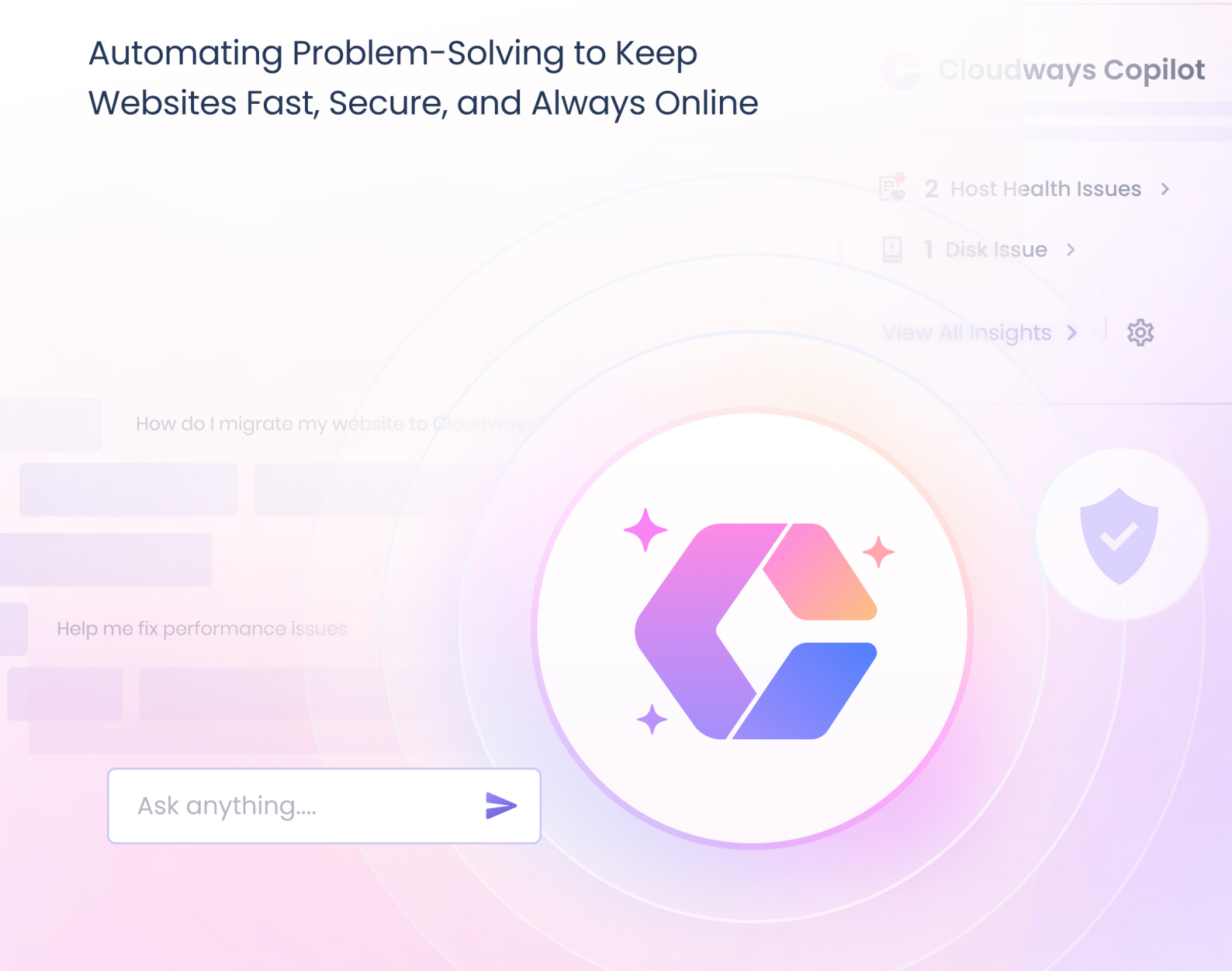
CLOUDWAYS by DigitalOcean

Whitepaper

The Future of Managed Hosting: Smarter, Faster, AI-Powered

Automating Problem-Solving to Keep Websites Fast, Secure, and Always Online



Executive Summary

This whitepaper examines the big changes artificial intelligence (AI) is bringing to managed hosting. Digital agencies, developers, and freelancers need scalable and reliable hosting solutions. Managing servers without technical expertise can be tough on teams and requires investing time. Troubleshooting problems like downtime, slow performance, and security risks are frequently common.

AI-powered managed hosting helps solve these issues. Tools like Cloudways Copilot use advanced machine learning to watch servers closely, spot problems early, and recommend fixes. Copilot simplifies everyday tasks, providing instant insights into technical issues before they become real problems.

Through the transformative capabilities of AI, digital professionals can now work more efficiently, reducing the cost of downtime to deliver better client experiences. This lets you focus on what you do best, while Cloudways keeps your websites running smoothly with zero downtime.

Key Takeaways

- **Solving Industry Challenges:** Integrated AI tools address critical issues such as frequent downtime, performance bottlenecks, and security vulnerabilities businesses commonly face.

- **Real-World Advantages:** Businesses that use AI-powered managed hosting increase operational efficiency, improve security & performance, and achieve significant cost reductions.

- **Cloudways Copilot Capabilities:** Offer proactive server monitoring, immediate alerts, automated problem-solving, and in-depth performance analysis.

- **Empowering Businesses:** Enables site owners to focus on their core business while ensuring superior online performance.

Table of Contents

Introduction

1.1. Background and Context

How we deliver online experiences is rapidly changing. Digital agencies, freelancers, and developers are increasingly relying on managed hosting solutions to build seamless experiences for their clients.

As the demand for better website performance, security, and reliability grows, leveraging managed hosting has become more critical. Digital professionals are realizing the depth of the issues being faced, seeking experts that can help them navigate the complexities and challenges that come with evolving trends.

Maintaining optimal server performance, optimizing site load times, and protecting applications from security vulnerabilities all have inherent complexities attached. Without the requisite troubleshooting skills, it can be difficult to identify a path forward. In some cases, significant damage can occur before the root cause is determined and resolved.

These challenges can appear in different ways, impacting both server and website levels. Here's a breakdown of some of the common issues site owners can encounter

Server-Level Issues

Server Overloads

High CPU usage, memory leaks, slow disk I/O, leading to website slowdowns or crashes

Resource Limitations

Insufficient RAM, storage, or bandwidth, hindering website performance and scalability

Network Connectivity Issues

Slow or unreliable network connections, impacting website availability and response times

Incompatibility with Hosting

Configuration conflicts, software limitations, or incompatible technologies, causing website errors

Website-Level Issues

Poor Code Quality

Unoptimized code, inefficient queries, excessive use of resources, causing performance bottlenecks

Slow Page Load Times

Large images, uncompressed files, inefficient caching, impacting user experience

Poor User Experience

Complex navigation, slow loading forms, inaccessible content, leading to high bounce rates

Lack of Security Measures

Weak passwords, unpatched plugins, missing security headers, exposing websites to vulnerabilities

1.2. Importance of Managed Hosting

Managed hosting services offer a lifeline to businesses. They provide expert support, proactive monitoring, and powerful infrastructure to keep websites up and running anytime, anywhere.

The managed services market is projected to grow from just under $60 billion in 2021 to nearly $100 billion by 2026, with a compound annual growth rate (CAGR) of 10.9%.

Source: S&P Global

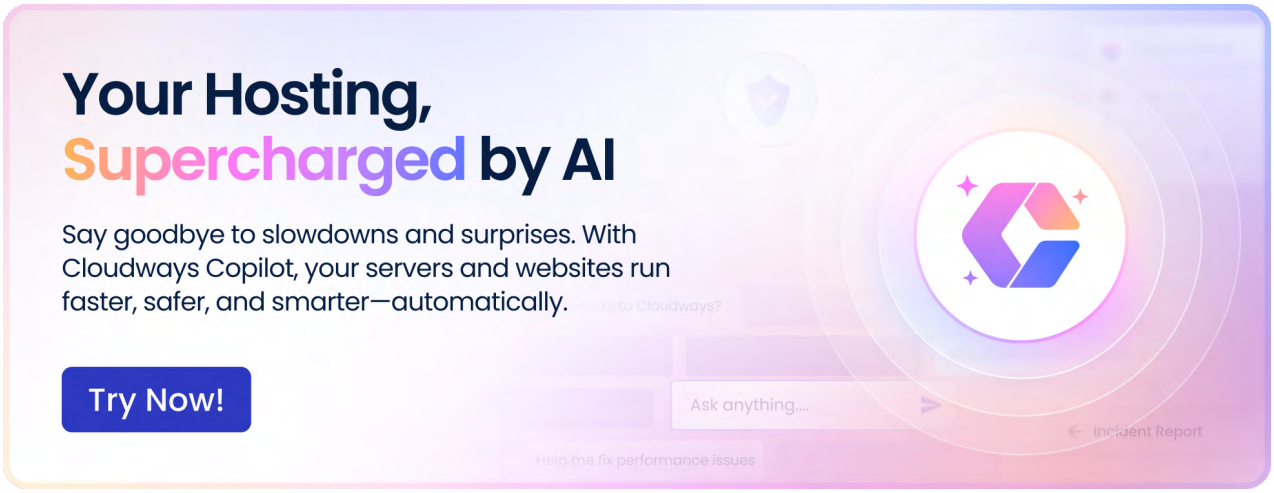
These services alleviate the burden of server management. This allows digital professionals to focus on their core competencies. Whether it's crafting stunning websites, developing innovative applications, or delivering outstanding client experiences, they can do what they know best.

Having the assurance that technical issues are being monitored and promptly addressed is invaluable. Downtime is a digital businesses enemy and can lead to significant financial and reputational losses, making this support crucial.

1.3. AI-Powered Managed Hosting

The integration of AI into managed web hosting marks a shift in how site owners can manage and maintain their applications. AI can analyze large amounts of data, predict potential issues, and automate complex tasks. This introduces a new level of efficiency and reliability for digital professionals.

By using the power of AI, managed hosting providers can offer users smarter, faster, and more responsive services that adapt to ever-changing needs. This whitepaper aims to demonstrate how AI-powered solutions like Cloudways Copilot transforms the web hosting experience for digital agencies, freelancers, and developers.



Server-Level Issues

2.1. Downtime and Availability

One of the primary concerns for site owners is server downtime. Unplanned outages can disrupt business operations, impact revenue, and damage a company's brand reputation. Such interruptions affect not only immediate financial returns but also long-term customer relationships that have been built on trust.

Gartner®

Downtime costs about $5,600 per minute, which adds up to around $300,000 per hour.

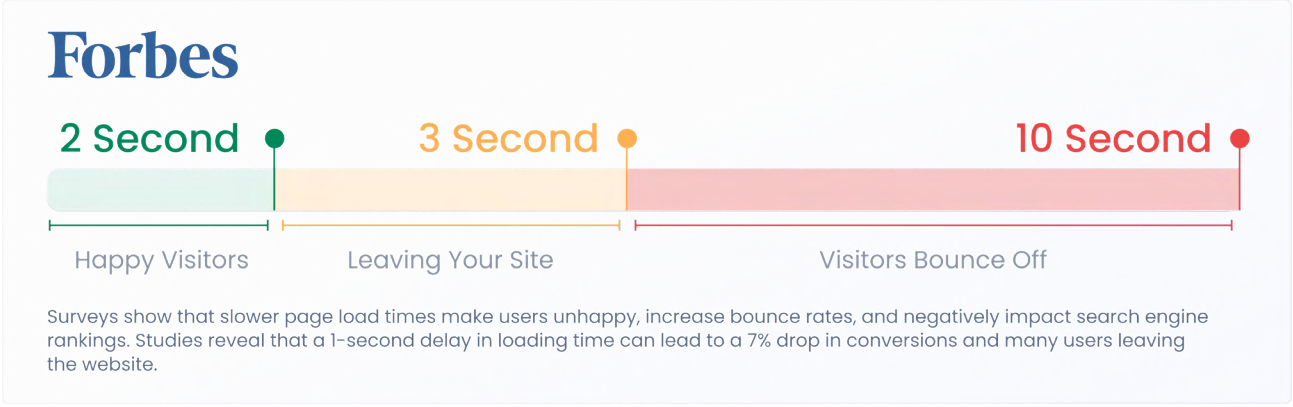
Their survey also found that 98% of companies report downtime costs ranging from $100,000 to $540,000 per hour

98% Downtime

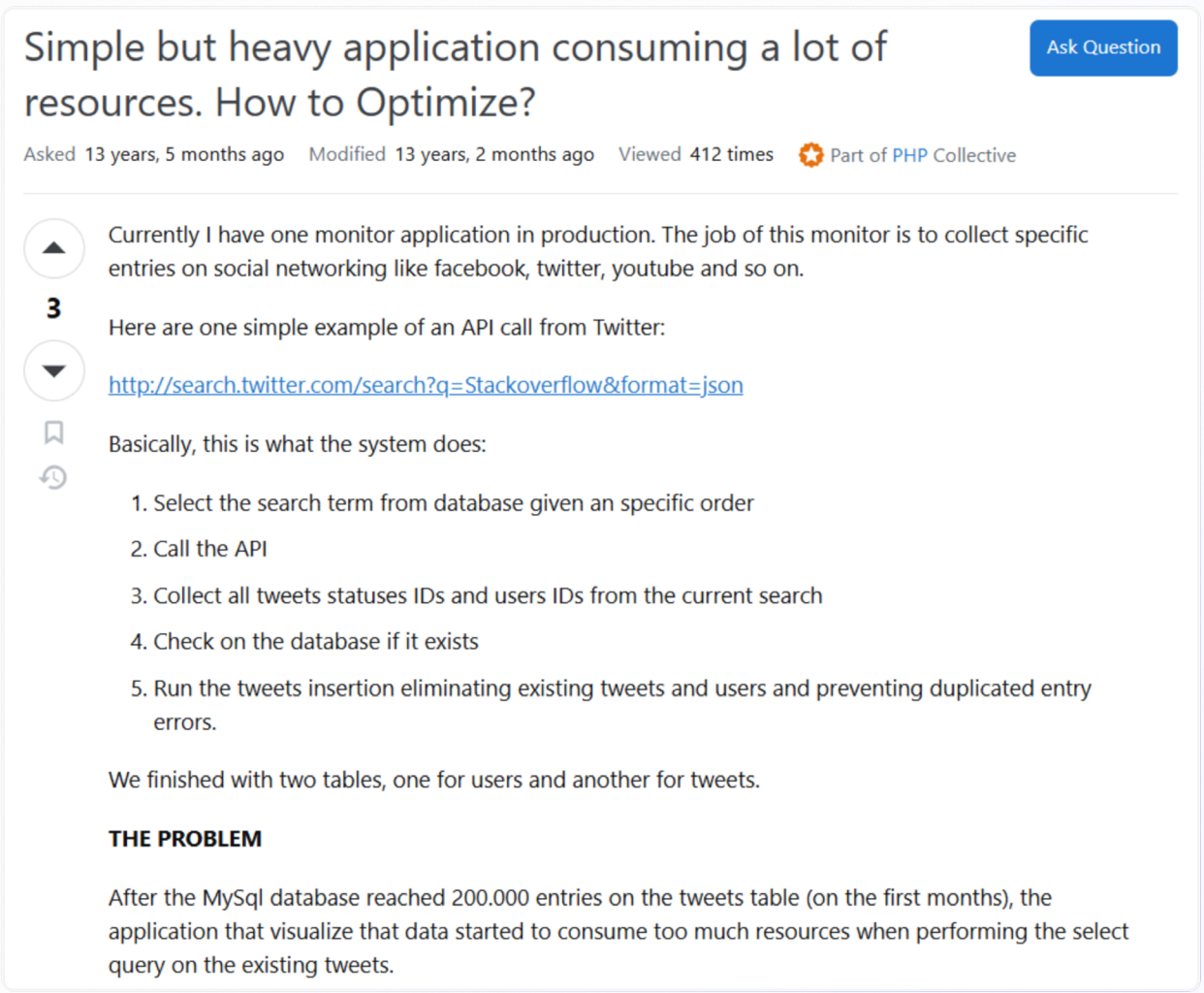
A user experienced a DDoS attack targeting the /wp-admin/admin-ajax.php file on their WordPress site. Despite having Cloudflare enabled with SSL, the site received 250,000 requests in two hours, causing CPU spikes and site crashes. Manual IP blocking was ineffective due to constantly changing IPs. The site remained down due to crashes and timeouts. (Source: Stack Overflow)

2.2. Performance Bottlenecks

Performance bottlenecks can severely affect the speed and responsiveness of hosted websites and applications. These bottlenecks often stem from suboptimal resource allocation, inefficient code execution, or high traffic volumes that exceed server capacity. They can lead to slower page load times and reduced user satisfaction, potentially increasing bounce rates and negatively affecting search rankings.



Surveys show that slower page load times make users unhappy, increase bounce rates, and negatively impact search engine rankings. Studies reveal that a 1-second delay in loading time can lead to a 7% drop in conversions and many users leaving the website.



Simple but heavy application consuming a lot of resources. How to Optimize?

Ask Question

Asked 13 years, 5 months ago Modified 13 years, 2 months ago Viewed 412 times Part of PHP Collective

3

Currently I have one monitor application in production. The job of this monitor is to collect specific entries on social networking like facebook, twitter, youtube and so on.

Here are one simple example of an API call from Twitter:

http://search.twitter.com/search?q=Stackoverflow&format=json

Basically, this is what the system does:

1. Select the search term from database given an specific order
2. Call the API
3. Collect all tweets statuses IDs and users IDs from the current search
4. Check on the database if it exists
5. Run the tweets insertion eliminating existing tweets and users and preventing duplicated entry errors.

We finished with two tables, one for users and another for tweets.

THE PROBLEM

After the MySql database reached 200.000 entries on the tweets table (on the first months), the application that visualize that data started to consume too much resources when performing the select query on the existing tweets.

A user had a monitor application in production that collected entries from social networks like Facebook, Twitter, and YouTube. The application started consuming excessive resources when the MySQL database reached 200,000 entries. The issue was due to inefficient SQL queries that performed multiple LIKE searches on the tweets table. (Source: Stack Overflow)

2.3. Security Vulnerabilities

The digital world is fraught with security risks. Servers are prime targets for malicious attacks, such as DDoS (Distributed Denial of Service) attacks, data breaches, and unauthorized access attempts. Protecting servers from these threats demands advanced security measures, regular updates, and quick response capabilities to mitigate potential damages.

KASPERSKY

DDoS attacks have been on the rise with significant impacts on businesses.

In 2022, the average cost per DDoS incident ranged from $52,000 for small-to-medium-sized businesses up to $444,000 for larger enterprises.

$52K
Small-to-Medium Sized Businesses

$444K
Larger Enterprises

How to stop hack/DOS attack on web API

Ask Question

Asked 9 years, 3 months ago Modified 4 years, 8 months ago Viewed 35k times Part of Mobile Development Collective

63

My website has been experiencing a denial of service/hack attack for the last week. The attack is hitting our web API with randomly generated invalid API keys in a loop.

I'm not sure if they are trying to guess a key (mathematically impossible as 64bit keys) or trying to DOS attack the server. The attack is distributed, so I cannot ban all of the IP address, as it occurs from hundreds of clients.

My guess is that it is an Android app by the IPs, so someone has some malware in an Android app, and use all the installs to attack my server.

Server is Tomcat/Java, currently the web API just responds 400 to invalid keys, and caches IPs that have made several invalid key attempts, but still needs to do some processing for each bad request.

Any suggestions how to stop the attack? Is there any way to identify the Android app making the request from the HTTP header?

A user experienced a Denial of Service (DoS) attack on their web API, which was hit with randomly generated invalid API keys in a loop. The attack was distributed, making it impossible to ban all IP addresses as it originated from hundreds of clients. The server, running on Tomcat/Java, responded with 400 errors to invalid keys and cached IPs with multiple invalid attempts, but still needed to process each bad request. (Source: Stack Overflow)

Website-Level Issues

3.1. Slow Load Times

Website performance is directly tied to user satisfaction and impacts site health metrics, including those that influence Search Engine Optimization (SEO) rankings. Slow load times can lead to higher bounce rates, lower engagement, and poor user experience. Different factors contribute to slow load times, including large file sizes, unoptimized images, and excessive use of plugins. These issues can ultimately result in decreased conversion rates and diminished online visibility.

kissmetrics

40%

of people leave a website if it takes more than 3 seconds to load.

Akamai

07%

Akamai found that a 100-millisecond delay in load time can make bounce rates go up by 7%.

3.2. SEO Impact

SEO is crucial for driving organic traffic to websites. Performance issues, such as slow load times and downtime, negatively impact SERP rankings, jeopardizing a site's ability to score favorably with search engine algorithms. Furthermore, security vulnerabilities can result in search engines flagging websites as unsafe, further hindering visibility and traffic, which eventually leads to a decline in organic growth.

Shopping Cart Elite

Website search rankings can drop by 30% after six hours of downtime on average and may stay low until the next Google update, which can take 30-60 days

30%

3.3. User Experience

A seamless and fast user experience is key to retaining visitors and converting them into loyal customers. Poor website performance can frustrate users, leading to higher abandonment rates and lower conversion rates. Maintaining a positive user experience and building long-term relationships with clients and customers require optimal website performance.

Toptal

88%

of online shoppers are less likely to return to a site after a bad user experience.

Impact on Businesses

4.1. Time-Saving

Managing hosting environments involves repetitive tasks like updates, backups, and performance checks, which can be time-consuming without automation. AI-powered solutions streamline these tasks, freeing digital agencies, freelancers, and developers to focus on innovation and client projects.

BetterCloud

34%

of IT teams spend half their week or more manually managing their SaaS environment. This shows they spend a lot of time on repetitive tasks that could be automated.

Manually diagnosing server and website issues is slow and complex, increasing the risk of prolonged downtime and performance problems. Real-time diagnostics powered by AI can quickly identify and resolve issues, minimizing troubleshooting time and ensuring smoother operations.

4.2. Smart Operations

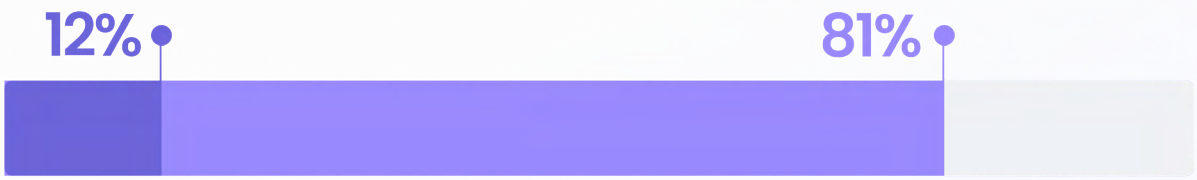
AI integration makes web hosting management easier by offering automated tools and smart insights. This reduces the need for manual work, errors, and overall efficiency. With smoother processes, hosting providers can deliver faster and more reliable services, improving their clients' operational performance.

Manual work often leads to inconsistencies and delays in solving technical problems. AI-driven solutions cut down on the need for human intervention by automating responses to common issues. This speeds up problem-solving and ensures a more consistent and reliable hosting experience.

4.3. Technical Savvy

Technology moves fast, often creating skill gaps among digital industry professionals. Not all team members have the expertise to handle complex hosting challenges. AI helps bridge these knowledge gaps by giving smart support and recommendations, helping less tech-savvy users make informed decisions.

skillsoft



Despite 81% of IT professionals saying they can use AI in their jobs, only 12% have the skills to do so. This shows a big gap between perceived and actual AI proficiency.

AI can analyze large amounts of data and provide useful insights, enabling users to make smarter, data-driven decisions. By using AI, digital agencies, freelancers, and developers can improve their hosting environments, boost website performance, and increase overall client satisfaction.

4.4. Cost Management

Managing hosting infrastructure can be costly due to expenses for hardware, software, and staff. AI-driven solutions lower these costs by automating tasks, optimizing resource use, and preventing expensive downtime. This leads to more efficient resource allocation and significant savings for businesses.

McKinsey & Company

54%

A survey shows that 54% of organizations saw cost decreases in service operations after using AI. This highlights AI's effectiveness in reducing operational expenses.

AI's predictive abilities allow for better resource management by forecasting traffic patterns, identifying resource-heavy processes, and suggesting improvements. This ensures resources are used effectively, reducing waste and boosting cost efficiency. Proper resource allocation also enhances performance and reliability.

Cloudways Copilot

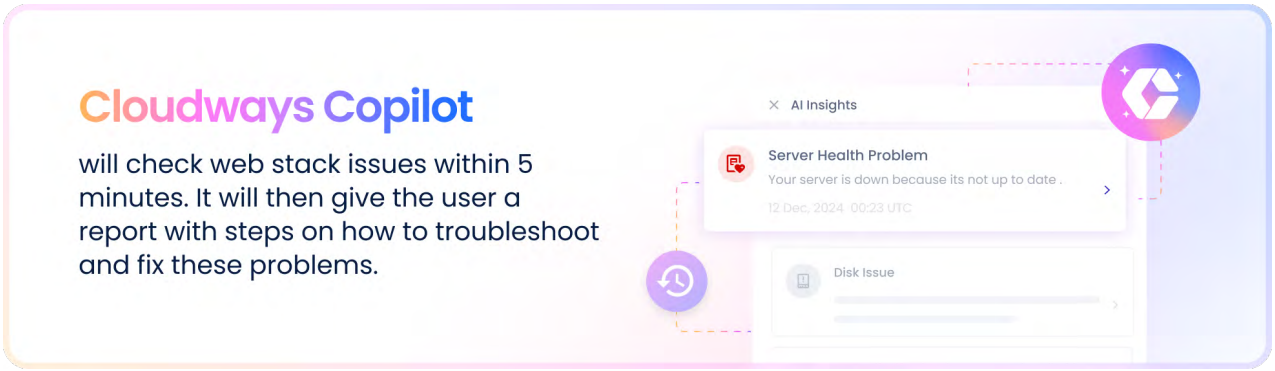
5.1. Concept and Development

Cloudways Copilot uses artificial intelligence to make managed hosting even better. It proactively monitors four critical areas, Webstack, Disk Health, Disk Inodes, and Host Health, to resolve common issues through smart checks, real-time fixes, and automated actions.

Cloudways Copilot is seamlessly integrated into the Cloudways Platform. Users benefit from its capabilities automatically, with no additional setup required. This native integration delivers instant insights and solutions, streamlining operations and enhancing hosting efficiency.

Without Copilot, resolving issues would require manual troubleshooting:

- Users would need to contact support, wait for ticket responses, and share logs for analysis, often taking hours or days to pinpoint root causes.
- Remediation steps (e.g., cleaning disk space, optimizing configurations) would rely on user execution or support intervention, extending downtime.



5.2. How Does Cloudways Copilot Work

Cloudways Copilot monitors server and app performance all the time. It detects potential issues before they get worse. By looking at patterns and data, it can find issues with server load, resource use, and app performance. This proactive method helps keep performance high and cuts down on downtime.

When issues are detected, Cloudways Copilot sends real-time alerts and recommendations via CloudwaysBot. This way, users are quickly informed of

any issues and can fix them fast. Our AI system can also handle common issues, like stopping DDoS attacks or freeing up disk space, making sure there is no disruption.

When a slowdown occurs, an alert is triggered. Cloudways Copilot analyzes the issue, pinpoints the cause, and provides specific solutions.

5.3. Cloudways Copilot Capabilities

DoS/DDoS Attacks: One of the critical functions of Cloudways Copilot is to detect and mitigate DoS/DDoS attacks. They can cripple servers and websites by overwhelming them with traffic. Cloudways Copilot identifies unusual traffic patterns and implements measures to protect the infrastructure, ensuring continuous availability and performance.

Aggressive Bots: Aggressive bots can consume significant server resources, leading to performance degradation. Cloudways Copilot monitors bot activity, identifying and blocking malicious or overly aggressive bots. This helps in preserving server resources and maintaining smooth website performance.

Disk/Inode Full Scenarios: Disk and inode usage can impact server performance and cause application issues if not managed properly. Cloudways Copilot tracks disk and inode usage, alerting users when thresholds are reached. It provides recommendations for cleaning up or expanding storage, ensuring the server continues to operate efficiently.

Beyond these capabilities, Cloudways Copilot detects and diagnoses numerous other issues, from security vulnerabilities to performance anomalies. Its adaptive intelligence ensures comprehensive protection and optimization for your infrastructure.

5.4. Key Features and Benefits

Features	Benefits
Proactive Monitoring Continuous monitoring of server and application performance.	**Increased Efficiency** Automation of routine tasks and quick issue resolution.
Real-Time Alerts Immediate notifications of potential issues.	**Enhanced Performance** Optimal server and application performance.
Automated Solutions Autonomous handling of common issues.	**Improved Security** Protection against threats such as DDoS attacks and aggressive bots.
Detailed Insights Comprehensive reports and analytics.	**Cost Savings** Reduced need for manual intervention and better resource allocation.

5.5. Testimonials and Feedback

Cloudways users have consistently praised the Platform for its reliability, performance, and the positive impact of Cloudways Copilot on their hosting experience. Testimonials highlight how AI-driven insights and automation have simplified server management and boosted operational efficiency.

Copilot gives me the confidence that I always have a server tech on standby for any issues that might pop up on our ecommerce store, solving problems in minutes instead of hours, and I don't need to pay them a salary!

David Curtis
Managing Director, CurtisE

Cloudways Copilot & AI is a game-changer for reducing the amount of time spent taking care of your web server. It is the first good implementation of AI I've seen in a web host that actually makes my life as an agency owner easier.

Blake Whittle
Owner at ClikIT

Conclusion

6.1. Summary of Key Findings

AI-powered managed hosting is changing how digital agencies, freelancers, and developers manage their web applications. This whitepaper covers how AI-driven tools like Cloudways Copilot solves key hosting challenges by boosting efficiency and performance, as well as reducing downtime. Here are some of the key findings:

- AI automates tasks like updates, backups, and performance checks, freeitime for businesses to focus on innovation and revenue.
- Continuous monitoring and proactive alerts prevent downtime by detecting issues early and ensuring a smoother user experience.
- AI tools detect threats like DDoS attacks and optimize resource use, providing faster load times, scalability, and stability.
- Automating routine tasks and resource management reduces operational costs, minimizes downtime, and improves efficiency.
- AI makes hosting management easier with smart recommendations and automated solutions, helping users of all skill levels deliver reliable services.

6.2. The Future of Managed Hosting

The future of managed hosting is set to be transformed by the advent and growth of AI technologies. Managed hosting providers will aim to offer faster, more secure, and scalable solutions to simplify the process of creating, managing and maintaining websites.

At the forefront of this technological shift are tools like Cloudways Copilot, solving key challenges like stopping DoS/DDoS attacks, managing aggressive bots, and preventing full disk/inode issues through machine learning and automation. Features like these add value to our users in helping them detect and fix common hosting problems. As Cloudways Copilot continues to improve its capabilities with more advanced troubleshooting and support features, users can expect to be able to handle a wider range of issues.

As AI advances, managed hosting providers will be able to predict potential issues, automate routine tasks, improve security, and offer personalized solutions. This ongoing evolution will make managed hosting smarter, more efficient, and more adaptable to users' changing needs.

6.3. Closing Thoughts

The transformational capability of AI has presented us with a rare generational shift not often encountered in the technology industry. AI derived machine-learning has existed for decades. However, the advent and accessibility of GPTs teamed with rapid integration across broad use cases and tools, has simplified workflows, reducing time to market and driving down the cost of doing business through automation efficiencies.

The impact of AI will expand further as managed hosting companies like Cloudways bring AI-powered workflows to address key customer challenges. We've chosen to focus on tackling the practical, day-to-day issues that plague customers, addressing the technical challenges of web hosting that consume time and human resources. By reducing manual tasks, improving security, and optimizing performance, AI helps businesses achieve greater efficiency and reliability. Tools like Cloudways Copilot lead this change, ensuring digital professionals can confidently meet their clients' growing needs.

The future is clear: AI-powered hosting isn't just a 'nice to have'; it's a must-have for businesses wanting to stay competitive in the digital world.

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by DigitalOcean

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