freistilbox
next-generation managed hosting

Scalable hosting for Drupal and WordPress

How freistilbox enables the cost-effective operation of large-scale websites

Introduction

As enterprise web applications evolve from simple collections of content to interactive information systems with lots of moving parts, they require faster, more comprehensive and more robust hosting infrastructure. However, operating this hosting infrastructure has traditionally been complex, time-consuming, and costly.

In the same way that hosted software applications, or Software-as-a-Service (SaaS), offer significant advantages over the client-server model, the freistilbox Managed Hosting platform provides a simpler, more powerful and more cost-effective deployment model for business-critical web applications. freistil IT operates freistilbox in the Platform-as-a-Service (PaaS) model which creates significant time and cost savings for its users.

freistilbox is a distributed enterprise hosting platform for websites based on Drupal and WordPress. It is designed to make sure it meets the three essential requirements for hosting business-critical websites:

- **Performance:** freistilbox can handle a huge number of concurrent requests.
- **Scalability:** freistilbox makes it easy to add capacity on demand.
- **Fault tolerance:** freistilbox stays operational even if single components fail.

This white paper outlines the details of the freistilbox architecture, and the benefits that can be realised by using the freistilbox Managed Hosting Platform.

Benefits of the freistilbox Managed Hosting Platform

Speed and Ease of Deployment

Running website instances for development or production takes a lot of time and know-how to install, configure, and maintain the necessary services. By automating this process, freistilbox streamlines web operations, driving down TCO.

Efficient Development Workflow

Launching test and staging instances on freistilbox is simple. Its deployment process can be easily integrated into the application development lifecycle and enables developers to deploy changes within seconds. Time-to-release is reduced significantly.

High Availability

Every component of the freistilbox platform has built-in redundancy so that the risk of downtime caused by either system failure or maintenance work is minimised.

High Performance

By harnessing the power of dedicated server hardware and short network connections, freistilbox offers maximum performance while still being much more cost-effective than public cloud offerings.

Scalability on Demand

Using a container-based private cloud infrastructure for its web application boxes makes an freistilbox Cluster easy and quick to scale. Capacity can be added or removed at any time, so freistilbox customers don't have to pay for an oversized hosting package just to overcome sporadic peak load.

Centralised Optimisations

With a continuous improvement process, freistil IT ensures that new features and optimisations benefit all users of the freistilbox hosting platform.

Cost Savings

Companies doing their own web hosting incur significant additional expense for IT staff and infrastructure. Being able to rely on a fully managed application hosting platform enables

freistilbox customers to focus on their core business. The 24/7 availability of support by experts in Drupal and WordPress hosting saves freistilbox customers time and money.

freistilbox customers are billed only by capacity provided, not by the number of hosted websites. This guarantees a fast ROI and simplifies budget planning.

Hosting platform architecture

The modern, distributed architecture of freistilbox offers significant advantages over legacy hosting approaches.

As you can see in the diagram, incoming web requests are processed by a chain of services before they reach one of the "boxes" running the actual web application.

HTTP requests to websites hosted on freistilbox are first processed by an *Edge Router* (based on nginx) which forwards requests to the right web application. It also acts as an SSL terminator, immediately decrypting SSL requests so they can be handled by the following stages efficiently as regular HTTP requests.

A customer's websites run on a dedicated *freistilbox Cluster* which consists of one or more *Application Boxes* (the actual "box" in "freistilbox"). In front of these boxes, a redundant pair of servers acts as *Content Cache* and *Load Balancer*. Before forwarding a request to the application boxes, the content cache checks if it already has the desired content in RAM and if that is the case delivers it immediately. The Varnish reverse proxy cache we use for caching is 100% optimised for Drupal and WordPress. It can process a multiple hundred requests per second. Only requests for which there is no valid cache content available get passed on to the application boxes via a load balancing mechanism.

This *Load Balancer* distributes requests between all the currently available boxes according to their capacity. Since it immediately responds to the health of each box, it gives the application cluster both *failure tolerance* (a box that becomes unresponsive will not be used) and *scalability* (a new box added to the cluster will immediately become active).

As the heart of each freistilbox Cluster, the *Application Boxes* run the customer's Drupal and
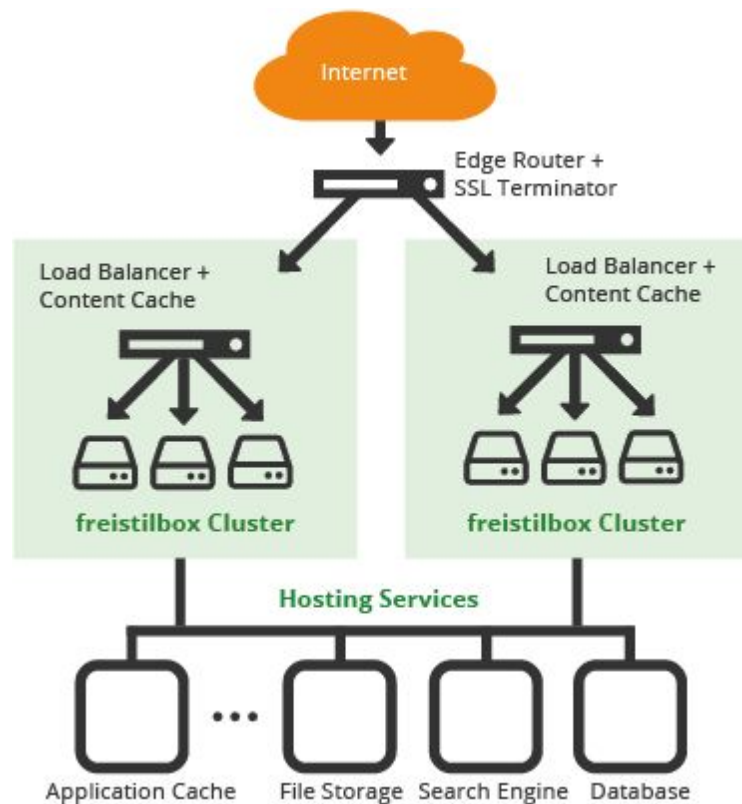
WordPress applications. The capacity of the cluster, determined by number and size of boxes, can vary to meet current demand.

Each freistilbox Cluster also comes with a dedicated *Shell Access Server*. While this server does not deliver web content, the web applications get also deployed to this server. Available to the customer via the secure SSH protocol, its purpose is to enable the manual or automatic execution of website operation and maintenance tasks.

Both Drupal and WordPress store website content in a *MySQL database*. freistilbox provides maximum database performance by using bare-metal servers equipped with fast solid state disks (SSD) and ample RAM for buffering. Data replication between identical database servers guarantees high availability.

For the purpose of storing internal application state replacing the database with a memory-based cache will increase processing performance by orders of magnitude and reduces overall system load. freistilbox provides dedicated Memcached servers as *Application Cache*.

Website asset files get saved to a *File Storage Cluster* with a distributed high performance file system. Each file is stored with triple redundancy; should a storage node fail, there will be at least 2 other copies of its files still available.

Content-rich websites can no longer rely on the simple search functionality built into Drupal or WordPress. Instead, web applications running on freistilbox can make use of a *Search Engine Cluster* based on Apache Solr. Not only does Solr make content search significantly faster, it also adds functionality like faceted search (i.e. repeated filtering of search results by content attributes).

With its distributed service architecture optimised for Drupal and WordPress, the freistilbox hosting platform is far superior to conventional, generic web hosting offerings both in terms of performance, scalability and fault tolerance.

IT infrastructure

We operate our hosting infrastructure in multiple data centres in Germany. By using high-quality hardware (server-grade disks, ECC RAM etc.), we keep hardware failure at a minimum.

Where system elasticity is more important than raw performance, freistilbox benefits from the advantages of a private cloud infrastructure we've built on the basis of Linux Container technology. This technology is much more resource-efficient than traditional virtualisation techniques and makes scaling the capacity of a freistilbox Cluster up (or down) a matter of seconds.

As server operating system, we exclusively use Ubuntu Linux Server Edition with Long Term Support (LTS). For every new LTS release, Ubuntu guarantees software updates for a five-year

time span.

Fully managed hosting platform

Managing a steadily growing IT infrastructure requires speed, scale and consistency. These three qualities are of a piece and any one depends on the other two. For example, scalability is not possible without being able to quickly add servers with a consistent configuration.

In order to achieve operational excellence and to ensure compliance to internal and external regulations, freistilbox is run almost exclusively by automated IT processes. All necessary system administration tasks are implemented in software. This avoids manual infrastructure changes by freistilbox engineers and, in consequence, minimises operational risk while optimising efficiency.

For the remaining few manual operations tasks (e.g., software upgrades), the freistilbox team follows written Standard Operating Procedures (SOP).

Maintenance

We announce scheduled maintenance tasks at least three days in advance on our status page. In order to reduce the risk of service disruption, we make an effort to perform necessary maintenance tasks during times with lower visitor traffic.

Sometimes, system failures or urgent security updates require swift action. In these emergency cases, we reserve the right to commence maintenance work without prior announcement.

Thanks to the high redundancy built into our hosting infrastructure, we can do many maintenance tasks (e.g. rebooting servers or restarting services) without affecting website uptime. In any case, we will use all available options to minimise the impact of maintenance work on website operation and update our status page with the progress of our maintenance.

Backup

We maintain a comprehensive backup solution that includes web application code, database content and static files. Each backup is held for a minimum of three days. Additionally, customers are encouraged to create additional backups independently. The number and volume of customer backups is limited only by the customer's available storage space.

Monitoring

We monitor our hosting infrastructure 24/7 and collect more than 100,000 performance metrics per minute in order to analyse the health and capacity of our services. That way, we can react to unplanned status changes at any time. If a hosting component operates outside of its normal parameters, the monitoring system alerts our on-call engineers via text message and phone call. With the performance metrics we collect, we can not only analyse the root

cause of service degradations but even take preventive actions before they occur.

Security

Data centre security

Our data centre partners employ best practices for data centre security. Data centre locations are not discernible as such from the outside and geographically distributed. Entrances and server rooms are monitored by CCTV. Access is granted only after checking credentials (passport) and authorisation. Visitors with access authorisation are continually attended by data centre personnel. By using multiple redundant uplinks, our data centre partners ensure frictionless data exchange with the internet. Network infrastructure is secured on multiple levels. Intrusion detection and traffic management enable fast reaction to abuse attempts and attacks.

Keeping your web application secure

Keeping a web application secure needs to be efficient. And updating your web application can not be easier than with freistilbox. If there's a new security patch, you simply apply it to your code base. With a single command, you upload the changes to freistilbox and within a second, your website runs on the new version. If you use a staging workflow, testing the update first on a separate website instance is equally easy and time-efficient.

If you'd like to automate this process, you can even integrate freistilbox with [Drop Guard](http://www.drop-guard.net), a third-party service that lets you update your web application with minimal effort.

Swift reaction to security incidents

As soon as we become aware of a security incident, we will escalate it immediately to company management. Within 24 hours, we will inform all affected customers. After the incident is resolved, we will issue a post-mortem report with detailed information about its cause and what we will do to prevent it from repeating in the future.

Secure remote access

Remote access is provided with individual, password-protected SSH keys. All SSH login attempts are logged and archived for auditing purposes. Admin access to freistilbox systems is limited to our IT operations team. Customers are only provided with limited user accounts.

If necessary, remote database access can be achieved via a protected SSH tunnel connection.

SSL/HTTPS encryption

The risk that unencrypted web communication creates for both website owners and individual website users can be significant. That's why encrypting traffic via SSL (Secure Socket Layer) and TLS (Transport Layer Security) has become indispensable for both B2C and B2B websites. If you are transmitting sensitive private data over the internet, using SSL on freistilbox gives you an important additional security layer.

The freistilbox Edge Routers decrypt incoming SSL requests before passing them on to the Varnish cache of your freistilbox Cluster. This not only takes the computational load required for SSL off your application servers but also enables Varnish to cache content even if it is transferred via SSL. For their excellent security standard, Qualys SSL Labs awarded our Edge Routers an A+ rating.

Privacy and data protection

We abide by all privacy laws and regulations that are applicable to our IT services and to our customers that host sites containing personal information on the freistilbox hosting platform. freistil IT employees have logical access to customer data stored in customer sites only if they are authorised and if their job function requires it. Neither our data centre partners nor any other third party employed by us have logical access to customer data stored on freistilbox. Any information that you provide will not be made available to third parties except in accordance with applicable laws and regulations.

We will transfer customer data out of the hosting infrastructure only by explicit request of the customer.

Customers must ensure privacy concerns and regulations are addressed and adhered to at the application layer where customer personnel may have logical access to personal information uploaded or stored in customer sites.

Our [Privacy Policy](http://www.freistilbox.com/privacy/ "freistilbox Privacy Policy and Notice") outlines how we handle any personal information gathered from visitors to our website and from users of our software and services.

DevOps support

freistilbox is built exclusively on Open Source Software. Combined, the freistil IT engineering team has more than 30,000 hours of experience in running business-critical IT services on Open Source Software.

For each software component used in production, deep operational know-how within the team is a core requirement. This also applies to the content management systems supported by freistilbox. Our extensive knowledge of the inner workings of Drupal and WordPress makes us a valuable resource for the your development team. With freistilbox, you get technical support directly from experienced system engineers. You can talk to us in all

matters of software deployment, application performance and other operations issues.

If you need some custom IT infrastructure, for example when your application requires a service that freistilbox does not provide by default, we will either build it for you or we will try and help you integrate a third-party alternative.

Sales contact

To contact our team with questions or to request an estimate, simply send us an email to info@freistil.it.