Oracle E-Business Suite
Trust But Verify

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Agenda

1. Insiders
   - Passwords

2. Auditing

3.  
4. Monitoring & Service Providers

5. Q&A
About Integrigy

**Products**

**AppSentry**
ERP Application and Database Security Auditing Tool

**AppDefend**
Enterprise Application Firewall for the Oracle E-Business Suite

**Services**

**Security Assessments**
ERP, Database, Sensitive Data, Pen Testing

**Compliance Assistance**
SOX, PCI, HIPAA

**Security Design Services**
Auditing, Encryption, DMZ

You
Oracle E-Business Suite

- Oracle EBS installs all modules (250+) and all web pages with each installation
- Large and complex application - security is an on-going effort
Insider Threat Cannot Be Avoided

- Insiders include
  - DBAs, administrators, developers, staff, contractors and vendors
- Number of insiders can range greatly
- If hosted, can have a very large number of insiders

Rocket Scientists

Horde of Zombies
Insider Threats Cannot Be Avoided

- **How do you guard against insider**
  - Unauthorized access and breeches
  - Not following policies and procedures
  - Poor or risky behaviors

- **How do you trust insiders?**
  - Trust but verify
Goal of this presentation

1. Use the perspective of an internal auditor
2. Offer a basic strategy to establish and maintain a trust perimeter for insiders
3. Share a few specific tips and recommendations from Integrigy’s consulting engagements
Insiders

Monitoring & Service Providers

Q&A

1. Passwords

2. Auditing

3. Monitoring & Service Providers

4. Q&A
Define Trust Perimeter with Passwords

Step One Define the Password Trust Perimeter

DB & Operating System
- 300+ accounts
- Generic accounts
- Staff accounts

Oracle E-Business
- System Admin
- Generic Accounts
- 40+ Default Accts

Environments
- Production
- Test
- Development

Remote
- Hosted/Cloud
- Offshore DBA
- Developers

Passwords
Create Insiders
Appropriate Trust

- Review business need and terms of access for each account
  - Appropriate and responsible

- Revise and monitor password rights
  - People will complain
Additional Steps

- Use a password vault application with strong reporting capabilities

- Where direct access is not required use random, long strings for passwords

- Use “half passwords” - assign one half a key password to two different people
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Enable Forms auditing
• User, Responsibility, Forms

Review and carefully monitor administration menus
• Who can change menus and edit users
Additional Steps

- **Generic accounts**
  - Review, remove or restrict

- **Protect production data**
  - Access to production by developers and testers

- **Protect sensitive data**
  - Sensitive data must be redacted, masked or scrambled in non-production databases
# Where is Sensitive Data in Oracle EBS?

<table>
<thead>
<tr>
<th>Category</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Credit Card Data</strong></td>
<td>iby_security_segments (encrypted)</td>
</tr>
<tr>
<td></td>
<td>ap_bank_accounts_all</td>
</tr>
<tr>
<td></td>
<td>oe_order_headers_all</td>
</tr>
<tr>
<td></td>
<td>aso_payments</td>
</tr>
<tr>
<td></td>
<td>oks_k_headers_*</td>
</tr>
<tr>
<td></td>
<td>oks_k_lines_*</td>
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<td></td>
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<td>po_vendors_obs</td>
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<td><strong>Bank Account Number</strong></td>
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<td></td>
<td>ap_invoice_payments_all</td>
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<tr>
<td></td>
<td>ap_selected_invoice_checks_all</td>
</tr>
<tr>
<td><strong>Protected Health Information (PHI)</strong></td>
<td>Order Management</td>
</tr>
<tr>
<td></td>
<td>Accounts Receivables</td>
</tr>
<tr>
<td></td>
<td>Human Resources</td>
</tr>
</tbody>
</table>
Where else might be Sensitive Data?

**Custom tables**
- Customizations may be used to store or process sensitive data

**“Maintenance tables”**
- DBA copies tables to make backup prior to direct SQL update
- hr.per_all_people_f_011510

**Interface tables**
- Credit card numbers are often accepted in external applications and sent to Oracle EBS

**Oracle EBS Flexfields**
- It happens – very hard to find

**Interface files**
- Flat files used for interfaces or batch processing

**Log files**
- Log files generated by the application (e.g., iPayment)
Other Ideas

- Create custom Oracle Alerts for real-time event auditing and monitoring
- Create custom reports for audit activity
- Break up system administration menus by function
- Audit menu functions
Verify Trust for Database Access

- Direct database access is the biggest insider threat
  - What accounts are used to directly access
  - Who is using the accounts
  - Where are they logging in from
Insider Database Access

- If automation tools used for cloning and patching, review accounts used
  - Appropriate privileges by the appropriate staff
  - How is security and logging provided

- Also confirm who can access
  - Virtual Machine images
  - Backup tapes/files
Three Steps To Verify Insider Database Trust

1. **Enable standard database auditing**
   - Need to protect the audit trail

2. **Manually review database privileges**
   - No standard method to review database privileges

3. **Create individual user database accounts**
   - Associate user account with roles to limit access to data
With Oracle Enterprise license
- Fine Grained Access Control (FGAC)
- Fine Grained Auditing (FGA)

Additional Oracle license cost
- Audit Vault and Database Vault
- Oracle Advanced Security Option (ASO)
  - Transparent Data Encryption (TDE)
  - Data redaction and data masking
Also Consider for Database Trust Verification

- **Automation tools**
  - Automation removes direct access need
  - Can also detect and report on change
  - Tools such as
    - Oracle Enterprise Management Packs for E-Business
    - Quest Stat
    - Kintana (formerly Chain Link)
Also Consider for Database Trust Verification

- **Log and Event Management Tools**
  - Purpose built reporting and correlation tools
    - Splunk
    - HP ArcSight
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Use Monitoring for Continuous Verification

- **Monitoring is your front line defense**
  - 24x7x365 verification services

- **Monitoring can include**
  - Access control alerts
  - System administration changes
  - Account creation and modification
Verify Trust Perimeter For Monitoring

- **What accounts are used for monitoring**
  - Appropriately privileged
  - Hardcoded and/or changed regularly

- **What accounts monitoring staff use to respond to alerts**
  - Appropriately privileged
  - How are passwords pulled and how many have access
  - Is the activity audited
How to Verify Trust of Service Providers

- Service providers introduce large numbers of insiders
  - Large cloud vendors can have 1,000s

- Use Service Organization Control (SOC) Reports
  - Third party audit and attestation
  - Standard set by American Institute of CPAs
  - Much more effective than contractual or SLA reports
Four Key Facts about SOC Reports

- **Replacement for SAS70 Report**
  - SSAE 16 SOC Report

- **Is a historical report**
  - Type I reports on a specific day
  - Type II reports on a historical period

- **SOC 1 Report** – Vendor management’s discretion on what to include
  - Vendor reports differ widely

- **SOC 2 Report** – Whether or not AICPA dictated Trust Principles are being followed
  - Security, Availability, Integrity, Confidentiality and Privacy
Verify Trust of Service Providers by

- Using service providers who regularly produce SOC reports
  - Management commitment

- Using providers whose SOC report works for you
  - Read carefully and don’t assume anything
  - Clearly meets your compliance and regulatory requirements
  - Aligns with your audit and fiscal periods
Additional SOC Reporting Considerations

- Beware of your service provider’s supply chain
  - Are they outsourcing key services?

- Consider writing into contract with provider
  - Production of SOC report e.g. annually
  - Notification, if not approval, of changes to controls

- Ask for a SOC 2 instead of SOC 1 report
  - Review with vendor plans for SOC 2 reporting
Additional Considerations for Verifying Trust

- Require adherence to PCI standard (credit card security) even if not a processing cards

- Request syslog feeds for insider operating system and/or database activity

- Consider independent security assessments
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Trust But Verify Summary

- Establish a trust perimeter first through password control
- Setup and use auditing
- Understand and exploit monitoring
- Use SOC reports to verify trust of service providers
- Consider regular security assessments
References

- **Written by Integrigy**
  - 189367.1 Secure Configuration Guide for Oracle E-Business Suite 11i
  - 403537.1 Secure Configuration Guide for Oracle E-Business Suite R12

- **Other references**

More can be found here: [http://www.integrigy.com/security-resources](http://www.integrigy.com/security-resources)
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