Attacking Factories via USB Devices

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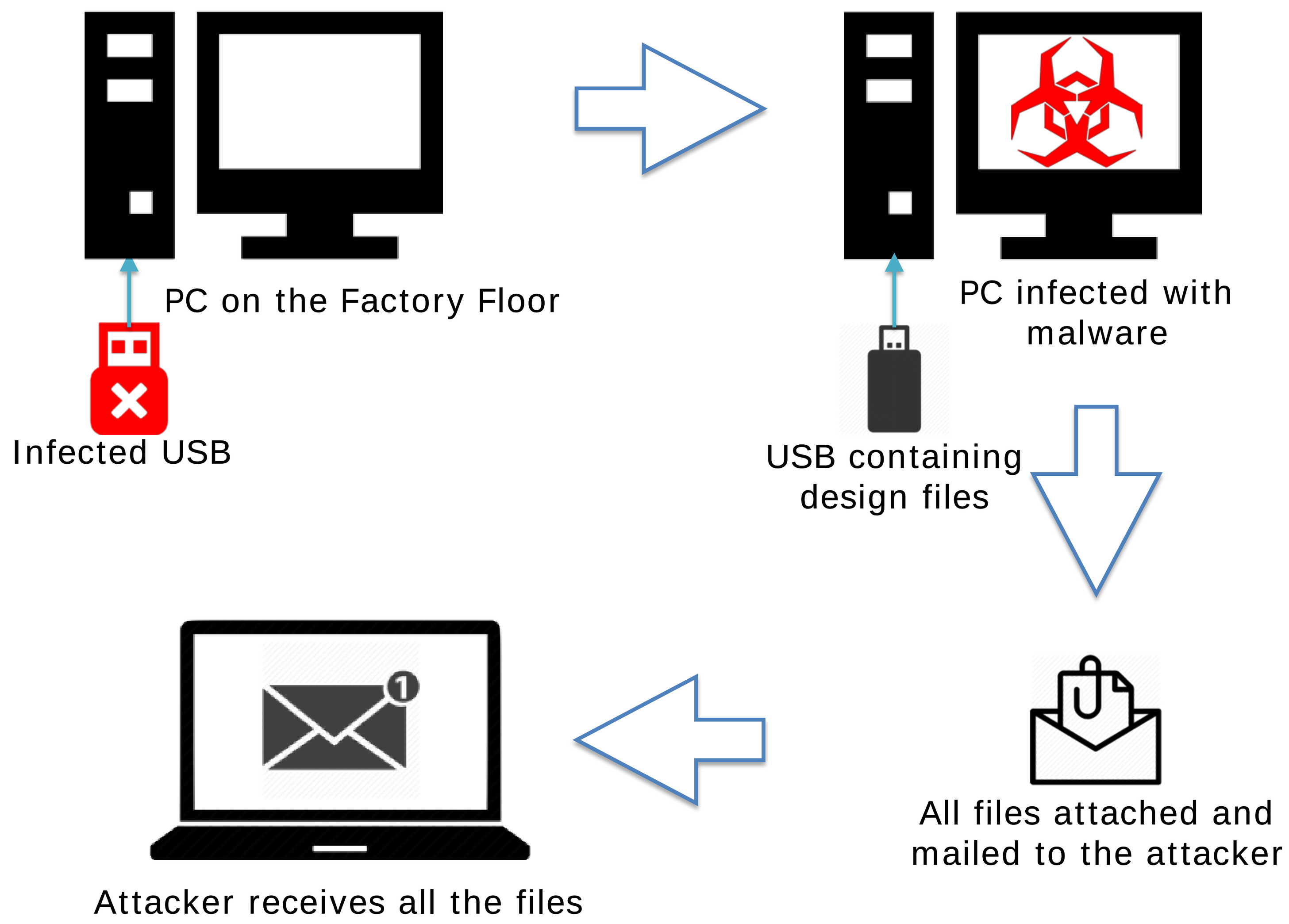
What an attacker can do

➢ **Steal designs and data**

- PC malware is installed as soon as an infected USB is inserted in the PC.
- All data from any USB subsequently inserted in the PC is secretly sent to the attacker.

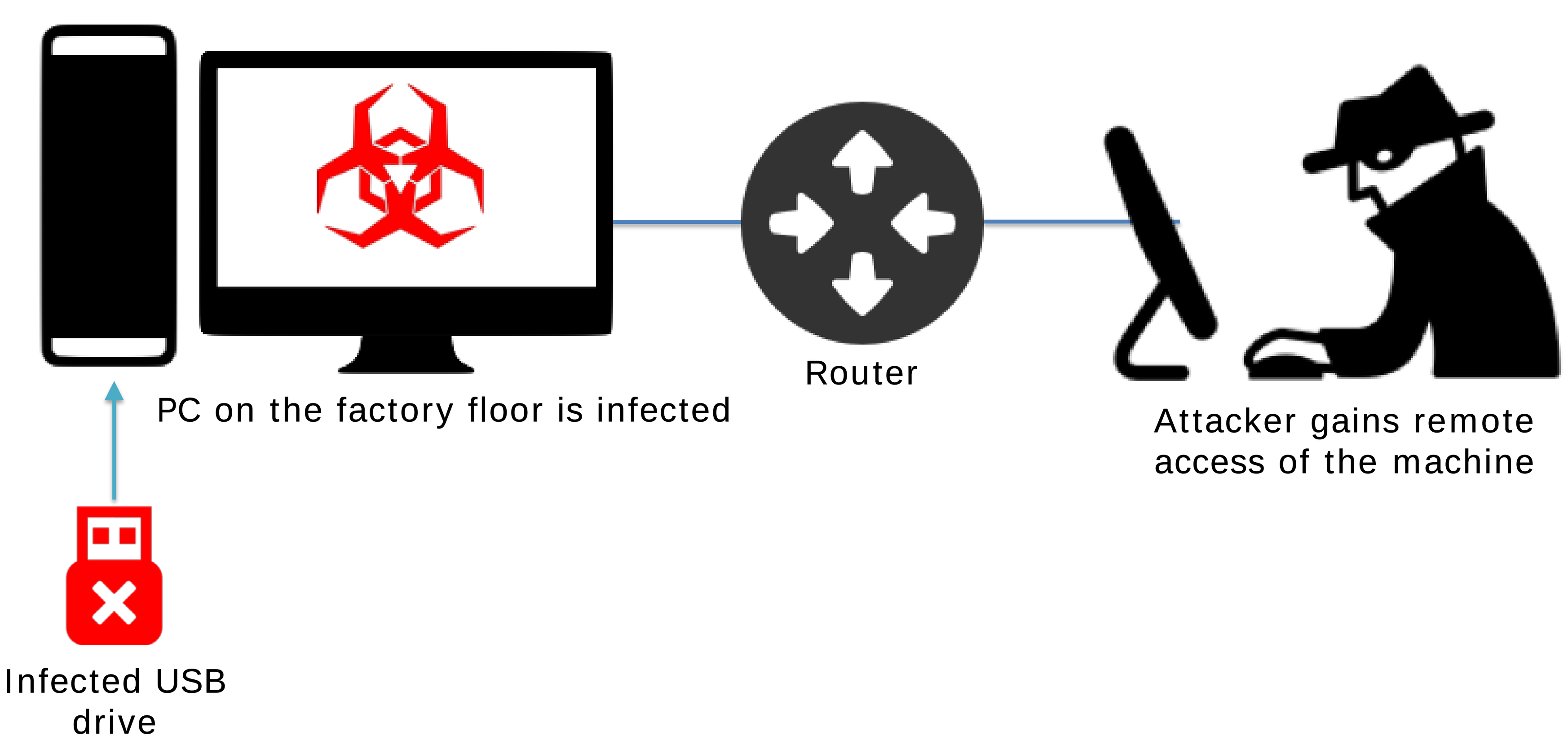


➢ **Alter designs and data**

- USB malware searches for designs, G-code and data as soon as the USB is inserted in the PC.
- After finding a file of interest, the malware corrupts the file as defined by the attacker.

➢ **Control a PC remotely**

- USB malware gives remote access to an attacker on the same network as the infected PC.
- The attacker has complete control over the infected PC from their local machine and can carry out a variety of attacks.



➢ **Alter machinery firmware**

- USB malware provides a new firmware file and forces its installation.
- The new firmware may cause damage to the machinery, introduce defects into products, or make good products look defective.
- Example: Machinery-destroying Stuxnet, which spread in part by exploiting a vulnerability in the handling of Windows shortcut icons. Malware was executed when an infected shortcut icon on a USB was displayed.

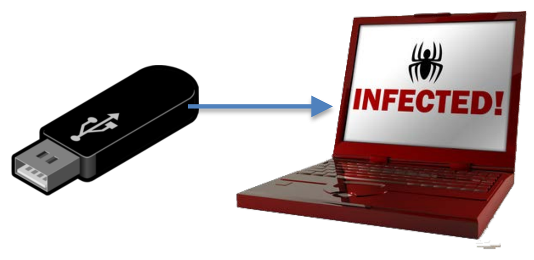
Why it Works

➢ **Factory employees and vendors use USBs to transfer design files to PCs on the factory floor,** because internet transfers are seen as too risky.

➢ **It's easy for them to get an infected USB.**


Get it as a freebie in an event


Pick it up in a parking lot or corridor

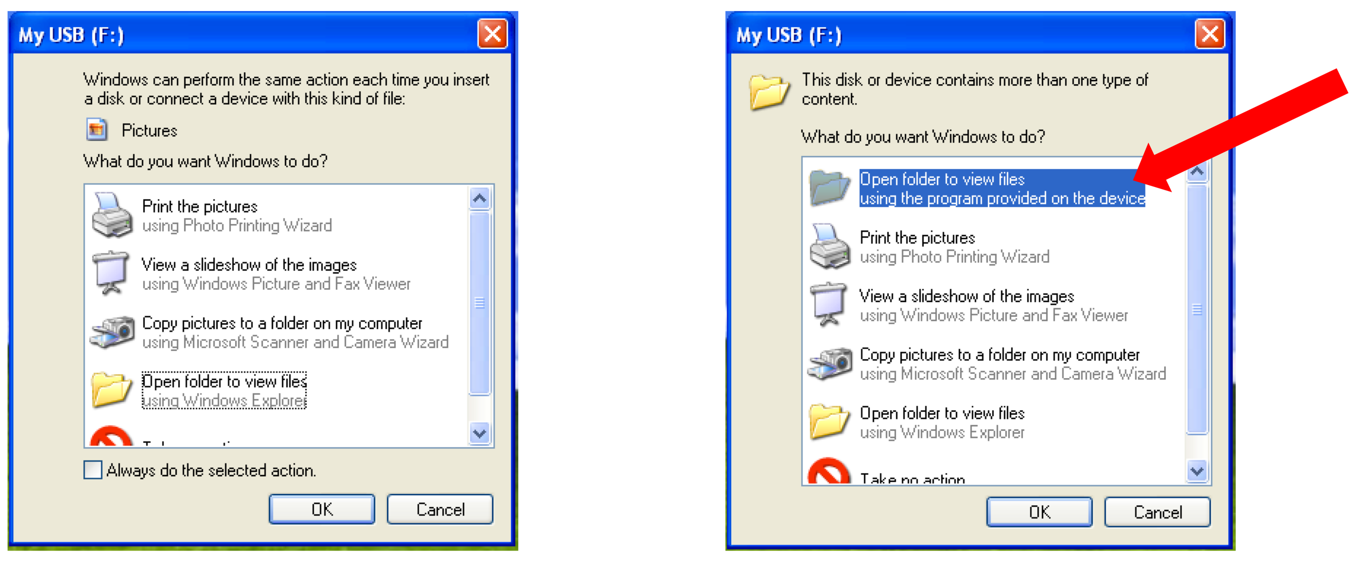


Use a healthy USB in an infected PC

➢ **Factory PCs run old, unpatched, vulnerable versions of Windows,** because machinery is long-lived and software updates can cause cascading failures.

How it works

➢ **Exploit Windows' Autorun**



Attacker's Autorun script on a USB uses social engineering to dupe the user.

'U3 Smart Drives' can execute a payload as soon as they're plugged in.

➢ **Inject malware into reverse-engineered USB firmware**

Reverse engineering the firmware to make the USB behave differently.

E.g., micro-controller reprogrammed to behave as a keyboard that types in commands from a script.

➢ **Exploit other vulnerabilities**

Patches are released whenever a vulnerability is discovered, but patches are not normally installed on PCs on the factory floor.