The Piercing Index

A scoring system for assessing Cloud provider security vulnerabilities

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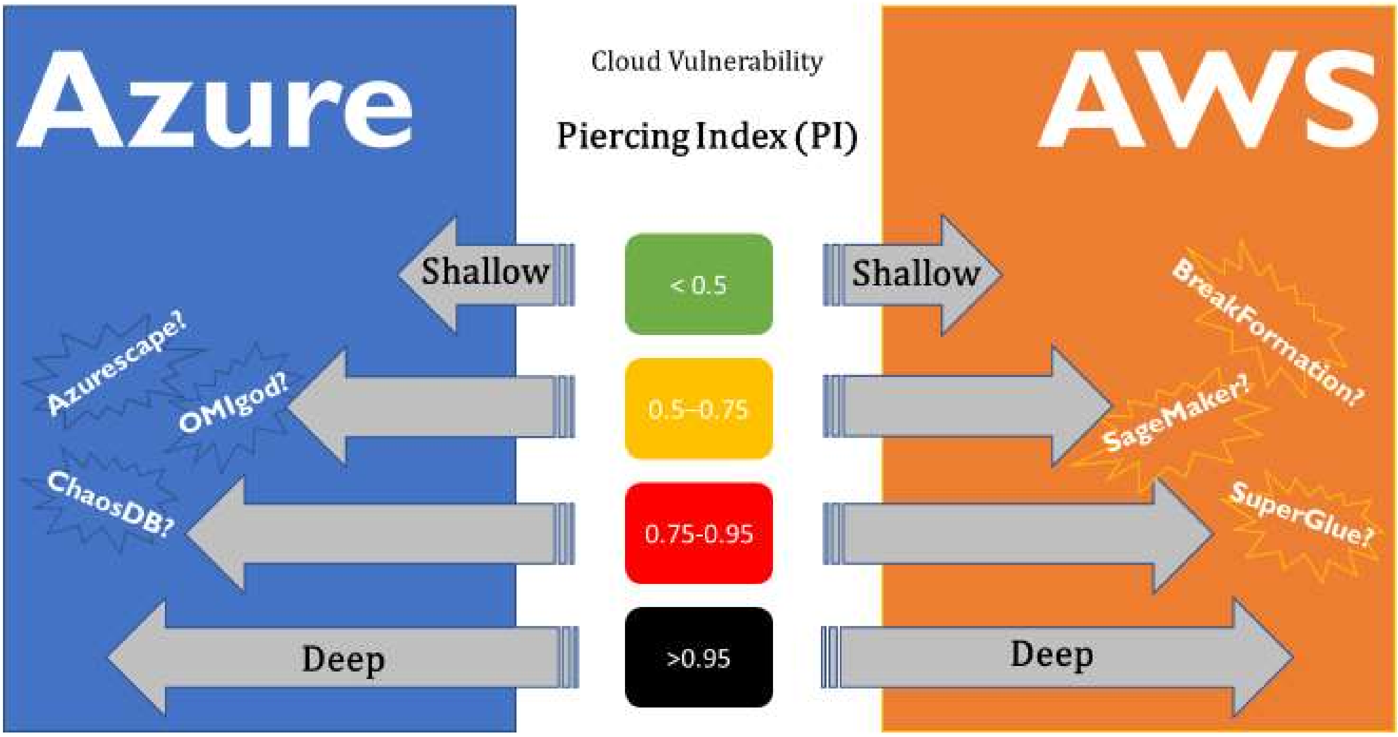
Permalink:
https://github.com/labyrinthinesecurity/cloudVulnerabilities/tree/main/PiercingIndex.pdf



How to calculate the Piercing *Index*

- Answer simple questions labelled A_1 to A_8
- If the vulnerability is X-tenant, only 4 questions must be answered: A1, A2, A7, A8. Otherwise, 6 questions must be answered: A3, A4, A5, A6, A7, A8.

$$\pi = \frac{\sum log(A_i)}{Max}$$

Max is the maximum possible score obtained by answering the questions.

Max=log(20*1.1*1.21*1.1*1.1*1.1) ≈ 1.55

Section 1: X-tenant boundary violation

Is another customer's <u>data plane</u> accessible within the vulnerable service boundary?

Yes ⇒ $A_1 = 20$

No ⇒ $A_1 = 1$

Is another customer's <u>control plane</u> accessible within the vulnerable service boundary?

Yes ⇒ $A_1 = A_1 * 1.1$

No ⇒ $A_1 = A_1 * 1$

Is the data or control plane of <u>another service</u> accessible within the vulnerable service boundary?

Yes, either the data OR the control plane ⇒ $A_2 = 1.1$

Yes, both data AND control planes ⇒ $A_2 = 1.1 * 1.1 = 1.21$

No, the vulnerability is not X-service ⇒ $A_2 = 1$

Section II: Same-tenant vulnerability

Is this same-tenant vulnerability a X-service boundary violation?

No, but it permits a X-plane boundary violation (data to control plane, control to data plane) $\Rightarrow A_3 = 1.05$

No, and it does not permit a X-plane boundary violation $\Rightarrow A_3 = 1$

Yes , it is X-service boundary violation $\Rightarrow A_3 = 1.1$

Does the vulnerability allow illegitimate <u>read access</u>?

Yes, to the control or data plane of another service $\Rightarrow A_4 = 1.05$

Yes, to the control or data plane of this service only $\Rightarrow A_4 = 1.05$

No $\Rightarrow A_4 = 1$

Does the vulnerability allow illegitimate <u>write access</u>?

Yes, to the control or data plane of another service $\Rightarrow A_5 = 1.05$

Yes, to the control or data plane of this service only $\Rightarrow A_5 = 1.05$

No $\Rightarrow A_5 = 1$

What is the maximum <u>scope elevation</u> granted by this vulnerability?

Whole tenant/organization $\Rightarrow A_6 = 8$

Subscription/account $\Rightarrow A_6 = 6$

Resource group $\Rightarrow A_6 = 1$

Section III: Additional information

What is the complexity of exploitation?

Easy (the exploit has been fully disclosed)	$\Rightarrow A_7 = 1.1$
Medium (the exploit is partially disclosed)	$\Rightarrow A_7 = 1$
Hard (the exploit is undisclosed)	$\Rightarrow A_7 = 0.9$

Does it require some intervention from a legitimate user (e.g.: by means of phishing) to trigger?

Yes	$\Rightarrow A_8 = 1$
No	$\Rightarrow A_8 = 1.1$

Example

Let's suppose an AWS X-tenant vulnerability impacts read access to the data plane of one Cloud service. ($A_1 = 20, A_2 = 1.1$).

The exploit has not been disclosed ($A_7 = 0.9$).

User intervention is not required ($A_8 = 1.1$).

$$\pi = \frac{log(20 * 1.1 * 0.9 * 1.1)}{MAX} = 0.86$$

In this example, the piercing index is 0.86. It falls into the red category (ranging between 0.75 and 0.95).