Oracle E-Business Suite

APPS, SYSADMIN, and oracle Securing Generic Privileged Accounts

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Agenda

Overview

Best Practices

Q&A

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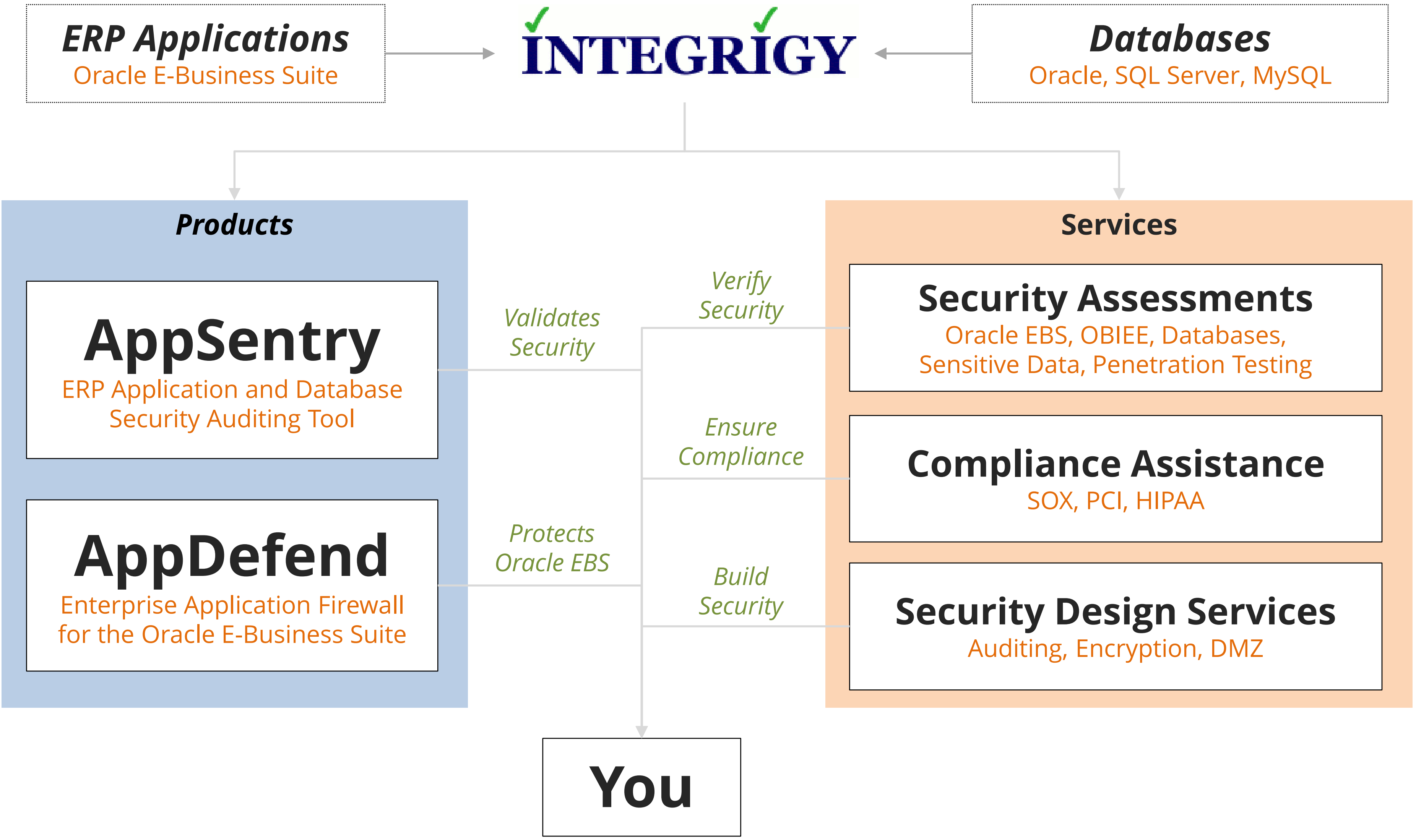
EBS Privileged Accounts

Logging Auditing & Monitoring

About Integrigy



ERP Applications
Oracle E-Business Suite

INTEGRIGY

Databases
Oracle, SQL Server, MySQL

Products

AppSentry
ERP Application and Database Security Auditing Tool

Validates Security

AppDefend
Enterprise Application Firewall for the Oracle E-Business Suite

Protects Oracle EBS

Services

Verify Security

Security Assessments
Oracle EBS, OBIEE, Databases, Sensitive Data, Penetration Testing

Ensure Compliance

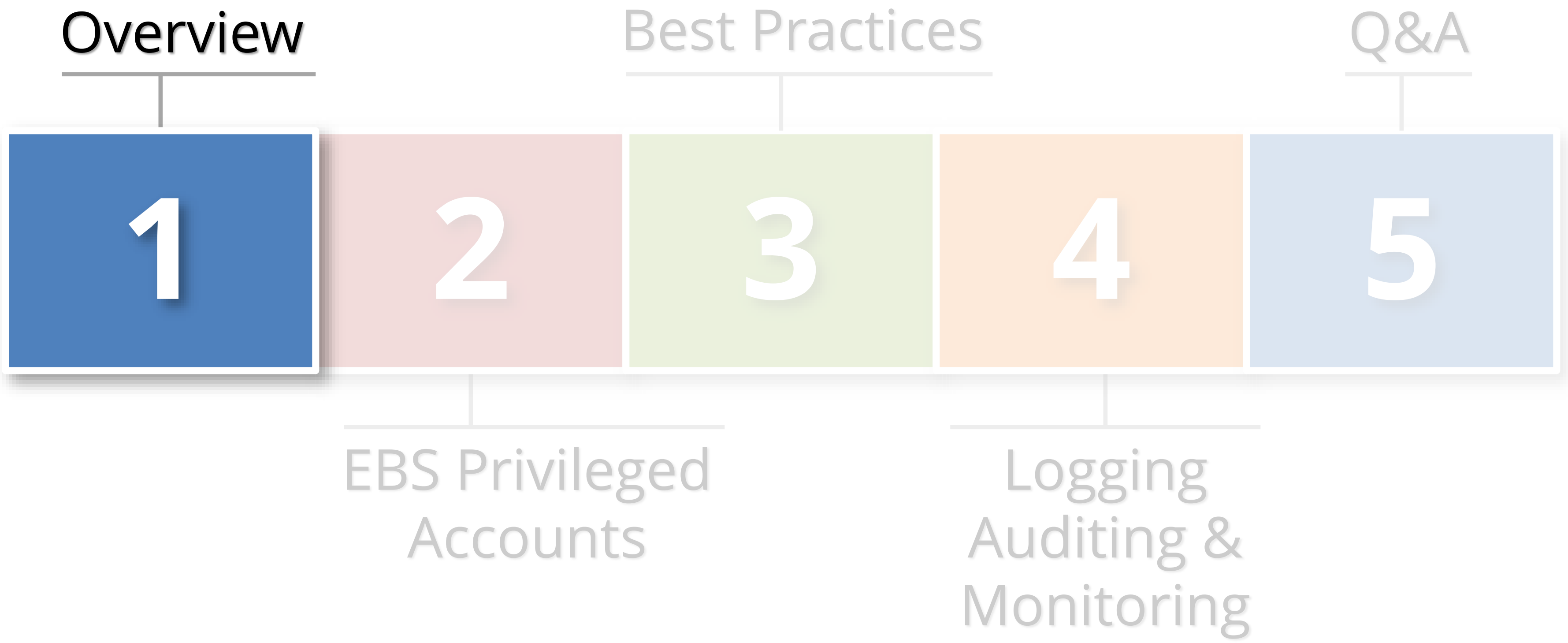
Compliance Assistance
SOX, PCI, HIPAA

Build Security

Security Design Services
Auditing, Encryption, DMZ

You

Agenda



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{ generic privileged account }

application, database, or
operating system account
used for administration
by **multiple people** and
has **significant privileges**

Generic Privileged Accounts

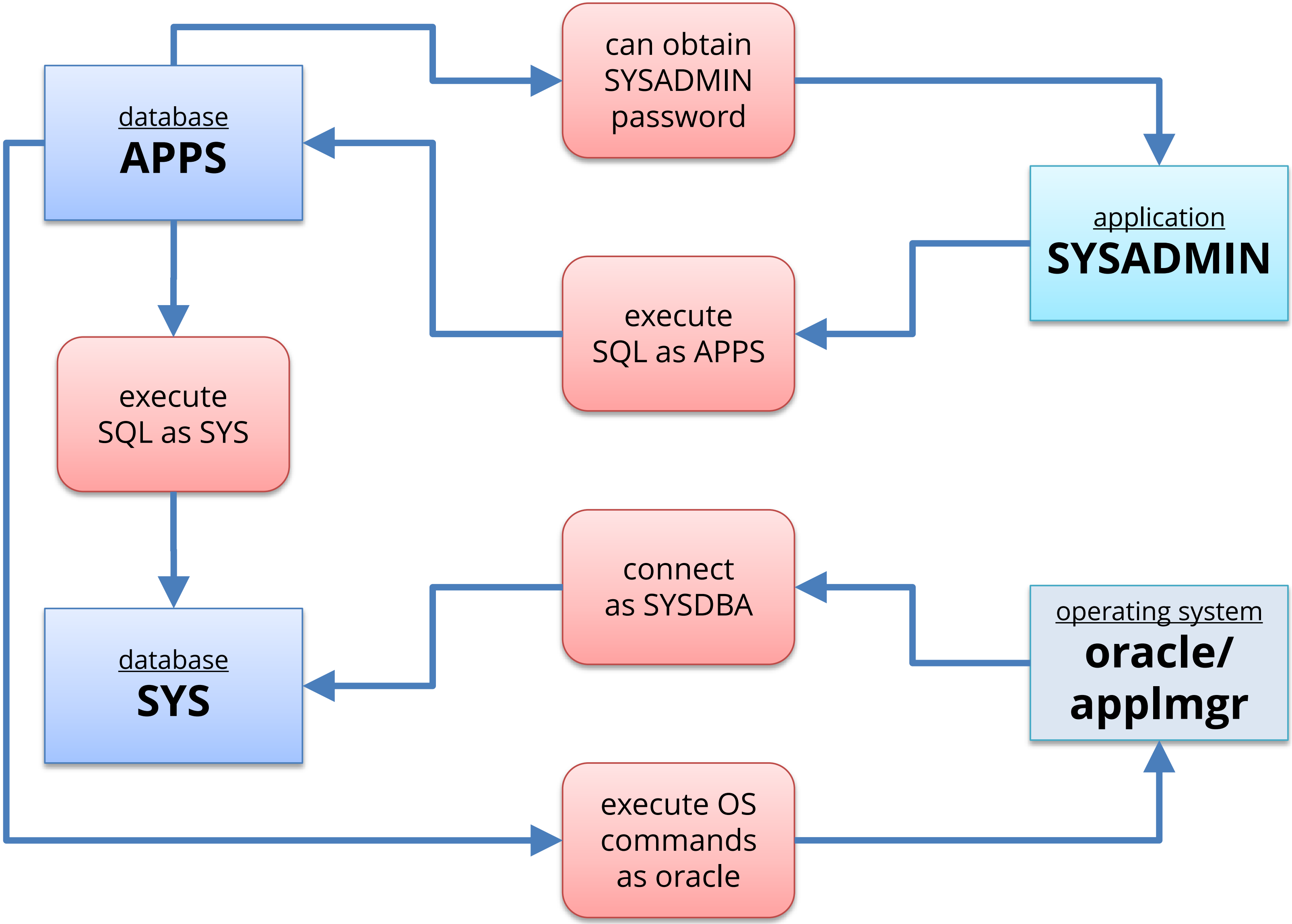
- **Oracle E-Business Suite is defined by generic privileged accounts in each layer of the technology stack**
  - Multiple highly privileged accounts
  - Generic accounts that must be used to manage the application and database

- **Majority of all data breaches committed by insiders**
  - Some intentional
  - Most accidental

Oracle EBS Generic Privileged Accounts

Oracle E-Business Suite	**SYSADMIN** *seeded application accounts*
Oracle Database	**APPS, APPLSYS** **SYS, SYSTEM** *Oracle EBS schemas (GL, AP, ...)*
Operating System *(Unix and Linux)*	**root** **oracle, applmgr**

Generic Privileged Account Inter-Dependency



database
APPS

can obtain SYSADMIN password

application
SYSADMIN

execute SQL as APPS

execute SQL as SYS

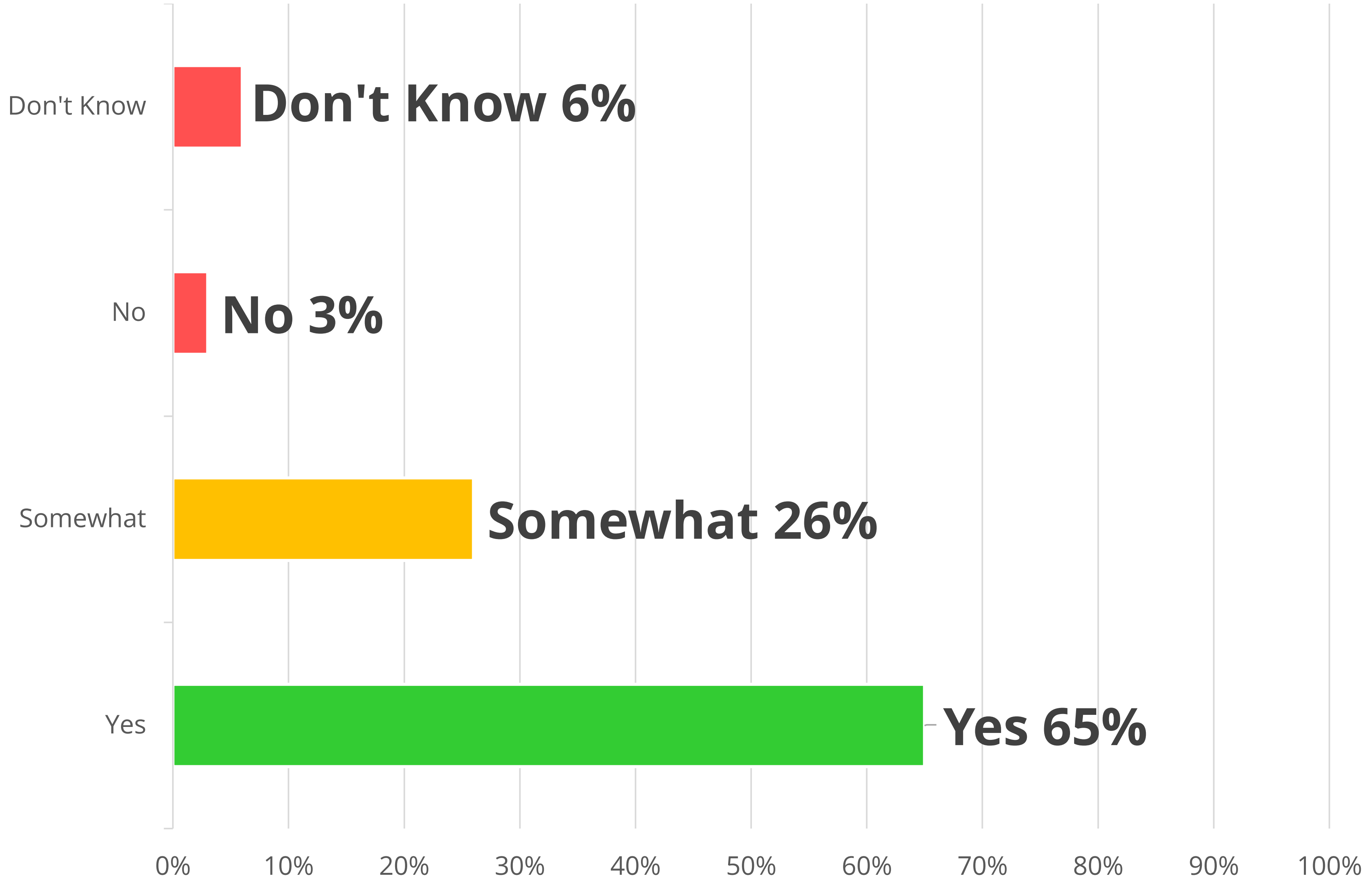
database
SYS

connect as SYSDBA

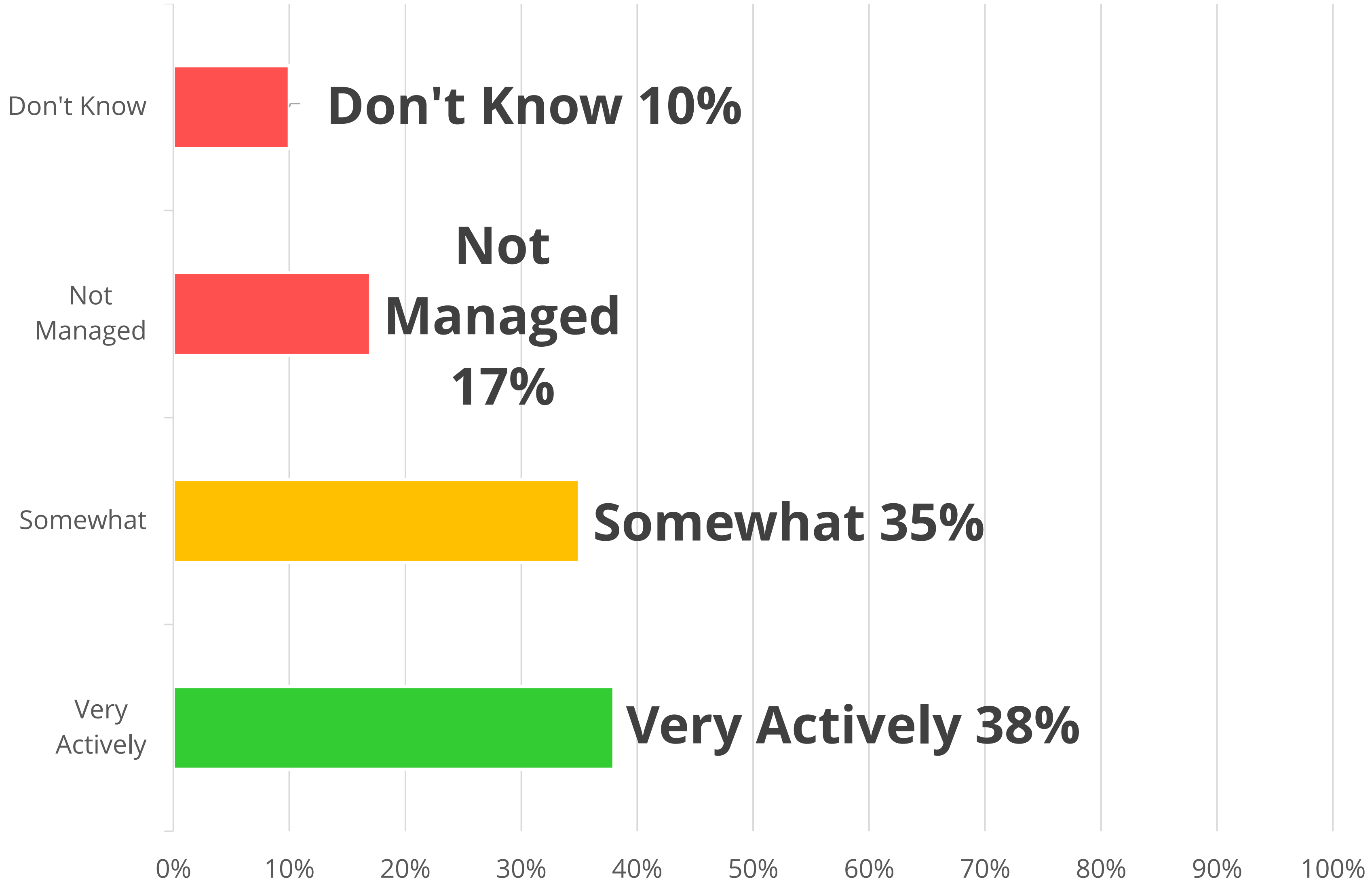
operating system
oracle/ applmgr

execute OS commands as oracle

How Concerned About Privileged Accounts?



How Actively Managed are Privileged Accounts?



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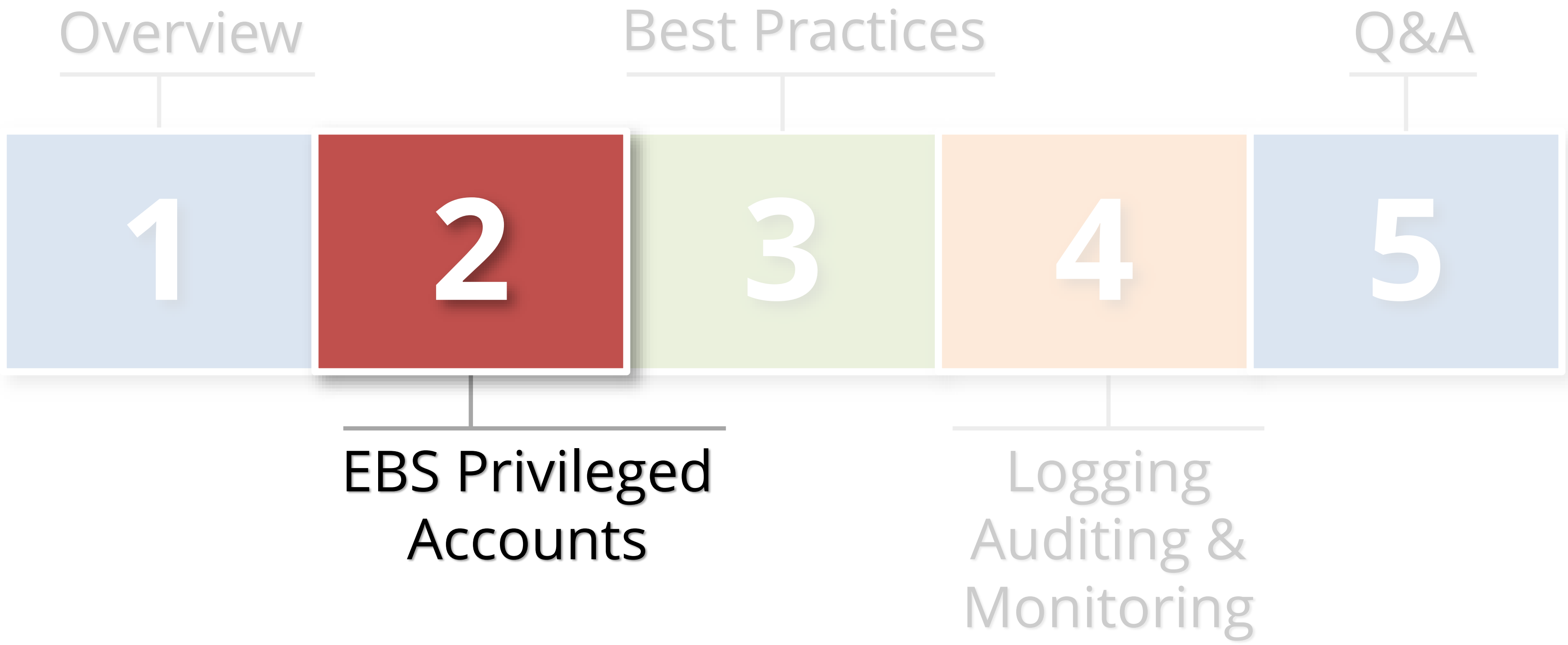

1. Overview
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Generic
Privileged
Accounts

E-BUSINESS SUITE

SYSADMIN Oracle EBS User

- **SYSADMIN**
  - System Administrator responsibility + 13 more
  - Must be used certain functions
  - Cannot be disabled or end-dated
  - Access to everything in Oracle EBS

- **Who might have access to SYSADMIN?**
  - Application administrators
  - Application DBAs
  - Support and power users
  - Helpdesk
  - Consultants and subcontractors

SYSADMIN Oracle EBS User

Control	▪ SYSADMIN should only be used for a few specific functions – named accounts for all other administration activities ▪ Change ticket required for all use in production ▪ Use custom generic, less privileged account for scheduled concurrent programs and proxy user ▪ Change password when cloning ▪ Frequently rotate password (90 days) ▪ **Manage password** in password vault *[Vault]*
Log & Monitor	▪ Implement auditing for all usage *[Framework]* ▪ Alert on login and monitor all usage
Audit	▪ Check last password change date ▪ Verify password complexity and length settings ▪ Interview to determine how password is controlled

30+ Seeded Generic Application Accounts

Active Application Account	Default Password	Active Responsibilities
ASGADM	WELCOME	▪ SYSTEM_ADMINISTRATOR ▪ ADG_MOBILE_DEVELOPER
IBE_ADMIN	WELCOME	▪ IBE_ADMINISTRATOR
MOBADM	MOBADM	▪ MOBILE_ADMIN ▪ SYSTEM_ADMINISTRATOR
MOBILEADM	WELCOME	▪ ASG_MOBILE_ADMINISTRAOTR ▪ SYSTEM_ADMINISTRATOR
OP_CUST_CARE_ADMIN	OP_CUST_CARE_ADMIN	▪ OP_CUST_CARE_ADMIN
OP_SYSADMIN	OP_SYSADMIN	▪ OP_SYSADMIN
WIZARD	WELCOME	▪ AZ_ISETUP ▪ APPLICATIONS FINANCIALS ▪ APPLICATION IMPLEMENTATION

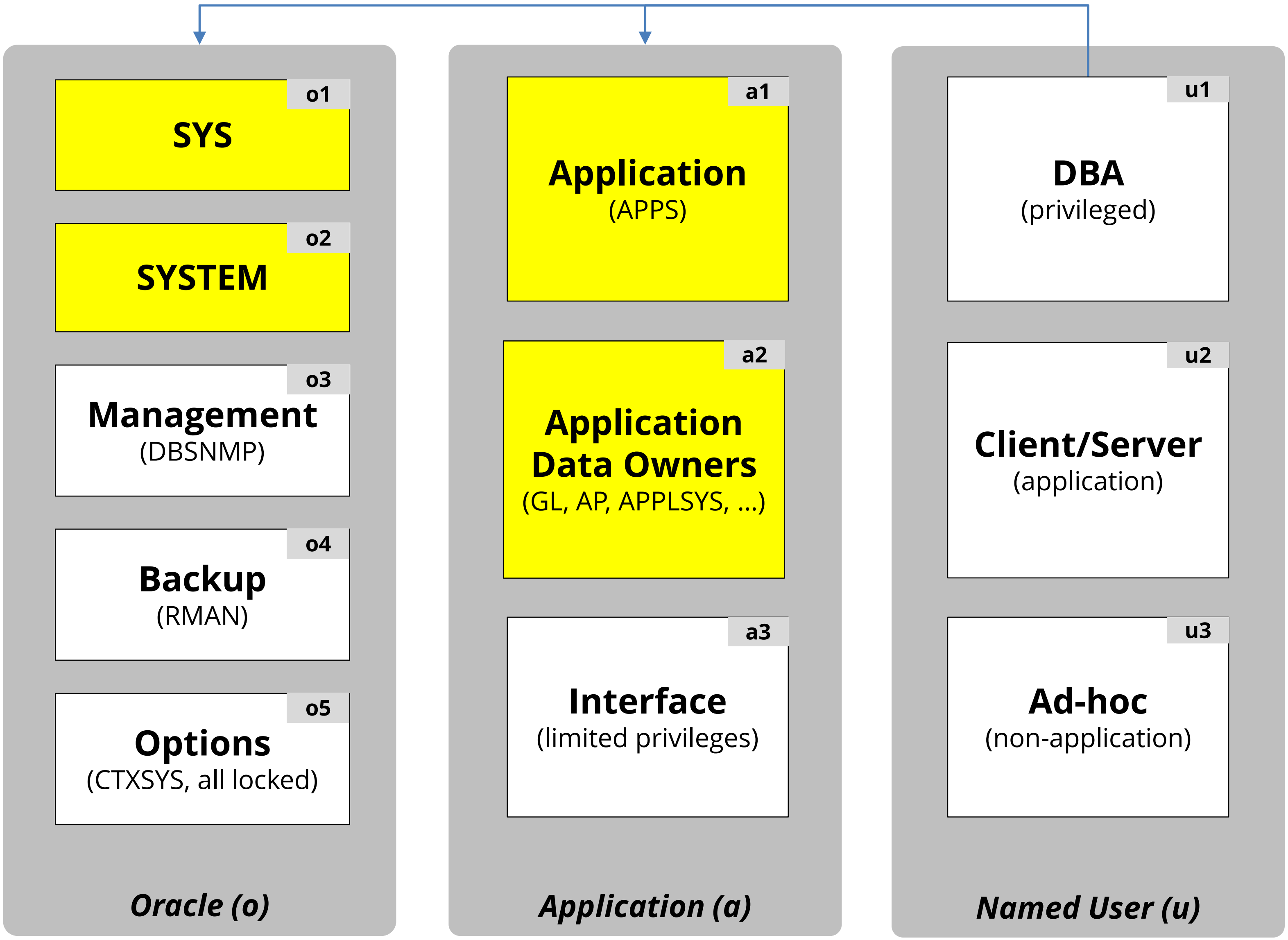
Seeded Generic Accounts

Control	▪ **End-date** per best practices ▪ Change password to random string
Log & Monitor	▪ Implement auditing for all usage or access *[Framework]* ▪ Alert on any attempt to access
Audit	▪ Review usage of accounts for external access (DMZ) ▪ Check end-date and last use ▪ Check last password change date ▪ Check for new seeded accounts after any major patches or upgrades

Generic
Privileged
Accounts

DATABASE

Integrigy Database Account Classification (Oracle)



o1 SYS

o2 SYSTEM

o3 Management (DBSNMP)

o4 Backup (RMAN)

o5 Options (CTXSYS, all locked)

Oracle (o)

a1 Application (APPS)

a2 Application Data Owners (GL, AP, APPLSYS, ...)

a3 Interface (limited privileges)

Application (a)

u1 DBA (privileged)

u2 Client/Server (application)

u3 Ad-hoc (non-application)

Named User (u)

Oracle EBS Database Accounts

Oracle Database	**SYS**	▪ Owner of database ▪ Must be used for some operations
	SYSTEM	▪ Generic DBA account ▪ Must be used for EBS adpatch & adadmin
Oracle E-Business Suite	**APPS**	▪ Application account for all access – users, concurrent manager, and maintenance ▪ Must be used for maintenance ▪ APPS can access all data, including encrypted sensitive data
	APPLSYS	▪ Same password as APPS ▪ Should not be directly accessed
	Schema Owners (GL, AP, etc.)	▪ 250+ schema accounts ▪ All active and have default passwords ▪ Significant privileges

Oracle Database Account Passwords

Database Account	Default Password	Exists in Database %	Default Password %
SYS	CHANGE_ON_INSTALL	100%	3%
SYSTEM	MANAGER	100%	4%
DBSNMP	**DBSNMP**	**99%**	**52%**
OUTLN	**OUTLN**	**98%**	**43%**
MDSYS	MDSYS	77%	18%
ORDPLUGINS	ORDPLUGINS	77%	16%
ORDSYS	ORDSYS	77%	16%
XDB	CHANGE_ON_INSTALL	75%	15%
DIP	DIP	63%	19%
WMSYS	WMSYS	63%	12%
CTXSYS	**CTXSYS**	**54%**	**32%**

* Sample of 120 production databases

SYS Database Account

Control	▪ **Control password** with password vault *[Vault]* ▪ SYS should only be used for a few specific functions – named DBA accounts for all other database management activities ▪ Change ticket required for use in production ▪ Change password when cloning
Log & Monitor	▪ Implement auditing for logins, key security and change management events *[Framework]* ▪ AUDIT_SYS_OPERATIONS = TRUE ▪ Reconcile usage to change tickets
Audit	▪ Check last password change date ▪ Interview to determine how password is controlled

SYSTEM Database Account

Control	▪ **Control password** with password vault *[Vault]* ▪ **SYSTEM should only be used for EBS administration and patching** – named DBA accounts for all other database management functions ▪ Change password when cloning
Log & Monitor	▪ Implement auditing for logins, key security and change management events *[Framework]* ▪ Reconcile usage to change tickets
Audit	▪ Check last password change date ▪ Interview to determine how password is controlled

APPS Database Account

Control	▪ **Manage password** with password vault *[Vault]* ▪ **APPS should only be used for EBS administration and patching** – named DBA accounts for all other database management functions ▪ Use custom database profile with no lockout but strong password controls ▪ Change password when cloning
Log & Monitor	▪ Implement auditing for logins, key security and change management events *[Framework]* ▪ Monitor closely for failed logins *[Framework]* ▪ **Attempt to reconcile** DBA usage to change tickets
Audit	▪ Check last password change date ▪ Review logins to see who else is using ▪ Interview to determine how password is controlled

EBS Schema Database Accounts

Control	▪ **Change all passwords using FNDCPASS and throw the password away** ▪ Control the APPLSYS account same as APPS ▪ R12 = lock all the schema accounts using the utility AFPASSWD –L ▪ Change passwords when cloning
Log & Monitor	▪ Implement auditing for all logins, key security and change management events *[Framework]* ▪ Alert on any logins to the schema accounts ▪ Alert on any logins to APPLSYS
Audit	▪ Check last password change date ▪ Interview to determine how password is controlled

Database Accounts – General IT Controls

Database Password Profiles

- Create organizational database password profiles for service and named users
- Assign these profiles to all accounts
- Never use the DEFAULT profile – routinely check for any accounts assigned
- Use custom password verify function that meets organizational password policy

Database Accounts – General IT Controls

Default Database Passwords

- Routinely check for default database passwords
- Check after all database upgrades and after major EBS patches
- Use a tool like AppSentry rather than DBA_USER_WITH_DEFPWD that checks all accounts for many passwords

Generic
Privileged
Accounts

OPERATING SYSTEM

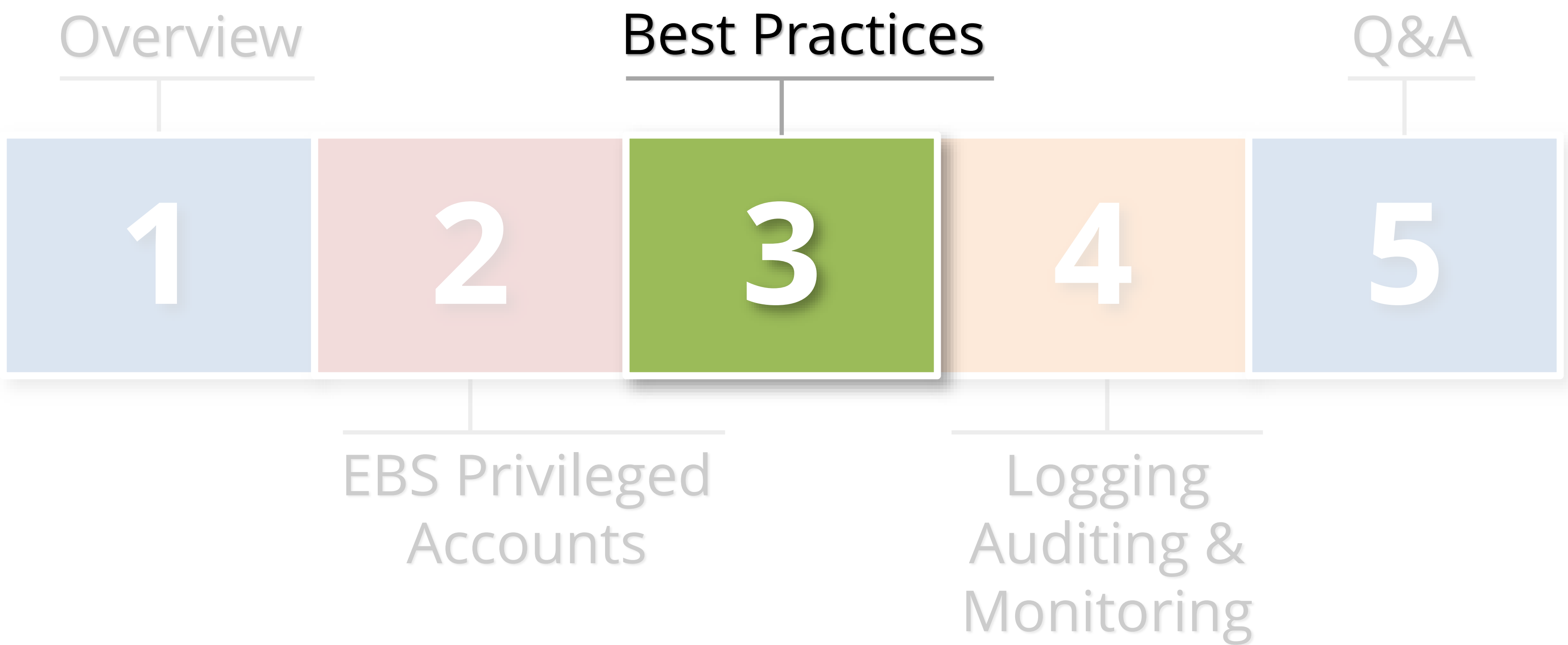
oracle and applmgr Operating System Accounts

Control	▪ **Control password** with password vault *[Vault]* ▪ **Prevent direct logins to oracle and applmgr** ▪ DBAs should have named OS accounts ▪ Require DBAs to use to su, sudo, or PowerBroker to access oracle and applmgr accounts ▪ Enforce a chain-of-trust – named user → generic user ▪ No developer access to production server OS
Log & Monitor	▪ Implement auditing at the OS level for all user logins ▪ Use keystroke or command logging if required ▪ Alert on direct logins to oracle or applmgr
Audit	▪ Check last password change date ▪ Interview to determine how password is controlled

Operating System – General IT Controls

- **DBAs should never have root access**
  - Require segregation of duties for operating system
- **DBAs should have named OS accounts**
  - Integrate with LDAP or Active Directory for authentication and access control
- **Avoid SSH key or trust logins**
  - Limit any use of password-less logins between servers
  - Do not allow for highly privileged accounts
  - Always use passphrases

Agenda



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Best Practices to Control Privileged Accounts

- **Use a Bastion host (virtual desktop) for direct O/S and/or database access**
  - Restrict network access and/or database ACLs
  - Two-fact authentication to access
  - Use SSH Keys for appropriate O/S accounts
  - Install key logger

- **Consider Oracle Database Vault**
  - Additional license but comes with pack for E-Business Suite schemas

Control Passwords to Control Privileged Accounts

- **Change defaults and don’t use weak passwords**
  - Use a random password generator
- **Use different passwords for production**
  - Change all passwords when clone
- **No hardcoding of passwords**
  - E.g. where possible consider password vault APIs and Oracle Wallet(s)
- **Use approach of need-to-know and least privilege**
  - Separation of duties and job function
  - Minimum of EBS, Database and O/S

Control Passwords to Control Privileged Accounts

- **Periodically inventory privileged and generic accounts**
  - Ask questions, cull and document
  - Take names and assign owners

- **Control passwords per risk classification of the account**
  - Rotate, expiry, complexity, length and half-passwords
  - One size does not fit all

- **Adopt formal privileged account and password policy**
  - Train and enforce
  - Make it real

Best Practices to Control Privileged Accounts

- **Do you have a policy to change privileged password when somebody leaves?**
  - Vendors included: managed services, hosting and cloud providers
- **Does your password policy govern generic privileged accounts or does it forbid them?**
- **When was the last time audited all privileged generic accounts?**
- **What is your policy for SSH logins?**

Best Practice: Use a Password Vault

- **Vaults are purpose built solutions for enterprise password management**
  - Sophisticated security
  - Robust standard reports
  - Built to support meet compliance requirements

- **Shrink trust perimeter and increase governance of privileged accounts**
  - Add all accounts passwords except those owned by named individuals
  - All service accounts
  - All generic accounts
  - Phased implementation (controlled vs. managed)

Password Vault Recommendations

- **Add field for ticket number for password pulls**
  - Required freeform text field to start
- **Use for password expiry and rotation process**
- **Use for password creation and reset process**
- **Use for Rescue ID workflow process**
- **Log using Syslog (e.g. to Splunk)**
  - Pass ticket number for password pull

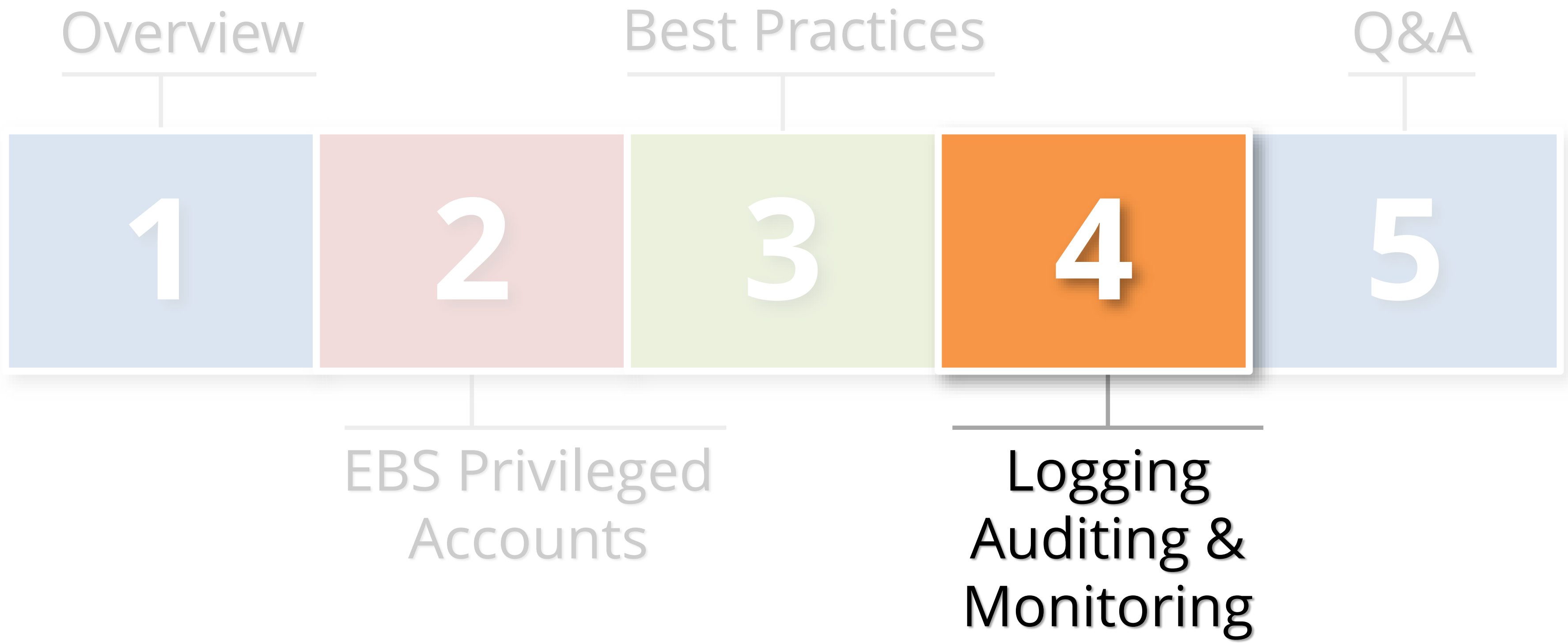
Best Practice: Access Management Policy

- **Implement an overall access management policy based on IT Security policies and compliance requirements**
  - E.g. SOX/CoBit, PCI, HIPAA, 21 CFR 11

- **Make part of overall Database security Program**
  - Access Management is only one component

- **Consider Access Management engagement**
  - Audit and recommendations

Agenda



Overview

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EBS Privileged Accounts

Logging Auditing & Monitoring

Logging and Auditing Is The Key

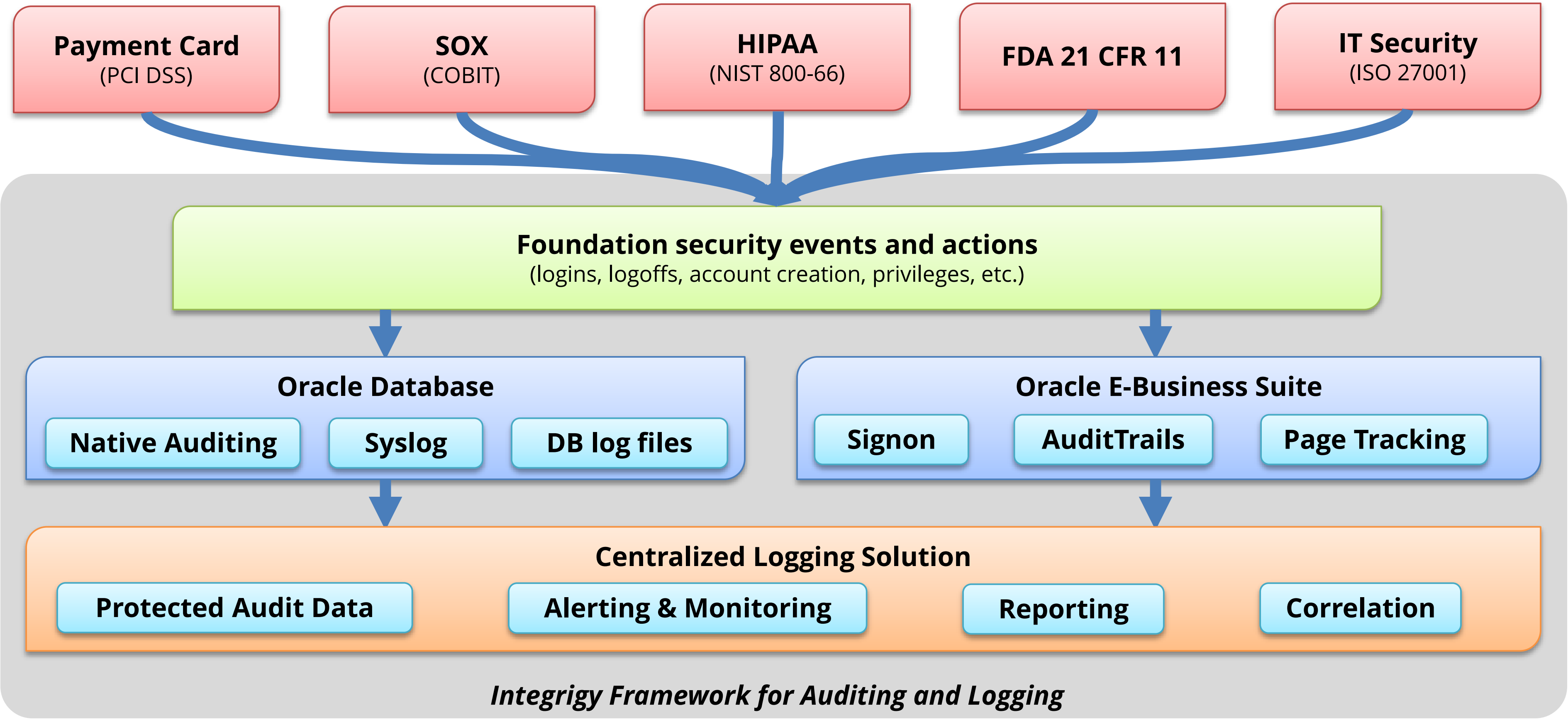
- **Access management success or failure largely based on logging and auditing**
  - No other way

- **Constantly log activity**
  - Focus on key events
  - Audit with reports
  - Alert in real-time

Auditing and Logging the Oracle E-Business Suite

- **The Oracle database and Oracle E-Business Suite offer rich log and audit functionality**
  - **Most organizations do not fully take advantage**
- **Requirements are difficult**
  - Technical, Compliance, Audit, and Security
- **Integrigy has a framework**
  - Already mapped to PCI, HIPAA, SOX and 21 CFR 11

Integrigy Framework for Auditing and Logging



Payment Card
(PCI DSS)

SOX
(COBIT)

HIPAA
(NIST 800-66)

FDA 21 CFR 11

IT Security
(ISO 27001)

Foundation security events and actions
(logins, logoffs, account creation, privileges, etc.)

Oracle Database

- Native Auditing
- Syslog
- DB log files

Oracle E-Business Suite

- Signon
- AuditTrails
- Page Tracking

Centralized Logging Solution

- Protected Audit Data
- Alerting & Monitoring
- Reporting
- Correlation

Integrigy Framework for Auditing and Logging

Foundation Security Events and Actions

The foundation of the framework is a set of key security events and actions derived from and mapped to compliance and security requirements that are critical for all organizations.

E1 - **Login**	*E8* - **Modify role**
E2 - **Logoff**	*E9* - **Grant/revoke user privileges**
E3 - **Unsuccessful login**	*E10* - **Grant/revoke role privileges**
E4 - **Modify auth mechanisms**	*E11* - **Privileged commands**
E5 - **Create user account**	*E12* - **Modify audit and logging**
E6 - **Modify user account**	*E13* - **Create, Modify or Delete object**
E7 - **Create role**	*E14* - **Modify configuration settings**

Foundation Security Events Mapping

Security Events and Actions	PCI DSS 10.2	21 CFR Part 11	SOX (COBIT)	HIPAA (NIST 800-66)	IT Security (ISO 27001)	FISMA (NIST 800-53)
E1 - Login	10.2.5	11.10(e)(d)	A12.3	164.312(c)(2)	A 10.10.1	AU-2
E2 - Logoff	10.2.5	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2

E3 - Unsuccessful login	10.2.4	11.10(e)
		11.300(d)
			DS5.5	164.312(c)(2)	A 10.10.1
					A.11.5.1
						AC-7

E4 - Modify authentication mechanisms	10.2.5	11.10(e)(d)
		11.300(b)
			DS5.5	164.312(c)(2)	A 10.10.1	AU-2

E5 – Create user account	10.2.5	11.10(e)
		11.100(a)
			DS5.5	164.312(c)(2)	A 10.10.1	AU-2

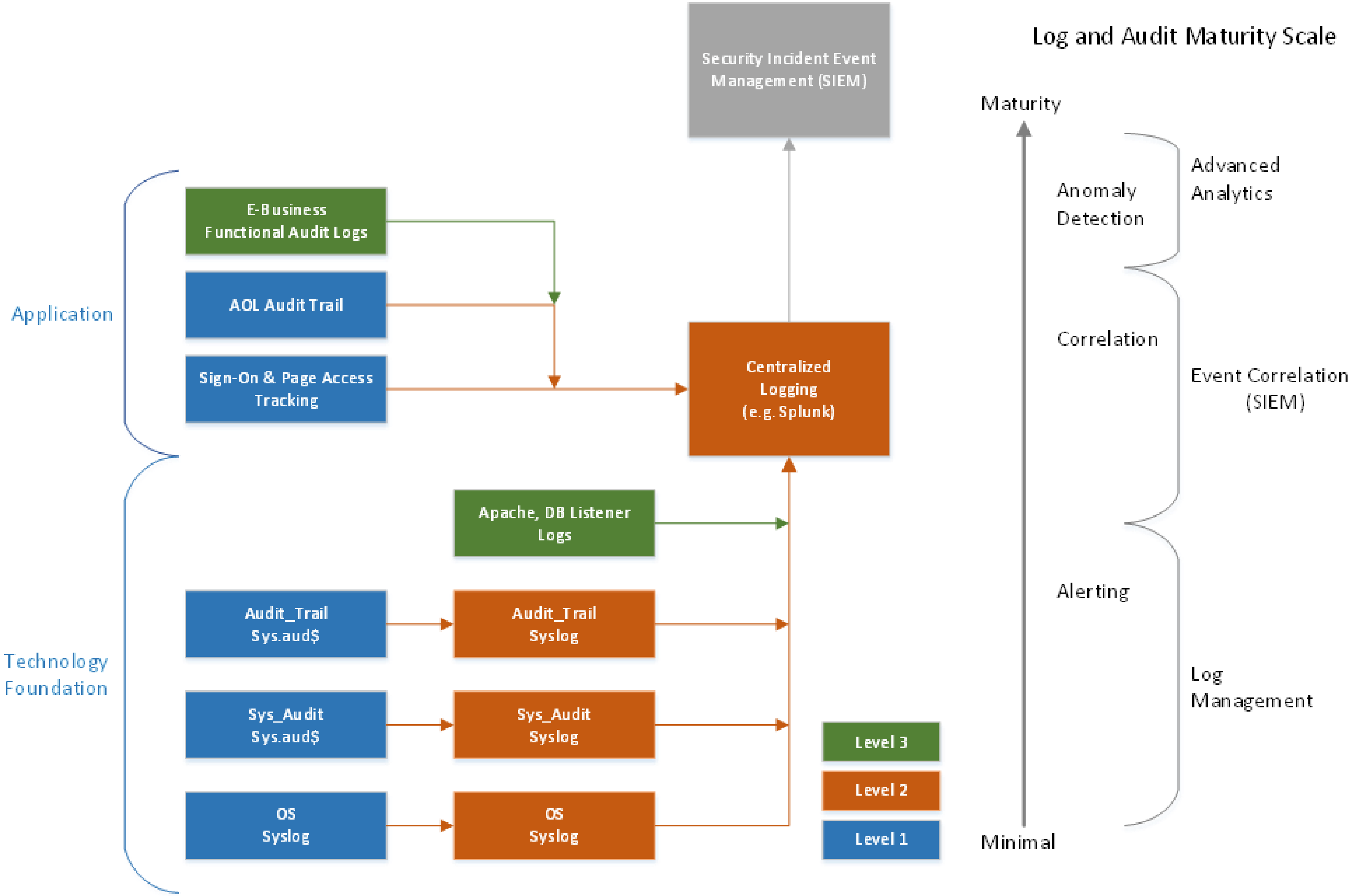
E6 - Modify user account	10.2.5	11.10(e)
		11.100(a)
			DS5.5	164.312(c)(2)	A 10.10.1	AU-2

E7 - Create role	10.2.5	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2
E8 - Modify role	10.2.5	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2
E9 - Grant/revoke user privileges	10.2.5	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2
E10 - Grant/revoke role privileges	10.2.5	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2
E11 - Privileged commands	10.2.2	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2
E12 - Modify audit and logging	10.2.6	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2 AU-9
E13 - Objects Create/Modify/Delete	10.2.7	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2 AU-14
E14 - Modify configuration settings	10.2.2	11.10(e)	DS5.5	164.312(c)(2)	A 10.10.1	AU-2

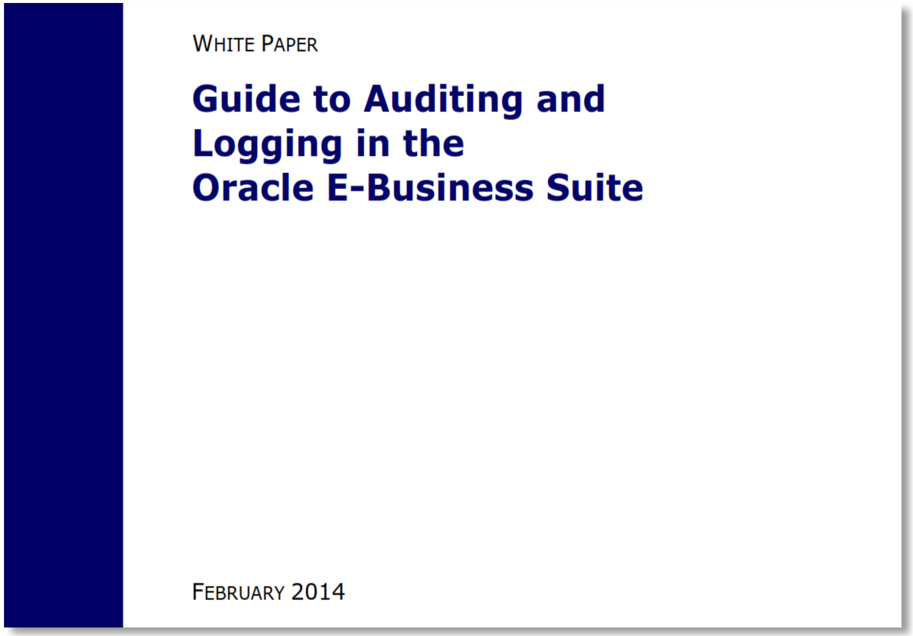
Integrigy Framework Maturity Model

Level 1	Enable **baseline auditing and logging** for application/database and implement security monitoring and auditing alerts
Level 2	Send audit and log data to a **centralized logging** solution outside the Oracle Database and E-Business Suite
Level 3	Extend logging to include **functional logging** and more complex alerting and monitoring

Logging and Auditing is the Key



Integrigy Log and Audit Framework



WHITE PAPER

Guide to Auditing and Logging in the Oracle E-Business Suite

FEBRUARY 2014

More information on Integrigy's Log and Auditing Framework is available in our Auditing and Logging whitepaper at –

www.integrigy.com/security-resources

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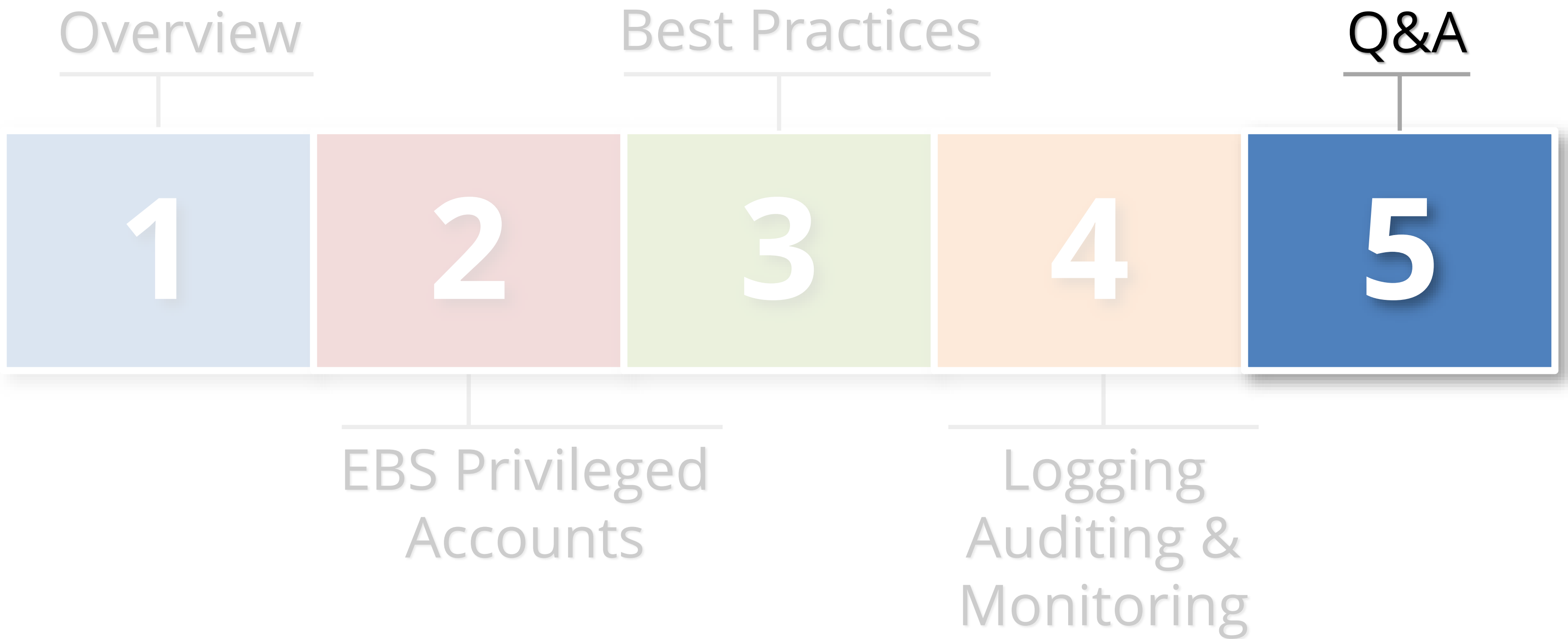

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