Heap Overflow

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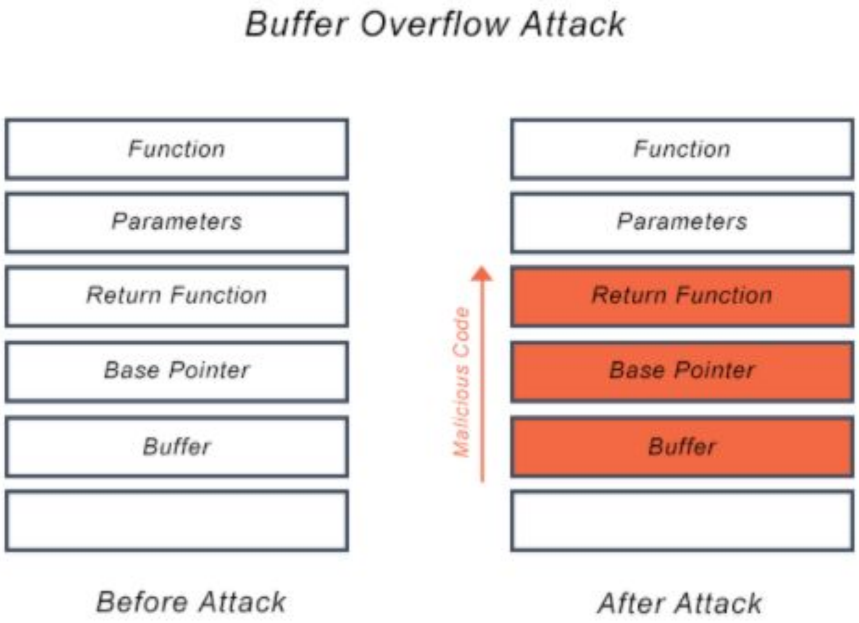
Buffer Overflow

int arr[5];

[1, 2, 3, 4, 5], 6, 7, H, A, C, K, M, E

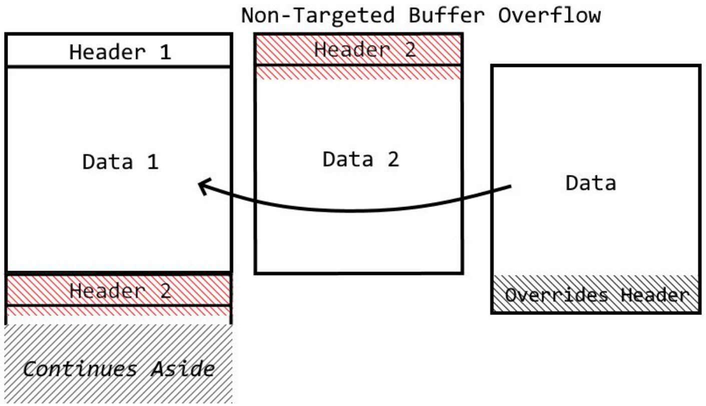
Overlap to adjacent memory areas

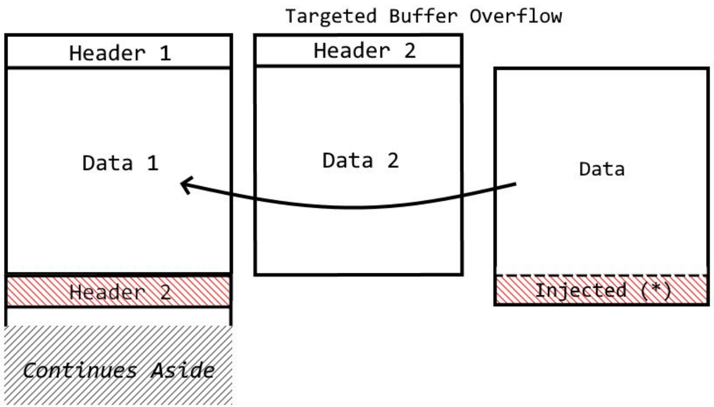


Heap Overflow

Heap overflow occurs when more data is written into a data block that that data-block has allocated space

Can override headers
-Gibberish (causes crash)
-Injected pointers (to execute code)





Security Solutions - Canaries

Pros:

Effective against Non-Targeted Buffer Overflows

Simple to set up

Cons:

Ineffective against Targeted Buffer Attacks

Significantly increases heap update times

Security Solutions - Guard Pages

Pros:

Headers/Data Cannot be manipulated by anything but the heap manager

Protects against ALL Buffer Overflows

Cons:

Complicated to set up

Can cause issues when debugging segmentation faults

Can increase the update times for the heap

Security Solutions - Random Allocation

Pros:

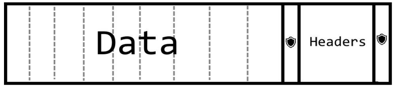
Targeted attacks cannot predict what the Heap memory looks like

Relatively Simple to set up

Cons:

Does not protect from Non-Targeted Buffer Overflows

Security Solutions - Grouped Headers



Pros:

Heap Overflow attacks cannot change pointers

Only two guard pages required

Effective against targeted attacks

Cons:

Does not protect data from being overwritten

Somewhat complicated to set up

Security Solutions - *HeapDefender*

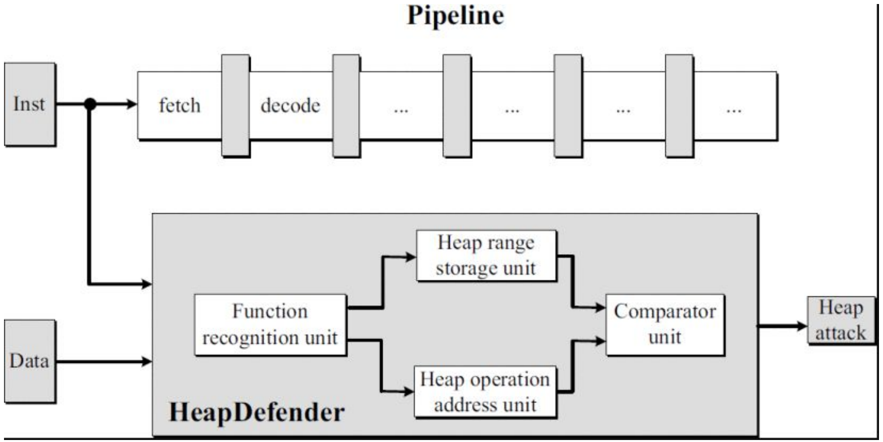
HEAP DEFENDER

Function unit - is heap doing as expected and in range that is supposed to be

Heap range-stores location of info

Heap operation - hold flag

Compares-if stuff in heap range is as long as supposed to be



Conclusion

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Photo links

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