Spectre & Meltdown

Revue technique

Capgemini

Qui suis-je ?

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0b00 Plan

0b01 Origine

0b10 Mécanismes

0b11 Meltdown & Spectre

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Origine

Google « Project Zero »

Jann Horn (@tehjh)

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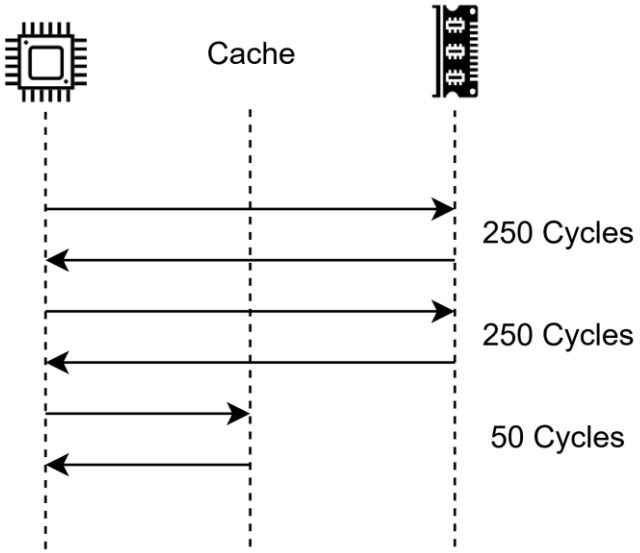
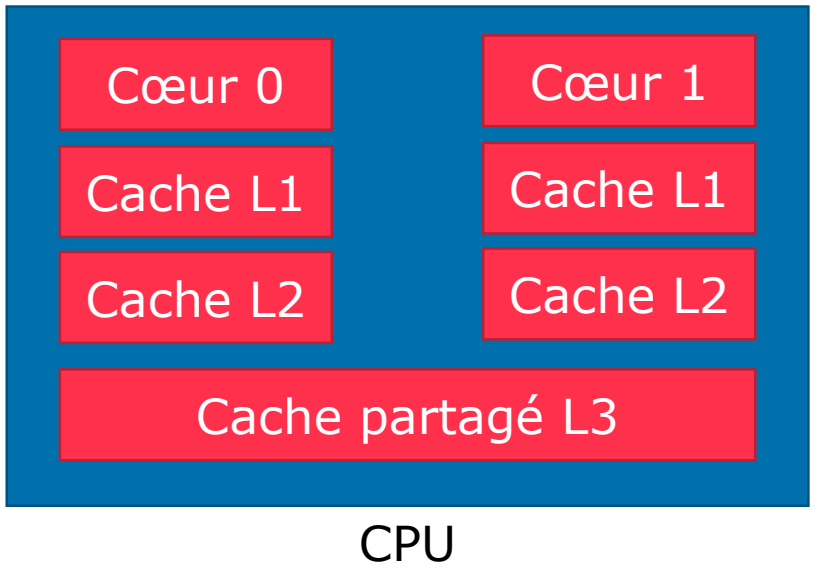
Cache

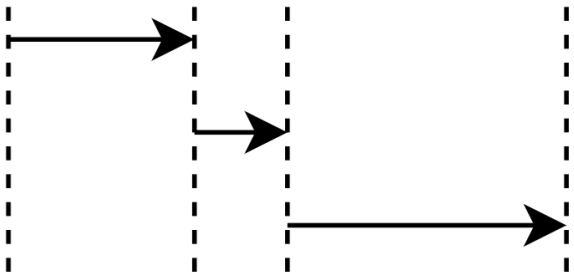


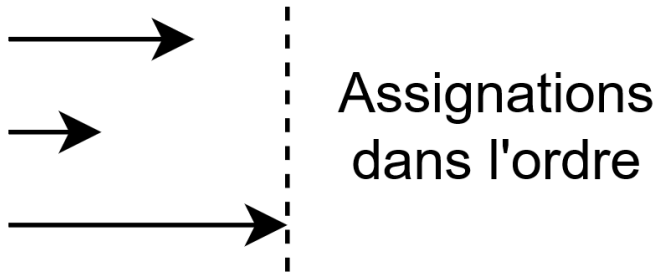


Out of Order

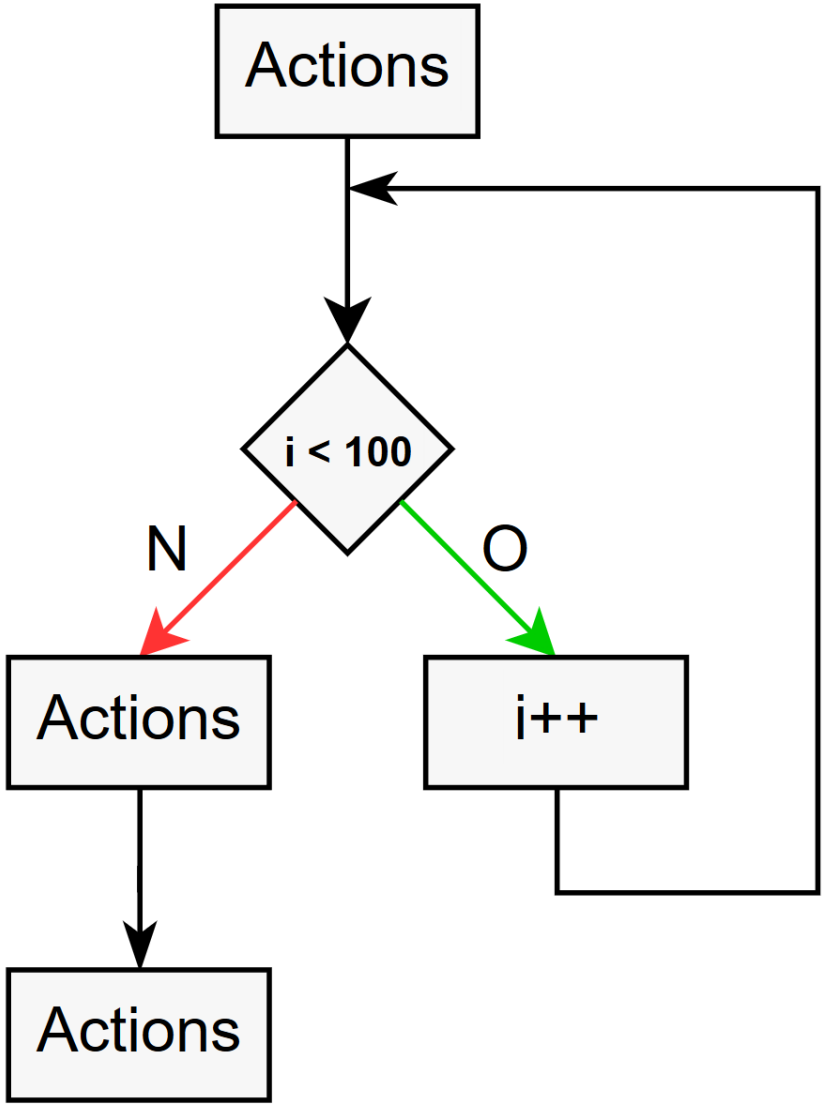
```
var_A = function()
var_B = calcul()
var_C = lecture()
```

```
var_C, var_A, var_B = lecture(), function(), calcul()
```

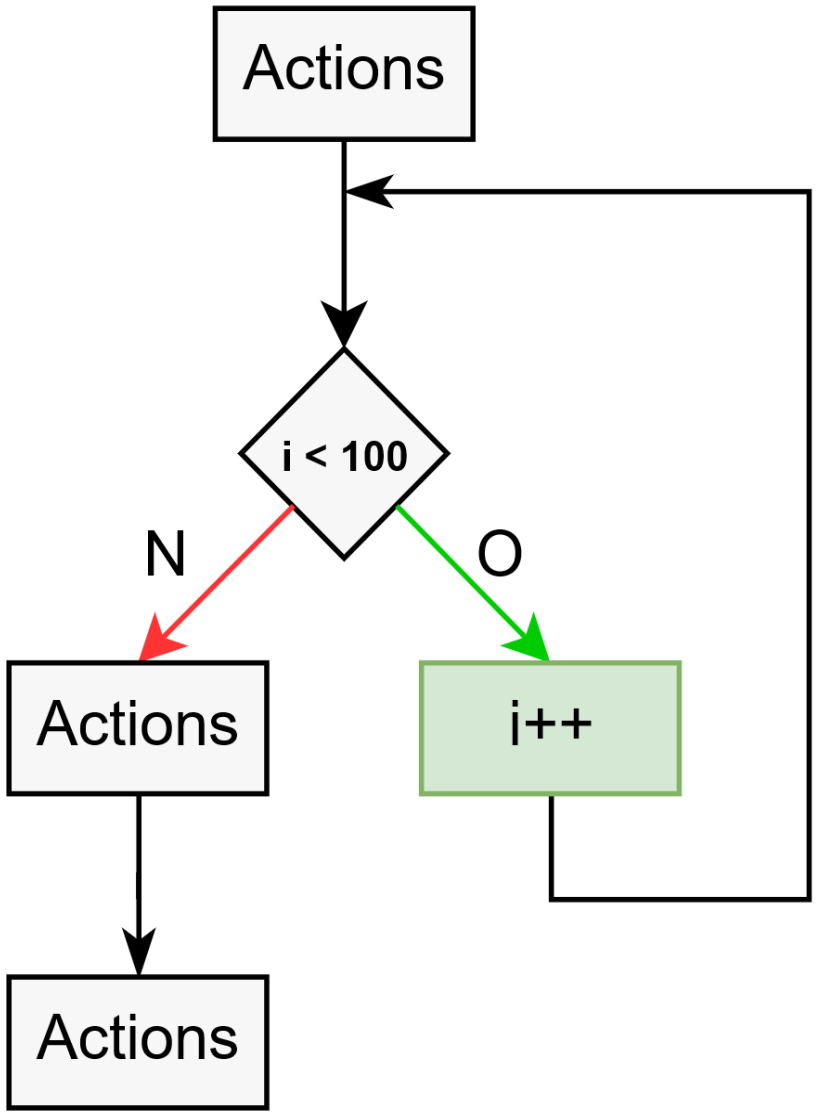




Prédiction



Prédiction



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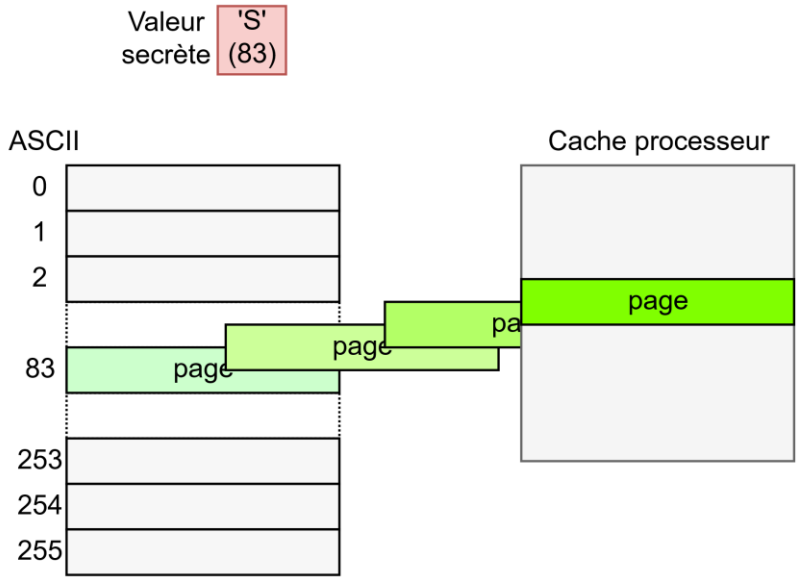
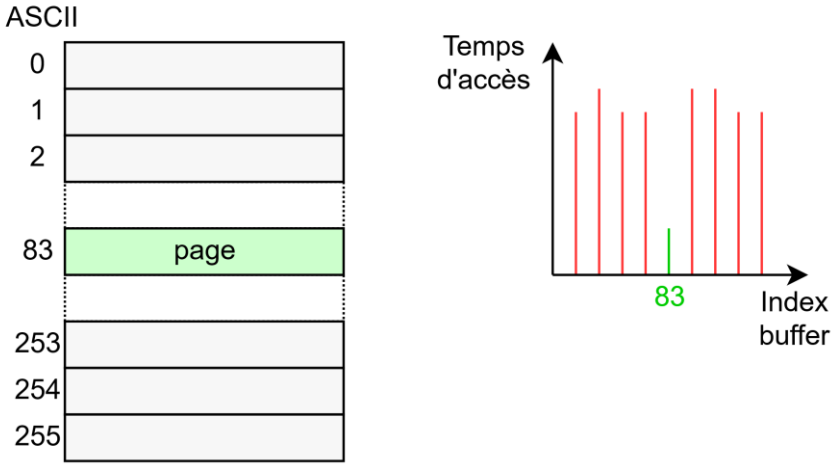
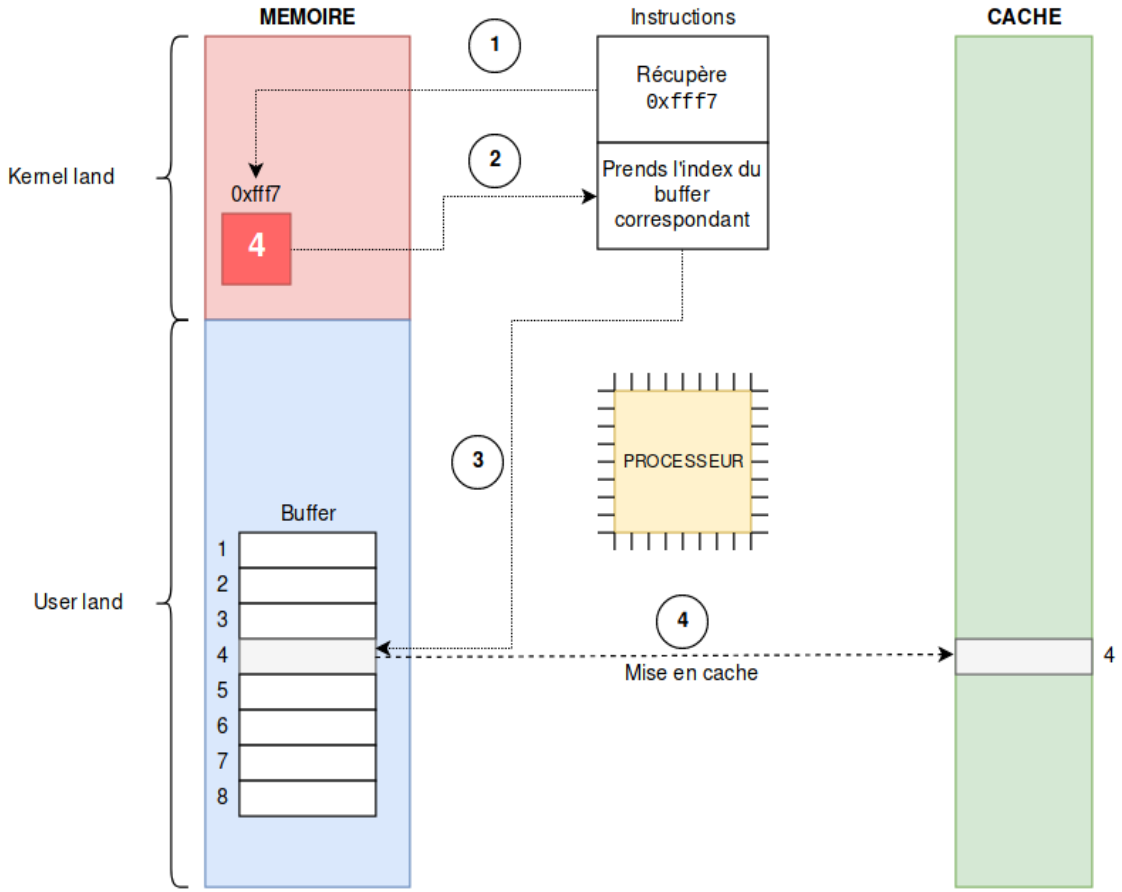
Cache side-channel attack





Meltdown

```
/* … instructions … */
var_secrete = kernel_space[0xfff7];
junk = buffer[var_secrete];
```

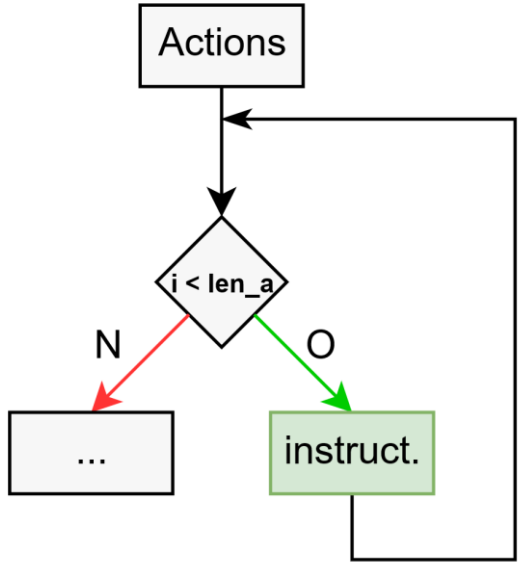


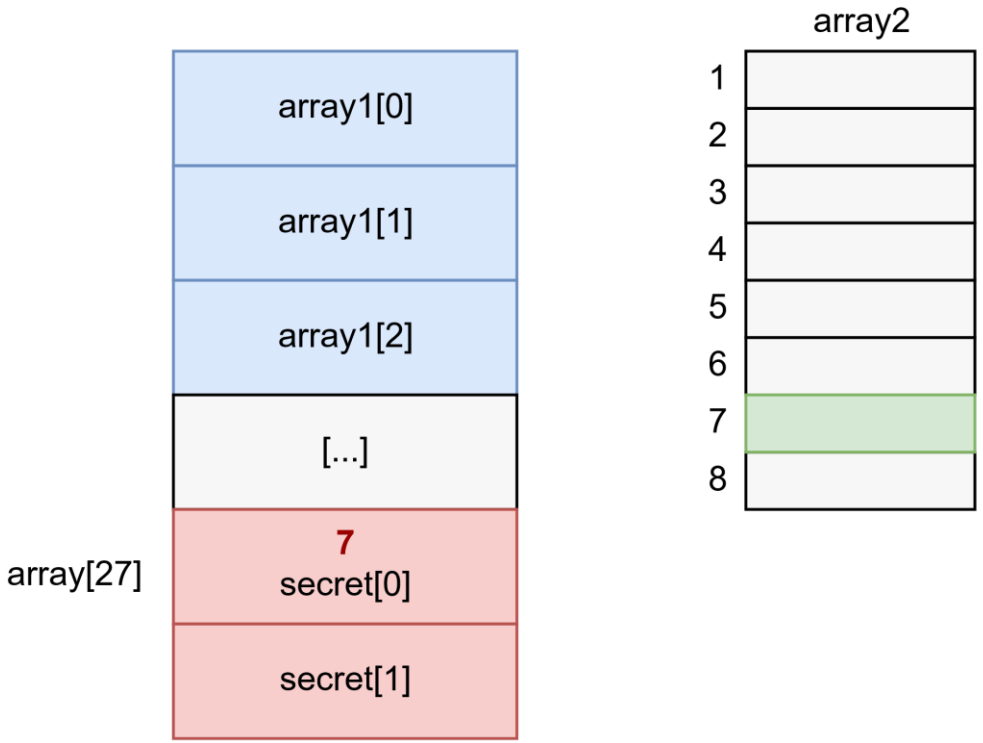
Temps d'accès aux « cases »

```
[1] 231
[2] 229
[3] 304
[4] 32
[5] 274
[6] 299
[7] 257
[8] 311
```

Spectre

```
if (i < len_array1)
{
    var_secrete = array1[i];
    junk = array2[var_secrete];
}
```





Proof of concept

https://github.com/Hackndo/spectre-poc

- poc_no_cache.c
- poc_cache.c
- poc_leak_one_byte.c
- poc_final.c

http://beta.hackndo.com/meltdown-spectre/

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