



DRIVING DIGITAL SUSTAINABILITY WITH CARBON NEUTRAL WEBSITES

Table of Contents

01 INTRODUCTION	3
02 KEY FINDINGS FROM DATA ANALYSIS	4
03 KEY OBSERVATIONS AND ANALYSIS	5
04 BASIC GUIDING TENETS FOR WEB DESIGN -BASED ON MOVATE'S DIGITAL ASSURANCE FRAMEWORK.....	6
05 REFERENCES	6
06 ABOUT THE AUTHOR	7
07 ABOUT MOVATE	8

01 Introduction

The world is getting digitized, and more and more activities, tasks and functions are becoming dependent on digital content. The concept of digitization, over the last 40 years, has been an outcome of convenience, experience, the need for access to information, saving time and many more possibilities. The world without digitization is unimaginable in multiple dimensions. The three main assets as part of any digitization setup are hosting centers, networks and devices. The data centers host the content, and transmit this information through the network connections, and finally push the information onto different devices (end-users). Now, it is interesting to note that 'going digital' is not carbon-free but more like using 'very less carbon'.

Various studies estimate the contribution of web technologies to the carbon footprint between 2.3 – 3.7 percent of global CO₂ emissions¹. The term carbon footprint is catching up fast and helps us understand the levels of emissions of gases that cause global warming and impact climate change. To drive sustainability, it is imperative to understand the underlying contributors of carbon sources, no matter how small their contribution.

A carbon footprint is a measure of the total greenhouse gas emissions caused by an individual, event, organization, service, place or product expressed as a carbon dioxide equivalent. Recent research estimates the information technology sector's carbon footprint to be 1.4% of overall global emissions, and the sector uses 3.6% of the global electricity for its operation. This sector's carbon emission comes from user devices, such as phones, tablets, computers and modems, followed by communication networks for both fixed and mobile access, and data centers, including enterprise networks and operator activities.

In India (778 million) and China (988 million) alone there are about 1.76 billion internet users. Now, doing the math of 1 hour internet usage per day and 100 days in a year would lead to an astronomical figure of 200 billion hours of computer/mobile usage in a year. The digital chain for all digital content consumes energy, and has a direct impact on the global CO₂ emissions. Going back to January 2020, global statistics suggest that there are approximately 1.74 billion websites running on the internet with 4 billion+ estimated daily visitors². There are also 8.9M mobile apps as per a report³ and all these add to carbon footprint scores.

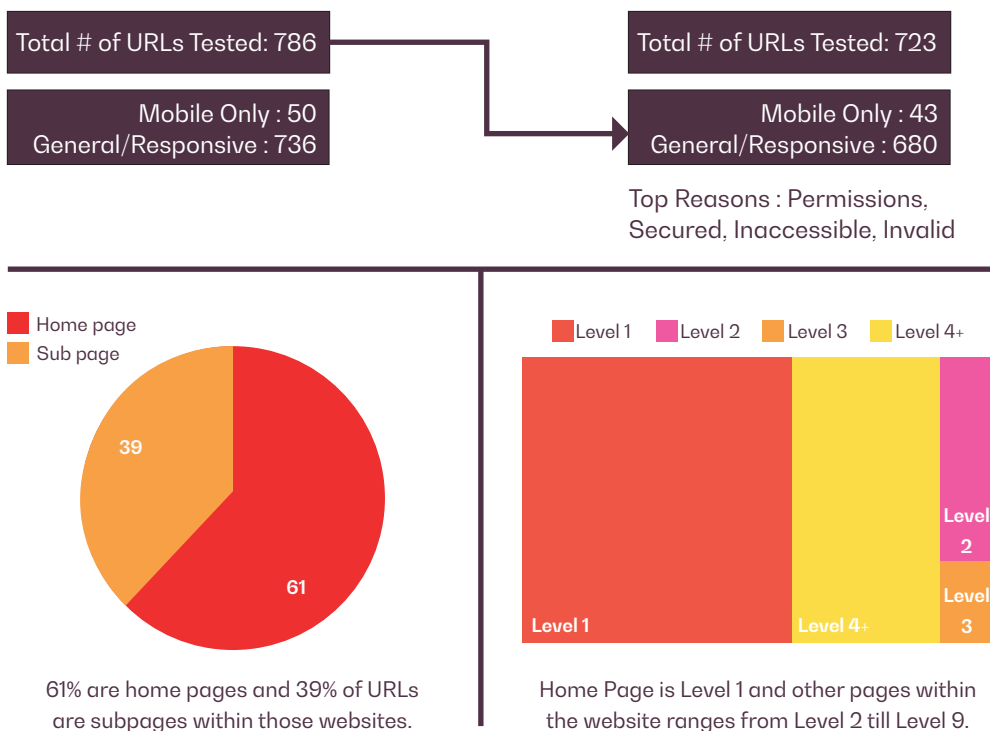
A study conducted in 2016 showed that data centres across the world consume more than 400 terawatts per year, which is about 3% of global consumption⁴. In the future, internet transaction volumes are expected to continue to grow, partly because a larger share of the global population will be connected, and also due to the expansion of Internet of Things (IoT) devices⁵.

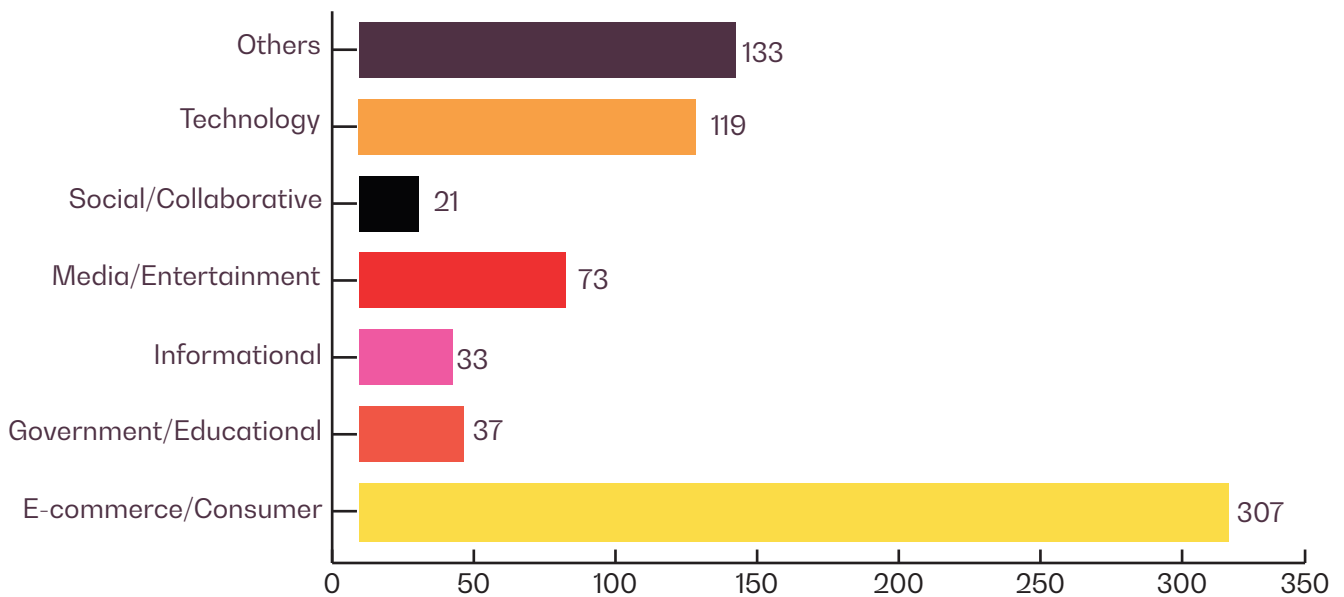
There is an increased focus at the consumer as well as corporate level on green and sustainable operations. With organizations committing to net-zero emissions and sustainable development goals, decarbonizing digital assets is gaining significant traction across industries. Reducing the carbon emissions associated with a website boils down to reducing the amount of electricity being used to load, send, and view a web page, and then ensuring the resulting electricity required is from clean, renewable resources. This requires a process to study the information flow through web infrastructural components and benchmark the present level of carbon footprint to identify the improvement areas, which are then followed by taking definitive actions and validating the changes as part of continual improvement cycles.

Movate has been a leader in website and digital asset optimization for leading global brands. As part of the digital initiative, Movate has started to expand its capabilities to include website carbon neutral strategies, and cater to the growing demand for sustainable services for existing and new clients. Movate has conducted extensive research work on assessing carbon scores of over 500 websites, and analyzed the factors that impact the scores and devised optimization approaches for greener websites.

02 Key findings from data analysis

Though 780+ URLs are accessed for evaluation, only 723 pages were accessible due to permission issues, security or invalidity. The data extraction was performed using automated custom-built methods and passed through open-source tools.





The distribution of URLs by domain is represented in the above chart, with e-commerce and technology websites and the 'others' category of websites crossing the 100 mark.

03 Key observations and analysis

Carbon footprint scores are between 0 and 100 with 100 being the best. These scores are generated by ecograder (Ecograder.com), a publicly available carbon footprint website score. This website computes the scores based on searchability, speed of page, responsive design support and hosting adherence.

- Only 18 URLs had high scores (>90 or more) on searchability. These scores are a reflection of the ease to search for information on search engines.
- 167 URLs had high scores (>90 or more) on response time. The universally accepted benchmark is 3s, and these websites have response times between 4s to 1s. Most of these websites are either technology or e-commerce portals, and account to 100+ URLs.
- 142 URLs appear to have adopted green hosting, and this is a critical factor for high scores of carbon footprint. The average carbon scores for these green hosted websites are 67 with the highest of 82.
- In websites where one does not host pages on green servers (581 URLs), the scores ranged from 8 to 57, with an average score of 35.

Row Labels	# of URLs	Speed (0 to 100)	Searchability (0 to 10)	Green Hosting (0 to 1)	Ecograder (0 to 100)
E-commerce/consumer	307	56.60	3.72	0.07	31.82
Government/educational	37	79.54	7.49	0.14	48.41
Informational	33	80.85	7.45	0.15	43.48
Media/entertainment	73	58.33	7.43	0.12	39.00
Social/collaborative	21	77.52	7.81	0.29	49.81
Technology	119	84.15	7.53	0.52	58.38

Observations also indicate that a majority of the websites have sustainability issues with both mobile and general websites (www.abcxyz.com versus m.abcxyz.com). The carbon scores appear to be within 2% range. The same appeared to be true for global brands with multiple regional websites. The poor scores in the site were consistent across regions (US region site vis-à-vis UK regional website). The scores of home page vis-à-vis child pages also appeared to be within 10%, and hence driven by content, page speed and search options. Further, to explore the factor of green hosting, an exercise was conducted to re-design sample URLs and host it on green servers. This experiment was conducted on lighter pages of 5 domains, and the results of **carbon scores increased from 10 points to 20 points**. These results may also indicate that irrespective of all the factors of UX design and page structure, **green hosting is the dominant factor in improving the carbon scores**.

04 Basic guiding tenets for web design based on Movate’s digital assurance framework

Let Movate’s digital assurance framework be your guidepost. Consider the following tenets:

- The purpose of a web page is to connect to end-users, and hence it is better to keep it light, simple and user-friendly for a diverse range of audiences.
- The search optimization design must be a part of page development. No matter what page one designs, it is better to follow the standards.

- Web pages have to be fast and responsive across multiple devices, channels and networks.
- Testing and verifying a website with 100 pages vis-à-vis 1000 pages are going to be tedious and costly.
- However, following the user journeys can lower the risk, and enhance the right pages to cover first.
- Adopt 100% automated monitoring with a combination of optimized algorithms to effectively improve coverage and smart testing principles.
- Last and most important of all is the need to shift to green hosting servers

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06 About the author



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07 About Movate

Movate, formerly CSS Corp, is a digital technology and customer experience services company committed to disrupting the industry with boundless agility, human-centered innovation, and a relentless focus on driving client outcomes. Recognized as one of the most awarded and analyst-accredited companies in its revenue range, Movate helps ambitious, growth-oriented companies across industries stay ahead of the curve by leveraging its world-class talent of over 11,700+ full-time Movators across 20 global locations and a gig network of thousands of technology experts across 60 countries, speaking over 100 languages.

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