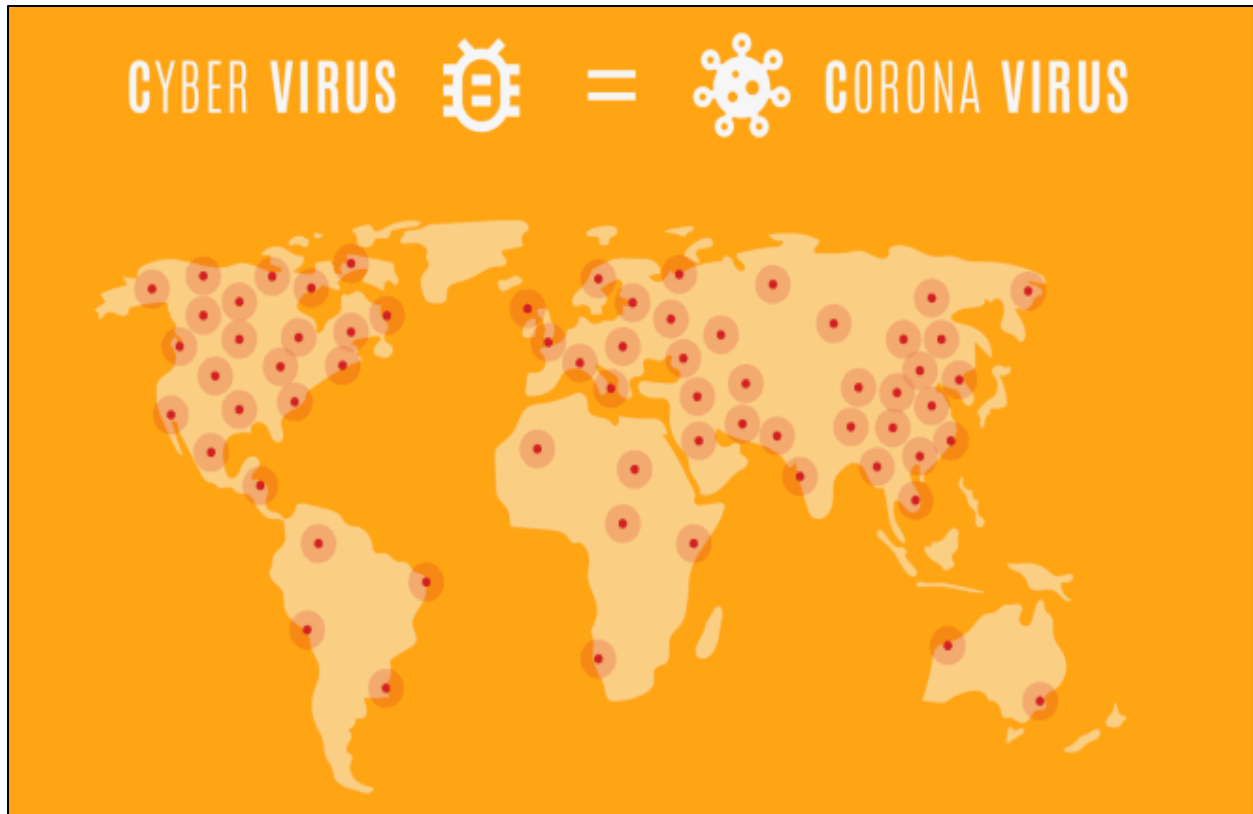


# Similarities Between Computer Viruses and Biological Viruses

## **TLDR: Too Long Didn't Read**

Computer malware and biological viruses(virii) are eerily similar in function. Biological and computer viruses can be considered to be types of glitches/bugs, or even be caused by them—can be accidental or intentionally developed in addition to being manually manipulated. Both biological and computer viruses require a host as a vessel to not only live but also utilize the host/device which is infected as a means of propagation. Both types of viruses can be taxing on the system's components or the biological organ, then spreading to negatively affect the whole system—weakening defenses which opens the device or creature to further infections by other malware or harmful biological pathogens. Just like one another, the computer malware is newer than the predecessor or an improvement on earlier versions; the biological pathogen is unidentified until examined or a mutation of its ancestor.



## Introduction:

As this document is being composed, the SARS-CoV2, the 2020 novel Coronavirus, also known as COVID-19, is wreaking havoc across the globe by causing sickness and leading to death of those critically affected by it. This being the first pandemic in 102 years since the Spanish Flu of 1918; COVID has the majority of the world in distress with millions infected, and currently over two hundred thousand deceased. According to reports, those who are favored by fortune just enough to avoid infection are the remainder. They took precautions by avoiding contact with others by adhering to social distancing guidelines such as

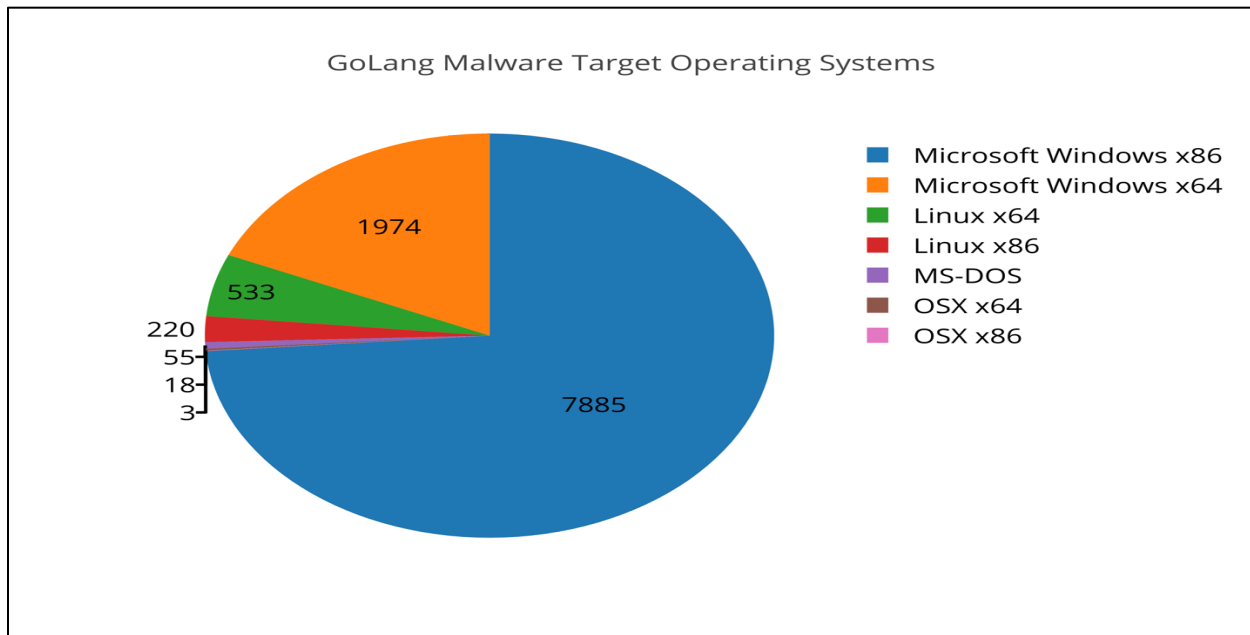
maintaining six feet of distance between other persons, in order to lower the chances of transmitting the virus to other people, creating new infections.

The current pandemic situation has led to the closure of businesses, required use of face masks, and curfews aimed at reducing the spread of the virus. Many individuals are now remotely working from home and even practicing self-isolation in hopes to assist the decrease of COVID-19 infections by avoiding physical contact with other people, and avoiding close proximity.

With the advent of working from home, self-isolation and the global lockdowns

enforced by governments via law enforcement; many have found themselves making use of the internet much more in order to remain in touch with loved ones, working, and various forms of entertainment. However, mitigating activities online brings up another type of threat—computer malware; also referred to as computer viruses.

The two separate disciplines of Computer Science and Biological Science make use of the same word, ‘virus’, within their titles yet that’s because of the similarities between computer code which can be harmful to an operating system, just as the human biological system can be harmed by viruses. So similar that the map of COVID-19 infections and computer viruses is the same.



## Origins:

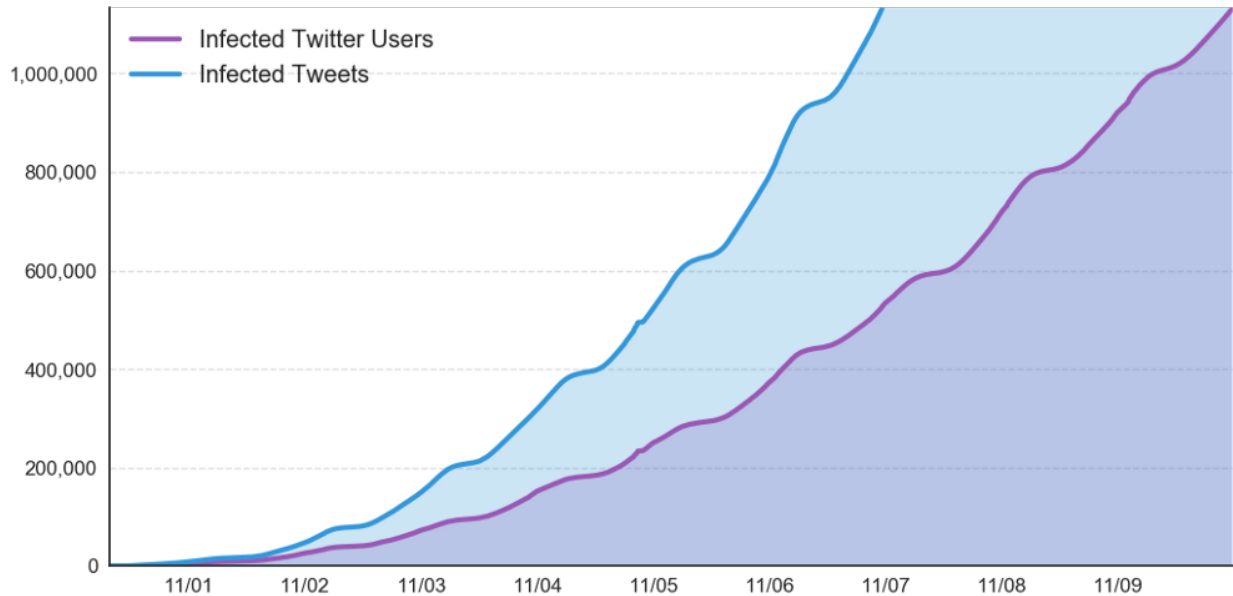
It’s safe to argue and even declare that viruses have been around since before life has been wittingly documented, so there’s no accurate way to determine when biological virii truly debuted. Although, virii have been said to have started from bits of cellular DNA then become independent—which leads them to stitch their own genes into the cells of the hosts they infect. When it comes to computer viruses, the first one appeared in 1971, by the name of

“Creeper System”. Creeper System was self-replicating and would fill up the hard drive of the infected machine until it could no longer function properly. Computer viruses all have an author. They are developed for specific system architectures and rarely cross-platform yet with the introduction of cross-platform compiled languages such as Go(Golang), OCaml, and Rust to name a few; That may change.

System security plays a role in the development of computer viruses, as the

vulnerabilities may be used to deliver viruses to specific targets

Tracking the Spread of the A [?] iOS Virus on Twitter



## Propagation:

Biological viruses are normally spread by viral pathogens and antigens which may be present on or in different parts of the body, depending on the route of infection. There are four types of spread for biological viruses: Local – confined to a surface of the body or an organ(diarrhea); primary hematogenous: directly into the bloodstream(mosquito bites causing malaria); secondary hematogenous: initial viral infection throughout the host(polio); nervous system: the virus spreads throughout the nervous system.

With biological viruses, the body of the infected individual acts as a reservoir for the

virus which is released through bodily fluids by way of coughing, sneezing, shedding skin, touching surfaces, and bodily contact. Computer viruses are typically spread from computer to computer by the code being transferred by way of removable media containing the infected files; sometimes without the knowledge of the parties involved in the exchange. The malicious code of the virus may not be recognized by antivirus software, causing it to go undetected due to methods of antivirus bypass, such as code obfuscation and encryption.

## Similarities:

There are a number of similarities between computer viruses and biological viruses, such as the ability to be created intentionally or accidentally. which evoked Computer Scientists to use the same vernacular to describe its likeness to its biological relative, one of which is the ability to mutate.

Bio viruses invade living cells and multiply and mutate, which makes them difficult to combat against. Computer viruses authored to be polymorphic will modify their code as they propagate in order to avoid detection and increase the lifetime of the malware before a patch is developed, it loses its functionality on systems, and virus definitions are developed to target the virus during scans.

## Defense:

It's not guaranteed that people can take all of the proposed necessary precautions and still not become infected by a computer virus or biological virus; as long as humans and machines have contact with the outside environments, they will be susceptible to infection. Avoidance is a method which has its use but it isn't totally effective in either realm, as a lot of people cannot avoid large crowds due to lifestyle and occupation. Just the same, there are individuals and organizations which do not keep their computers disconnected from the internet, so it would behoove those people at risk of computer and biological viral infections to seek anti-viral solutions.

The human body has its immune system which combats infections while on autopilot(at least to the conscious mind) just like an computer's antivirus software

Computer viruses attack components of the computer by design, just as biological viruses can attack organs of a living being until its extermination, dormancy or causes complications such as sepsis or other irregular changes to organs which can lead to failure and death of the virus's host. Worms, a type of computer virus, are spread without any user interaction, so they can be likened to socially transmitted viruses such as the flu.

Like computer viruses, biological viruses can be created. Horsepox and Mousepox are examples of man-made viruses. Horsepox is deadly yet doesn't affect humans and Mousepox was mistakenly created.

would does. Unfortunately, computers have only been around and available for personal use since the year 1971, and its functions are complex yet not as complex as the human body is. Therefore, computers have antivirus software which can scan for certain properties such as matching text, IP addresses, file hashes, function calls, etc.— just like bio virii— based on previous research about the malware that's been discovered and added to 'definitions' which is appended to based on malware analyses performed by analysts and engineers.

Some methods of defending against computer viruses include enforcing strict access rights and privileges of users on the network/system. For personal and business use, it's best to block dangerous and risky filetypes from the e-mail gateway/server. Keeping the operating system up to date is

very helpful, along with making backups, maintaining firewalls and a good digital environment. Hygienic use of the computer includes activities such as regular virus scans with regularly updated definitions, removing files and programs which aren't used, and regularly updating programs and the operating system.

Bio virii are slightly similar yet maintain their difference when it comes to defenses because it's an organism of systems, such as the respiratory system, digestive, reproductive, nervous system and immune system, which has the objective of maintaining good health for the organism.

Viruses are difficult to treat because they reside within the body's cells. Since they are within the cells, they are out of reach from a lot of medication that would be able to

For a biological virus, it's very similar yet the person or patient must first determine if bodily activity is outside—as in above or below their normal baseline of various factors such as heart rate, blood pressure, sugar, higher temperature than normal, aches, etc., in order to remediate the problem or seek consultation from an expert or professional.

Some virii— bio and computer— remain dormant upon initial infection, until its author triggers it to become active. A computer which is infected with a virus and it may be a member of a botnet or just to suddenly begin a malware campaign to propagate it to other individuals and

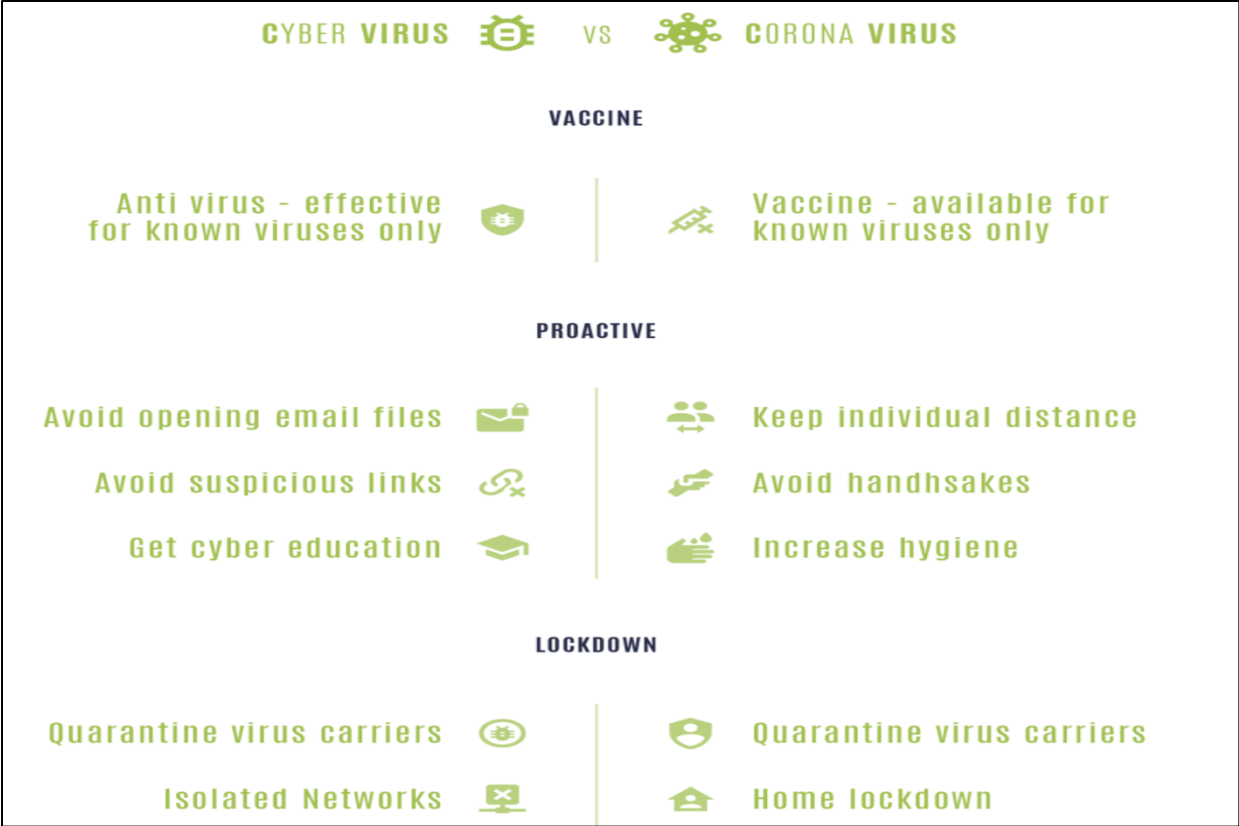
treat the illnesses caused by viruses. There are only a few antiviral medications available. Aside from maintaining a healthy lifestyle, which promotes and enhances the ability of the immune system to combat viral infections, another preventative measure includes vaccination—injecting the body with the dead or inactive virus which causes an immune reaction.

Other methods of defense for a biological virus, it's very similar yet the person or patient must first determine if bodily activity is outside—as in above or below their normal baseline of various factors such as heart rate, blood pressure, sugar, higher temperature than normal, aches, etc., in order to best remediate the problem or seek consultation from an expert or professional and maybe they will be able to get medical treatment before it's too late

## Symptoms:

network-connected devices; Much like bio-virii which have an incubation period and lay dormant until it has duplicated enough in the body to put strain on an organ then spread to other parts of the body.

Malware attaches to system processes, even disguising itself as such which results in the device user not knowing until the infection has become obvious because of the amount of system or network resources which are now being abused. Much like a person with leukemia would feel fine up until the moment they walk a few hundred feet and feel as though they've run ten miles.



**Treatment:**

There are a few methods of treating biological viral infections yet Isolating the malware in a sandboxed environment, usually virtualized in order to avoid damage to the researcher’s device, the remedy may be an automated script which edits the Assembly(low-level code) instructions of the virus, removes the infected components and provide signatures and definitions for an antivirus program to avoid further infection. The signatures and definitions are very similar to a vaccine—the body gets a ‘small’ trace of the virus and develops an immunity to it. In the computer’s case, the antivirus picks up the malicious code prior

to execution followed by deletion or quarantines the file(s). A method of remediation for biological virii is isolation and containment to a certain area to prevent the spread to others and provide treatment to the individual while supplementary methods of treatment are researched and planned—very similar to using a sandboxed environment for a computer virus. There are only a few medications which are effective against viral infections yet the best thing that someone can do is to maintain good health, hygiene and avoid stress; In these trying times, one must do so physically and virtually.

## End Notes:

[Infographic]: ODIX True CDR." *Odix Content Disarm and Reconstruction (CDR)*, 31 Mar. 2020, [odi-x.com/coronavirus-vs-malware-frightening-similarities-how-to-stay-safe-infographic/](http://odi-x.com/coronavirus-vs-malware-frightening-similarities-how-to-stay-safe-infographic/).

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"Coronavirus vs. Malware: Frightening Similarities & How to Stay Safe