Parameter Tuning for Domain Name System Covert Channels

Evaluating Signature-Based Intrusion Detection System Evasion

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Introduction

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- Essential for internet to work.

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- But DNS is left unfiltered! Previous research indicates this is often the case. Using a **DNS covert channel**, they can send the sensitive file over DNS.
- How can we detect this covert channel? **Intrusion Detection System (IDS)**.

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- What generalized conclusions can be drawn about how IDSs detect covert channels?

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- Using an experimental setup that runs *Iodine* and *Snort*.
- Mixing *Iodine* traffic with legitimate traffic to see if *Snort* falsely detects this.
- Using established detection rules from previous research.
- Modifying *Iodine* to try to avoid these rules.

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- **EDNS(0) Parameter**: Iodine also makes use of EDNS(0), an extension to DNS.

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- **Both Parameters**: Both parameters are modified.

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- **Bandwidth**: The achieved throughput. That the tunnel is able to send data from the client to the server during the bandwidth test.

What is the result?

Metric	Scenario 1	Scenario 2.1	Scenario 2.2	Scenario 3	Scenario 4
False Negative Ratio (FNR)	0.82%	100%	50.36%	50.45%	100.0%
False Positive Ratio (FPR)	0.0%	0.0%	0.0%	0.0%	0.0%
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- *Iodine* can be modified to evade *Snort*.
- Scenario 2.1 evades *Snort* by simply using another record type.
- The bandwidth remains virtually unchanged across scenarios.

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- By modifying the Record Type parameter and the EDNS(0) parameter.
- **What generalized conclusions can be drawn about how IDSs detect covert channels?**
- How easy it is to detect *Iodine* depends heavily on the selected ruleset.

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- **Selection of Snort rules**: Use more than two rules.
- **Signature-based**: We only look at signatures, adopt statistical-based.
- **Experimental Setup**: Simplified experimental setup that doesn't include a resolver.

Thank you!

Thank you for listening!

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