SciVisum

Meeting the challenges of modern website performance

Developments in monitoring strategies

Is your website monitoring realistic enough to meet today's challenges?
Is your web testing strategy holistic enough to deliver real business benefits?

This guide outlines the latest developments affecting website performance and advancements in testing practices, for business and technical managers; including an overview of the key areas to consider for a more holistic web testing strategy.

Contents

Introduction

The growth of the cloud, streaming media, increasing reliance on hosted services and in particular the explosion of mobile brings a whole host of new web performance challenges. Even Google uses site speed as a ranking factor in their algorithm. Providing a fast, reliable user experience has never been more essential, and so difficult to achieve.

Many internet savvy businesses understand the importance of measuring website performance and undertake some level of monitoring or testing. Most believe their monitoring programme is good enough to protect their brand and to ensure they deliver an excellent user experience. But with rapidly developing market changes, advances in technology and higher end-user expectations, is this really the case? Is your monitoring programme realistic enough and your strategy holistic enough to meet today's challenges?

'Traditional' monitoring solutions fail to address the complexities of today's websites. Monitoring basic metrics for simple pre-defined URLs, is not enough to provide the bigger picture on your users' experience or to troubleshoot the complex issues – both technical and business - that impact on website performance.

For an effective monitoring strategy, it's time to move on from traditional monitoring, to solutions that test the website as a whole. It's time to adopt new monitoring approaches that foster a shared understanding across the entire business, of the impact of web performance on user experience.

We discuss the developments in website monitoring strategies to meet the challenges of modern website performance.

1. Improving realism - getting closer to the user

Truly reflecting the complex interaction of modern websites

As websites have become more complex with rich content and technologies like Ajax and JavaScript commonplace, user actions have become more varied, fluid and dynamic. And with new digital marketing approaches such as personalised content and pricing driving this dynamic approach further still, it's more important than ever that today's performance testing truly reflects the dynamic, real-world user experiences of today's web journeys.

Past

It's well known that website monitoring has moved on from simple static page monitoring. This gives only limited information "the lights are on but is anyone at home?" - a homepage may be functioning but can visitors perform critical business processes across a website? It's very common for some deeper part of the website to be broken which prevent sales being taken, but the home page is still working.

Present

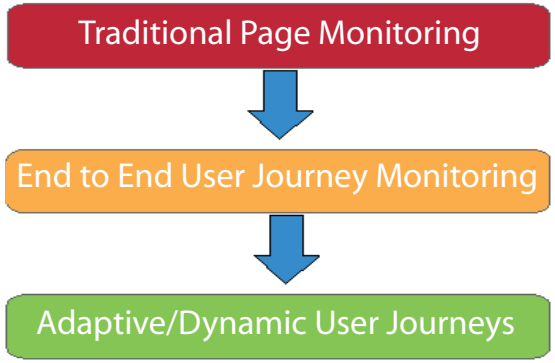
With website's typically built on multiple layers of HTML, Java Script and AJAX calling for information from servers, databases, content delivery networks, cloud based storage systems and more – at various rates and in multiple request configurations – it's necessary to understand how the end user experiences the unique application of code and functions as they travel through a website to complete their task or 'journey'.

Monitoring from the end user's perspective is the best way to be sure that business web applications and the underlying business processes, are operating as intended. It also helps to focus resource on the critical web performance issues that are impacting on customers.

Most web monitoring solutions currently follow 'end to end' journeys a customer makes across a website to ensure more underlying technology is put to the test. But not all end-to-end

approaches are alike. The majority of these end-to-end scripts, simply check pre-defined URLs along the customer's journey which leaves much of the complex nature of today's web applications untested. Real customers don't interact with website infrastructure by accessing a single page and then typing in the next URL; they follow multiple links and make choices from page content in real time.

Evolution of monitoring approaches

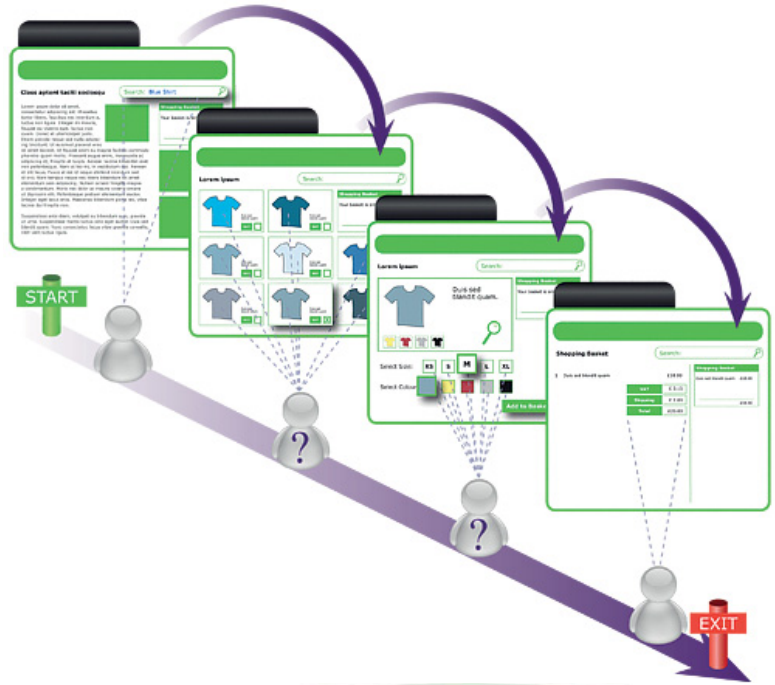


Today's innovators

The latest evolution in website performance monitoring is to dynamically test a website's performance using scripts that make intelligent decisions in real time, and adapt the user's journey each time the script runs - as a real customer would.

By acting as real customers and visiting the site like a mystery shopper, you will find all the pitfalls that affect end users - including root causes you may never have encountered before.

At each step of a User Journey, today's monitoring technology needs to look into the page and dynamically pull out the content needed for the next step, adapting the journey each time it runs and simulating real customer interaction.



2. Increasing synergy across the business

Improving business outcomes by uniting technical & business teams around monitoring

Website monitoring is no longer a series of simple technical tests, it is about impact on the bottom line. It is about the value of lost sales, perception of customer service and brand protection.

Business teams can no longer leave website performance to Technical teams

Performance is no longer purely a technical issue but also a marketing issue. As well as affecting bounce rate, page impressions and conversions, download speed even affects the ability for prospects to find your site. Site speed is now a ranking factor in Google's algorithm.

Customers judge a business by its website user experience; so for web businesses, technical and business performance are inextricably linked. Yet despite this, monitoring efforts across the two functions are often isolated and un-coordinated.

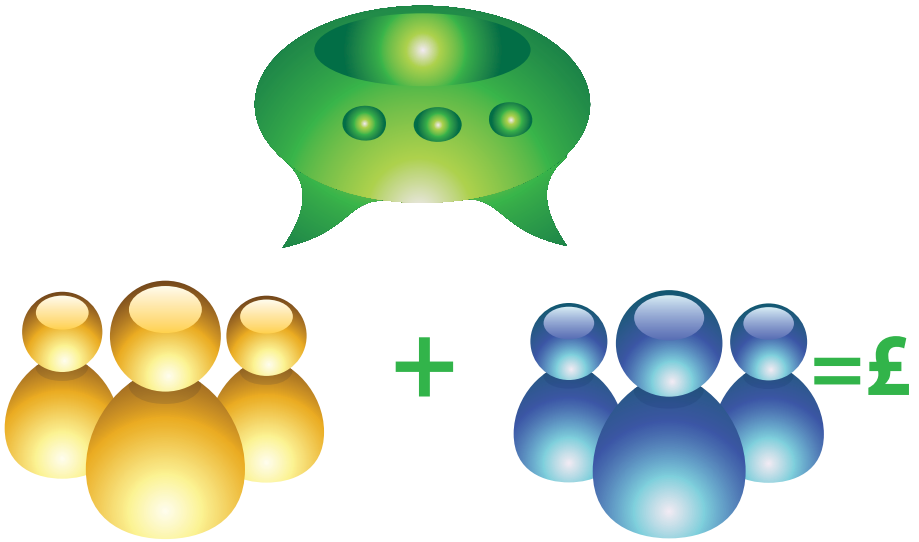
Traditionally, technical and commercial teams have worked independently with different metrics and tools to assess website success.

Uniting technical and business monitoring can result in significant business benefits. Monitoring from the customer's perspective delivers customer centric metrics, a common language that can be understood by both technical and business teams. Delivering a more joined-up view of how an organisation's web applications affect a business, can help solve complex issues that cross business and technical functions as well as save time and resource. This provides insight into the state of the business and can drive real improvements in business performance.

This co-ordinated approach also saves time and effort for all involved teams. Management knows that user experience is covered. Technical teams don't need to waste time in meetings or generating reports. And other teams such as marketing can login directly to the monitoring GUI to find the information they need.

Often business teams may be aware of occasional slowdowns or errors affecting user experience, via the call centre, but are unable to provide technical teams with the necessary information to pinpoint or replicate the problem.

With a more joined up approach reflecting real user interaction, it's possible to identify which products are affected, the specific timings and where the content is being served from. In particular irregular problems - often the result of 3rd party issues – can be very difficult to detect with more traditional monitoring tools.



Business Monitoring
Marketers and product managers use tools such as marketing analytics to ensure business processes are functioning as expected, and measure applications in line with business objectives.

Technical Monitoring
Sys admin and developers use traditional and server monitoring to ensure web systems are up and running, and collect data for capacity planning and other technical developments.

3. Improving speed
Optimising website pages and minimising latency

Did you know that a 1 Second delay in page download time causes:

3.5% decrease in conversion rate
2.1% drop in cart size
9.4% fewer page views
8.3% increase in bounce rate
(Source: Radware 2013)

The growth of mobile is the major reason why site owners should focus on improving speed. Regardless of the poor performance delivered by 3G networks, mobile users expect the same page download times they get from their desktops.

To compound this, since 2010 the average web page has doubled in size from just over 600Kb to 1.2Mb (Source: webperformancetoday.com). This increase in page size is mainly due to the greater number of images and scripts used on today's web pages. Images are one of the largest stumbling blocks, and new arrivals like the increasing popularity of custom fonts, is also hampering front-end performance.

So with the greater need for performance on mobile devices and larger page sizes what can be done to improve page download times?

Speed is affected by the number of objects on a page, the size of the page and the connection speed/latency.

There are two top level options to consider:
1)Use website optimisation to transfer less bits – minimise the size of components, the number of HTTP requests or reuse connections.
2)Use Content Delivery Networks to reduce the distance bits travel – move your servers closer to your users

Web Performance Optimisation (WPO)
Many organisations use WPO tools and techniques such as compression, progressive images, optimising images, spriting, caching, minimising HTTP requests, minifying JS and CSS, deferred loading, to name a few. However for most there is still room for improvement and plenty of organisations still don't implement some basic best practice techniques for optimising page download speeds.

You can use ongoing website monitoring that delivers more granular data down to the object level - to track down individual page elements which are negatively affecting website performance and require optimisation.

Content Delivery Networks (CDNs)
One of the most widely adopted methods for reducing page download speeds is to use a 3rd party Content Delivery Network (CDN). CDNs are a collection of web servers in different locations. They deliver content from servers that are located closer to your end users, reducing server round trip time (RTT) – the length of time it takes for a request to go from the browser, to the server, and back to the browser again.

Measure performance of CDNs is critical
Whilst a CDN can significantly reduce page download times it's important to remember that it also introduces another potentially weak link, to the already complex application delivery chain. When functioning correctly CDNs bring great benefits to performance but when things go wrong, such as caching issues and server failure, they can adversely affect performance.

Use monitoring tools to measure the performance of your CDN. As with web optimisation issues, monitoring performance down to the object level will identify if content delivered by a CDN is negatively affecting customer experience. You may sometimes find that your CDN is not serving content as close to your customers as you are paying for.

4. Managing performance across mobile devices

From web to mobile and mobile apps

The explosion of mobile devices in recent years is probably the biggest reason for site owners to think seriously about performance - not least because of the high performance expectations from mobile users.

Mobile presents numerous options for website owners, such as responsive web design (RWD) or mobile sites, mobile apps or mobile web, And for those entering the mobile app route, the choice between native, HTML5 or hybrid.

Whichever route your organisation chooses, mobile brings with it a whole new set of web performance issues. This is a vast topic so we will only touch on the bigger picture in this eBook.

The main mobile performance issues include: high expectations for user experience, the need to reduce page download times (section 4), shorter times to market, and managing multiple sites/apps.

Mobile User Experience Expectations
The bar is high as mobile users have high expectations for performance. 72% of smartphone and tablet users expect the same quality of experience across all their digital devices (Source: Vibrant 2013).

With performance so critical, minimising page download times is crucial for mobile customers. And with 90% of us performing sequential usage according to Google (performing a task across multiple devices), seamless performance across multiple devices is becoming more important.

It's essential to incorporate mobile web and apps into your monitoring strategy to maximise user experience across all devices.

Shorter times to market
Developing and updating web apps so rapidly means it's not always easy to factor testing into the development lifecycle.

Integrating load testing and synthetic monitoring during pre-production ensures no nasty surprises when your app or mobile web goes live. Performance testing as a managed service is fast to implement and requires minimum input from your DevOps team. You can also use monitoring for regression testing, so you'll be aware immediately of any performance issues resulting from updates.

Once new developments go live you can use before and after monitoring results to highlight any new performance issues or even improvements.

Managing multiple sites/apps
Most monitoring solutions today can monitor performance across multiple sites or various mobile apps and from multiple locations, and present the data on a single GUI. It's important to look for solutions that offer a clear dashboard so you can see instantly when and where issues arise. You may also want the flexibility to group journeys so the results are organised in a more logical way for your requirements.

5. Maximising performance throughout the web delivery process

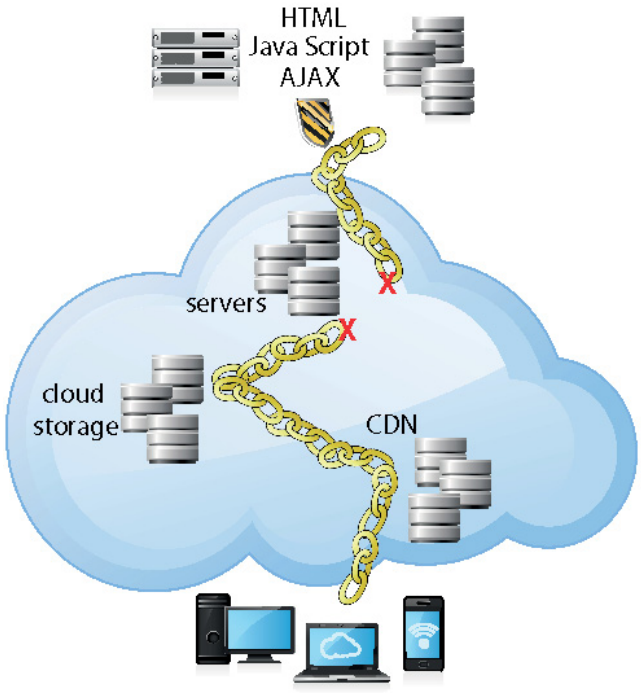
An increasing reliance on 3rd party components such as shopping carts, hosted servers and cloud services, has made the web delivery process more complex. These components provide end users with a richer experience but bring with them new performance challenges.

Any one of these components could be a weak link in the delivery chain, potentially affecting your site's performance, and damaging your brand. And with these components outside of your direct control, it's important to understand how they are performing and hold them accountable when problems arise.

Performance monitoring can be used to monitor 3rd party components (including CDNs) and provide evidence to hold providers accountable.

Look for monitoring solutions that help you to identify and report quickly on problems specific to a 3rd party component. Some solutions speed up diagnosis by enabling external providers to access detailed monitoring information directly; this direct access provides them with the evidence and diagnostic tools to troubleshoot the issue.

You can also use objective, accurate performance metrics to define SLAs and measure against them to ensure consistent service delivery.



If you need to ensure consistent and reliable performance across other internet backbones, it's likely that you will need a monitoring solution that can measure website performance from multiple locations globally.

6. Greater understanding of user experience
Synthetic and Real User Monitoring (RUM)

We couldn't review developments in monitoring without mentioning RUM. It's not a case of one approach versus the other, both approaches have their pros and cons and an effective monitoring strategy should combine both synthetic monitoring and RUM.

Synthetic Monitoring (Active Monitoring)
External agents run scripts to perform specific journeys or transactions across a site to replicate a real user's actions.

This approach is ideal for alerting, monitoring availability and getting to the root causes of problems. It's also the only way to identify problems before they impact customers and is often used during pre production phases as well as once a site goes live. Having full control over the browser means you control all the variables, with more detail and more regular metrics making it easy to quickly gather enough data to be statistically valid.

Real User Monitoring (Passive Monitoring)
Uses JS tags embedded in pages to gather real user performance data from the browser's perspective.

This approach is great for identifying problems only after they have occurred and provides little information about the root causes.

Takeaways

1. Ensure your web testing strategy measures the dynamic, real-world user experiences of today's web journeys and puts your entire web infrastructure to the test.
2. Make a holistic, co-ordinated approach central to your monitoring strategy with shared knowledge across the business.
3. Adopt a web monitoring strategy based around more meaningful, customer focussed metrics in a common language understood by all teams across the business.
4. Ensure your ongoing monitoring enables you to drill down to object level data to identify badly optimised objects affecting user experience.
5. Ensure your monitoring reports on the performance of objects delivered by your content delivery networks.
6. Use monitoring to measure the performance of 3rd party solutions, define SLAs and measure 3rd party performance against these on an ongoing basis.
7. Consider a monitoring solution that gives 3rd parties direct access to your monitoring GUI to save time and resource when problems arise.
8. Measure performance of mobile and mobile apps to ensure seamless performance across mobile devices.
9. Integrate load testing and monitoring during pre-production phases.
10. Use monitoring for regression testing and measure performance before and after site changes to identify new performance issues.

SciVisum Ltd is a web performance testing company.

We deliver dynamic user journey website monitoring and load testing solutions, as managed services. Our data gives you customer focussed metrics, real-world, actionable data and hard evidence - focussed on the performance issues that impact your cutomers.

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