Penetration Testing

How Government Can Achieve Better Outcomes

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Compliance, Protection & Business Confidence

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Penetration Testing

Penetration Testing

- is a series of activities with the objective to determine current technical security posture
- includes testing of effectiveness of protective controls which can be used to [6,7]:
  - deduce effectiveness of detective & responsive controls
  - identify opportunities for improvement in information security governance (in support of ISM/S)
- is one security assessment method

Why?

Because

"Foolproof systems don't take into account the ingenuity of fools." — Gene Brown.

Agenda

- Effective Outcomes:
  - Dependencies
  - Getting the Balance Right
    - Balance - Making Informed Decisions
    - Depth of Testing vs Time
  - Cloud & Regulation - AU Govt
  - Pen Testing – The Broader Picture
  - Conclusions

Effectiveness of Outcomes

Dependent on:

Limitations

- Point in time
- Environmental (test/dev/prod)
- Negative testing (only proves the presence of flaws)
- Funding is finite
- Business Continuity
- Resources to remediate
- Abused as check box testing (compliance)

Constraints

- Scope
- Time
- Budget

Capability

- Methodology/approach
- Experience
- Skill
- Tools

Deliverable

- Ease of use
- Accuracy of findings (no false positives)
- Ability to articulate technical & business risk
- Technical findings should include precise actions to remediate
- Anatomy of attack should incl all details to reproduce the exploit
- Root cause analysis (fix the cause not symptom)
- Exec Summary with adequate info for C Level
- Threat/Risk centric not system centric

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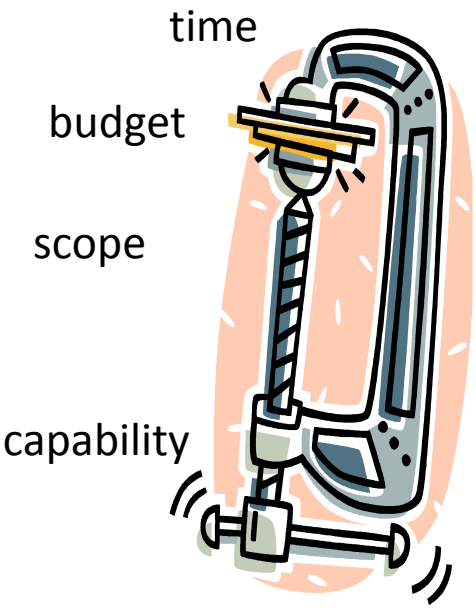
Where is the Squeeze?

- Time
- Budget
- Scope
- Capability



Implication on Outcome?

A Good Outcome?

No issues!

A Good Outcome?

Client side attack

Input validation

Click jacking

Remote control

Trojan

Buffer overflow

File upload

Man in the middle

User Enumeration

Cookie hijacking

SQL injection

A Good Outcome?

It's Up to You

The outcome is a function of the inputs

Before Testing

- Determine what it is that you are protecting
- Determine implication of a breach
- Know your data:
  - Where is it?
  - What is it?
- Risk Assessment – define depth and breadth of scope

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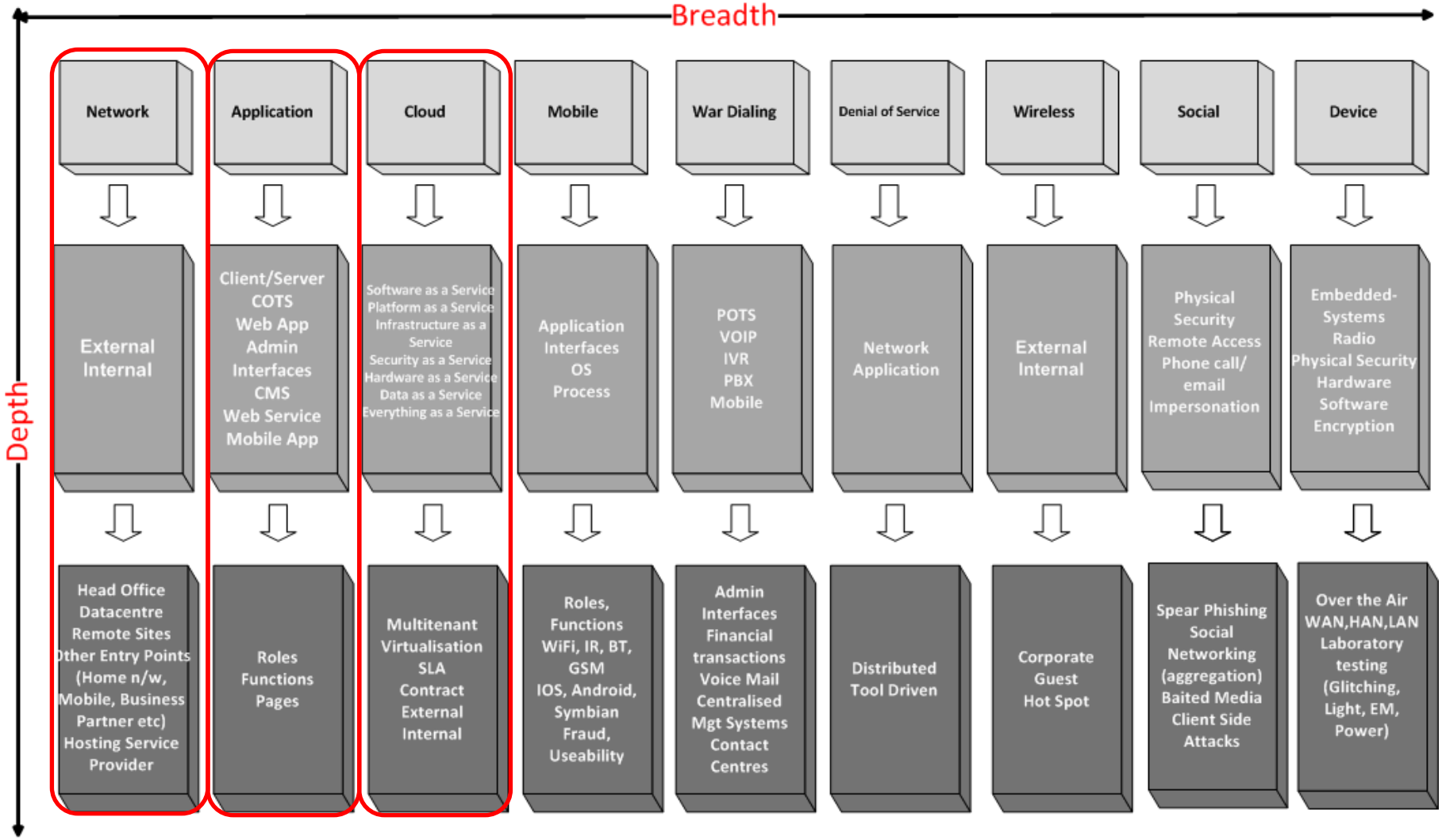
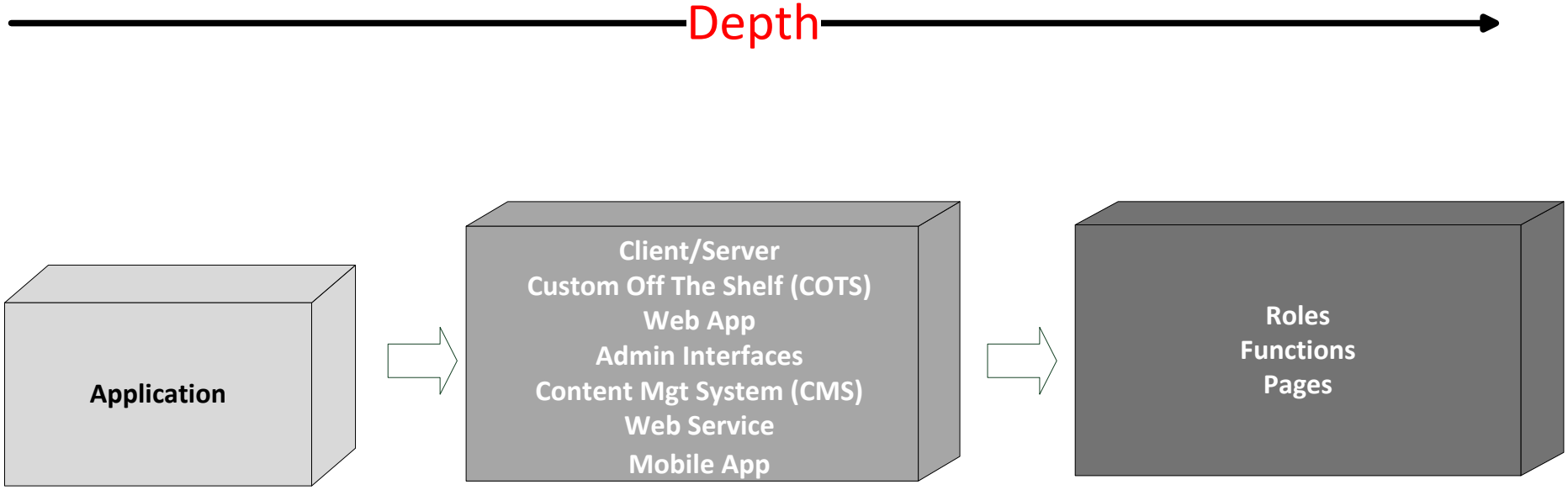
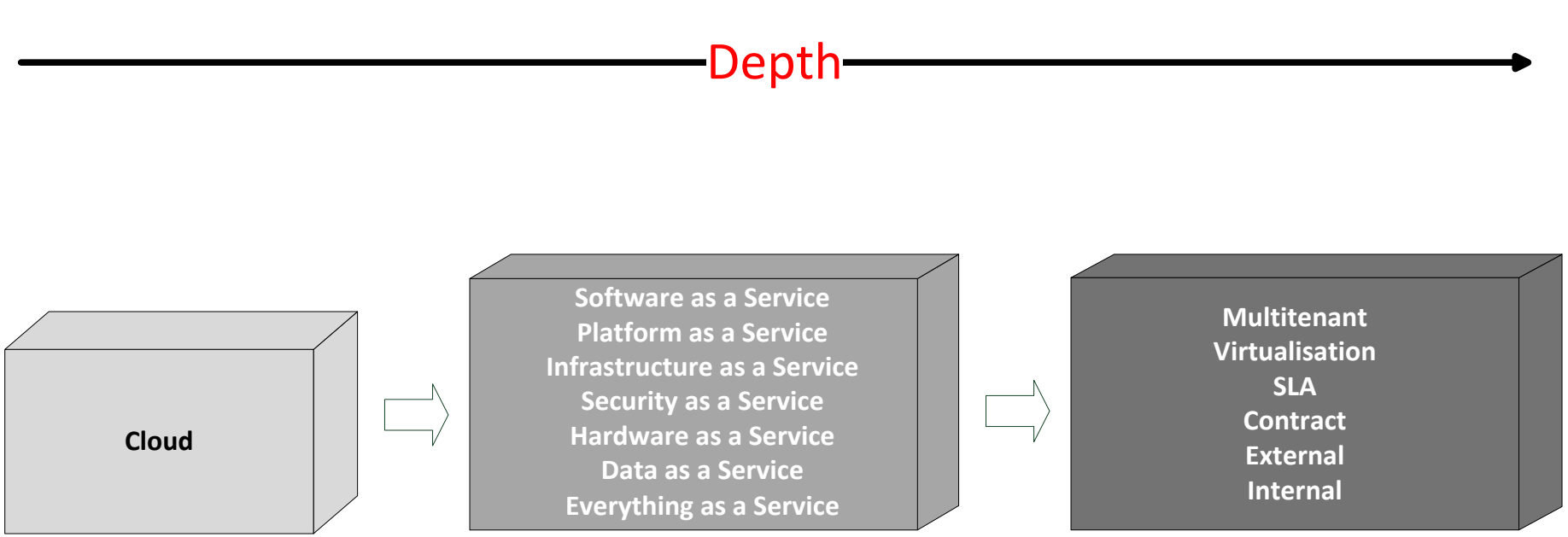
Breadth & Depth of Scope



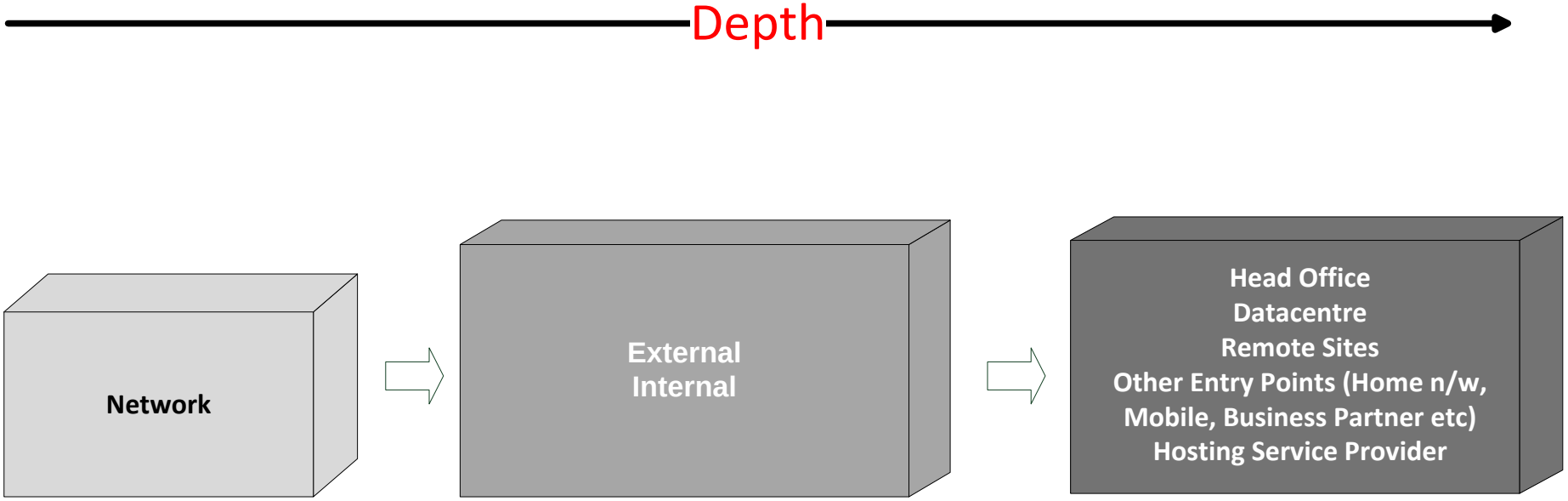
Breadth & Depth of Scope



Breadth & Depth of Scope



Breadth & Depth of Scope



Capability

Methodology → **DISCIPLINES:**
Network
Application
Social Engineering
Advanced Persistent Threat
Cloud
Mobile
Wireless

Experience → **MATURITY:**
Heritage
Track Record
Research Lab
Vulnerability
Analysis

Skill → **COMBINATION:**
Fundamentals (Network, Operating System, Application)
Intuition
Process
Finesse & Accuracy

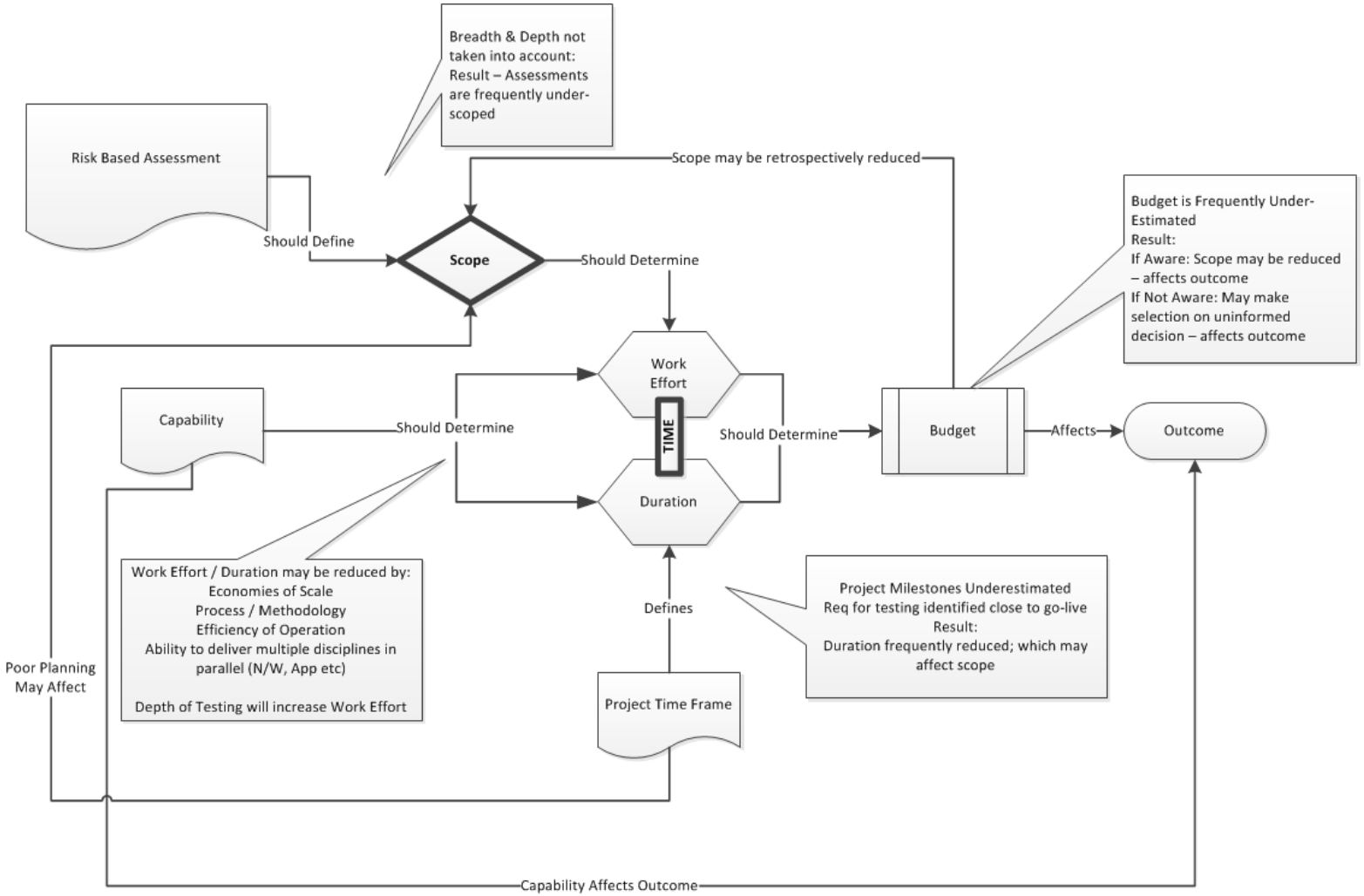
Tools → **SUITE:**
Open Source (various)
Commercial (various)
Custom Written (various)
Custom Written Exploit Code

Me

Time & Budget

- Risk Assessment should define scope
- Budget buys you time
- Time dependent on scope (breadth & depth) and capability
- An underestimated budget will impact:
  - Time
  - Scope
  - Capability
- Outcome is affected

Time & Budget



Interdependencies, aligned with commonly accepted methodologies: PRINCE2 and PMBOK

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Depth of Testing vs Time

- Short timeframe – limited expectation:
  - Run scan tools
  - High-level research specialised tools and techniques
  - Execute and validate findings
  - Write report – some findings might be generic without detailed technology specific fixes
- Reasonable Timeframe – Value oriented outcome
  - Do all above
  - Familiarise with new technology
  - Download and install software and look for bugs or potential mis-configuration options that can be set by user
  - Write custom tools and exploit code
  - Write detailed report with technology specific recommendations that can be implemented without the customer having to do any additional research

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Cloud & Regulation – AU Govt

- WoG policy position on Cloud Computing: “Agencies may choose cloud-based service where they demonstrate value for money and adequate security”[1]
- … take all reasonable steps to monitor, review and audit agency information security effectiveness, including assigning appropriate security roles and engaging internal and/or external auditors and specialist organisations where required [2]
- … have an obligation to protect the personal information that they hold from loss or misuse and unauthorised access, modification or disclosure [5]
- DSD recommends against outsourcing information technology services and functions outside of Australia, unless agencies are dealing with data that is publicly available.[4]
- Applicability of the Protective Security Policy [3]

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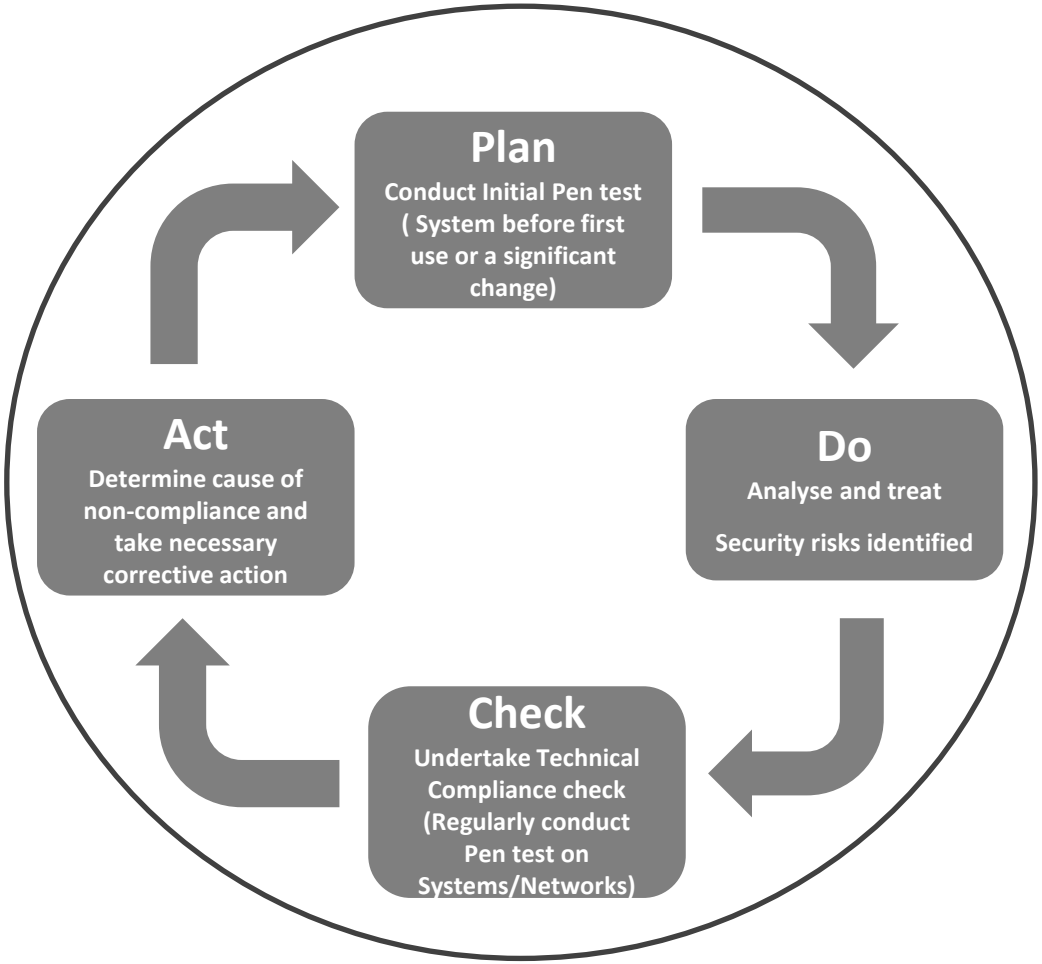
Where Does Pentesting Fit In?

Information Security Monitoring

Requirements from Standards and Regulatory Frameworks

AUS Gov - ISM
ISO 27001/2
PCI DSS



Compliance with security standards and regulatory requirements thereby improving the Security Posture

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Conclusion

- Know your data; think data centric not system centric
- Know what you need to test – Risk Assessment to define scope
- Breadth & Depth of scope; work effort (cost) should reflect
- Due to sophistication of attacks, increased requirement for expertise; cannot rely on tools
- Make informed decisions – outcome related to inputs
- Capability a function of methodology + skill + heritage + reporting
- Quality of reporting should be evaluated (Tech+Exec); affects ability to remediate; need to be able to act on the outcome
- Comprehensive testing will cost more than a check box test
- Cloud is an extension of your organisation; risks must be evaluated and treated accordingly
- Use the pentest as an opportunity to evaluate/tune your detection + response capability

References:

[1] Australian Government Cloud Computing Strategic Direction Paper, Dept of Finance, April 2011 Version 1.
http://www.finance.gov.au/e-government/strategy-and-governance/docs/final_cloud_computing_strategy_version_1.pdf

[2] Australian Government Protective Security Policy Framework, AGD, Jan 2011, V1.2
http://www.ema.gov.au/www/agd/agd.nsf/Page/ProtectiveSecurityPolicyFramework_Contents

[3] Securing Government Business. Protective Security Guidance for Executives, AGD, June 2010
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[4] Cloud Computing Considerations. DSD, April 2011
http://www.dsd.gov.au/publications/Cloud_Computing_Security_Considerations.pdf

[5] Privacy and the Cloud – speech to Cloud Computing Conference and Expo – 9/9/2010 Office of the Privacy Commissioner.
http://www.privacy.gov.au/materials/types/download/9572/7133

[6] Western Australian Auditor General's Report. Information Systems, Report 4, June 2011.
www.audit.wa.gov.au/reports/pdfreports/report2011_04.pdf

[7] Victorian Auditor-General's Report *Security of Infrastructure Control Systems for Water and Transport,* October 2010
download.audit.vic.gov.au/files/20100610_ICT_report.pdf

[8] Analyzing the Accuracy and Time Costs of Web Application Security Scanners, Larry Suto, Feb 2010

Questions?

Thank you

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