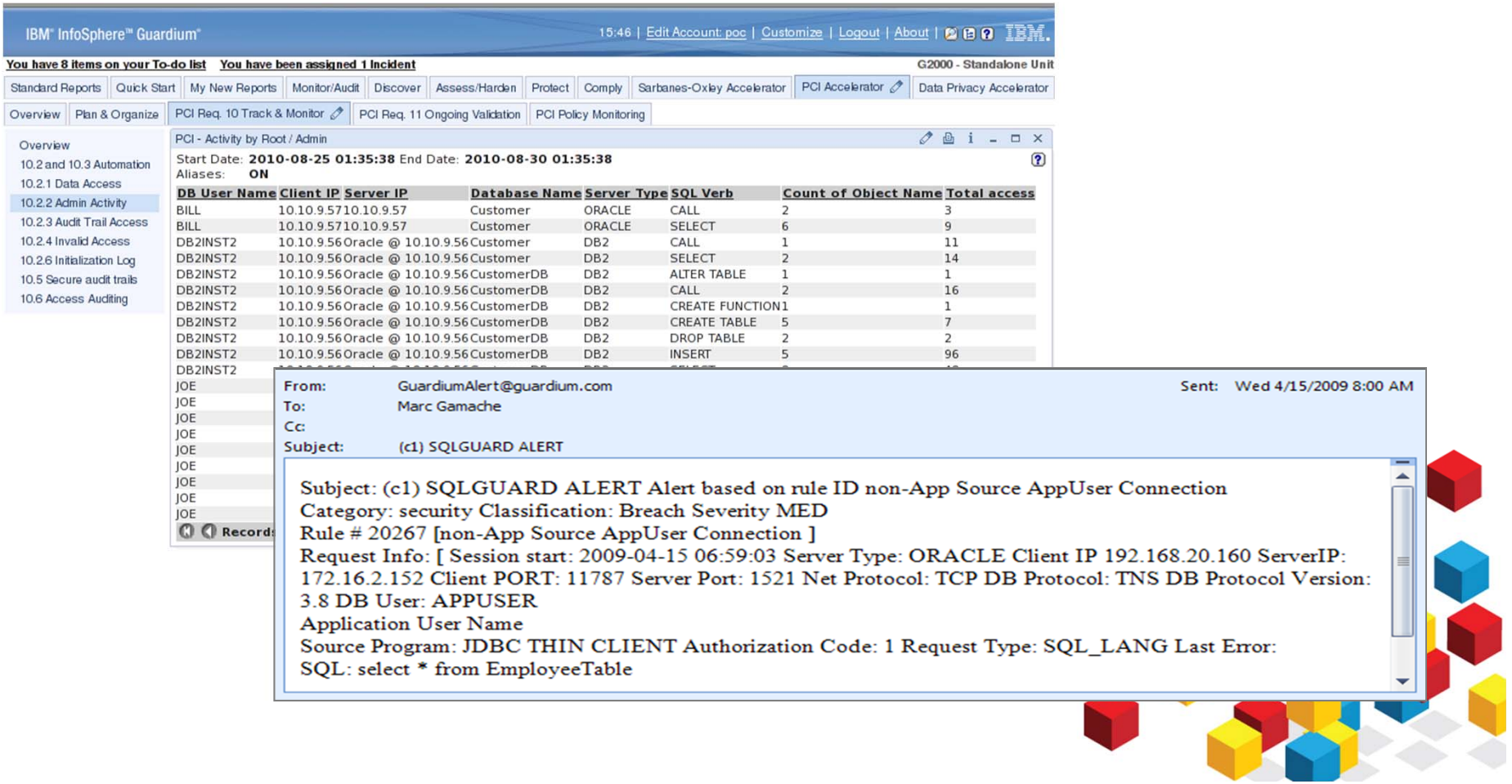
Filters and Sort Controls

Detailed Test Results

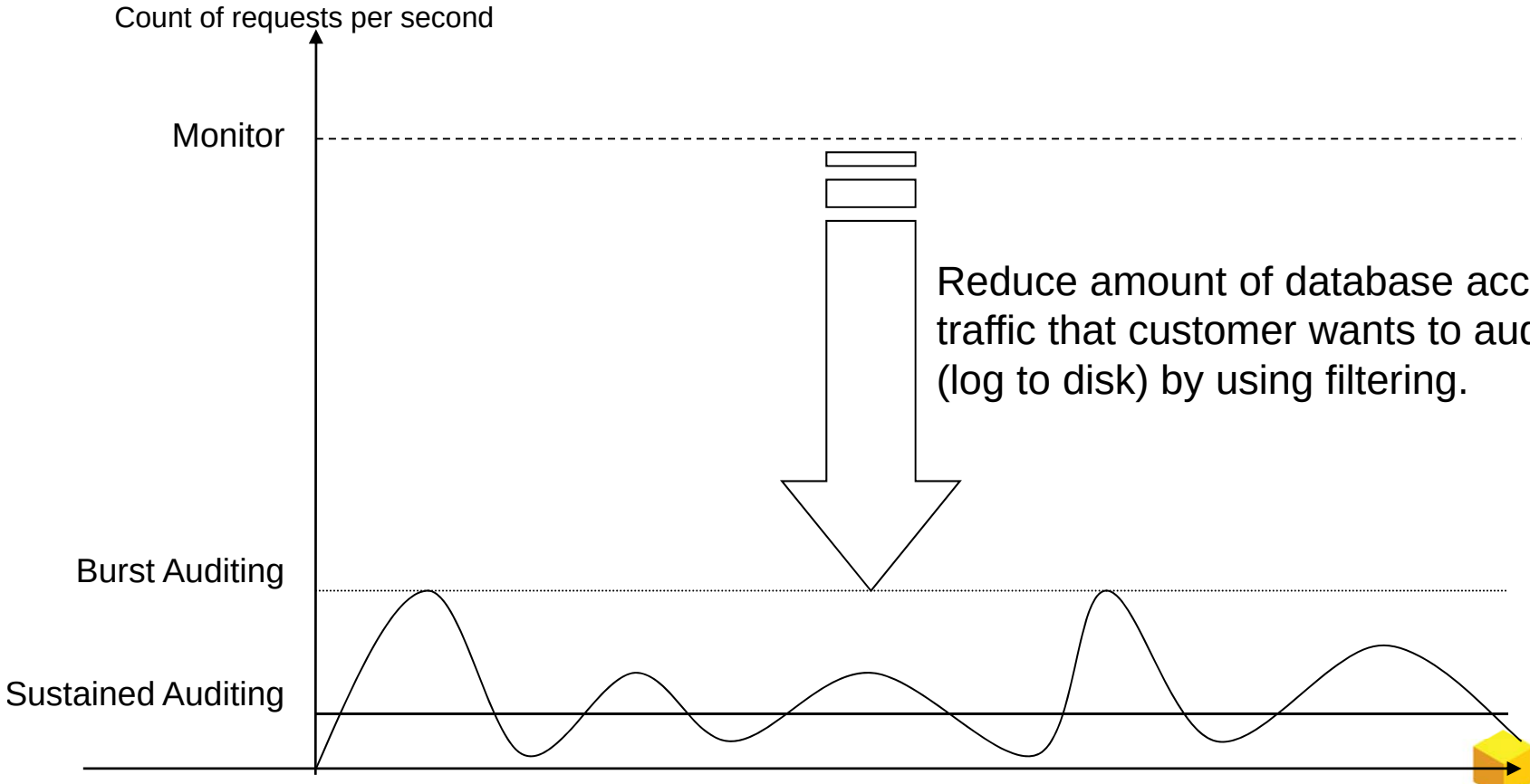
Detailed Descriptions of Fixes

Audit Policies

A Detailed Look

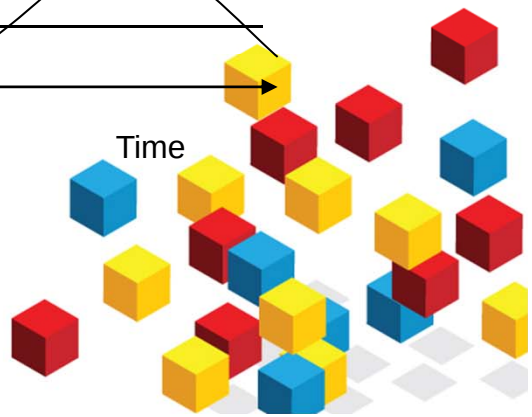


Monitoring or Auditing?

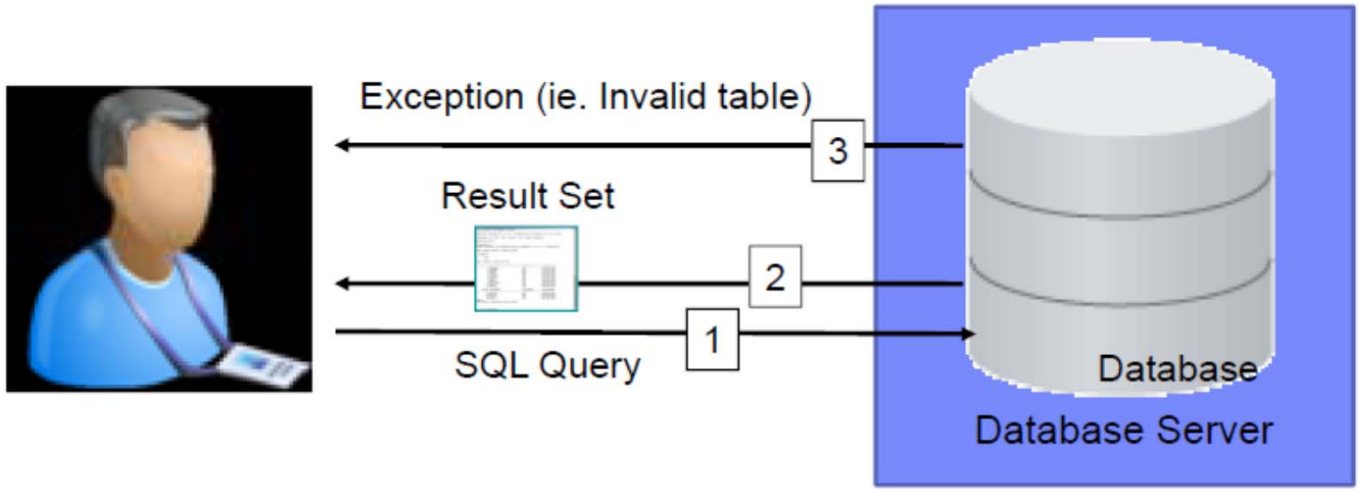


Monitoring watches all traffic (alerts, report DB errors, etc)

Auditing logs information to disk

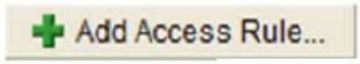


Policy - Identify and Audit Significant Activity

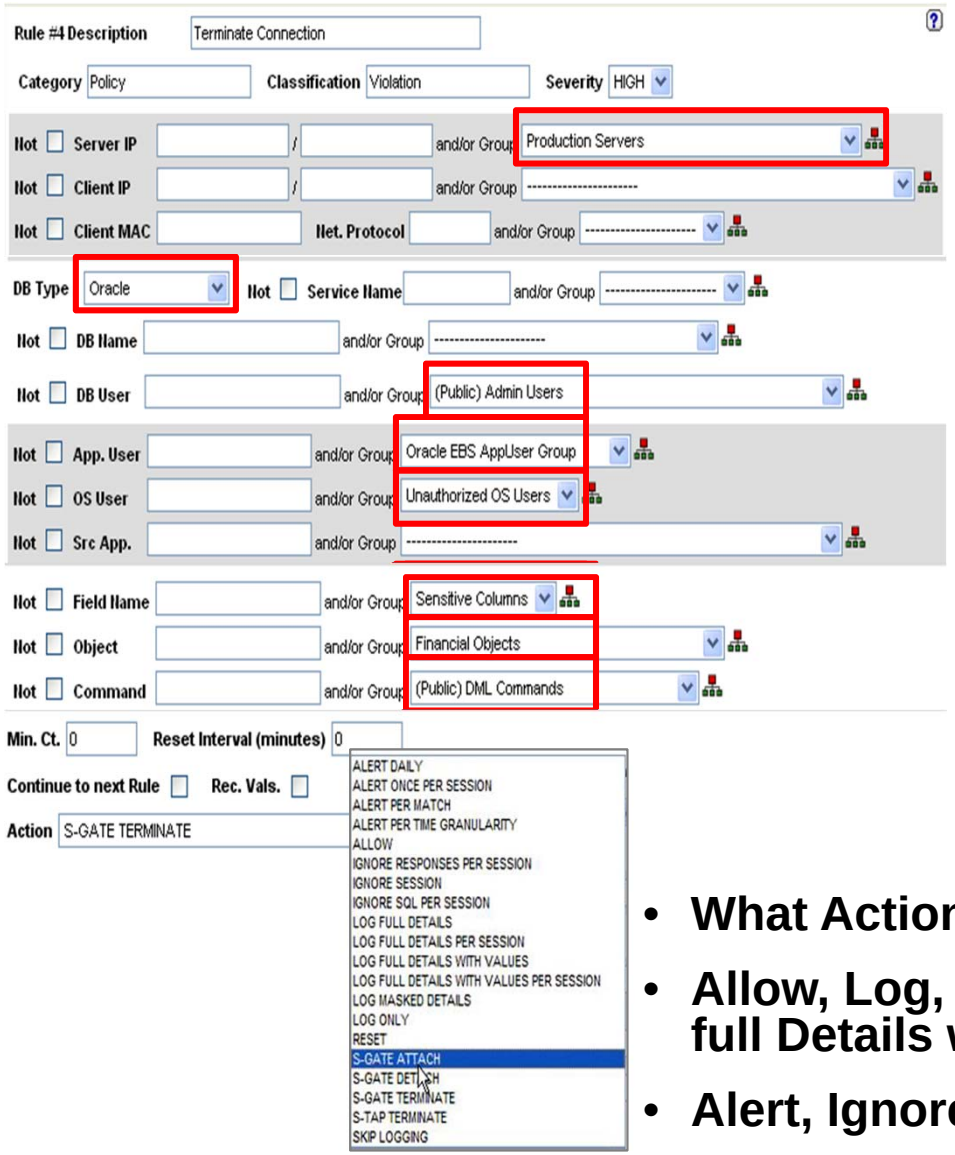


There are three types of rules:

1. An access rule applies to client requests
2. An extrusion rule evaluates data returned by the server
3. An exception rule evaluates exceptions returned by the server



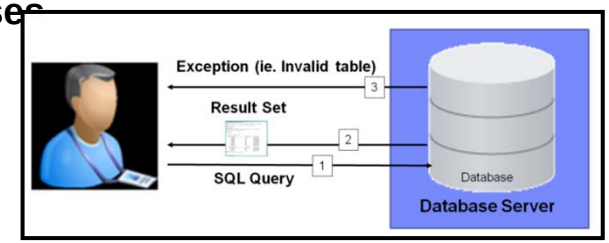
Access Rule



Which Servers

Which Databases

Which Users



Which Fields
Which Tables
Which SQL Commands

- **What Action?**
- **Allow, Log, Log Full Details, Log full Details with Values**
- **Alert, Ignore, Terminate**

Access Rule Actions

Log Full Details with Values

Log Full Details

Allow

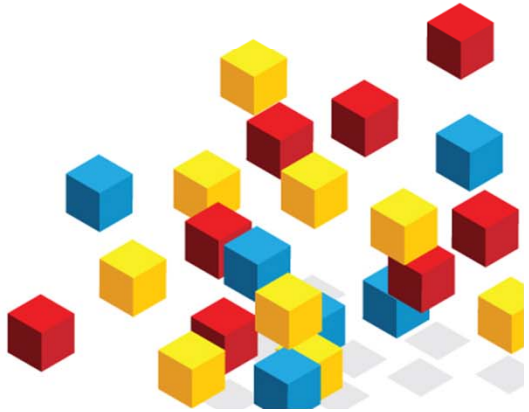
Start Date: 2009-08-11 09:39:36 End Date: 2009-08-11 10:39:36

Object Name	Field Name	Value	Object-Field	DB User Name	Object-Command	Full Sql	Sql
Payroll	Salary	50000	Payroll+Salary	HARRY	Payroll+INSERT	Insert into Payroll(NAME,ID, Salary) VALUES('TOM JONES',2,50000)	Insert into Payroll(NAME,ID, Salary) VALUES(?,?,?)
payroll	salary	55000	payroll+salary	HARRY	payroll+UPDATE	update payroll set salary=55000 where id=2	update payroll set salary=? where id=?
Payroll	Salary	75000	Payroll+Salary	HARRY	Payroll+INSERT	Insert into Payroll(NAME,ID, Salary) VALUES('BILL SMITH',1,75000)	Insert into Payroll(NAME,ID, Salary) VALUES(?,?,?)

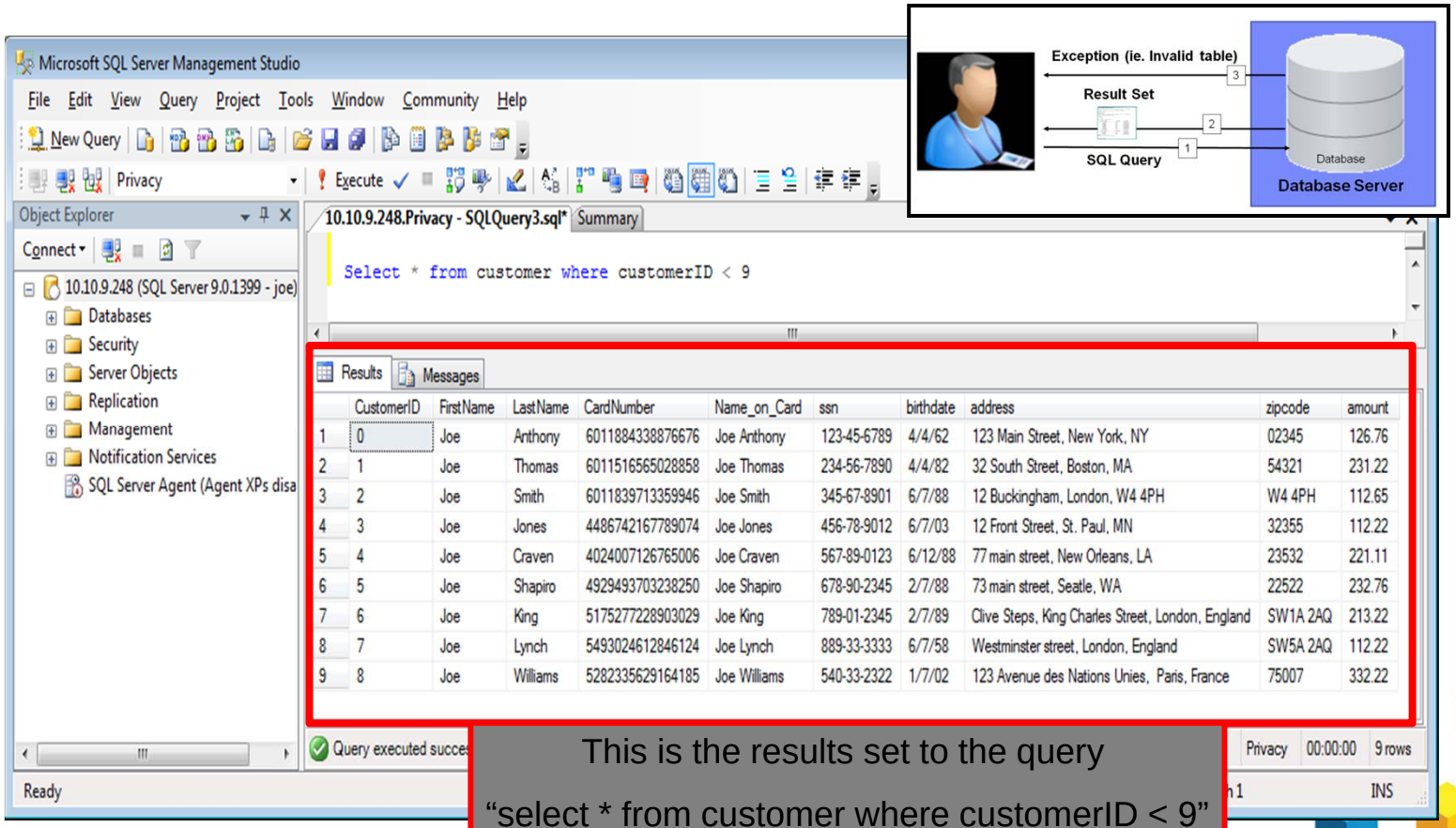
Records: 1 to 3 of 3

Each level of detail will store more information

- Allow - By default don't store bind values which may contain sensitive information
- Log Full Details – Stores bind values
- Log Full Details with Values - Each field value will be stored



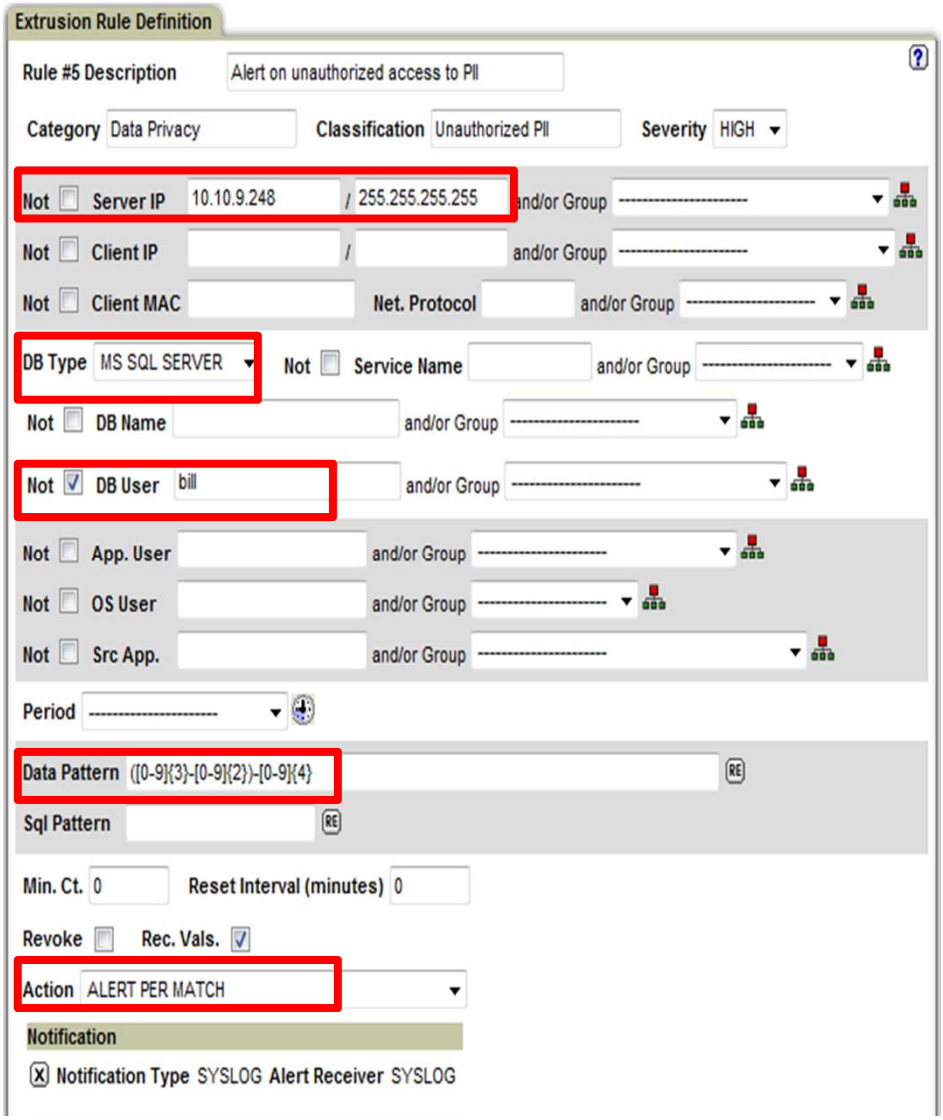
Extrusion Rule - Monitor the Results Set For Sensitive Data



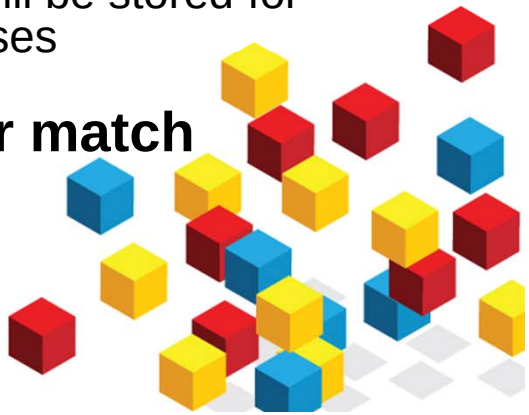
This is the results set to the query

“select * from customer where customerID < 9”

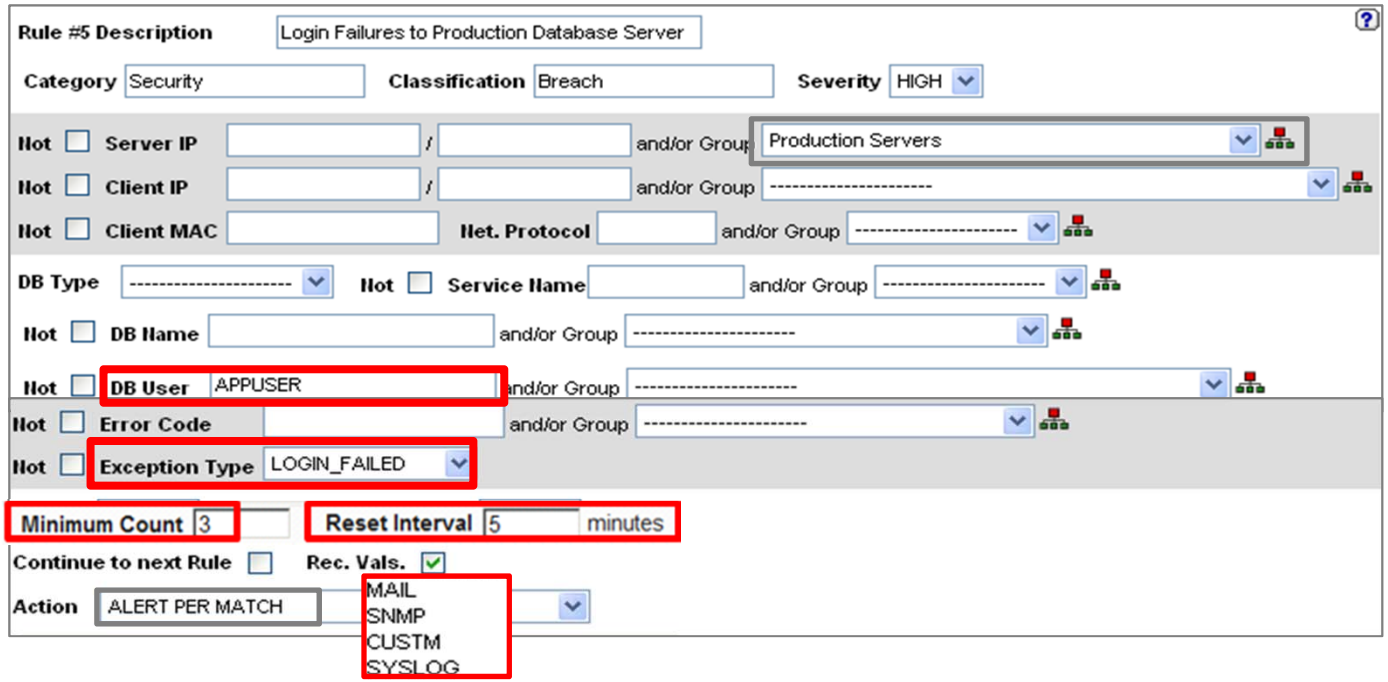
Extrusion Definition to Alert on Suspect Results

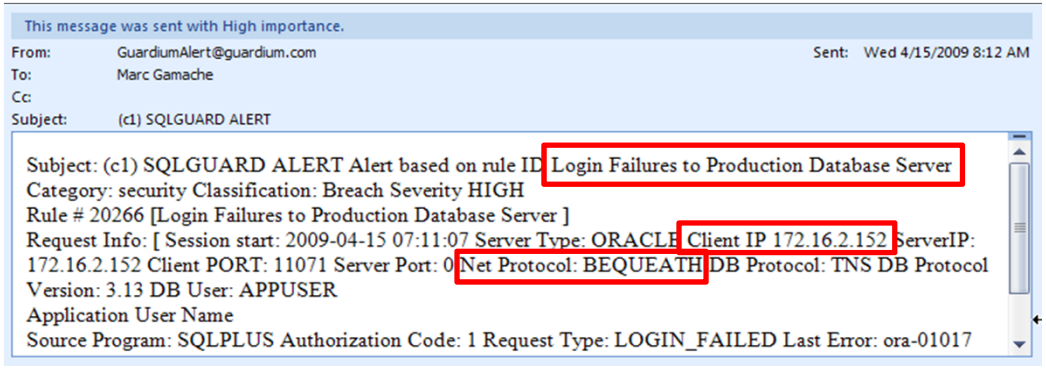


- **Monitor 10.10.9.248**
- **SQL Server database**
- **Not user Bill**
- **Credit Card numbers**
  - ([0-9]{4}-[0-9]{4}-[0-9]{4} -[0-9]{4}) will match the pattern for a Credit Card Number xxxx-xxxx-xxxx-xxxx
  - Everything between the "(" and ")" will be masked out so no sensitive data will be stored for reporting purposes
- **Send Alert per match**



Exception Rule - Alert On Failed Login



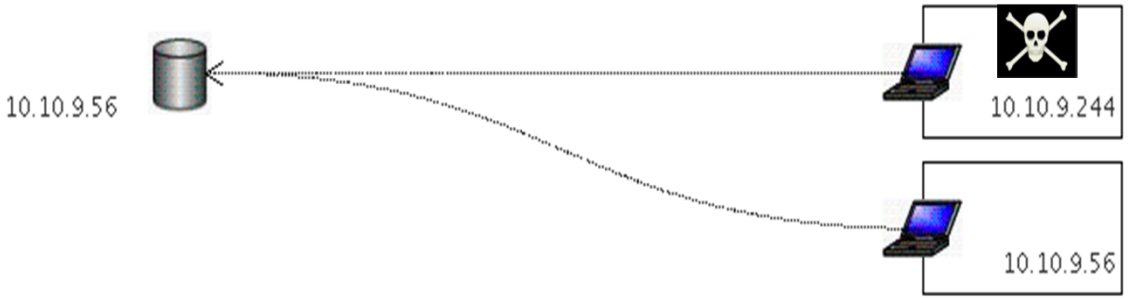


Actual SMTP Alert

- APPUSER is generic DB service account (connection pooling)
- Exception Type = Failed Login
- Min Count = How often
- Reset Interval = Time period for count
- Action = Alert
- So … Alert on 3 Failed Login attempts from the same user if they occur 3 times within a 5 minute interval

You should not see three failed logins from a production applicatio

Exception Rule - Preventing Attacks



Rogue users know what they're looking for, but...
They don't always know where to find it!

Returned SQL Errors

Start Date: **2007-03-01 00:00:00** End Date: **2007-04-15 00:00:00**

Client IP	Server IP	Server Type	DB User Name	Database Error Text
10.10.9.244	10.10.9.56	ORACLE	APPLSYSPUB	ORA-00942: table or view does not exist

SQL injection leads to **SQL errors**!

Failed Login Attempts

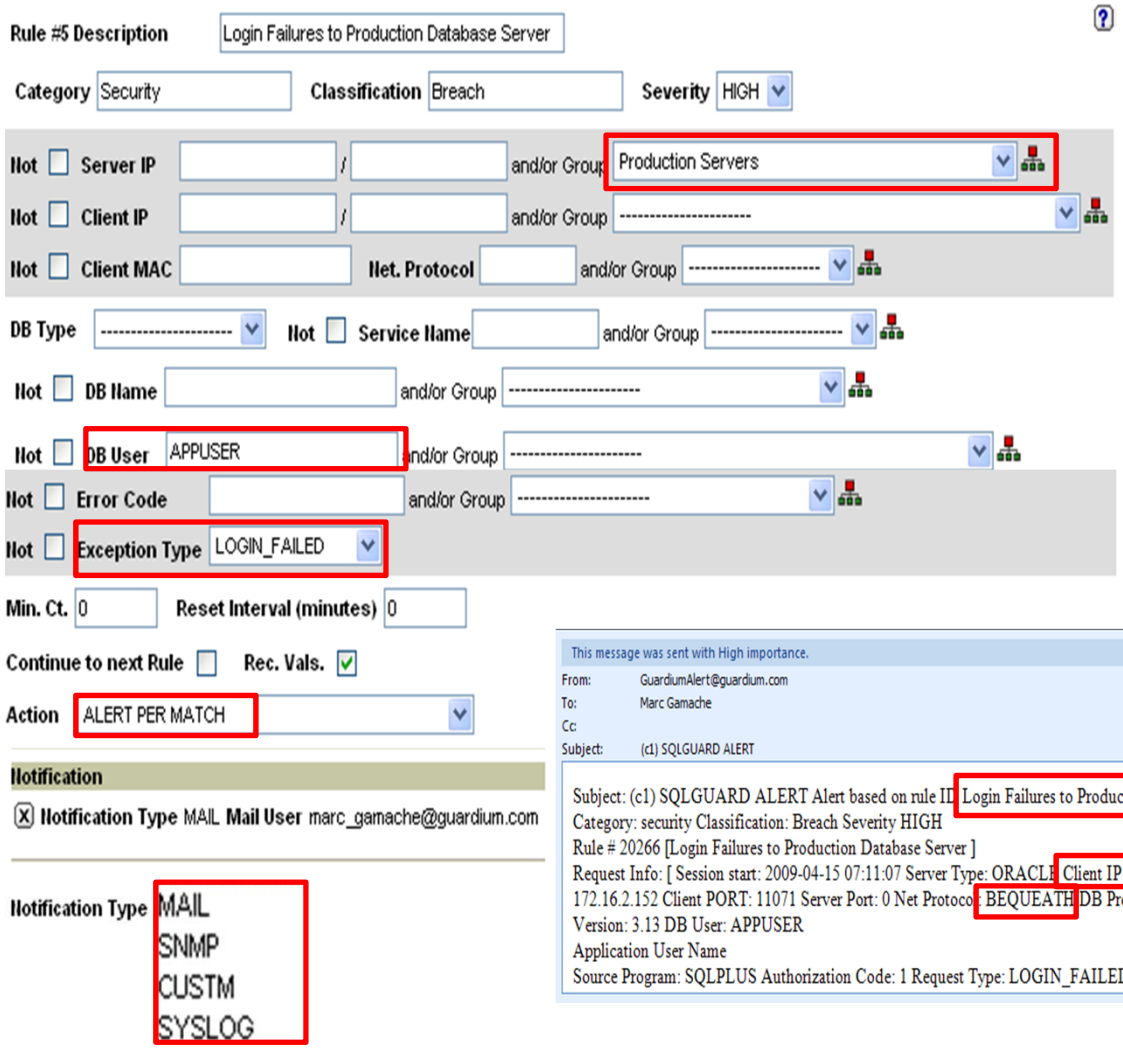
Start Date: **2007-03-01 00:00:00** End Date: **2007-05-01 00:00:00**

User Name	Source Address	Destination Address	Database
MarcG	192.168.20.107	10.10.9.56	ORACLE
APPLSYSPUB	10.10.9.244	10.10.9.56	ORACLE
APPLSYSPUB	10.10.9.56	10.10.9.56	ORACLE

Brute force attacks result in **failed logins**!

Guardium: 100% visibility with real-time alerts …

Exception Rules With Real-Time Alerts



Category Name	Access Rule Description	Client IP	Server IP	DB User Name
security	Login Failures to Production Database Server	10.10.9.56	10.10.9.56	APPUSER

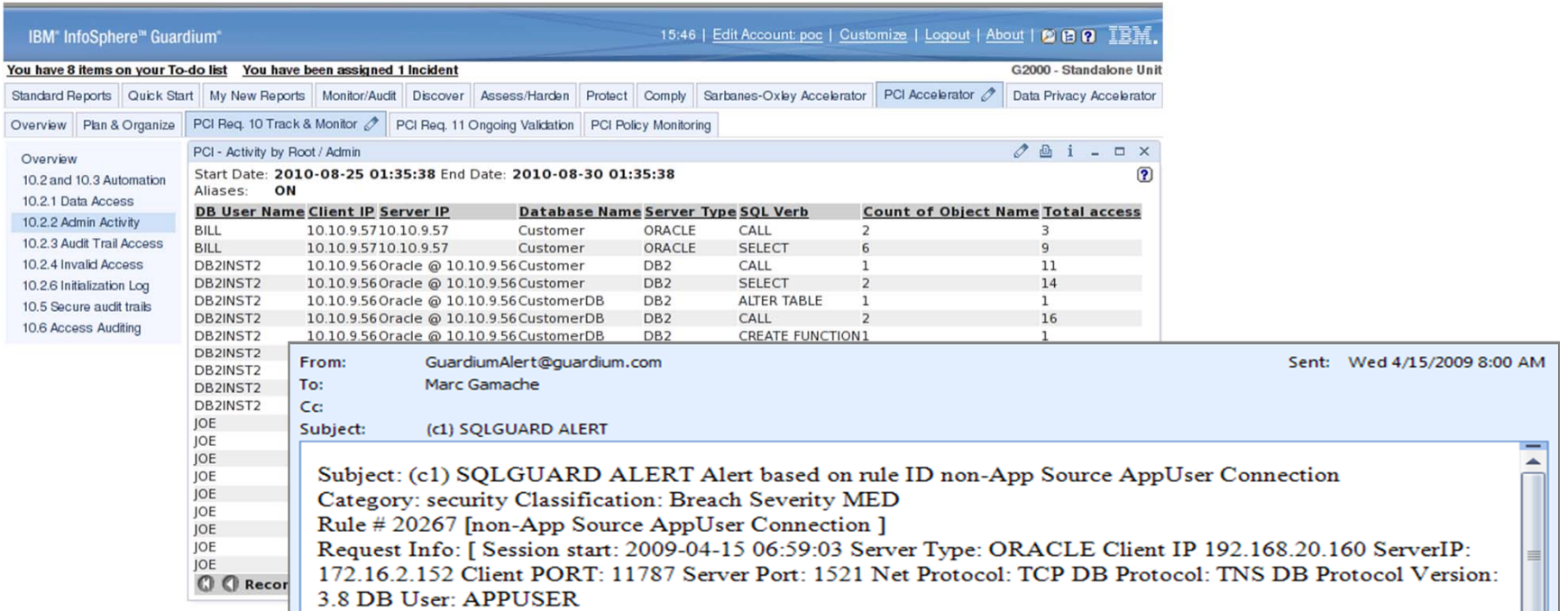
Focus on production DB servers

Identify failed login attempts using the application account!

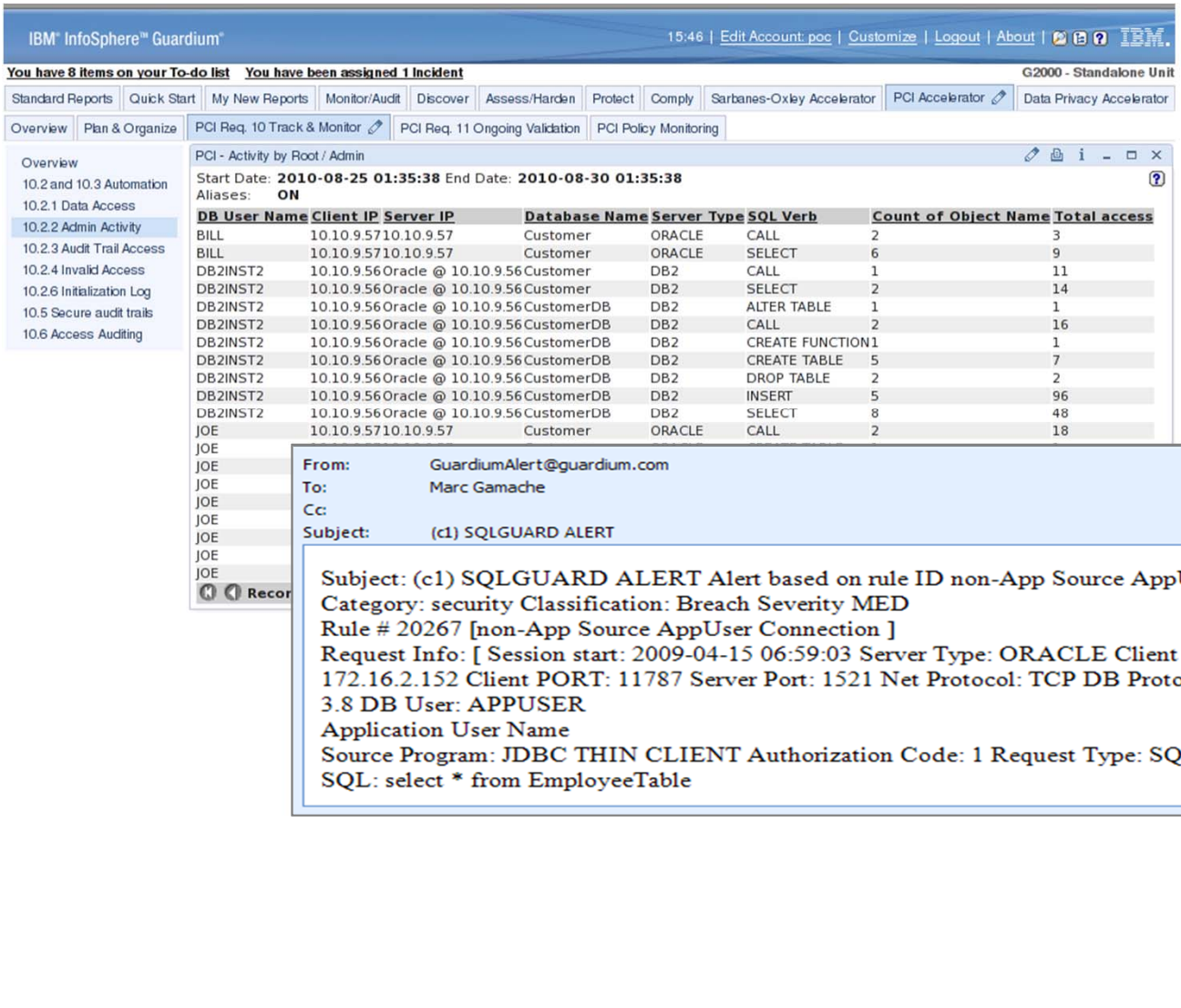
Take Action:
Send alert via email, SYSLOG, SNMP or custom Java class

Demonstration

Activity Monitoring, Auditing & Alerting



Thank you


IBM® InfoSphere™ Guardium®
15:46 | Edit Account: poc | Customize | Logout | About | IBM.
You have 8 items on your To-do list
You have been assigned 1 Incident
G2000 - Standalone Unit
Standard Reports
Quick Start
My New Reports
Monitor/Audit
Discover
Assess/Harden
Protect
Comply
Sarbanes-Oxley Accelerator
PCI Accelerator
Data Privacy Accelerator
Overview
Plan & Organize
PCI Req. 10 Track & Monitor
PCI Req. 11 Ongoing Validation
PCI Policy Monitoring
Overview
10.2 and 10.3 Automation
10.2.1 Data Access
10.2.2 Admin Activity
10.2.3 Audit Trail Access
10.2.4 Invalid Access
10.2.6 Initialization Log
10.5 Secure audit trails
10.6 Access Auditing
PCI - Activity by Root / Admin
Start Date: 2010-08-25 01:35:38 End Date: 2010-08-30 01:35:38
Aliases: ON
DB User Name | Client IP | Server IP | Database Name | Server Type | SQL Verb | Count of Object Name | Total access
BILL | 10.10.9.57 | 10.10.9.57 | Customer | ORACLE | CALL | 2 | 3
BILL | 10.10.9.57 | 10.10.9.57 | Customer | ORACLE | SELECT | 6 | 9
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | Customer | DB2 | CALL | 1 | 11
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | Customer | DB2 | SELECT | 2 | 14
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | ALTER TABLE | 1 | 1
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | CALL | 2 | 16
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | CREATE FUNCTION | 1 | 1
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | CREATE TABLE | 5 | 7
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | DROP TABLE | 2 | 2
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | INSERT | 5 | 96
DB2INST2 | 10.10.9.56 | Oracle @ 10.10.9.56 | CustomerDB | DB2 | SELECT | 8 | 48
JOE | 10.10.9.57 | 10.10.9.57 | Customer | ORACLE | CALL | 2 | 18
JOE
JOE
JOE
JOE
JOE
JOE
JOE
JOE
From: GuardiumAlert@guardium.com
Sent: Wed 4/15/2009 8:00 AM
To: Marc Gamache
Cc:
Subject: (c1) SQLGUARD ALERT
Subject: (c1) SQLGUARD ALERT Alert based on rule ID non-App Source AppUser Connection
Category: security Classification: Breach Severity MED
Rule # 20267 [non-App Source AppUser Connection]
Request Info: [Session start: 2009-04-15 06:59:03 Server Type: ORACLE Client IP 192.168.20.160 ServerIP: 172.16.2.152 Client PORT: 11787 Server Port: 1521 Net Protocol: TCP DB Protocol: TNS DB Protocol Version: 3.8 DB User: APPUSER
Application User Name
Source Program: JDBC THIN CLIENT Authorization Code: 1 Request Type: SQL_LANG Last Error:
SQL: select * from EmployeeTable