University of BRISTOL

Systems & Software Security

COMSM0050

2020/2021

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Race condition: Examples
Reference Monitor

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What is a reference monitor?

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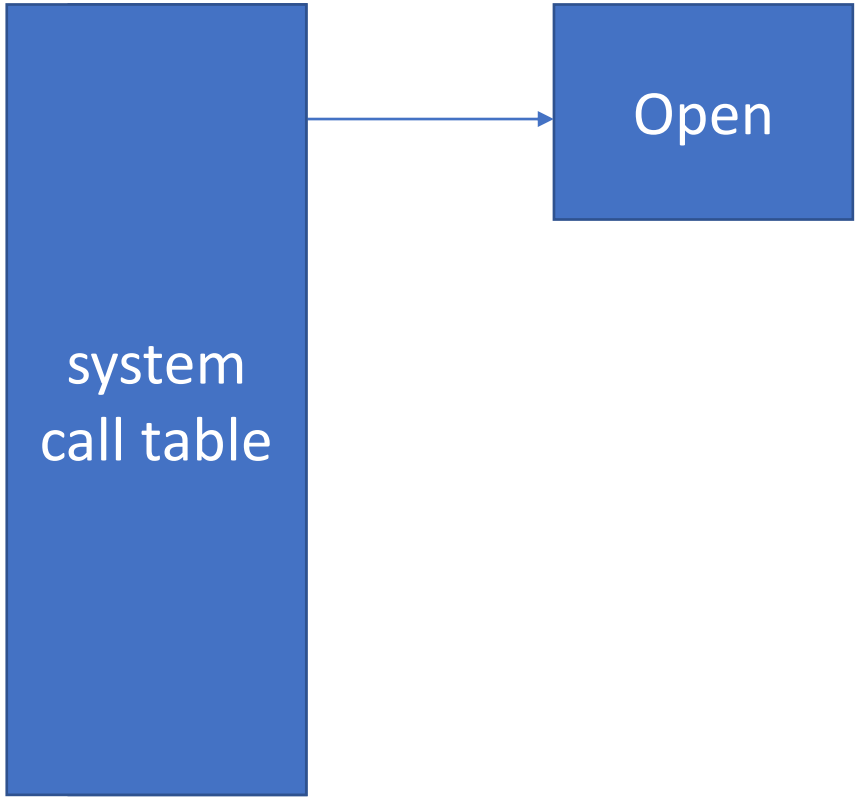
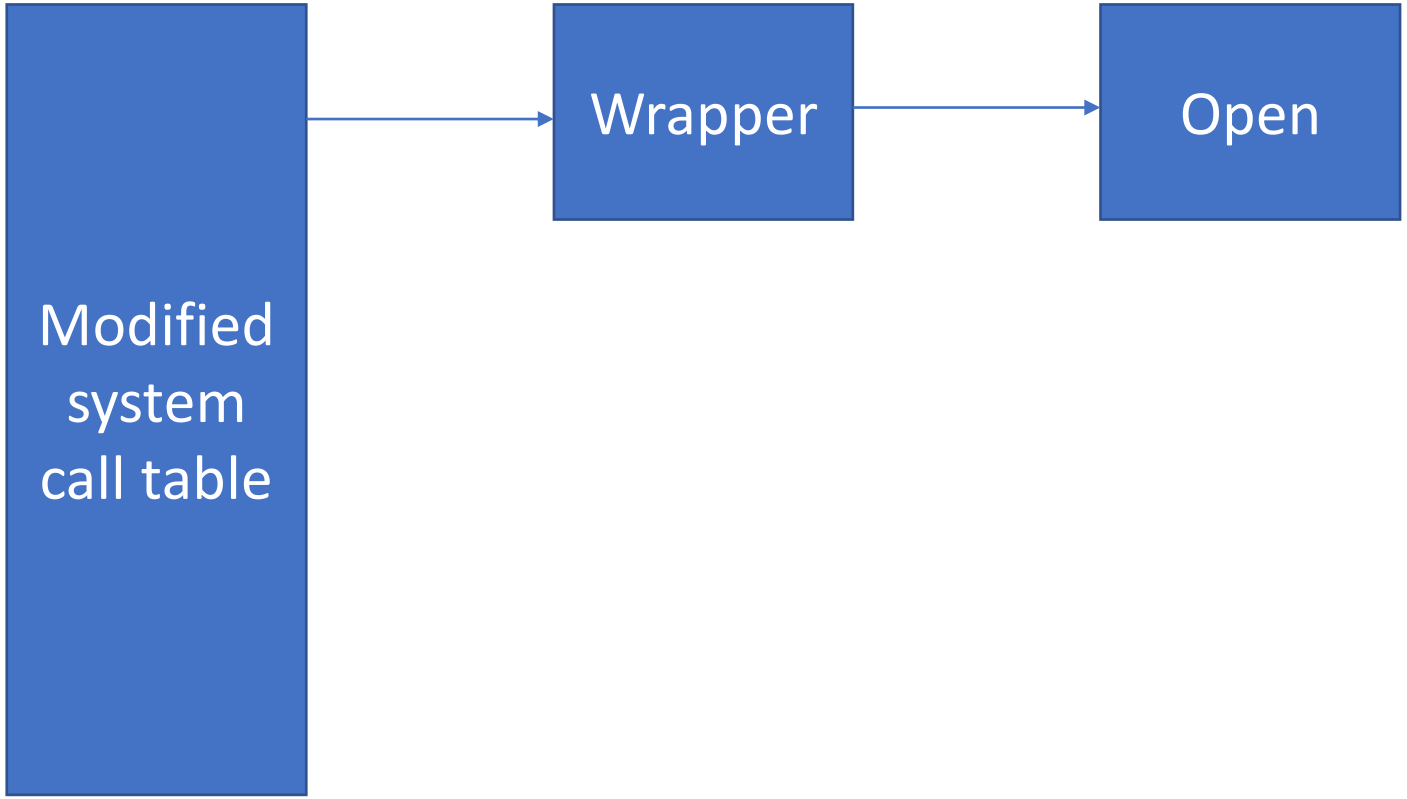
Example 2: implementing OS reference monitor

- *a **reference monitor** is a secure, always-used and fully-testable module that controls all software access to data objects or devices*

Example 2: implementing OS reference monitor



Example 2: implementing OS reference monitor



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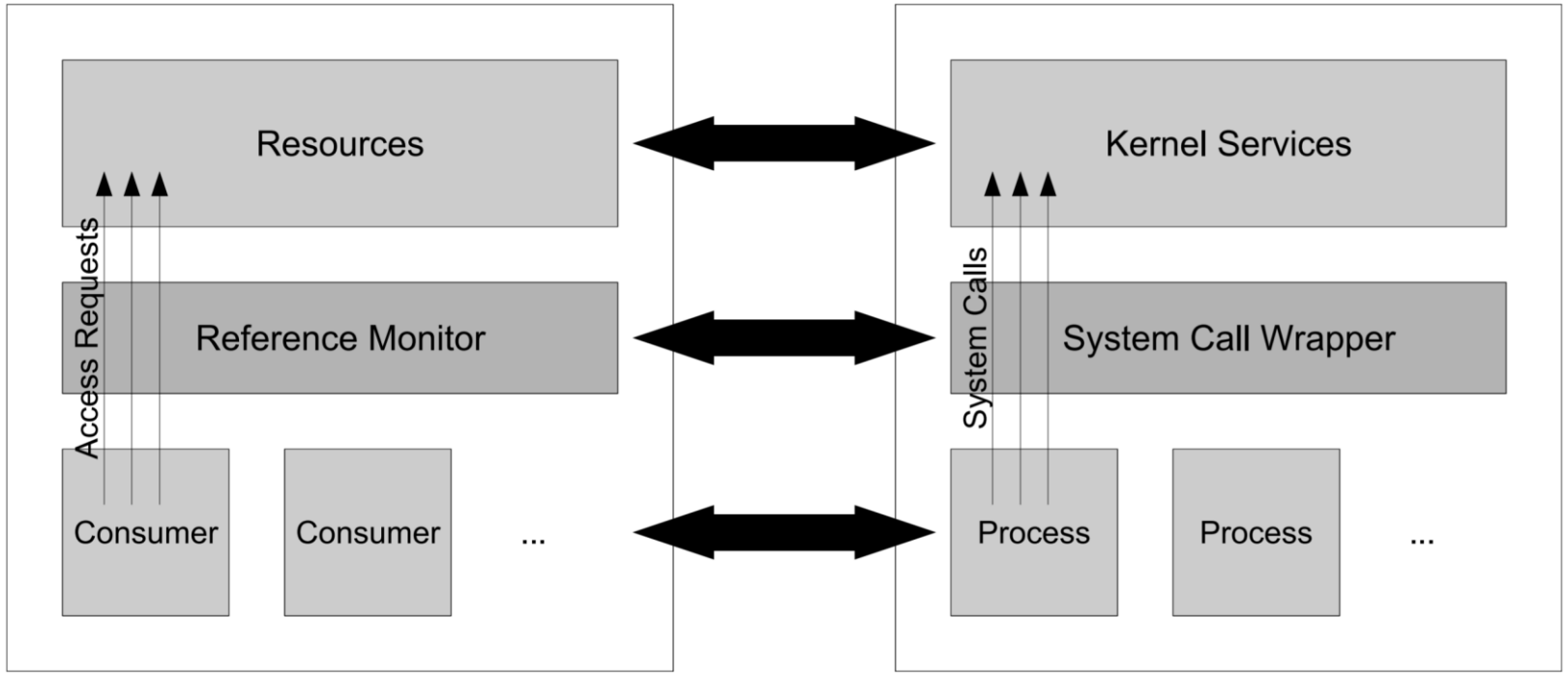

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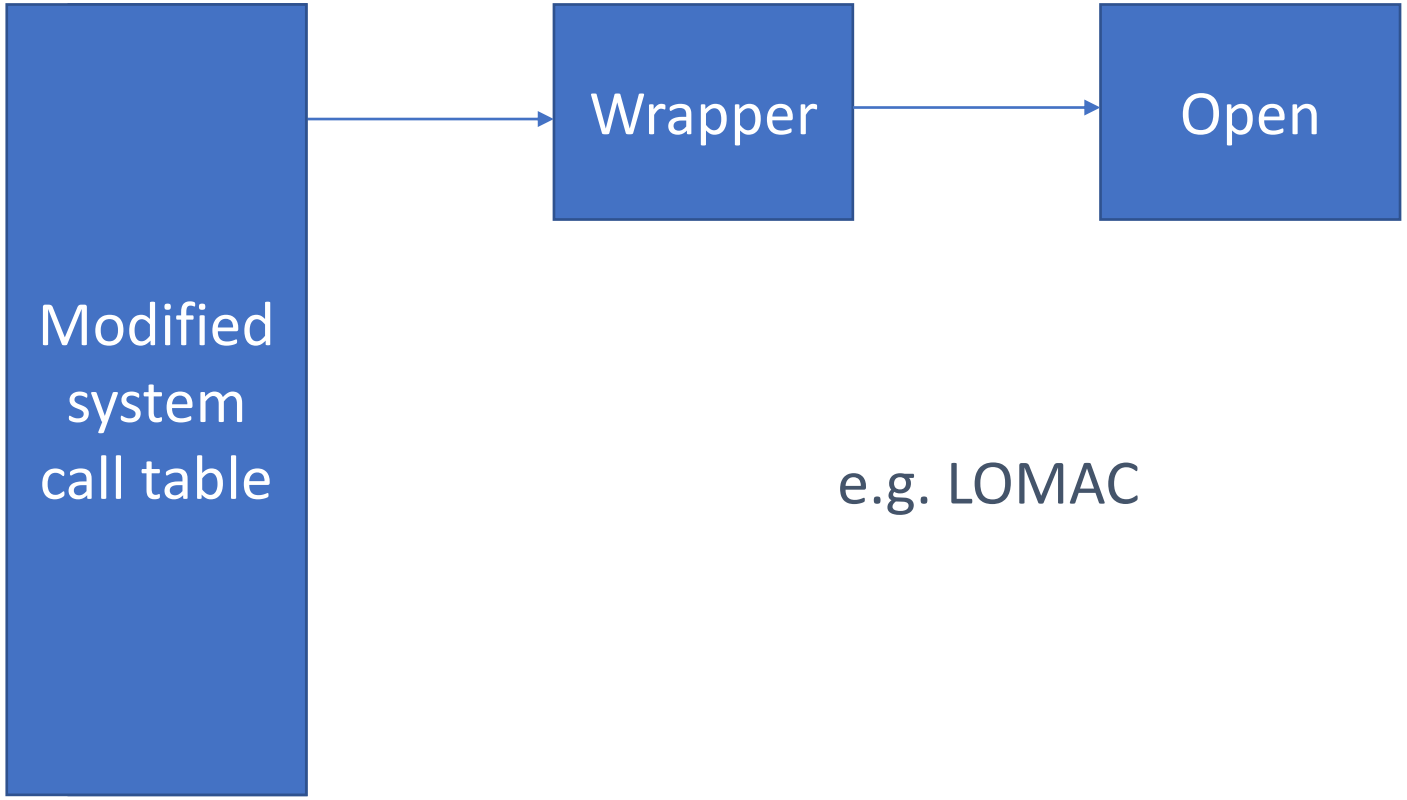

e.g. LOMAC

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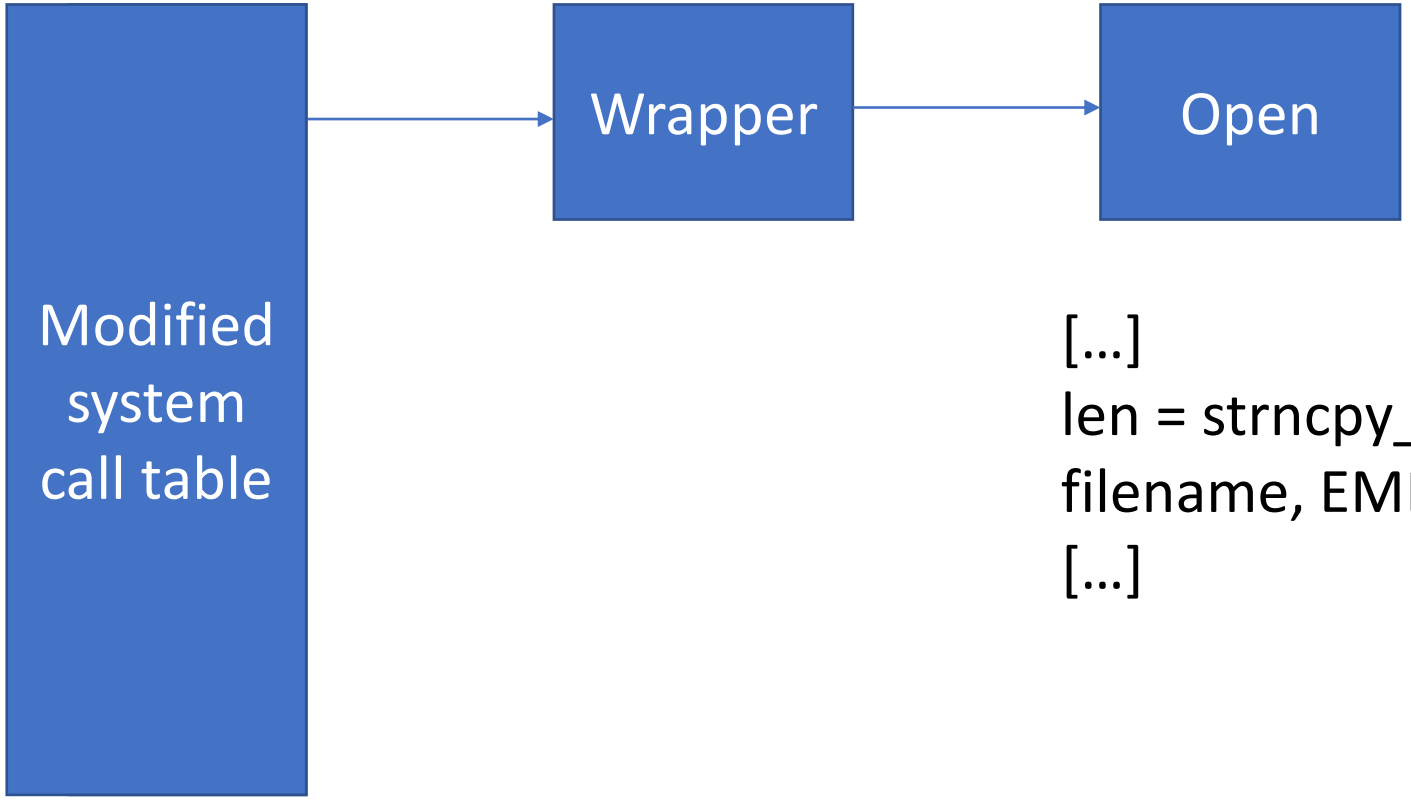


```
[…]
len = strncpy_from_user(kname,
filename, EMBEDDED_NAME_MAX);
[…]
```

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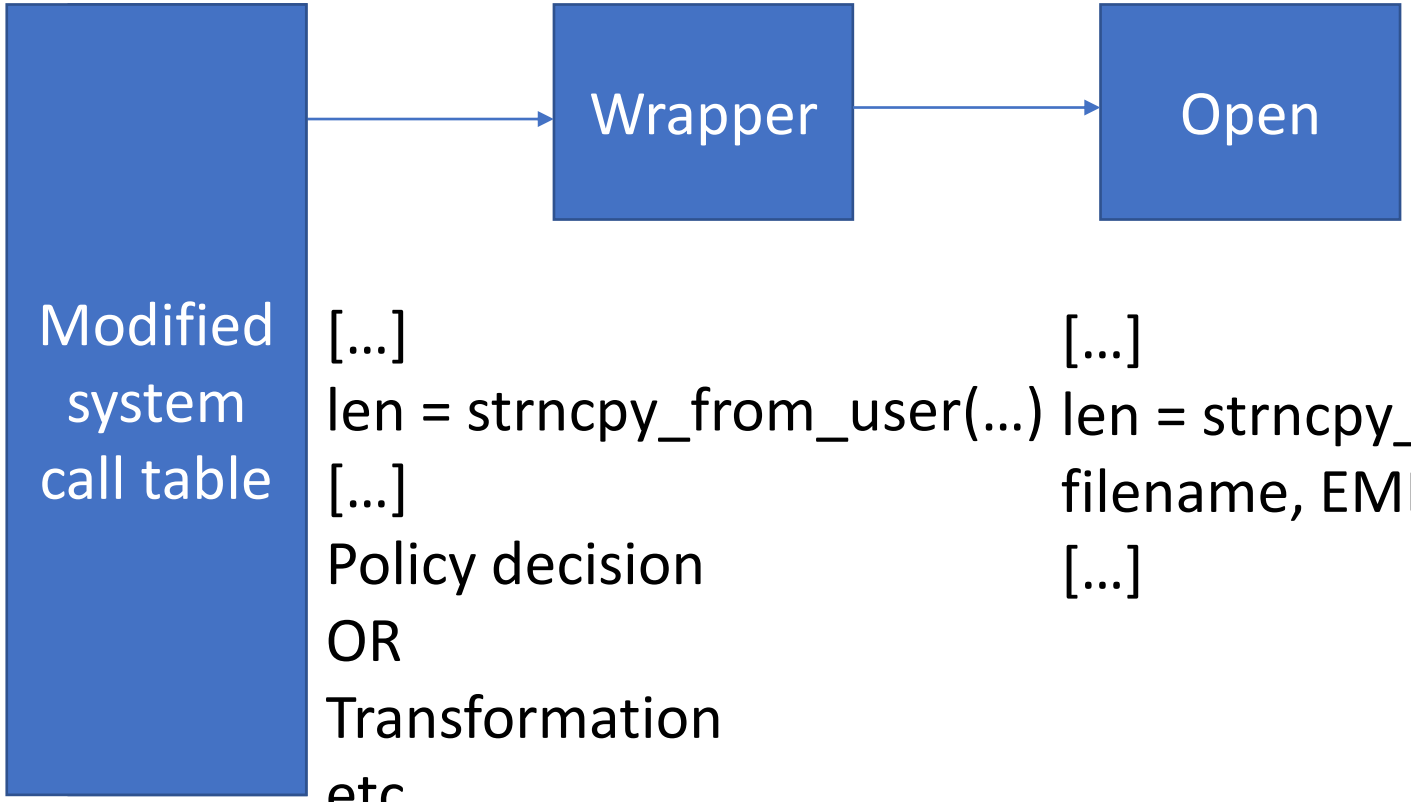

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Problem?

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Example 2: implementing OS reference monitor

- Wrapper and syscall work on two different copy of the buffer!
- User space controlled buffer
  - Can be controlled by an attacker
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- Check Robert Watson paper for more in depth discussion on this topic