WHITEPAPER

About Snapt Web Acceleration

What is web acceleration and how can it help your online presence?

Snapt Technical Team
sales@snapt.net

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Introduction

Snapt Accelerator is a specialized product offered by Snapt, which accelerates websites, eCommerce stores and mobile apps, enabling organizations to reliably and quickly deliver both dynamic content and applications to remotely located users, from a centralized infrastructure. Web acceleration is critical to businesses as well as retailers with a web focus, and providers or software as a service.

These businesses and service providers share a common challenge and have pressing need to deliver very high quality experiences to an increasingly diverse user base that is usually dispersed around the globe. Unfortunately, this challenge emerges because the standard internet protocols were not designed to handle and support delivery of applications as well as dynamic content at a very high speed this is the reason why many websites go through periods of poor performance, where the page load cycles become sluggish and the content is displayed slowly. This results in a direct decline in the organization's productivity and may increase consumer dissatisfaction. Eventually, this results in lower revenues for the organization.

Recent research shows that conversion rates tend to increase by 74 per cent when the page load times decrease by a mere amount of 4 seconds. For web based retailers and providers of software as service, these 4 seconds are crucial because reportedly, the rates for shopping cart abandonment and customer churn increases with an increase in page load times. The challenge of slow page loading, unfortunately, is not only limited to eCommerce websites. Almost 40 per cent of employees today, work outside the corporate headquarters in remote locations. These employees are able to do so because of a high reliance on access to a range of applications which help deliver data quickly through the web. However, if the loading time of these business applications increases, it can have an adverse effect on the productivity of the entire business.

Both the hardware and software available through the modern advanced technology, allow websites to generate dynamic content at the origin server quickly in a matter of a few seconds. In addition to that, the prevalence of broadband connections also reduces delays for average sized pages. When it comes to international transit, the network level

latencies have also been reduced to mere tenths of seconds, and even less in some instances. It is interesting to note then, that it still takes a few seconds for dynamic content to reach the end user.

This white paper attempts to explain why the delivery performance of applications and content is poor, and how Snapt Web Accelerator can help organizations overcome this kind of poor performance.

The Problem: Inherent Internet Issues

The understanding of what is acceptable as an online user experience has raised dramatically because of advanced proliferation of information technology and broadband. The experience has to be fast, and if it isn't what the users describe as 'enjoyable and optimum', the website will lose visitors regardless of how well designed, aesthetically pleasing, easy to use or engaging it is. Unfortunately, despite highly advanced technology and optimized servers, such high and consistent level performance cannot be guaranteed. This is simply because even optimized servers are susceptible to performance problems because of congestion and inherent internet latency issues. These issues are often very common and may end up leading to a very poor experience for the end-user. This finally results in higher site abandonment, brand erosion and loss of productivity.

The internet has not evolved at the space at which some of the other technologies have. It was simply not designed to support the fast paced delivery required by cloud applications. The technologies that have been designed especially to improve the performance of the internet, including the processes of caching, routing and content delivery, may not often address the performance requirements and issues adequately. Dynamic and web based applications are usually the processes that demand the most resources, and when these processes are not adequately addressed, it leads to poor application and content delivery systems.

Though some of these problems are inherent with the internet, they are especially magnified for non cacheable dynamic content, which is not only time sensitive, but highly personalized as well. Only minutes after dynamic content is cached, it may become irrelevant. Therefore, such content needs to be served effectively and continuously, requiring highly efficient connectivity between the application server and the end user. Still, the legacy TCP/IP has a very narrowband transmission protocol, and it was not developed to maintain such a high level of connectivity.

Businesses and organizations have to give a lot of attention to the speed and performance of their websites and web based applications because they are not only a source of revenue for them, but may also be instrumental in the smooth functioning of the

organization. In today's scenario, when employees, partners and customers of organizations access various enterprise platforms from all parts of the world, the smooth functioning and speedy performance of these dynamic web applications is all the more necessary. Secondly, the eCommerce industry has seen a huge boom and it continues to grow massively. The online retail sales from the US alone is valued at about US $250 billion in 2014. Against this backdrop, a recent research by the Forrester Research Group reports that almost 58 per cent of website users have reported that the performance and speed of the website is the key factor in determining whether they continue using the website or not.

What Causes the Problem?

Network latency is measured by the round-trip time (RTT), which is the time taken by any IP packet to move from one location to another and back. This time encompasses several factors, including direct routing, the speed of light and the hop count. However, round trip times between two backbone systems is usually low. Round trip times are often measured under one tenth of a second, and therefore, cannot individually explain their low response rates.

One has to look at a broader picture to identify the real culprit. The real disparity is between the impact of multi-second latency and low round trip time lies in the HTTP and TCP protocols. Together, the TCP and HTTP force several exchanges, back and forth, during the download of a full page web content. New TCP connections especially require this delay, without which they simply cannot establish a new connection. Additional round trips can finish the transfer, however this activity results in a significant number of back and forths, or turns between the server and the client. The main contributors to the number of these turns are the page size, the server and client technologies being utilized and the composition of the page. If the IP packet gets dropped during this process, a secondary penalty is applied. However, since the manner in which TCP and HTTP interact with each other is so complex, it is not unusual to see a lot of TCP 'timeout' every now and then. This happens when a packet is lost when the web page is downloading.

As a result of all these processes, the web performance not just remains a function of the round trip times, but a combined effect of both the time take to complete round trips and the turns. This also not only leads to packet loss, but also a loss of packet coupled with a recovery based on a TCP timeout. This problem is often viewed as a network layer issue by typical web acceleration technologies, but not by Snapt. Snapt does not only rely on replication and web cashing to place content closer to the user and reduce round trip times. It actually prevents packet loss and uses advanced routing technologies to address the loss recovery.

The Solution: Dynamic Web Acceleration

Solutions called dynamic web acceleration, or Application Delivery Networks (ADN), promise to address these performance issues, leading to increased productivity, higher customer satisfaction, and a much better user experience. Dynamic web acceleration solutions can help enterprises deliver extremely fast response times and increased application availability while maintaining the cost benefits of a centralized datacenter and application infrastructure.

A dynamic web acceleration solution is a system of speeding up the delivery of applications that rely upon networks such as the Internet. By increasing the TCP throughput and maintaining a pool of open connections, dynamic web acceleration solutions significantly reduce the number of round-trips, thereby accelerating application response time. Dynamic web acceleration does not work by enabling the server to process information faster; rather, it speeds up and optimizes the way the server interacts with the network.

Users often confuse WAN optimization with dynamic web acceleration. However, this would be a mistake, since WAN focuses exclusively on limiting the effects of congestion on networks in a wide area, and improves the utilization of servers by prioritizing traffic. This may increase the efficiency of resources, especially at the backend of applications, it does nothing to improve responsiveness of the application, which is considered a key performance area of web accelerators.

Who Benefits from Web Acceleration?

Any companies that use web based, dynamic applications as a part of their branding exercise, or to deliver a range of services, are candidates for using web acceleration software. For companies that consolidate data centers in a bid to lower costs, while still desiring successful performance of online applications and delivery of an impeccable user experience, web accelerators can be really effective. Web accelerators are known to improve end user experience considerably, and therefore are a necessity for businesses who value their end users. Though the end user experience can also be improved by using multiple globally distributed datacenters throughout the world, and using mission critical

application servers - these measures are resource intensive and very expensive too. Therefore, optimal delivery of applications as well as content, can be ensured without building an expansive number of datacenters around the world - simply by using web accelerators at the application end. These solutions efficiency at very little cost, giving the same rich and compelling user experience as a high performance but costly network of datacenters would.

Do we need web accelerators?

End users of web based applications are often very far away from the data source of applications. This data source has to be consulted several times during the use of the said application, and through the course of a single session. Without web acceleration, this entire process is very time consuming. Therefore, web accelerators are recommended to improve the end user experience significantly.

The Snapt Approach

Snapt is a revolutionary web acceleration product with extremely advanced functions. Snapt is able to cache both dynamic and static content, rewriting all kinds of pages in a flash. It easily re-encodes images and combines javascript and CSS files to reduce the time taken by the website to load. To enable smooth functioning of the website and web applications, Snapt Web Accelerator proxies the web traffic using a wide array of protections and optimizations. It uses a High-speed Caching System to decrease page load times by offloading web servers. Another feature called PageSpeed minimizes your content, compresses it and recodes it by rewriting it. This speeds up loading times for the website drastically. It optimizes your bandwidth and protects your servers through precise limit zones. Snapt also terminates SSL to offload the web servers and optimize it, and re-encodes it once again after all such optimizations have been achieved. The system adjusts expiry times intuitively and changes content settings intelligently to achieve more compression effortlessly. It also offers advanced DoS prevention, allowing your website to stay online when legitimate users log on to it. It also offers a very fast and resilient SSL

which prevents denial of service on the website, and protects it from any kind of weaknesses as well.

Why is Snapt Accelerator Considered the Best?

Snapt has used its knowledge and competence in developing high end application delivery software to design a web accelerator which is both powerful and cloud ready. It is also a reverse proxy which can easily accelerate communication between web servers and clients. It has several features, including caching, SSL, compression, and traffic management. Its three pronged approach to web acceleration increases performance by improving browser experience and reducing up to 50% load on the servers; increases reliability by monitoring server redundancy to ensure websites are never disconnected, and that the platform is able to serve at least stale content in an event where the website fails to load; and increases security by preventing DoS attacks and providing SSL to end users among many other functions.

Primary Features of Snapt Web Accelerator

Object Caching

The primary objective of Snapt Accelerator is to cache as much content as users may request from web servers. Therefore, as soon as the accelerator is deployed, it begins serving images, javascript, static page content and stylesheets along with any other content to users, dramatically dropping the load and service requests to the servers. This immediately saves about 40 to 80 percent of your web server's load, speeding up your website and web applications and saving a lot of money for you. You can manually control the time period for which the content is cached, and can determine the type of content which would be cached. The content will also have to be compressed before it is delivered to the user, therefore increasing the delivery speed manifold.

SSL Offloading & Acceleration

Where web servers are concerned, SSL communication can be extremely taxing. Especially now, when more and more sites require accessibility of HTTPS, it increases costs for both websites and applications. The servers also use many more resources than they would,

and also require much more maintenance. When a single certificate is changed, it could lead to updates on all the web servers, which would then have to be monitored very carefully to fix any patches and apply any updates. A lot of websites get an SSL overhead when they change to HTTPS. Such a change increases the load on their web servers by ten to twenty times. Snapt can handle SSL communication and avoid such an overload. Snapt helps clients terminate SSL on the accelerator itself, communicating with web servers in HTTP, while converting it into SSL for the end users and allowing them to communicate in SSL too. All of this is done very transparently, without letting the web servers know. This means users can still browse your website securely with a single click of a button, while managing this entire transaction from one central location, without putting any extra load on the web servers. Since Snapt's web accelerator also supports re-encryption of SSL, it can decrypt on Snapt, cache the information, accelerate the content and then re-encrypt to the web servers.

Traffic Compression

Snapt's accelerator has the ability to compress traffic automatically, sending it to compatible browsers so that bandwidth usage will become lower. This would also decrease load times so that users can get the best experience every time. This compression happens with both static and dynamic content. Clients can determine what gets compressed and how. They can control the traffic compression through the click of a single button, in a very transparent manner. This function of Snapt web accelerator has had a very dramatic effect on both smartphone and mobile phone apps. To make mobile apps more optimized, Snapt also supports mobile redirection.

Security

Snapt not only accepts all the traffic sent by clients' web servers, but also generations its own requests that are passed on to the origin servers. Therefore, the outside world is in direct communication only with Snapt - offering the web servers a never-before security level. It also limits requests by hosts and protects against DoS. Further, it limits throughput at a very finer level to improve speeds. Snapt lays a lot of emphasis on protection, which is why Snapt's web accelerator has a very strong set of security features. When these are

coupled with web applications and firewall plugins, it can provide unsurpassable protection.

Content Rewriting

Snapt has a very powerful PageSpeed engine, which can efficiently rewrite content as and when it passes through the accelerator. This makes performing tasks like combining CSS and Javascript, and minification of content much easier. It also processes re-encoding of images, and rewrites pages to improve speed. The PageSpeed engine adds a head element to the document - in case one is not present already, it integrates multiple style sheet elements and combines them into one, it adds a response header for meta tags, converts large JPEGs to other faster formats, extends a cache of CSS, javascript and image resources, which may not have been optimized otherwise, it rewrites resources from CSS files which may not be minified or parsed, it flattens @import rules and inlines CSS into the HTML document, it also inlines style tags that comprise only of CSS @imports by converting them to equivalent link tags. In addition to all these features, the PageSpeed engine also inlines small Javascript files into the HTML document, rewrites CSS files to remove excess whitespace and comments, rewrites or cache-extends images referenced in CSS files, optimizes images, re-encodes them, removes excess pixels, and inlines small images, rewrites Javscript files to remove excess whitespace and comments, and rewrites the CSS in style attributes in text.

Traffic Management

Snapt's Web Accelerator offers a highly advanced traffic management system, which prevents denial of service for your servers - for both SSL and HTTP. It uses throughput limiting to set the maximum throughput that a client can do. It also puts a limit to what maximum a server can do. You can also allow bursting for several different file sizes. The first 1 MB of download can be pegged at a certain speed, and then it slows down to retain this speed. You can then supercharge it by paths used on the web server. This allows you to limit zip files and slow down /images/ folder. Traffic management is performed through RPS Limiting as well. RPS limiting allows clients to limit the number of connections per second, encouraging bursting either per IP or per server. This can be done by the location of the server as well. Finally, traffic management can also be performed through total

limiting, where the total amount of connections from a single user are limited. This limiting can be performed on the basis of servers or location.

Monitoring

Snapt Accelerator monitors your servers. Advanced protocol support and intuitive health checks can be achieved by linking the web accelerator with Snapt Load Balancer. This way, Snapt not only just watches out for web server that are completely dead, but even those that may be facing trouble. Even if clients choose not to use the Snapt Balancer,the accelerator is along capable of monitoring servers and perform load balancing. Users would therefore, never see errors. In extreme situations and emergencies, stale content would be delivered to the end user, to avoid failures. All of this information is also recorded and logged in real time, so that clients can receive extremely customizable alerts. Reports of down servers and errors can be easily sent to clients through emails, instant messages and text messages - as desired.

Visibility

We increase the visibility of your content by finding many different ways of getting this content to the client's users. Snapt is able to look inside the content, logging users' throughput and a lot more through the accelerator. A report can be generated at any time, with graphs of the load and a lot of other statistics and analysis.

Detailed Reporting

Reporting is an often overlooked requirement. Snapt offers an advanced reporting mechanism, with a reporting engine storing everything in a very easily accessible format which is available instantly. Whether clients want to have their own reporting, or use an advanced reporting engine like that of Snapt's, all available metrics can be stored to see real time information or generate trends. Past reports are also generated and stored, and minute by minute views can be recorded. Graphs and custom reports can also be easily generated so that clients can receive actionable information, and action can be immediately taken.

Customizability

Snapt Web Accelerator comes with open databases for client use. These databases are completely visible and therefore can be customized to client needs. Clients can write their own SQL queries and scripts, or retrieve query information through API.

IPv6 Transitioning

IPv6 is the latest technology and the entire world is quickly adopting it. Snapt is designed to seamlessly accept IPv6 data from the web and convert it into compatible versions to the servers, converting them back to IPv6 as replies. Since upgrading servers to IPv6 can can be very costly, and may cause a lot of downtime, clients can skip this hassle by converting their services to the latest version through Snapt.

To find out more about Snapt Web Acceleration, visit

http://www.snapt.net/products/accelerator

Extensive Customer and Technical Support

We know that even if every detail of your server setup has been checked and double checked, thanks to Murphy's Law, something is bound to go slightly awry, sooner or later. We anticipate these headache-inducing moments by having a trained team of support staff ready to help.

Snapt also offers a wide array of user manuals, tutorials, and live demos for all of our products. The Snapt Community places you in an online pool of product users like you, where you can share tips and suggestions on how to enhance the total user experience.

The Snapt Knowledge Base also offers a wide range of topics and explanations for every aspect of the load balancer's functions and capabilities.

Summary

If, at the end of the day, you still find yourself scratching your head over a specific issue, Snapt Support gives you access to our helpful staff's range of services. Feel free to enquire at our website.

Not ready to dive headfirst into the full Snapt Web Accelerator experience? We understand. Take a 14-day trial run to see what top-quality performance and trusted security feel like.

For more information about Snapt Accelerator, a detailed look at its features, or a better look at our entire line of virtual products, visit www.snapt.net.

About Snapt

Snapt is a total application delivery platform, ready to ensure your site is always online, always fast, and always safe. We provide load balancing, security, caching and acceleration to your website or service, and then we support it like you've never seen before.

With more than 10,000 clients in over 50 countries, industry leaders trust Snapt to ensure their critical applications are fast, security and available.

Contact Information

Email: sales@snapt.net
Web: http://www.snapt.net
Phone: +1 408 516 4157