HTTP - Caching

HTTP is typically used for distributed information systems, where performance can be improved by the use of response caches. The HTTP/1.1 protocol includes a number of elements intended to make caching work.

The goal of caching in HTTP/1.1 is to eliminate the need to send requests in many cases, and to eliminate the need to send full responses in many other cases.

The basic cache mechanisms in HTTP/1.1 are implicit directives to caches where server-specifies expiration times and validators. We use the **Cache-Control** header for this purpose.

The **Cache-Control** header allows a client or server to transmit a variety of directives in either requests or responses. These directives typically override the default caching algorithms. The caching directives are specified in a comma-separated list. For example:

```
Cache-control: no-cache
```

The following cache request directives can be used by the client in its HTTP request:

S.N.	Cache Request Directive and Description
1	**no-cache** A cache must not use the response to satisfy a subsequent request without successful revalidation with the origin server.
2	**no-store** The cache should not store anything about the client request or server response.
3	**max-age = seconds** Indicates that the client is willing to accept a response whose age is not greater than the specified time in seconds.
4	**max-stale [= seconds]** Indicates that the client is willing to accept a response that has exceeded its expiration time. If seconds are given, it must not be expired by more than that time.
5	**min-fresh = seconds** Indicates that the client is willing to accept a response whose freshness lifetime is not less than its current age plus the specified time in seconds.

6	**no-transform** Does not convert the entity-body.
7	**only-if-cached** Does not retrieve new data. The cache can send a document only if it is in the cache, and should not contact the origin-server to see if a newer copy exists.

The following cache response directives can be used by the server in its HTTP response:

S.N.	Cache Response Directive and Description
1	**public** Indicates that the response may be cached by any cache.
2	**private** Indicates that all or part of the response message is intended for a single user and must not be cached by a shared cache.
3	**no-cache** A cache must not use the response to satisfy a subsequent request without successful re-validation with the origin server.
4	**no-store** The cache should not store anything about the client request or server response.
5	**no-transform** Does not convert the entity-body.
6	**must-revalidate** The cache must verify the status of stale documents before using it and expired ones should not be used.
7	**proxy-revalidate** The proxy-revalidate directive has the same meaning as the must- revalidate directive, except that it does not apply to non-shared user agent caches.
8	**max-age = seconds** Indicates that the client is willing to accept a response whose age is not greater than the specified time in seconds.
9	**s-maxage = seconds** The maximum age specified by this directive overrides the maximum age specified by either the max-age directive or the Expires header. The s-maxage directive is always ignored by a private cache.