

Global File Systems as a Solution in Challenging Times

By Mitch Lewis

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Executive Summary

The recent Covid-19 pandemic has brought a number of challenges to light for individuals and businesses alike, and has done so on a global scale. Among these challenges are financial and technical hurdles that may lead to organizations re-evaluating their information technology strategies to find new efficiencies in data storage, data protection, and global collaboration. This paper proposes Global File System technologies as a potential solution for the challenges IT organizations may face in a post-Covid world.

Challenging Times - In IT and the World

The whole world has been affected in some way by Covid-19 and IT organizations are no exception. While organizations may not be rushing to make any drastic changes in the midst of a pandemic, the challenges faced and lessons learned during this time will certainly play a role in shaping future strategies.

Top of mind may be a conscious effort to save money as many organizations have felt an economic impact or are preparing to proceed with caution as they enter into uncertain times ahead. 50% of respondents participating in a recent Evaluator Group survey¹ stated that they expect IT budgetary cuts due to Covid-19. While in some cases, this may mean avoiding any significant IT spending all together, this may not be feasible when looking to address some of the other concerns that have arisen due to the recent pandemic.

Perhaps the most obvious change for many with regards to Covid-19, has been an adjustment to remote work. The trend of working from home and flexible working environments was already growing, but large-scale quarantines saw the trend accelerate to a massive scale. Even as workplaces re-open, many are doing so in a staggered format, or continuing to offer remote work options, with some offering the choice as a permanent transition. With this in mind, IT organizations will need solutions that support data access and collaboration in this new work dynamic for the long term.

Other key challenges brought to light by recent events include the areas of data protection, security, and ransomware recovery. While certainly areas of focus in the pre-Covid world, their importance has been

¹ Evaluator Group Research Study “Enterprise IT Responds to COVID-19”

further magnified recently as bad actors have used the chaos of the pandemic as an opportunity to exploit organizations with inadequate data practices.

The Global File System

A Global File System is a file-based storage solution that uses central cloud-based storage in conjunction with intelligent caching technology at the edge. Solutions that have been identified as part of this category include Nasuni, Panzura, Ctera, LucidLink, and Netapp's Global File Cache. These solutions have been referred to by a number of different names within the storage industry, including Hybrid Cloud Storage System, Cloud Native File System, Distributed Cloud File System, and others. The imprecise naming convention leads to confusion regarding the utility of the technology; however, the solutions can be distinguished by a set of common characteristics.

Global File Systems utilize cloud storage, either public or private, as a central, gold copy of data that is then cached to local systems for quick, efficient access. Depending on the solution used, these local systems may be a physical or a virtual appliance. The whole system, including the cloud storage and edge caches, are presented and managed as a single namespace. These filesystems are designed to operate similar to a standard on-premises NAS system, however, they are actually truly global systems that maintain a master copy in a centralized cloud, often with the files stored as objects. This global system allows for increased data access as well as collaboration of multiple users accessing shared files using file locking technologies to maintain consistency. In addition to use as a primary storage system for file data, Global File Systems often contain functionality allowing them to be used as data protection solutions. As with all technologies, various advanced feature sets and differing technological implementations will differentiate the distinct Global File System solutions and their capabilities.

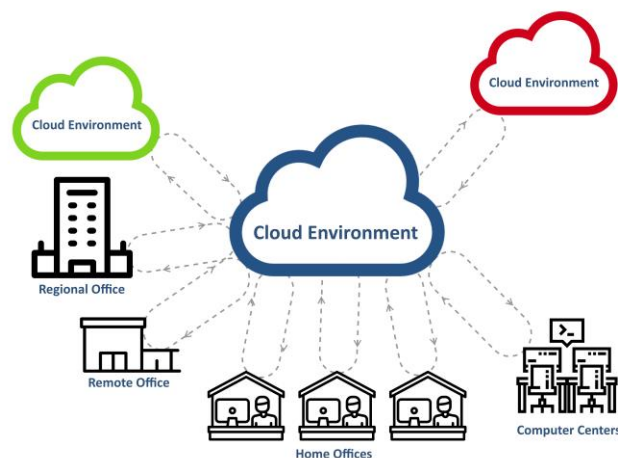


Figure 1: Global File System Architecture

More Efficient Cloud Storage

Organizations utilizing cloud storage from vendors such as Amazon, Microsoft, or Google has been an increasing trend, and one that will continue – even with a global pandemic. Cloud storage provides a number of benefits to customers including offloading physical hardware and management off-premises to be handled by a cloud provider. In addition, cloud storage offers flexible scaling and OpEx pay-as-you-go purchasing models. The Covid-19 pandemic has shown an increased focus on these values. In researching the impact of Covid-19 on IT, Evaluator Group concluded that among the changes most likely to become permanent are “Increased use of public cloud and/or infrastructure resources that are immediately available for a remote workforce” and “A slow but steady shift from CAPX to OPEX spending.”

A common issue with cloud storage, however, is that for certain use cases it can become incredibly expensive. Cloud storage is priced by the capacity stored, as well as egress costs that are charged as data is accessed. Because of this, it can be difficult for organizations to obtain the benefits of cloud-based storage for their primary storage, such as filesystems, especially when considering the current strain that many budgets are facing.

Global File Systems offer a solution that provides the benefits of cloud storage while doing so in an efficient fashion that directly addresses the ways that cloud services incur cost. In a Global File System solution, data can be deduplicated before being sent to the cloud, effectively reducing the amount of data that needs to be stored, and in turn the amount of capacity charged for usage. Even greater cost savings are achieved by using edge caching devices to avoid egress costs. In a typical cloud filesystem service, cost would be incurred every time a file was accessed. In a Global File System, data is cached to local storage from the master copy stored in the cloud. The caching systems use intelligent algorithms to predict what data is most likely to be needed. This way the majority of data is accessed directly from the cache, and egress costs are only required to access data that is not currently being stored at the edge.

Global File Systems present a cloud-based offering that provides organizations with the benefits of cloud storage and allows them to meet their cloud goals, but does so in a feasible way. When compared to a direct file storage service from a major cloud provider, Global File Systems are often a much more efficient and economical solution. In an uncertain economic environment, these cost savings may be a key contributor to decision making when adopting a cloud strategy.

Simplify On-Premises

As popular as cloud services have become, on-premises storage solutions are not likely to disappear anytime soon. On-premises storage systems represent a collection of technology and solutions that have become deeply engrained in IT and it takes time to make large operational transitions. Because of this,

the notion of a rapid change to a 100% off premises solution is often impractical, and instead a more gradual or hybrid approach will likely form a more feasible transition.

The Global File System solution is by nature a hybrid solution. While the cloud is used as a central, master data store, the system presents itself as if it is an on-premises NAS system. This method offers cost advantages against traditional on-premises solutions, just as it does when compared to traditional cloud storage solutions.

A Global File System utilizes its cloud storage to combine multiple functions of on-premises infrastructure. These solutions can be implemented to consolidate traditional NAS, file-sync, and even backup solutions into a single cloud service. This takes a significant amount of hardware, as well as management and administration, off-premises to provide impactful cost savings. Capacity will still be required to populate edge devices, however, the amount needed is only a small percentage of the total storage requirements as the majority of data will be off-loaded to the cloud.

In addition to using less capacity on premises, the capacity that is provisioned in the cloud is often much more economical. Many Global File Systems are capable of storing file data in the cloud as object storage. This solution allows for organizations to access their file data just as they would with a traditional NAS system, while simultaneously storing the majority of data on a more economical and highly scalable object back end.

As previously discussed, cutting costs is likely to be a key driver for IT organizations reacting to Covid-19 and the resulting economic conditions. The movement of hardware and management resources off-premises can be a cost-effective approach, but it also represents a significant shift in operational practices when compared to more traditional file solutions. It is still unlikely for Global File Systems to completely replace on-premises NAS solutions in the immediate future, but as adoption grows, the technology will help pave the way for an operational transformation that may be better suited for implementing file storage in a post-Covid world.

Enable Global Collaboration

The recent state of work environments has seen people more separated than ever with many self-quarantined and remote work becoming the norm. Social distancing came about suddenly, but will likely depart at a much more gradual rate, and remote work is anticipated to continue for the foreseeable future. For some, remote work is destined to become a permanent solution as companies and employees alike realize the benefits and adjust to a more public health conscious approach.

The mass transition to remote work has seen a number of challenges, with technical challenges being no exception. Workers may be physically separated, but they still require close communication and collaboration for their organization to run effectively and efficiently. There are currently many

technologies that help foster this remote collaboration, including teleconferencing and messaging systems, however efficient use of data storage presents its own unique set of challenges.

With remote workers being spread across vast geographic distances, in some cases across the entire globe, data access increasingly becomes an issue. Workers need to be able to access any file that they might need, and they need to be able to do so quickly. In addition, with many people collaborating remotely, it becomes vital that there is an accurate record of changes to any data and an effective method of handling simultaneous file access.

Global File Systems are well positioned to assist organizations in tackling these global collaboration challenges. Crucial to the value of a Global File System is the ability to access file data globally. These solutions solve the data access barrier issue by distributing data from a central cloud out to local edge devices where it can be accessed quickly and efficiently.

Along with accommodating efficient data access, Global File Systems are designed to facilitate effective collaboration when using data resources. A key characteristic of Global File Systems is the inclusion of a global file locking mechanism. This type of mechanism is used to ensure that while a file is being modified, conflicting changes cannot be made at the same time. Often, this is implemented as ensuring that the file is only available in a read only setting while it is being updated.

File history is also maintained as all changes can be stored in the central cloud storage. This allows for a clear trail of changes to be shown and provides versioning control to roll files back to previous versions as needed.

The flexibility provided to enable remote collaboration also allows Global File Systems to be an adaptable solution for future needs. As businesses expand with new work from home priorities, this offers a solution that can scale and grow to meet these needs in terms of both greater capacity and in additional collaboration requirements.

Addressing Data Protection and Security

Two areas of critical importance for every organization are data protection and data security. This is true whether there is a global crisis or not. The recent pandemic has only highlighted the importance of proper attention to these areas. System failures do not pause for chaotic global events and neither do malicious actors. In fact, increased numbers of phishing scams, ransomware, and other cyber-attacks have been reported during the Covid-19 outbreak. These malicious actors have found an extra advantage by attacking in a time of excess confusion or distraction due to new work environments and changing policies. Whether the issue comes from a hardware failure or a cyber-attack, ultimately the result will end in data loss or worse if the proper precautions are not taken.

With the effects of Covid-19 leading to an enhanced focus on protecting data, Global File Systems once again offer an appealing solution. Global File Systems lean on their cloud storage to provide built-in data protection and security practices. As a default, cloud service providers take extreme care to ensure that customer data is not lost. Data stored in the cloud is replicated across physical systems to protect against hardware failures. Not only is data secured in the cloud, but the responsibility to do so is transferred to the cloud provider, freeing organizations of time and resources dedicated to this.

While the built-in data protection and security features are true for any cloud service, Global File Systems can further expand on this to help organizations meet their data protection goals. Centralized cloud storage can now be used as a disaster recovery solution, rather than the traditional approach of a separate co-location site. Since the true copy of any file is always stored in the cloud, when a local cache device encounters difficulty, no data is really lost, only the cached copy. To recover, it is as simple as refreshing cache devices from the cloud, which can be done much quicker than a traditional fail-over and fail-back solution.

Global File Systems can also be effective in the battle against ransomware. The file system stores every change to a file as a new file in the cloud to populate a full version history of the file. Having this full version history allows organizations to combat data corruption due to ransomware by rolling back to an earlier version of the file.

The need for data protection and data security will not be going away anytime soon, despite any type of global event. As data loss continues to be an issue for organizations around the world, many will turn to the cloud for assistance. Global File Systems provide a way to utilize the cloud's secure data practices while simultaneously consolidating data protection resources and primary storage in to a single solution.

Conclusion

The Covid-19 pandemic has brought upon many challenges and will likely facilitate a number of operational changes both inside and outside of IT. The changes highlighted in this paper, such as reduced budgets, greater remote collaboration, and stronger emphasis on data protection practices were likely to become a focus eventually, but have been quickly moved into the spotlight as the world faces challenging circumstances. Because of this, the need to address these areas has been accelerated and organizations may look for a shift in operational practices to achieve this. Global File System solutions are one technology that addresses many of the impacts that have been felt. These solutions create a new approach that transitions much of the hardware and operation out of the data center and into the cloud for greater simplicity and potential cost savings, while appending additional features on to a standard cloud file service. They also help to provide collaborative data access and data security for organizations as they adapt to remote working trends and battle an increasing number of cyber threats.

The effects of Covid-19 have been widespread and have greatly shifted priorities in a number of areas, paving the way for new solutions, such as Global File Systems, to refine existing practices.

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