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POINTS**Effective Bandwidth Usage for Hybrid IT Datacenter management Web Applications (D956)**[Team - Vikrant Dhimate](#) Submitted: Jun 8 2020 Category: [Hybrid IT Experience](#) Status: Pending

apache caching web server configuration +

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Bandwidth Consumption and UI Ir-responsiveness are major areas which can be investigated to improve WFH effectiveness during Covid 19. In this project we are proposing solution which gives user better UI experience with effective bandwidth utilization while accessing web applications from remote browser/limited bandwidth network. Compression and caching are the most common measures to improve loading time and effective ways to save bandwidth. Gzip is actually a fairly simple idea that is extremely powerful when put to good use.

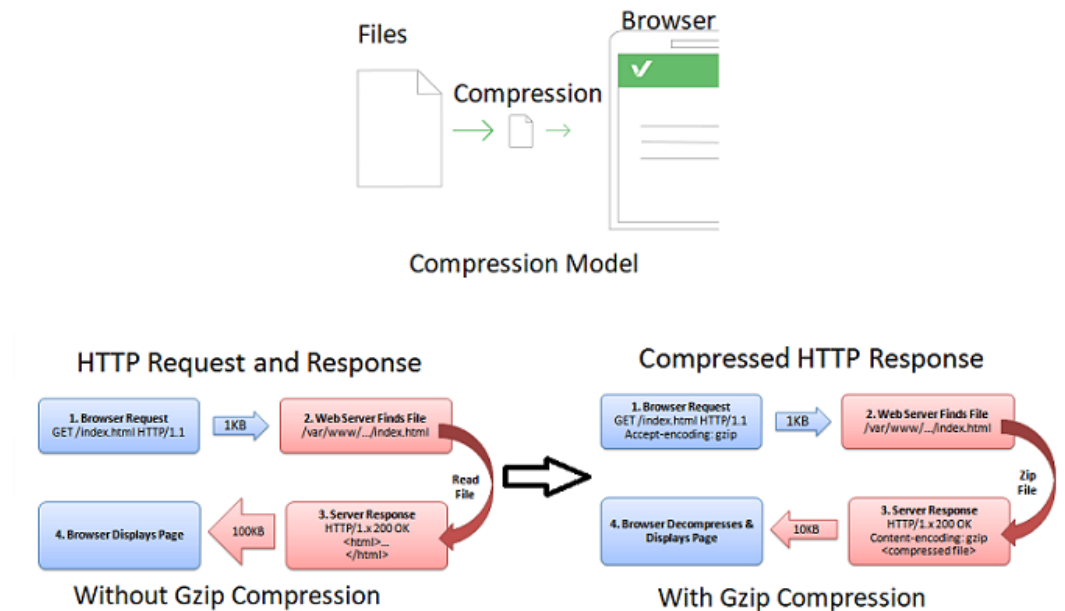
**Expertise Required**
[Gzip](#) [Web Server Configuration](#) [Caching](#) [Apache](#) [Effective Bandwidth Use](#)
**What problem are you addressing with your project?**

When we click on a website, a call is made to server to deliver the requested files. The bigger these files are the longer time takes for them to get to your browser and appear on the screen. Gzip compresses webpages and style sheets before sending them over to the browser which drastically reduces transfer time since the files are much smaller. GZIP compression saves bandwidth and greatly improves downloading of text files.

This solutions makes Hybrid IT Remote Data center management a bandwidth effective and have fully responsive for the customers.

**What is the solution you are proposing**

Solution :



This solution guarantees bandwidth savings and responsive UI for web applications deployed on Apache Web Server while accessing from remote browser/limited bandwidth network. Gzip is a method of compressing files (making them smaller) for faster network transfers. If the web application has frequent data transfer with considerable amount of json data transfer, enabling gzip compression for Apache makes lot of improvement while accessing these applications remotely or with limited bandwidth without affecting CPU utilization significantly. Compression allows your web server to provide smaller file sizes which load faster for your website users. Compression is enabled via webserver configuration and different web servers like Litespeed, Apache, Nginx have different instructions.

Files ----> Compression ----> Browser (understands Gzipped file)

In this POC we have taken example of Apache.

We have attached results for page load time, content load time and download size with and without Gzip Compression in evidence section. Also we have attempted and collected results over LAN and WAN. (Attachment Section). Also we could see that there was no significant impact on memory utilization.

Memory/Processor :

Without gzip

-----

```
27645 apache 20 0 3839888 13460 4788 S 0.3 0.1 0:00.50 httpd
```

```
27646 apache 20 0 3905424 13800 4712 S 0.3 0.1 0:00.48 httpd
```

With gzip

-----

```
6823 apache 20 0 3909584 24308 5148 S 0.3 0.1 0:00.88 httpd
```

```
6824 apache 20 0 3909584 26124 5144 S 0.3 0.1 0:01.69 httpd
```

Steps to enable :

1. Copy the attached gzip.conf to your apache web server system
2. Chmod 644 gzip.conf
3. Cp gzip.conf /etc/httpd/conf.d/.
4. Service httpd restart
- Wait for a min
5. Service httpd restart

Benefits :

Amount of data transfer is considerably reduced

UI become more responsive due to reduced waiting time

### What is the evidence that solution works

#### 1.1 Page Load Time without Gzip

**Load timings (ms)**

Redirect Count: -

Event	When	How long	Sum
Redirect	0	0	0
DNS	2	0	0
Connect	2	0	0
Request	12	336	336
Response	348	4	340
DOM	948	69793	70133
Interactive	1695	0	-
Content loaded	1695	0	-
Load event	70744	1	70134

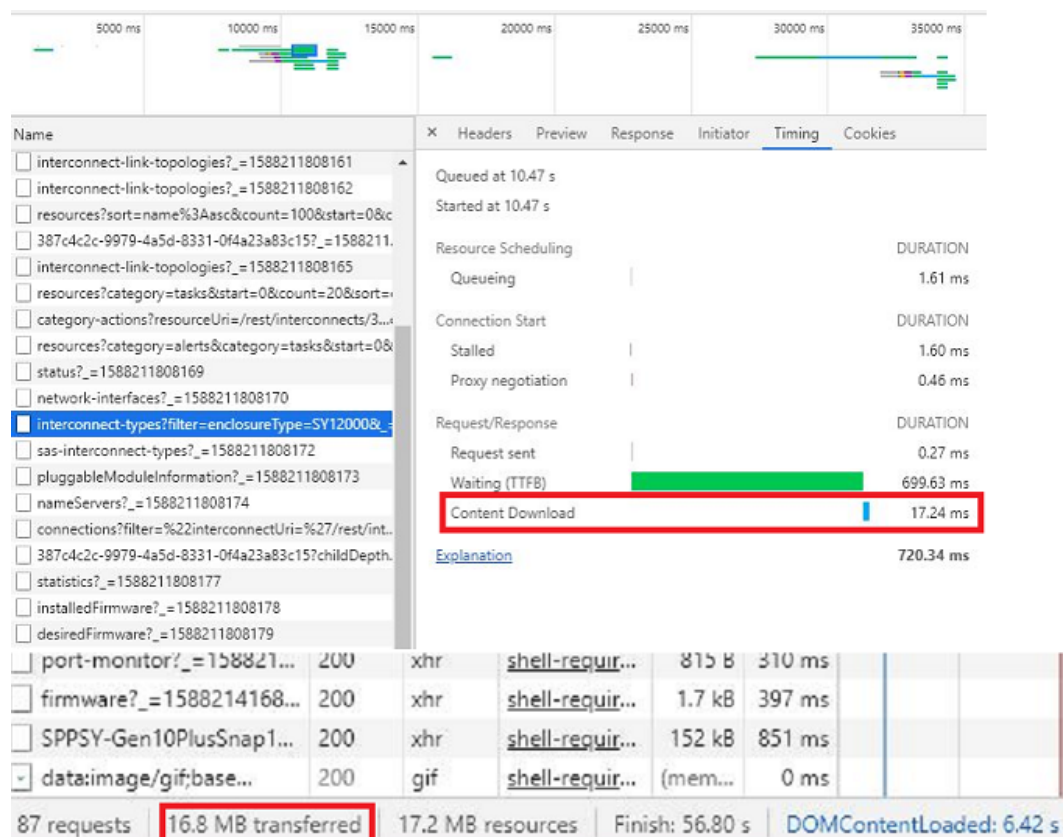
#### 1.2 Page Load Time With Gzip

**Load timings (ms)**

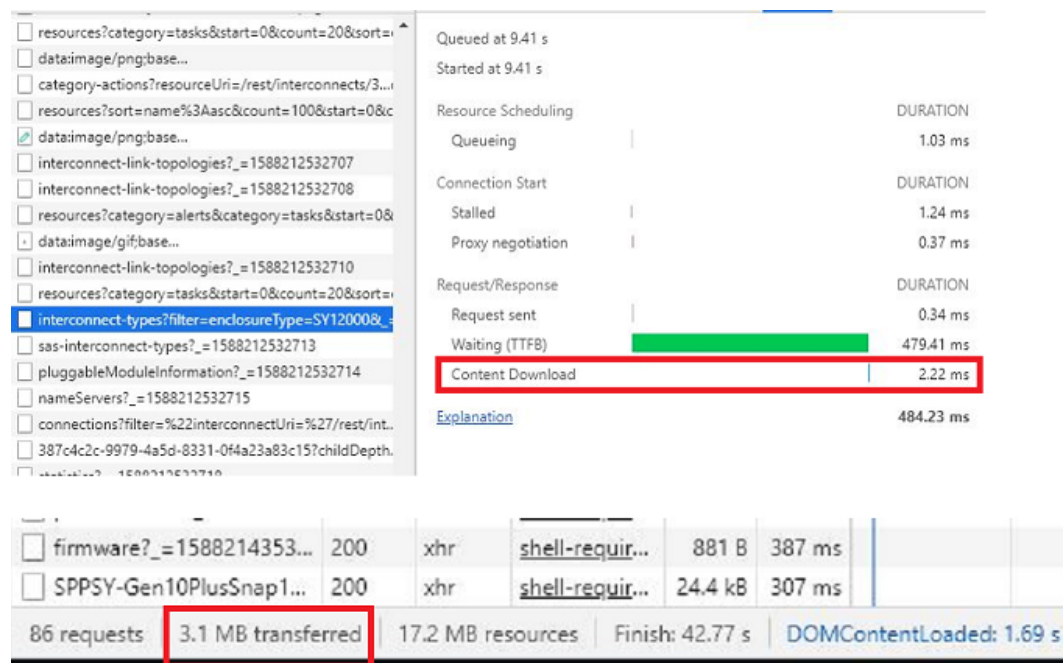
Redirect Count: -

Event	When	How long	Sum
Redirect	0	0	0
DNS	1	0	0
Connect	1	0	0
Request	10	362	362
Response	373	1	363
DOM	681	8847	9210
Interactive	1082	0	-
Content loaded	1082	0	-
Load event	9529	1	9211

#### 2.1 Content Downloaded Size and Time Without Gzip



## 2.2 Content Downloaded Size and Time With Gzip



Above results shows significant improvement page/content load time and content downloaded when Gzip Compression is enabled.

What are the other competitive approaches ?

Enabling gzip compression is a standard practice. If the users are not using it for some reason, web pages are likely slower than competitors. All modern browsers understand and accept compressed files. There can be other effective approaches on top of Gzip compression, which can further improve bandwidth utilization and response time. But there are other competitive frameworks like Brotli which makes use of a dictionary and thus it only needs to send keys instead of full keywords and thus gives better performance than Gzip. Brotli is a newer data format specification that takes advantage of multiple algorithms to condense data more efficiently than Gzip.

**What is the current Status**

Completed implementation

**What are the next steps**

Explore and improve in Dynamic Compression methodologies over current solution of static compression.

**Acknowledgements**

Thanks to Arun Mohan for investigating in this effective area. This idea give seamless and fully responsive experience for web applications and saves significant amount of bandwidth.

**References**

<https://betterexplained.com/articles/how-to-optimize-your-site-with-gzip-compression/>

<https://medium.com/@ali.dev/how-to-setup-caching-gzip-compression-in-apache-web-server-with-htaccess-292a0f689553>

<https://2014.jsconf.eu/speakers/raul-fraile-how-gzip-compression-works.html>

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