

Digital Signage Transformation

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1 – Introduction

Communication is critical. It is arguably the key to success in an increasingly dynamic and fast-paced world of business. Digital signage presents a unique opportunity to enhance internal communication, boost employee engagement, and streamline information dissemination in the workplace. The aim of this project was to plan and implement a modern digital signage solution for a manufacturing company.



2 – Research

Digital signage is a network of digital electronic displays that display text, animated or video messages for advertising or information. [1] Digital displays improve over traditional signage installations by enabling frequent, timely updates, and dynamic, context-aware experiences. [2] In 2022, the global market for digital signage had a value of \$24.86 billion, and the global compound annual growth rate is tapped to be 8%. By 2030, this could bring the total value of the digital signage market to \$40 billion. [3]



3 – Design

To replace the existing digital signage system with something more modern, we needed to design a robust solution to provide a viable alternative. Initial prototyping gave us an idea of the kinds of technologies available to us, which enabled us to create a detailed set of requirements. We designed a comprehensive survey that would help us test the system’s effectiveness and user experience.

4 – Implementation

We used the Raspberry Pi single board computer as the foundation of the new system, building software solutions to help manage the content distribution and health monitoring of the overall system. Technologies used include Bash, Golang, NodeJS and ReactJS. The resulting system had innovative features such as the ability to cache content for offline playback in the event of a network outage and use the multi-HDMI output of the Raspberry Pi to display on two screens at once.

A real-time monitoring solution called DisplayWare was developed to help technicians troubleshoot the system and remotely reboot devices in the event of a problem.

DisplayWare Suite			
Navigator	gbsuk0pcdlx004		
Display Devices	Shut Down Restart		
gbsuk0pcdlx004	 gbsuk0pcdlx004 Operating System Ubuntu CPUs 4 Memory 4 GB Hostname gbsuk0pcdlx004		
Network Information		General Information	
Network Interfaces IP Addresses		MAC Address	
br-3c79a12b81fa		172.18.0.1/16	
docker0		e2:72:32:59:cc:3a	
enp0s31f6		b0:22:7a:e9:f1:99	
enx489ebd3881b5		43.210.10.37/24	
lo		fe80::5f0a:d8fd:ebe7:77c5/64	
wlp0s20f3		127.0.0.1/8	
wwan0		::1/128	
		43.210.16.185/24	
		fe80::cbb:8792:93f2:7f2f/64	
		f0:9e:4a:30:14:48	
		CPU 4	
		Memory 4 GB	
		Disk Size 32 GB	
		Disk Usage 61%	

5 – Evaluation

Participants in a survey were asked how well they ranked the old and new systems on several metrics including overall satisfaction and ability to deliver relevant content. Overall, the new system scored higher, with the average satisfaction score of the new system being 4.2, a marked improvement over the old system at 2.7. Overall, the project has been a huge success and will continue to be developed over the coming years.

References

- [1] J. Schaffler, Digital signage - software, networks, advertising, and displays: A primer for understanding the business. New York: Taylor & Francis, 2008.
- [2] F. A. Nigel Davies Sarah Clinch, “Pervasive displays: Understanding the future of digital signage,” Synthesis Lectures on Mobile and Pervasive Computing, 2014, doi: <https://doi.org/10.1007/978-3-031-02484-9>.
- [3] ScreenCloud, “Digital signage industry trends and statistics.” Accessed: Apr. 04, 2025. [Online]. Available: <https://screencloud.com/digital-signage/statistics-trends>