



**Nearpod functions well, without the need to configure anything in 95% of network infrastructures. The purpose of this document is to explain how Nearpod works and to provide suggestions on how to enhance your Nearpod experience by introducing cache enabled proxies and adjusting some settings. Additionally, in some cases a cache enabled proxy can increase download speeds by more than 70%!**

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## 1. How does Nearpod work?

Nearpod works in two phases: Download and Execution.

- a. Nearpod saves data (videos, sounds, images, etc) on distributed servers whose data can be cached locally on a proxy with cache. Once the resources needed for a presentation are downloaded, the presentation is ready for execution. At this point, all of the data downloaded is cacheable for later reuse.
- b. During execution, Nearpod requires a low latency connectivity, since tiny transfers are performed every few seconds. The transfers here are very small, but the internet connection must respond accordingly.

## 2. What is a proxy server?

A proxy server is a device that acts as representative of other computers that connect to it, in order to connect to the internet. A computer configured with a proxy does not connect directly to the internet, but instead through the proxy, which receives the connection, performs certain validations (if you have permission to navigate within a given context or if the user / password incorrect, etc.) and connects itself. Eventually, the proxy can filter the contents obtained and return the results to the requesting computer. However, the machine never connected *directly* to the Internet.

For example, if a school does not want students to access facebook.com, the proxy should block all domains: .facebook.com .fbcdn.net

### a. What is the difference between Proxy and Cache?

The proxy with cache enabled has the ability to keep a local copy of a certain fraction of the contents downloaded, which is then sent to the next client that tries to access the same content. The result is a sharp decline in the consumption of bandwidth across multiple accesses to the same content. Given that cache is part of proxy, a proxy can exist *without* cache, but cache cannot exist *without a proxy*.

### b. What is the difference between Proxy, Cache, and Gateway?

Understanding the proxy as a *representative* device that is not allowed to exit *directly* to the internet, a gateway is a device or mechanism that allows *direct* connection to the Internet.

The gateway does not have the ability to cache or filter content accessed, however it has the ability to filter connections. Specifically, the gateway, as its name suggests, is a *gateway* to the internet where a device can meet its requests.

A great example of a proxy with cache is Squid, which is a FLOSS software (free/libre open source software) of excellent performance and widely available on GNU / Linux.



### 3. Example using Squid.

#### a. How do I set a proxy with cache on Squid for NEARPOD?

In various distributions, the Squid configuration file is /etc/squid/squid.conf.

Though this file is large, it is very well documented (the vast majority are comments) and it is a fairly simple configuration.

In summary: The following is an example of a configuration appropriate for Nearpod

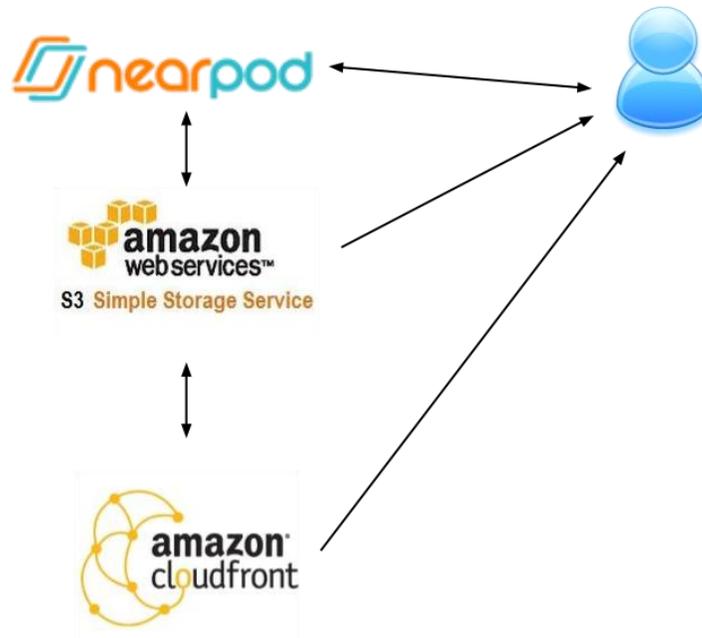
acl CONNECT method CONNECT	method CONNECT (for HTTPS)
acl localnet src 192.168.0.0/24	LAN Definition (eg 192.168.0.0/24)
acl Safe_ports port 80	Defines as an allowed port, port 80
acl Safe_ports port 443	Defines as an allowed port, port 443
acl Nearpod_Servers dstdomain .nearpod.com .s3.amazonaws.com .tra nsloadit.com d38ybj8g0p5z3m.cloudfront.net	Defines the rules to allow access to Nearpod's servers
Safe_ports http_access allow localnet	Allow connectivity via HTTP / S
http_access allow localnet Nearpod_Servers	Defines access from the local network to Nearpod_Servers
localhost http_access allowNearpod_Servers	Defines access from localhost (the same server) to the Nearpod_Servers
http_access deny all	Deny all that is not defined, in this way only the Nearpod_Servers can be accessed.
minimum_object_size 0 KB	Allows caching very small files
maximum_object_size 30 MB	Allows caching files up to 30MB. Nearpod, under normal conditions does not need to cache larger files
cache_mem 256 MB	Configures the total cache in RAM of Squid in half the server's free memory: If the server has 512MB free (not to be confused with the total memory) without using then cache_mem should be 256MB.
maximum_object_size_in_memory 30 MB	Allows caching files in ram up to 30MB. Nearpod, under normal conditions does not need larger files



#### b. How do I set a proxy without cache with Squid?

View more information on the [official](#) site.

#### 4. How does data flow within Nearpod?



#### 5. How is the presentation download experience with Nearpod?

The time it takes to download presentations may vary depending on the bandwidth consumption at any given time, size of the presentation, and concurrent devices accessing

#### 6. How can I improve my experience with Nearpod?

##### a. Pre-Download download

You can download presentations prior to use. Once downloaded, the application keeps all resources in the local storage. During execution there must be connectivity, but the volume transferred is minimum.

##### b. Hardware needed

- i. Minimum WiFi requirement are equipment supporting G/A/B, we recommend equipment supporting N, whose speed varies between 150 and 600 Mbps theoretical.
- ii. Regarding the proxy server, the most bottlenecking is the storage. It is recommended that the server have at least 4GB of ram on a dual core processor.



### **c. Necessary connection speed.**

If the connection has no irregular or low consumption, the following reference examples can illustrate the delays that occur with different connection speeds to download 10 different presentations of about 10 MB each:

- A connection of 5Mb (megabit per second) could download 10 presentations simultaneously in just under 3 minutes.
- A connection of 10Mb (megabits per second) could download 10 presentations simultaneously in about 1 min. 20 seconds.
- A connection of 20Mb (megabits per second) could download 10 presentations simultaneously in about 40 seconds.

*Note: A proxy with cache enabled can increase download speeds by more than 70%.*

## **7. Additional proxy setting information.**

### **a. Proxy settings**

- Nearpod supports unauthenticated proxies that are configured by the operating system.

### **b. Domains used by Nearpod**

- [\\*.nearpod.com](http://*.nearpod.com)
- [nearpod.s3.amazonaws.com](http://nearpod.s3.amazonaws.com)
- [s3.amazonaws.com](http://s3.amazonaws.com)
- [\\*.cloudfront.net](http://*.cloudfront.net)

### **c. Important notes**

- The IP addresses that various domain names resolve to don't necessarily fall within any given address range.
- Nearpod supports DNS-based & DHCP distribution of PAC files.
- Domains used by Nearpod may change IPs. Consider this when setting up proxy rules.

## **MORE INFO**

Squid : Optimising Web Delivery <http://www.squid-cache.org/>

SQUID FAQ <http://wiki.squid-cache.org/SquidFaq>