UNIVERSIDAD EAFIT

Technical report

Operating Systems ST0257

March 01 of 2022

UNIVERSIDAD EAFIT

Contents

1 General Research

The first activity is simple, the idea is just research about the history of the operating systems.

1.1 Assignment

- Make a conceptual map about operating systems.
- Make a timeline that reflects the history and generation of operating systems.

1.2 Conceptual Map

This is the conceptual map using **draw.io**:

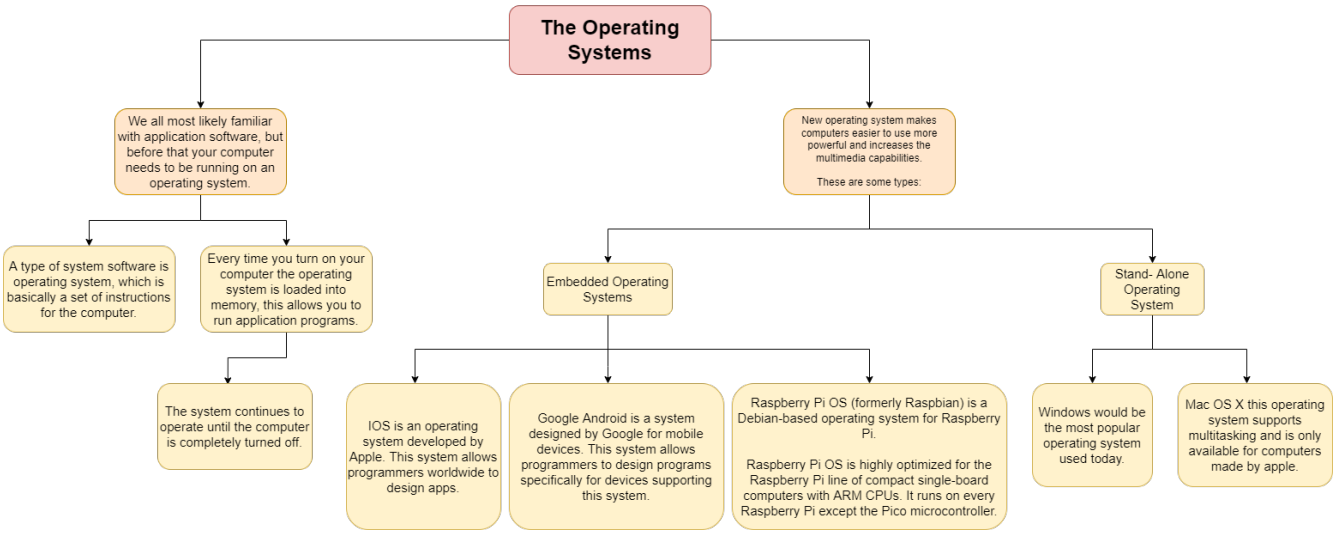

Figure 1: Operating Systems Conceptual Map

URL

ConceptualMap.png GitHub file

1.3 Timeline

This is the Operating System Timeline using **draw.io**:

URL

OperatingSystemsTimeLine.png GitHub file

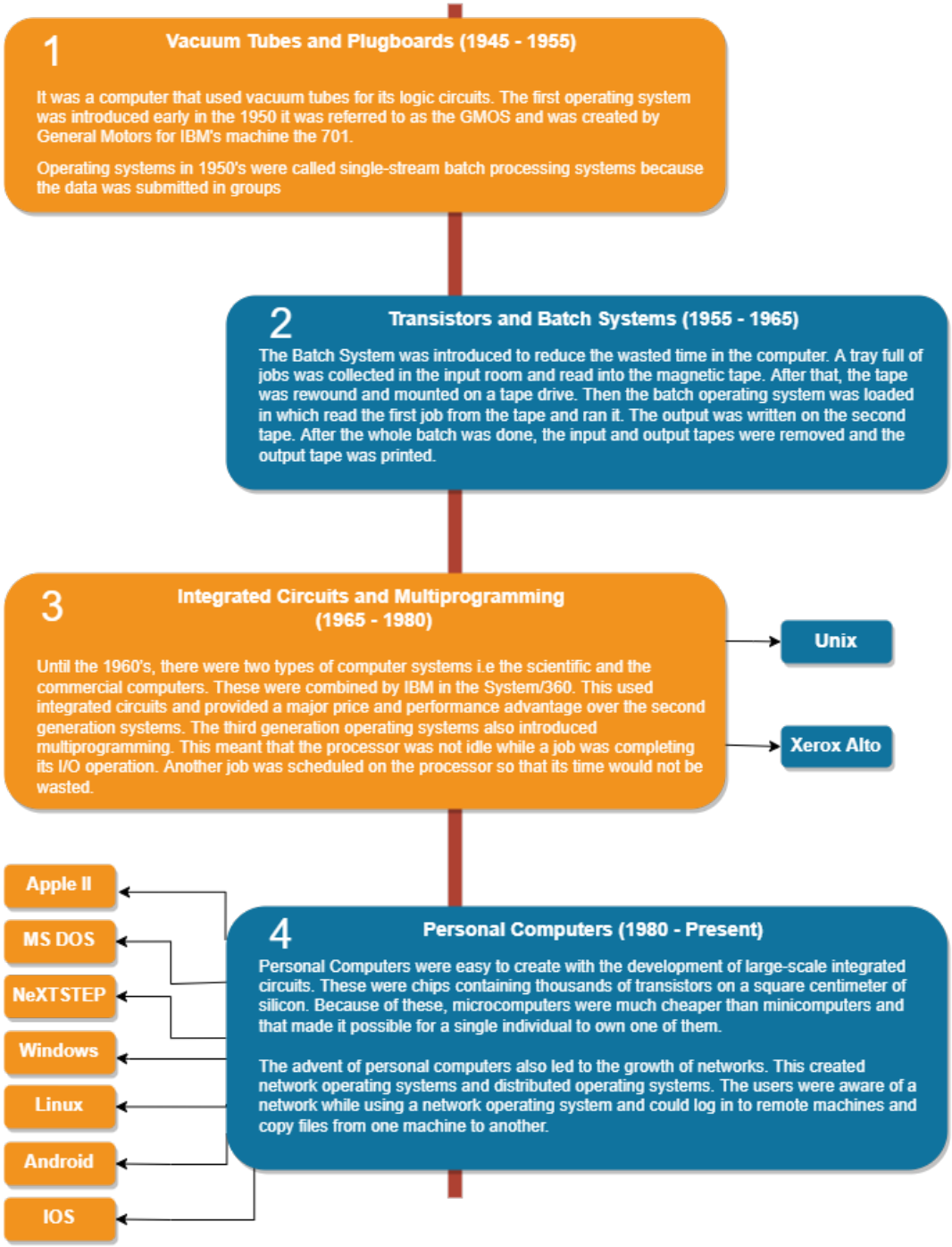

Figure 2: Operating Systems Timeline

2 Operating Systems Interruptions

The idea is just research and implementation of some of the operating system interruptions.

2.1 What is and O.S. Interruption?

An interrupt is a signal emitted by hardware or software when a process or an event needs immediate attention. It alerts the processor to a high-priority process requiring interruption of the current working process.

2.2 Buffer overflow

A buffer overflow occurs when a program or process attempts to write more data to a fixed-length block of memory, or buffer, than the buffer is allocated to hold. Buffers contain a defined amount of data; any extra data will overwrite data values in memory addresses adjacent to the destination buffer.

Figure 3: Buffer overflow diagram, image taken from imperva.com

```c
# https://github.com/Youngermaster/ST0257-Operating-Systems/blob/main/Challenges/Challenge_1/BufferOverflow/buffer_overflow.c

#include <stdio.h>

int main(int argc, char const *argv[]) {
    char *s = "hello world";
    char c = s[20];
    printf("%p - %p -> %d\n", &c, __builtin_frame_address(0), c);
    printf("%p - %p -> %s\n", &s, __builtin_frame_address(0), s);
    printf("%p - %p -> %d\n", &s[20], __builtin_frame_address(0), s[20]);
    return 0;
}
```

Code 1: This script allow us to extract nmap generated info

3 Disclaimer

A penetration test is considered a snapshot in time. The findings and recommendations reflects the information gathered during the assessment and not any changes or modifications made outside of that period.

Time-limited engagements do not allow for a full evaluation of all security controls. **EAFIT** prioritized the assessment to identify the weakest security controls an attacker would exploit. **EAFIT** recommends conducting similar assessments on an annual basis by internal or third-party assessors to ensure the continued success of the controls.

3.1 Confidentiality Statement

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3.2 Contact info

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3.3 Assesment overview

From *Date 1* to *Date 2*, **EAFIT** engaged Penetration tests to evaluate the security posture of its infrastructure compared to current industry best practices. All testing performed is based on the NIST SP 800-115 Technical Guide to Information Security Testing and Assessment, OWASP Testing Guide (v4), and customized testing frameworks.

Phases conducted for penetration testing are the following:

- Planning and preparation.
- Reconnaissance / Discovery.
- Vulnerability Enumeration / Analysis.
- Initial Exploitation.
- Expanding Foothold / Deeper Penetration.
- Cleanup.
- Report Generation.

4 Antecedents

The following document takes all the processes and results given by the audit made to the machine **Operating Systems ST0257** from the platform **HackTheBox**.

Figure 4: Details of the machine

URL

https://app.hackthebox.com/machines/98

4.1 considerations

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4.2 examples

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5 Objectives

The idea is to check the machine state of the machine **Operating Systems ST0257**.

5.1 considerations

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5.2 results

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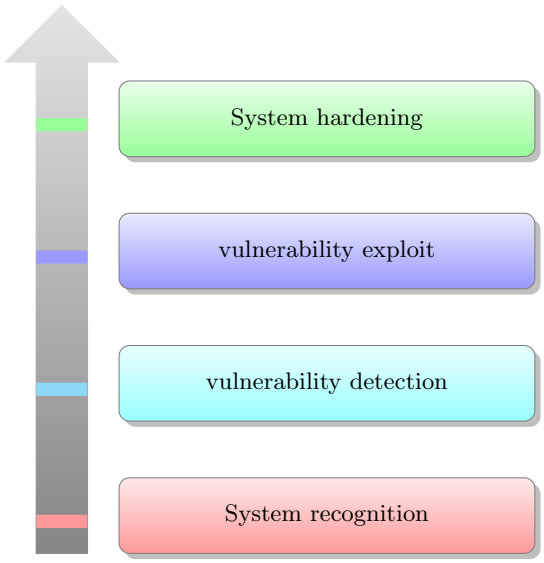

Figure 5: Workflow

6 Vulnerability analysis

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6.1 Initial Recognition

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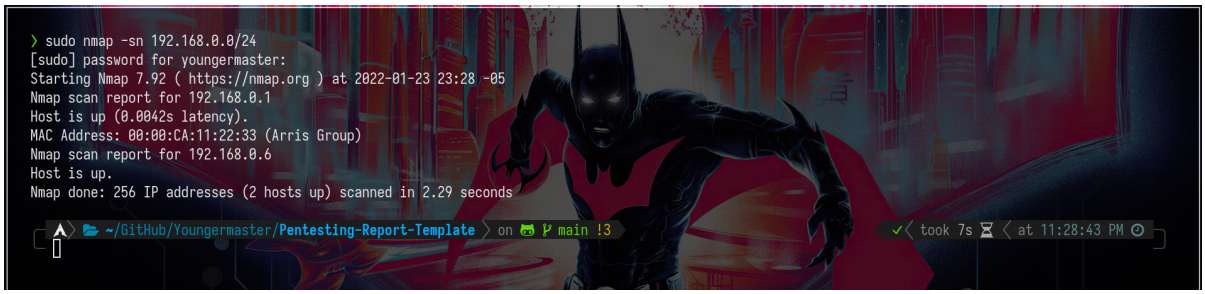

6.2 Improvement

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```
# This function is taken from S4vitar's blog.
# https://s4vitar.github.io/bspwm-configuration-files/

ports="$(cat $1 | grep -oP '\d{1,5}/open' | awk '{print $1}' FS='/' | xargs | tr ' ' ',')"
ip_address="$(cat $1 | grep -oP '\d{1,3}\.\d{1,3}\.\d{1,3}\.\d{1,3}' | sort -u | head -n 1)"
echo -e "\n[*] Extracting information...\n" > extractPorts.tmp
echo -e "\t[*] IP Address: $ip_address"  >> extractPorts.tmp
echo -e "\t[*] Open ports: $ports\n"  >> extractPorts.tmp
echo $ports | tr -d '\n' | xclip -sel clip
echo -e "[*] Ports copied to clipboard\n"  >> extractPorts.tmp
cat extractPorts.tmp; rm extractPorts.tmp
```

Code 2: This script allow us to extract nmap generated info

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Ports
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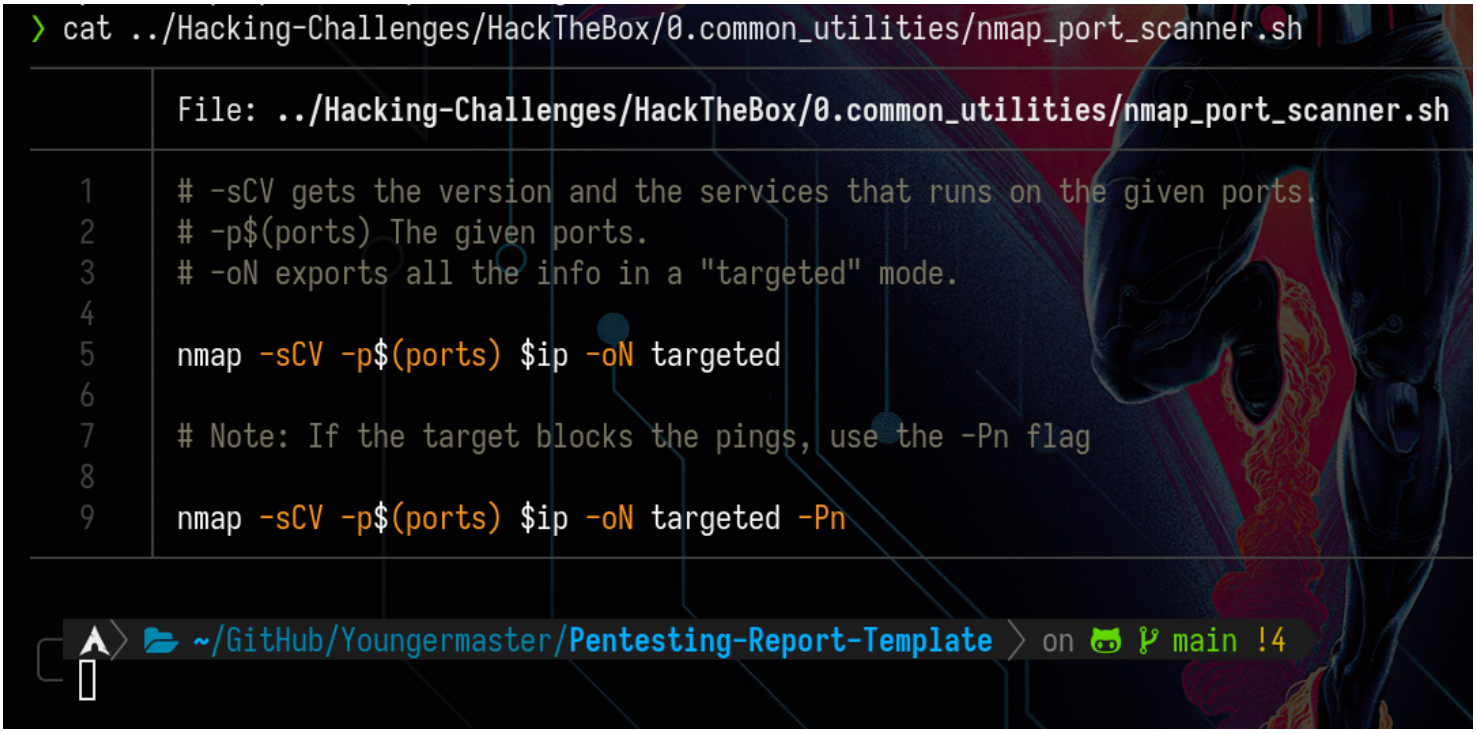

Figure 6: These are the results of lorem ipsum

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