Challenging COVID-19 with Open Source Technology

Survey conducted: April 2020

**The Payara® Platform - Production-Ready,
Cloud Native and Aggressively Compatible.**

Introduction

Open Source technology is helping organisations worldwide overcome challenges presented by the COVID-19 pandemic.

Whether used to facilitate the exchange of information between resource providers and those in need, as seen in China, or for the development of a tool to estimate the impact of COVID-19 on local communities, as seen in the US, it is clear that open source technology is playing a pivotal role in helping individuals, communities, organisations and governments circumvent and control the coronavirus.

What isn't as clear, however, is how the pandemic has impacted the use of open source technology on a smaller scale, within individual organisations.

Therefore, the objective of this research, undertaken by Payara Services Ltd, is to understand and provide greater insight into how organisations are using open source technology during this 'unprecedented' period, whether they have had to make any significant changes to support business continuity, and what challenges have been presented as a result.
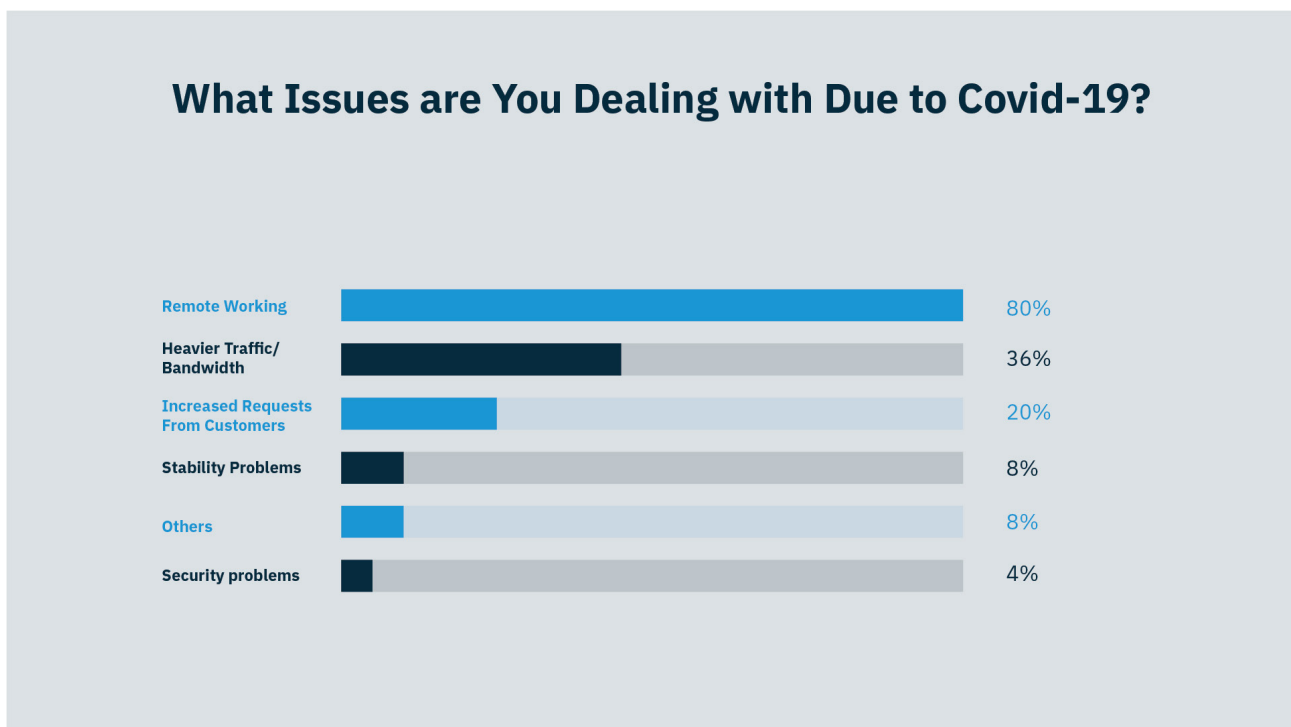
The results prove interesting and demonstrate the fundamental role open source technology will continue to play in helping global organisations adapt and find new ways of working, as we reach, what will become, the 'new normal'.

Executive Summary

The research presented the following statistics:

Remote Working has been cited as the biggest challenge presented by COVID-19, followed by heavier traffic and bandwidth issues.

Phishing scams, network security, and an increase in server requests have sparked **Security and Stability** concerns.

What Issues are You Dealing with Due to Covid-19?

Remote Working	80%
Heavier Traffic/Bandwidth	36%
Increased Requests From Customers	20%
Stability Problems	8%
Others	8%
Security problems	4%

Despite challenges in adapting to remote operations, the majority of respondents had **Business Continuity** processes in place, prior to the pandemic outbreak.

COVID-19 has **changed the usage** of open source application servers, runtimes and microservices, with:

- Usage increasing in some organizations
- Usage of container technologies, such as Docker and Kubernetes
- Migration to an alternative application server
- Moving business operations to the **cloud**.

Open Source technology is being used to aid and benefit **coronavirus research** and recovery efforts, from driving data collection through to supporting healthcare organisations in using open source software.

Throughout this whitepaper, we explore the key statistics in more detail and discuss how organisations can use open source technology to overcome challenges presented by the pandemic, whilst providing insight into how tech professionals are using open source to help organisations and wider communities combat COVID-19.

Key Findings

Payara Services Ltd surveyed its open source community in April 2020, where the results presented the following key findings of challenges experienced during the pandemic:

Remote Working

It is estimated that a third of the global population was under 'lockdown' at the peak of COVID-19, resulting in significant challenges for organisations worldwide who have been forced to close their doors and operate remotely.

Despite reports predicting a permanent shift to remote working once office closures are lifted, **80%** of respondents cited remote working challenges as the biggest issue presented by the coronavirus pandemic.

Remote working challenges were followed by **heavier traffic** and **bandwidth challenges**, as reported by **36%** of respondents.

Open Source and the Shift to Remote Working

Any unplanned and rapid shift to remote working results in significant pressures on existing systems. Open Source applications, together with moving business operations to the cloud, have proven valuable during this shift, particularly in maintaining business continuity and enabling staff members to operate as 'usual' from home.

As key information systems move from within the data-center to online and become accessible over the Internet to remote workers, it is inevitable that organisations will experience increased traffic, resulting in increased bandwidth usage and requirements for 24/7 high availability. An increase in the use of video conferencing and workers accessing systems from poor Internet connections can result in latency and performance issues. Addressing these challenges is essential to maintaining access for business continuity.

Organisations planning to implement permanent remote working policies will need to undertake a review of existing IT, technology, and cloud-based systems. For example, what may be sufficient for current staff levels working remotely may not sustain business growth, essentially impacting service delivery as the business scales. Open Source platforms like Jakarta EE and Eclipse MicroProfile provide industry leading frameworks and runtime platforms for building Internet services at scale, delivering high performance, scalability and availability when moving previously internal applications online.

The value of open source in supporting the rapid shift to remote working is demonstrated in an alternative way through Swiss developer, HankiDesign., The company has used open source to create a free resource platform that offers services, tools, and resources to support distance learners and remote workers with a view to "help people make the best of the unfortunate situation and continue with their daily tasks."

The platform combines an extensive list of resources to help both remote workers and children, whilst offering tools to aid teachers and parents in adapting to this change. Developed at speed, the HankiDesign platform showcases the solution-focused nature of the open source community and the valuable role it has played during the pandemic.

Security and Stability

The rapid shift to remote working has resulted in significant security and stability issues for organisations globally, as confirmed by the following statistics:

Is Coronavirus Creating Security Concerns?

8%

32%

- Yes
- No
- Not Sure

60%
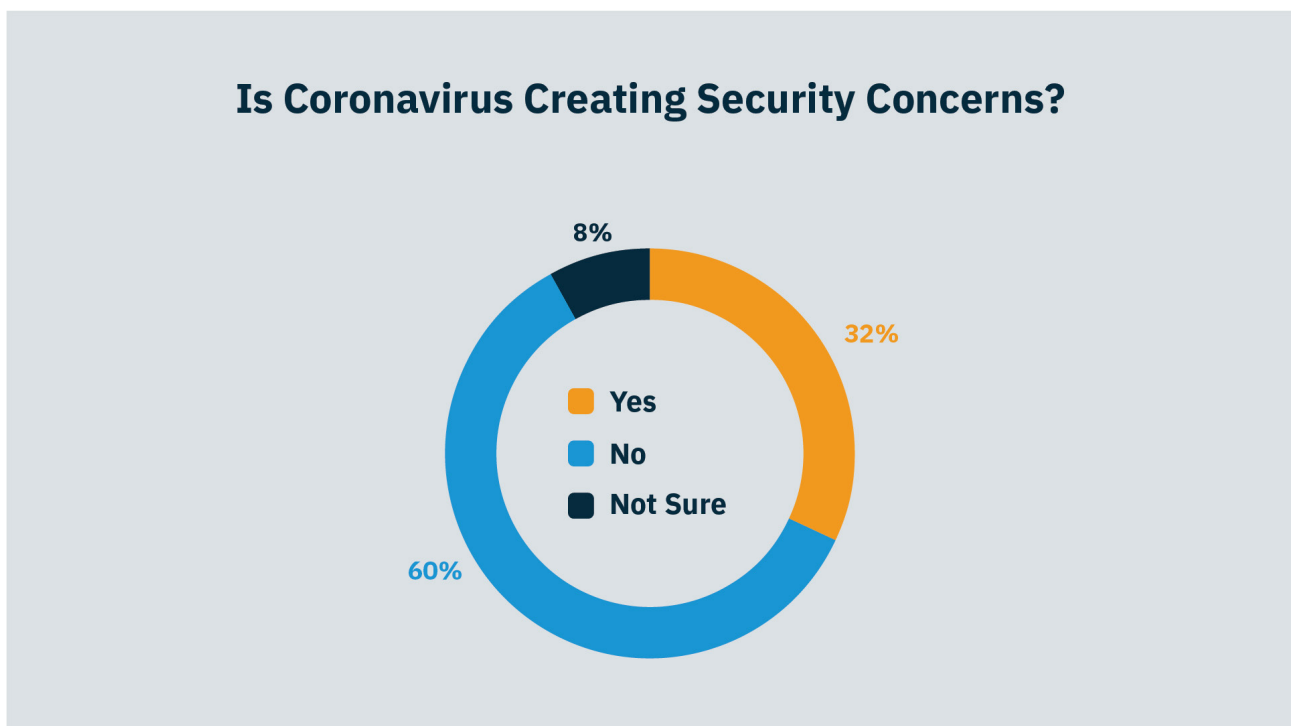
32% of respondents have advised that coronavirus has created security concerns within their organisation, which included:

- Network technology security issues
- Secure remote working
- DOS Attacks
- Server Attacks
- Phishing or Scam Emails

Is Coronavirus Creating Stability Problems?

8%

24%

Yes
No
Not Sure

68%
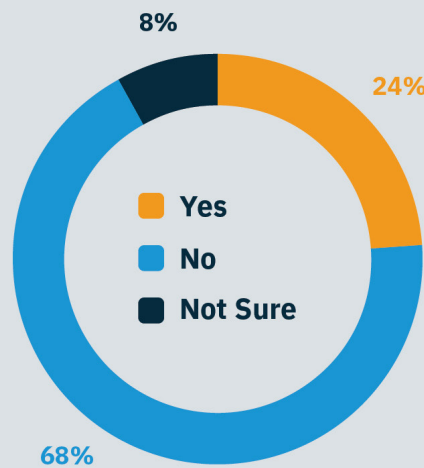
A quarter [**24%**] of respondents also cited stability concerns as a result of the pandemic, which extended beyond technical issues. These included:

- Financial concerns
- Staff availability
- Staff morale
- Web applications being able to run 24/7 to enable remote working
- Server request increases

Combatting Security and Stability Concerns

A growing number of cyber criminals are continuing to exploit the COVID-19 outbreak for their own personal gain, forcing organisations globally to evaluate their cyber security measures. Simplistic processes like keeping employees informed about phishing scams are proving valuable, but it's still vital to assess both the security and stability of existing applications.

With remote working, applications that were previously only accessible from within the security of the organisation's Intranet may now have to be made accessible over the Internet. This makes these applications vulnerable to malicious actors and denial of service (DoS) attacks. Moving applications onto fully-supported and stable open source application server runtimes, which are widely used in Internet applications - and ensuring they are configured correctly for security - can mitigate some of these risks, together with robust network and application security practices.

The growing cyber security threats during the pandemic have been confirmed through recent research by the World Economic Forum, which revealed that hacking attacks and phishing emails could become the new norm post COVID-19, leaving organisations more at risk of cyber-attacks for 'months or years to come'. This is evidenced by the fact the number of attacks against organisations grew exponentially during April 2020, reaching a four-month high.

To help combat this threat, cyber security specialists, Anomali, have collected, curated, and distributed the clear and concise open-source intelligence needed to help organizations defend against growing cyber threats.

This has been delivered through two key resources: The COVID-19 Campaign Threat Model and a COVID-19 Threat Bulletin, which are continually updated with the latest COVID-19-related information to provide businesses with a steady stream of new and actionable intelligence.

Business Continuity

Was Your Open Source App Server Set Up Properly for Business Continuity Before Coronavirus?
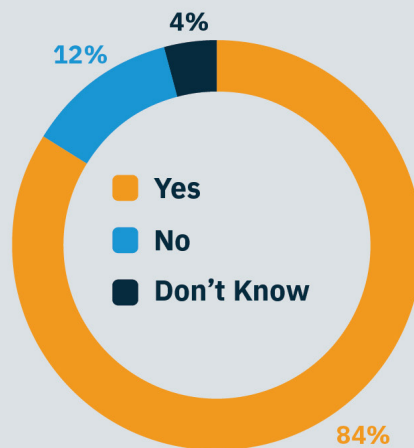
Despite issues experienced over remote working and security and stability, the majority **[84%]** of respondents advised that their open source app server, runtimes and microservices were set up properly to support business continuity prior to the outbreak of COVID-19.

Of the **12%** of respondents who had not set up open source applications to support business continuity, the following activity was implemented to maintain operations during the pandemic:

- Increased network capacity
- Strengthened communication
- Upgraded to the latest version
- Created a cluster with high availability
- Containerised and moved it to the cloud with a container management feature

The Value of Containers

Containerisation is a logical move for organisations looking to strengthen business continuity during the coronavirus pandemic. Aside from offering additional stability, containers provide excellent architecture for hybrid cloud and multi-cloud scenarios and by carrying all dependencies, the software only needs to be written once and can run across laptops, cloud and other computing environments without needing to be re-configured. Organisations can use pre-configured base images with baked in best practice security configuration to move applications into the cloud.

As a result, the organisation can quickly adapt operations, whilst meeting fast changing customer requirements, which will prove invaluable as businesses continue to alter working practices both during and post COVID-19.
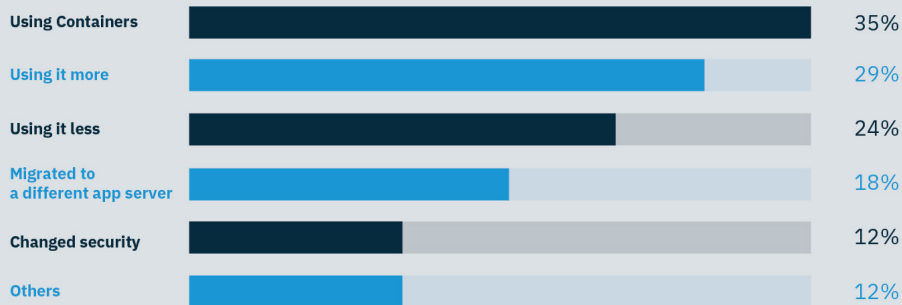
Has Open Source Use Changed?

Has Your Use of Open Source Tech Changed Since Coronavirus?

28%

72%

■ Yes
■ No
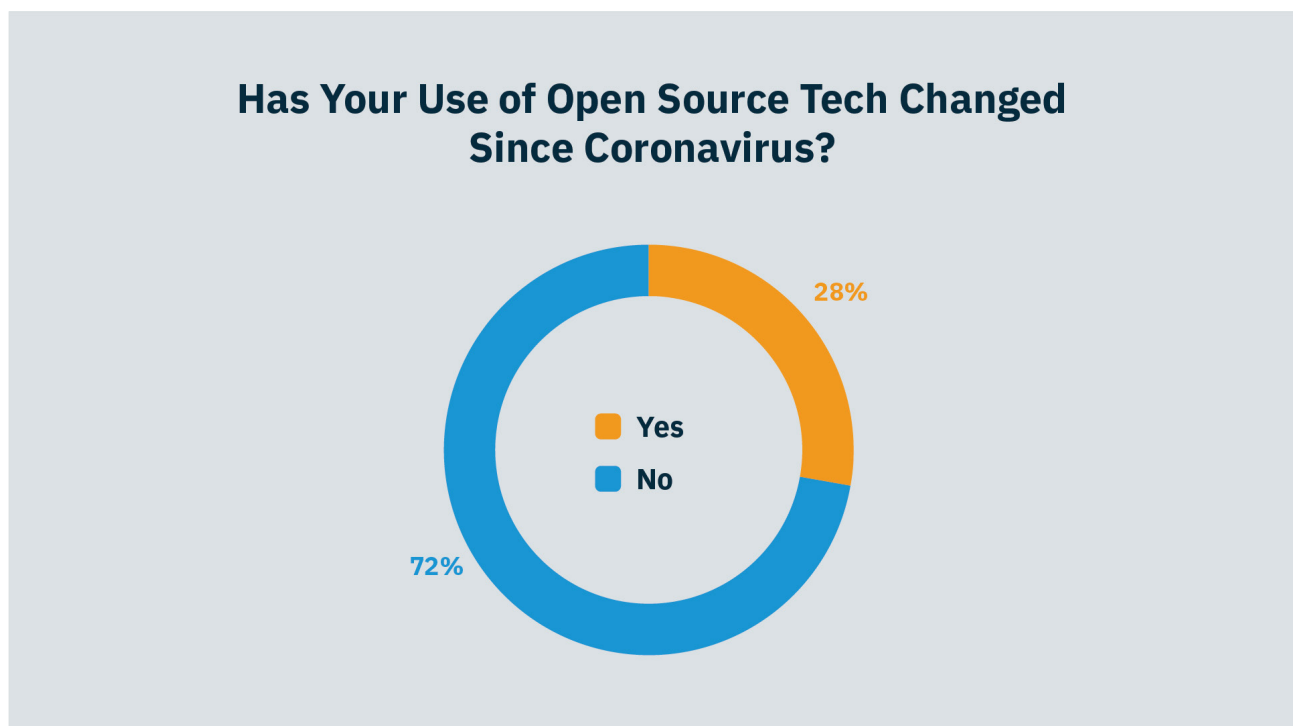
28% of respondents advised that their use of open source application servers, runtimes, and micro-services has changed as a result of COVID-19 with:

- 35% advising that they have started using containers
- 29% confirming an increase in usage
- 24% confirming a decrease in usage
- 18% migrating to an alternative server

How Has Your Use of Open Source Changed as a Result of Covid-19?

Using Containers	35%
Using it more	29%
Using it less	24%
Migrated to a different app server	18%
Changed security	12%
Others	12%

In addition, a quarter **[25%]** of respondents advised they have moved business operations into the cloud as a result of coronavirus for easier remote access.

Migrating to cloud platforms enables greater resilience when moving applications online. This is because cloud platforms drive business continuity through collaboration and accessibility, whilst enabling applications to scale out on demand; therefore alleviating risks associated with increased traffic and bandwidth.

Have You Moved Business Operations into the Cloud as a Result of Coronavirus?

25%

Yes

No

75%
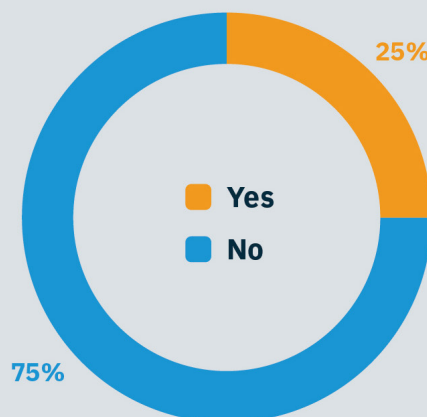
The value of migrating operations and/or applications to the cloud has been experienced worldwide and has proved fundamental for upholding vital services during COVID-19, such as the provision of healthcare.
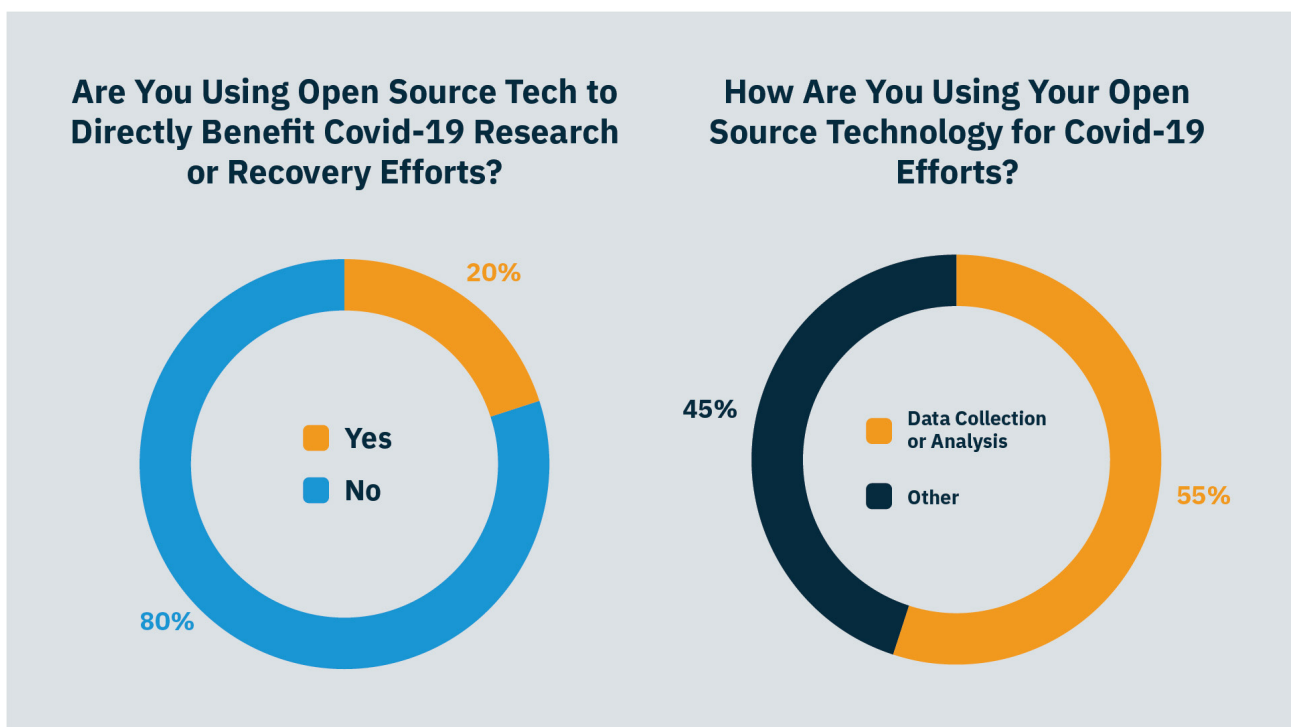
For example, a report by US digital transformation providers, West Monroe, revealed that many hospitals, healthcare institutions, and government health service agencies have migrated their data to the cloud to optimise services and maximise patient outcomes.

This early cloud adoption has been vital in the fight against the pandemic, by enabling US health-care providers to analyse relevant data to improve response. In addition, migration to the cloud has reduced operational costs whilst driving collaboration through data and system integrations.

Open Source technology and cloud often go hand in hand, particularly for organisations that have implemented a 'hybrid' or 'multi-cloud' model to avoid reliance on one particular vendor. Under this model, open source technology and technology stacks are used to run the hybrid cloud environment, providing flexibility and eliminating issues associated with 'vendor lock-in'.

COVID-19 and Changing Environments

Open Source technology is renowned for its capability to offer a solution for rapid change. This is demonstrated by the fact a fifth [**20%**] of respondents advised they are using open source application servers, runtimes, or microservices to directly benefit coronavirus research and recovery efforts, and over half [**55%**] are using their open source technology for data collection or analysis during the pandemic.

Are You Using Open Source Tech to Directly Benefit Covid-19 Research or Recovery Efforts?

20%

Yes

No

80%

How Are You Using Your Open Source Technology for Covid-19 Efforts?

45%

Data Collection or Analysis

Other

55%

Of these respondents, some have committed to data collection and analysis to help officials gain greater insight into the spread and trends of the pandemic, with others supporting health organisations in the use and development of open source software.

For example, one respondent advised they were in the process of building a small business application to analyse patient cases and demographics, together with patient infection rates within specific regions to help restrict the spread of the pandemic.

Similar examples are prevalent throughout the open source community and range from virus symptom tracking applications through to sourcing vital medical resources to strengthen the frontline.

Community Code, Community Support: The Role Open Source Continues to Play in Fighting the Pandemic

Since the outbreak of the coronavirus pandemic, communities have gathered to support the vulnerable and show appreciation for dedicated frontline workers. This same ethos is prevalent in the open source community, as members work together to build stronger and agile technology that continues to help governments in their battle through the pandemic and in helping organisations adapt to a new normal.

This is effectively demonstrated by Neo4j, a market leader in graph databases, who have worked with data scientists and researchers to create 'COVID Graph'. 'COVID Graph' is an open source graph database that brings together information on COVID-19 from different sources, such as medical practitioners, public health officials and other scientific publications; enabling people to make connections between facts and review long-term solutions.

Another key example is that of 3D printing company, Markforged, who open sourced the design for face masks, protective shields, nasal swabs and other PPE equipment. By making the decision to open source the print files, Markforged enabled anyone to have access to these resources; effectively demonstrating how open source can quickly produce any solution for those in need.

What's more, without open source, the rapid development and deployment of track and trace applications would not exist, businesses would have struggled to pivot and adapt at the same rate, and many remote workers would not have been able to maintain 'business as usual'.

Therefore, if COVID-19 has taught us one thing, it is that community matters. For many organisations this 'community' will be a group of coders working together to build stronger solutions, underpinned by the power of Open Source.

About Payara

This research was conducted by Payara Services Ltd.

The Payara Platform Enterprise is production ready, cloud native, and aggressively compatible with the services you're already using. Stable and supported with a 10-year software lifecycle, the Payara Platform is designed for mission critical production systems and containerized Jakarta EE (Java EE) and MicroProfile applications.

Headquartered in the UK, with its EU office in Funchal, Portugal, Payara Services provides a seamless service to customers around the world, including BMW Group, Hermes and Rakuten Card.

For more information, visit: www.payara.fish

sales@payara.fish   **+44 207 754 0481**   **www.payara.fish**