Oracle E-Business Suite
Trust But Verify

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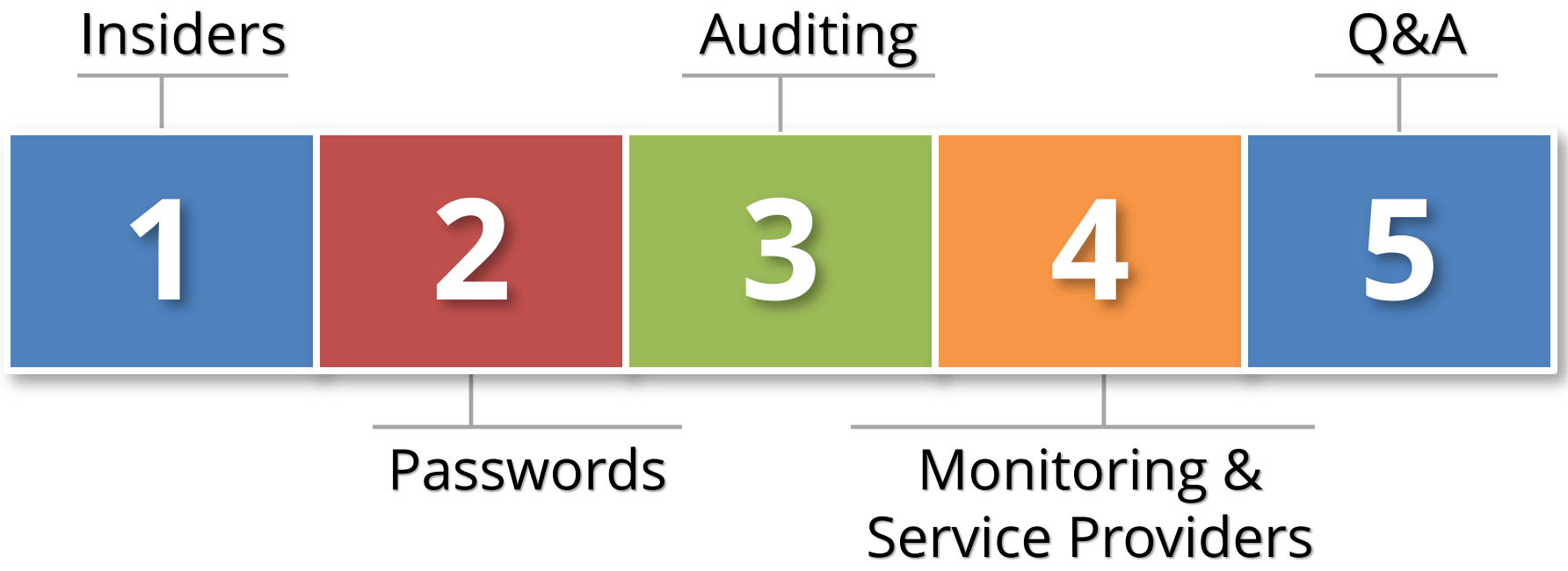
Agenda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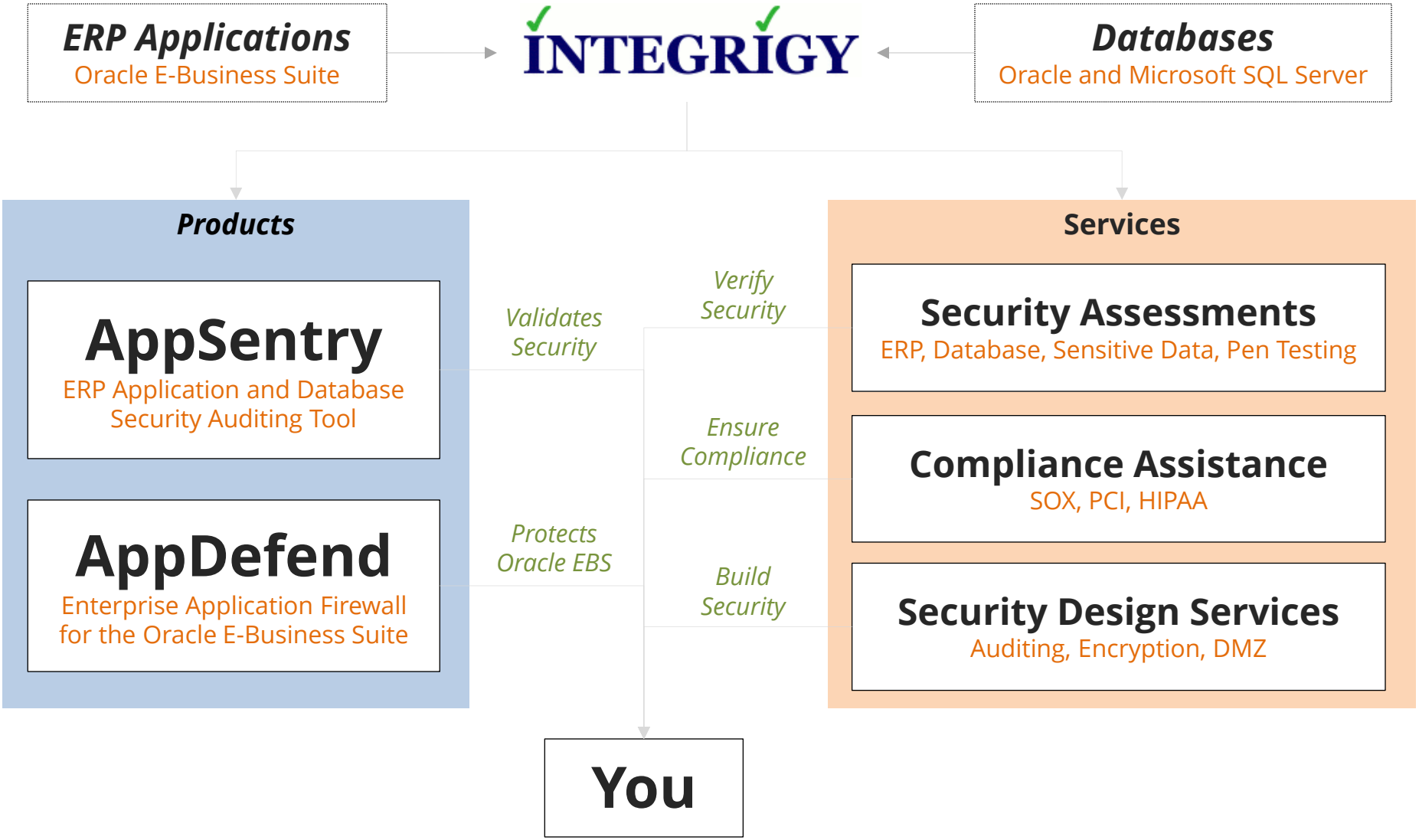
About Integrigy



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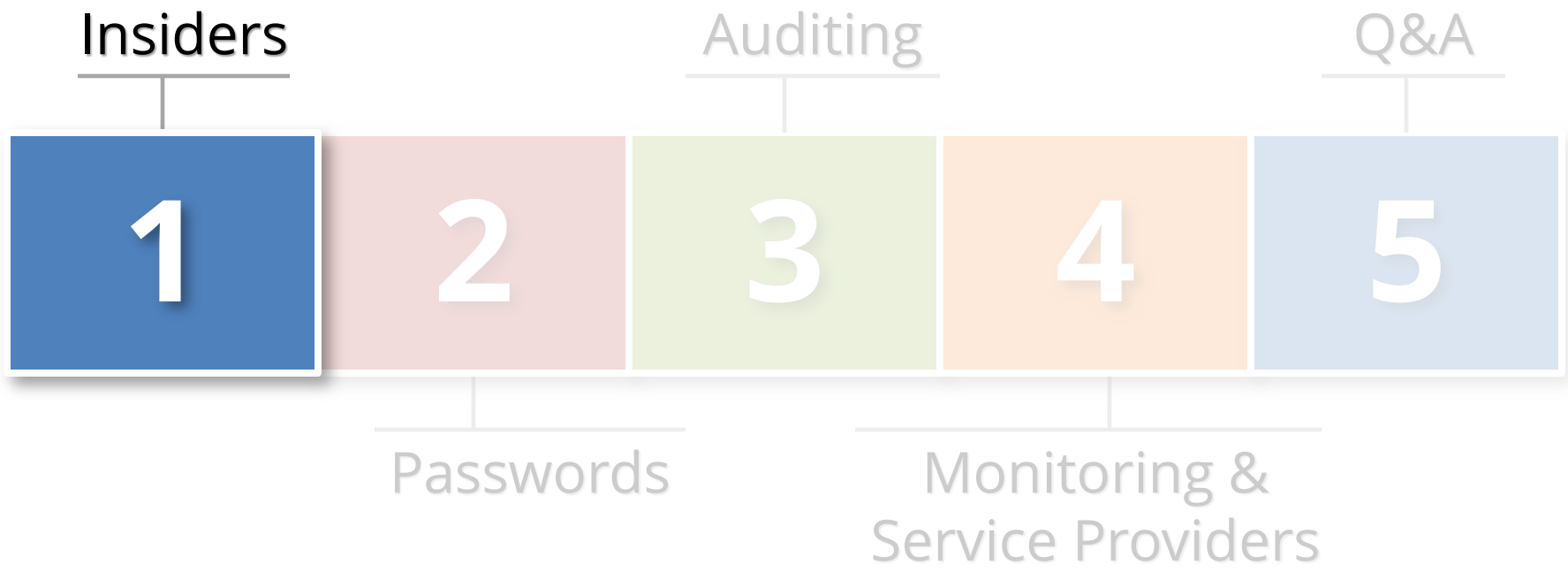
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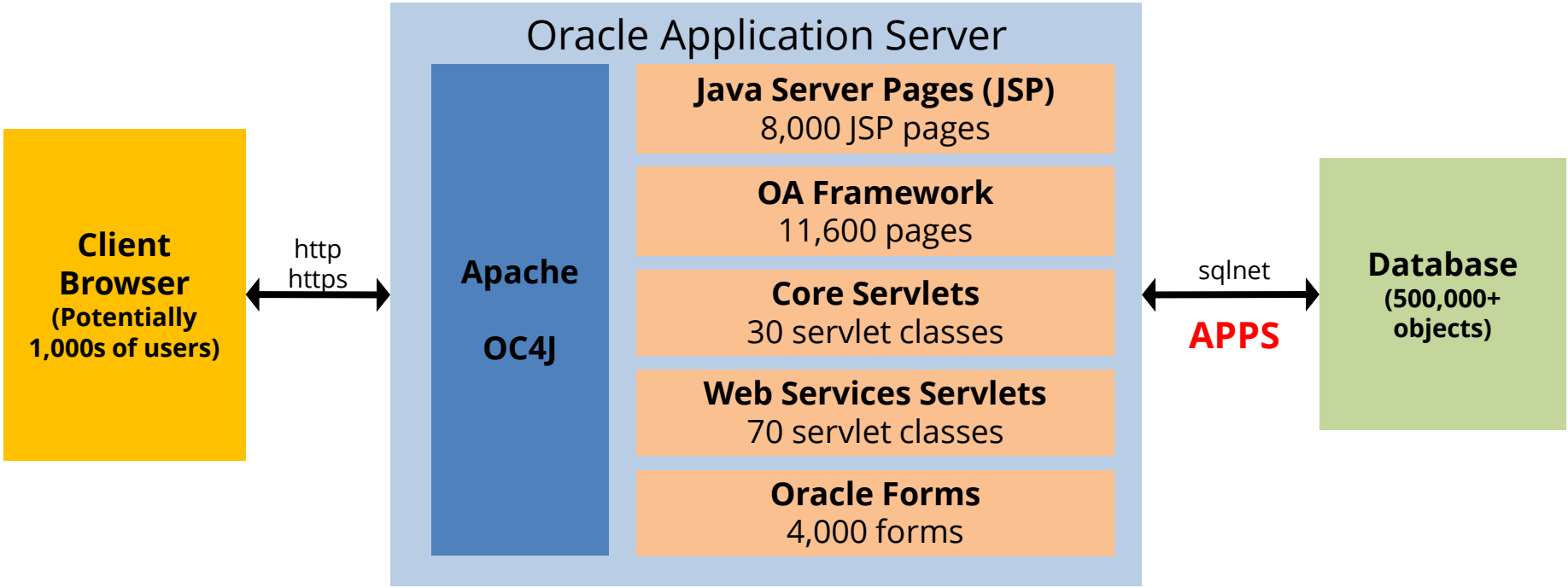
Oracle E-Business Suite



- 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

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

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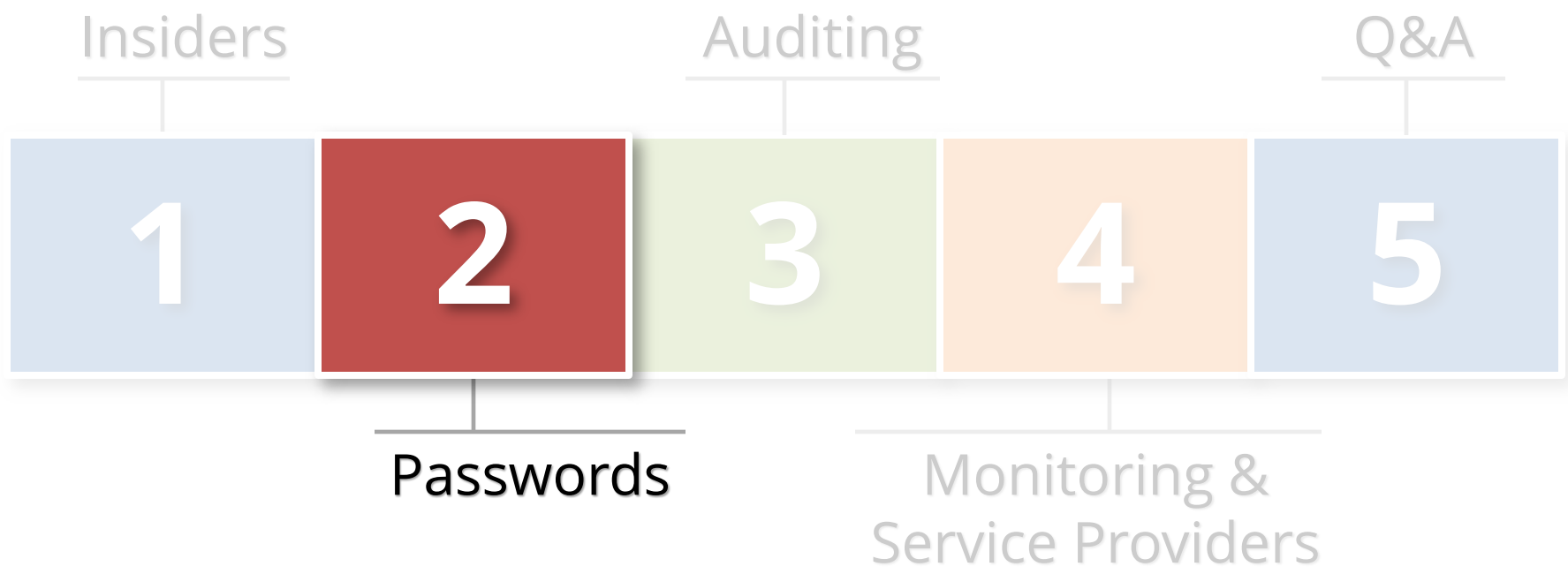
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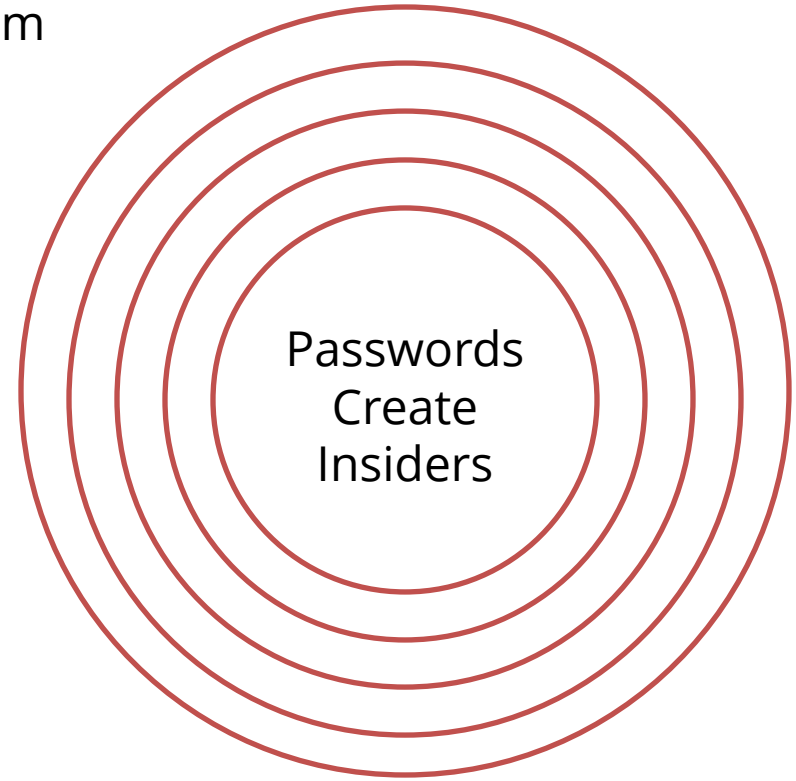
Define Trust Perimeter with Passwords

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

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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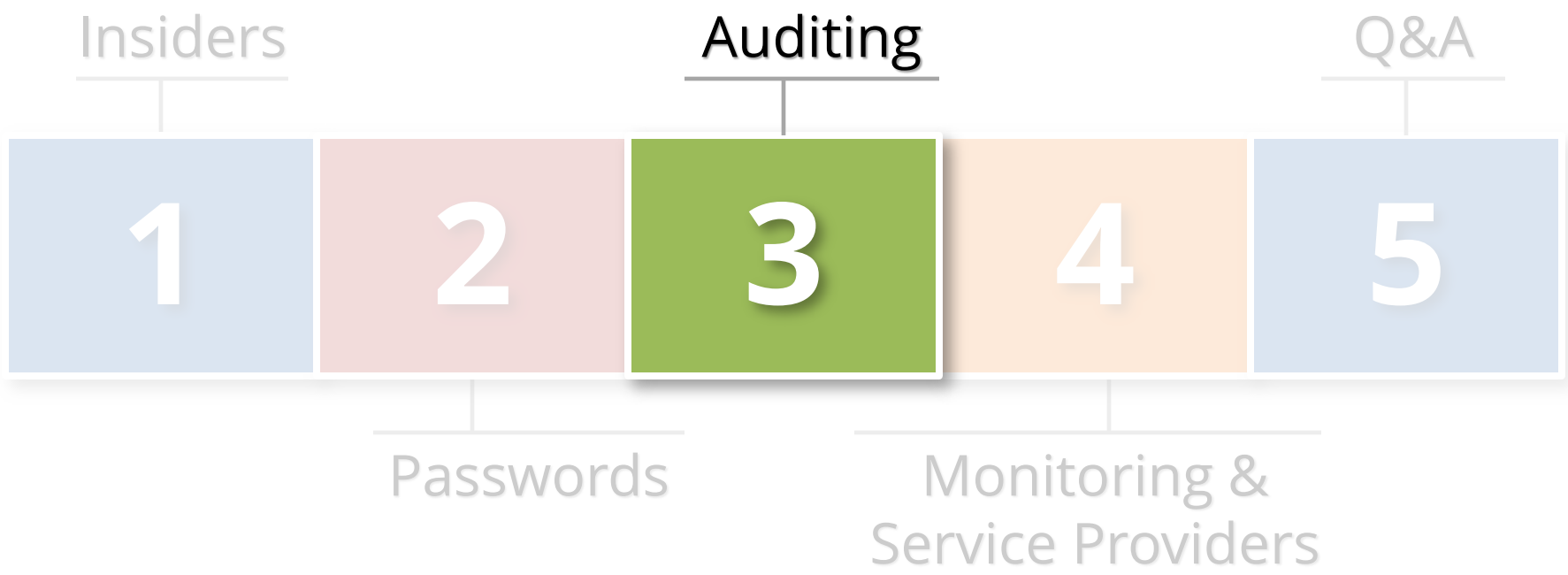
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Two Steps to Verify Trust for EBS Insiders

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?

Credit Card Data	`iby_security_segments (encrypted)`
	`ap_bank_accounts_all`
	`oe_order_headers_all`
	`aso_payments`
	`oks_k_headers_*`
	`oks_k_lines_*`
	`iby_trxn_summaries_all`
	`iby_credit_card`

Social Security Number
(National Identifier)
(Tax ID)
	`per_all_people_f`
	`hr_h2pi_employees`
	`ben_reporting`
	`ap_suppliers`
	`ap_suppliers_int`
	`po_vendors_obs`

Bank Account Number	`ap_checks_all`
	`ap_invoice_payments_all`
	`ap_selected_invoice_checks_all`

Protected Health Information (PHI)	Order Management Accounts Receivables Human Resources

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)

Database

File System

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**

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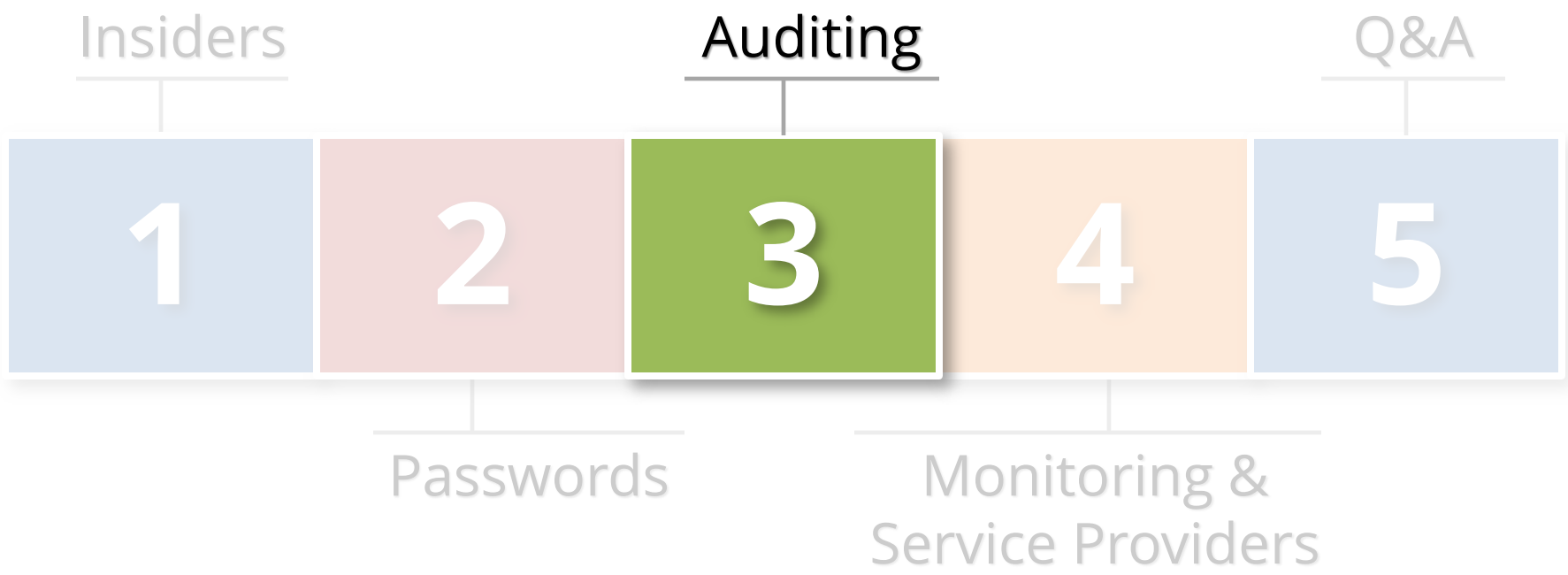
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Verify Trust for Database Access

- **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

Also Consider for Database Trust Verification

- **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

ArcSight™
An HP Company

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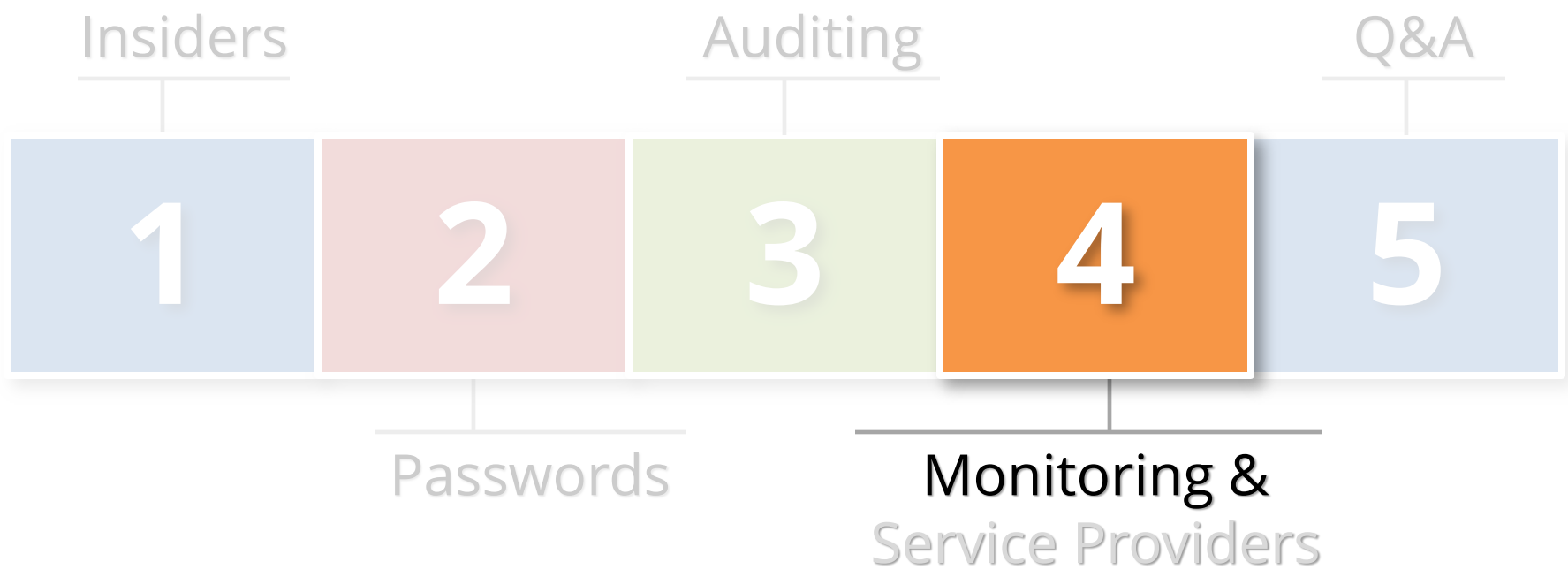
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Use Monitoring for Continuous Verification

- **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

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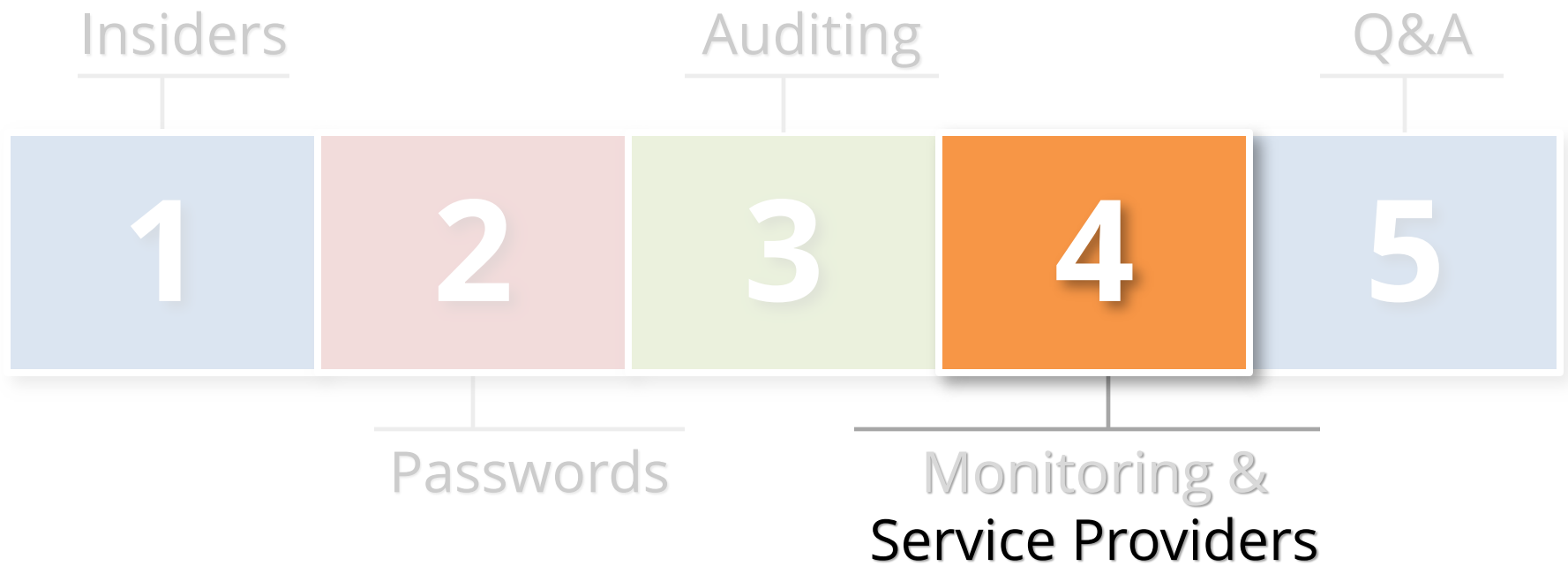
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How to Verify Trust of Service Providers

- **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

AICPA
American Institute of Certified Public Accountants

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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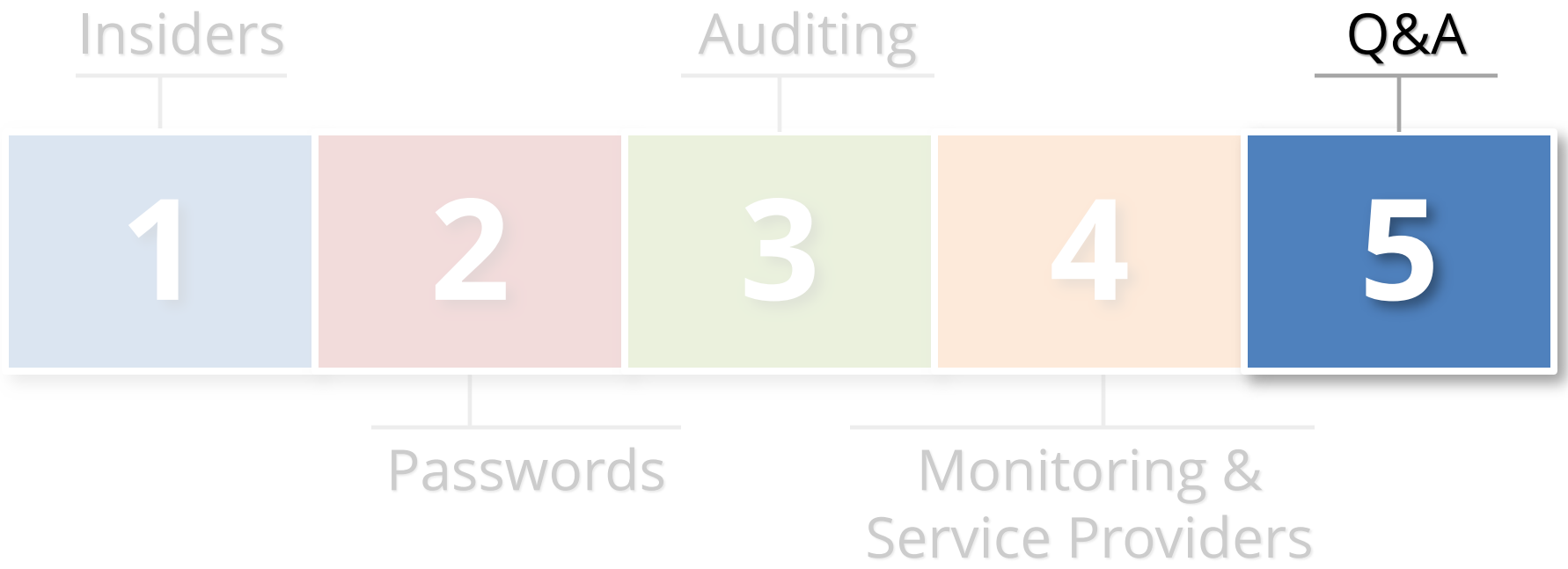
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Trust But Verify Summary

- **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**
  - *Security, Audit and Control Features, Oracle E-Business Suite, A Technical and Risk Management Guide 3rd Edition*, ISACA, ISBN 978-1604201062
  - *Oracle E-Business Suite Controls: Application Security Best Practices*, Jeff T. Hare, ISBN 978-0557193134
  - *Security, Audit and Control Features, Oracle Database 3rd Edition*, ISACA, ISBN 978-1604201185
  - *SOC 2 Reporting on Controls at a Service Organization*, AICPA, ISBN 978-1-93735-060-04

More can be found here: http://www.integrigy.com/security-resources

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