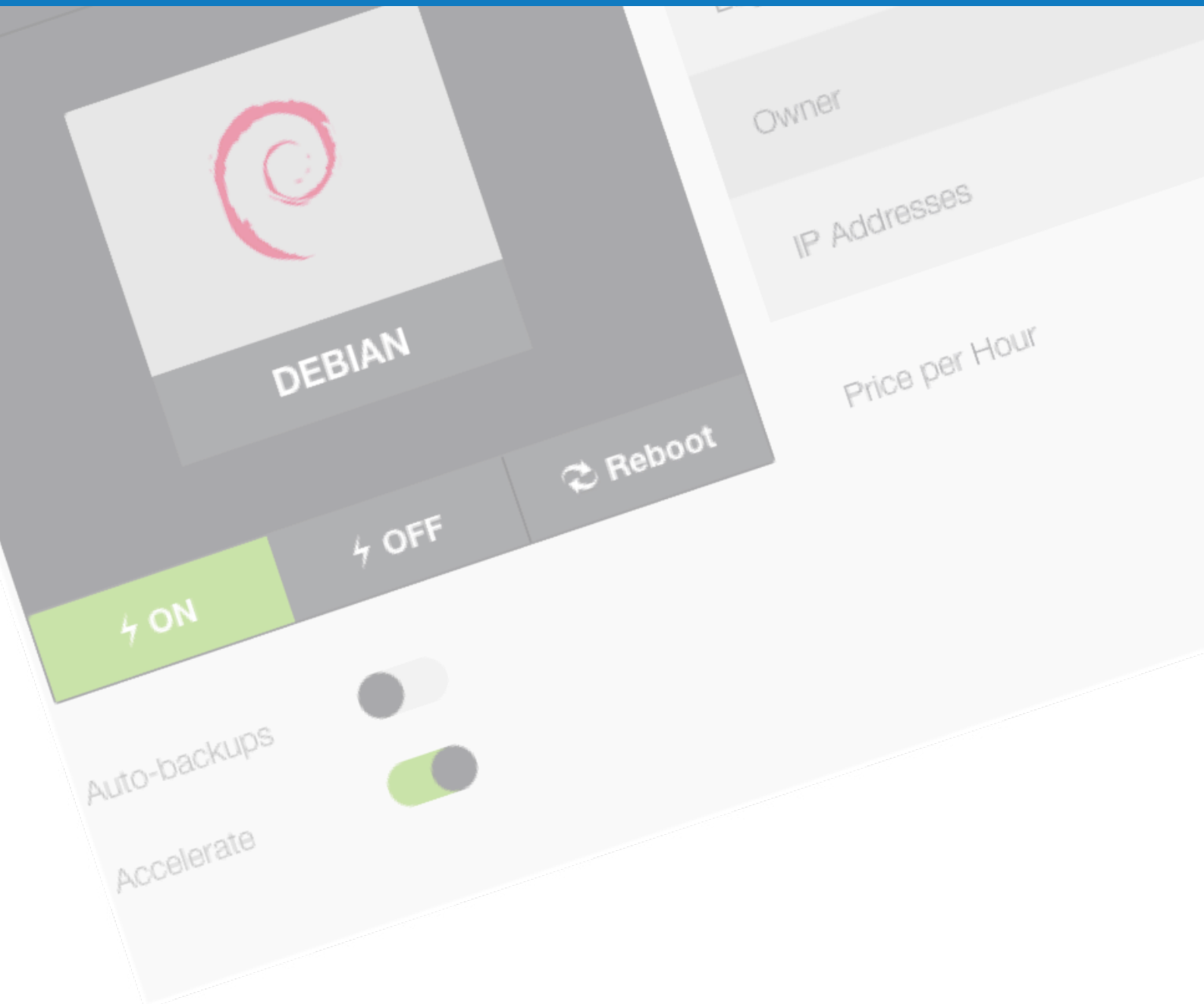


WHITEPAPER

OnApp Accelerator



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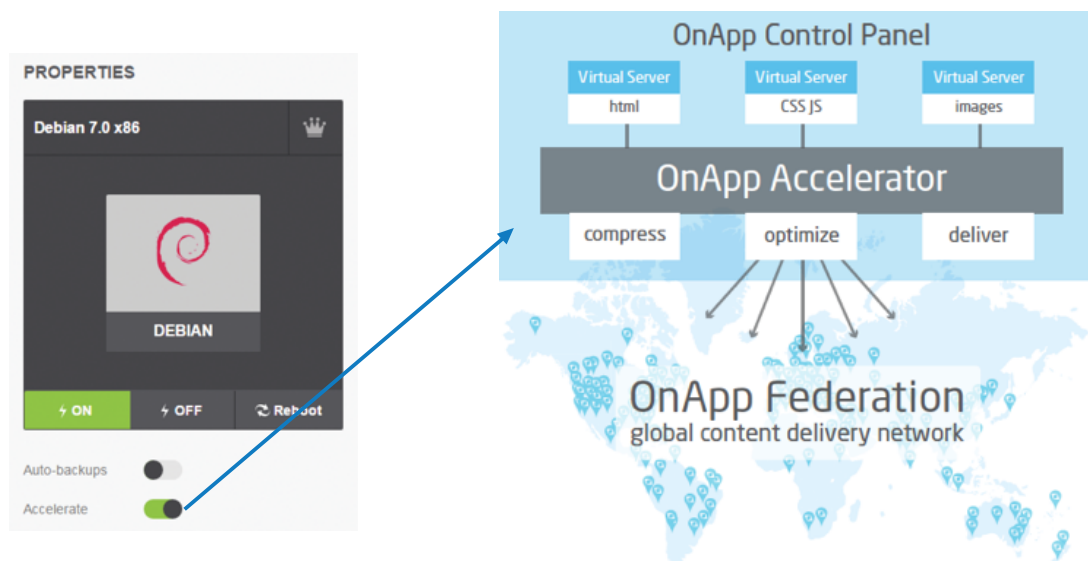
What is OnApp Accelerator?

OnApp Accelerator is a patented content optimization technology for web applications hosted in OnApp clouds.

OnApp Accelerator enables OnApp cloud providers to give their customers the performance benefits of a global Content Delivery Network (CDN) without the complexity or cost of a full-blown CDN solution.

When Accelerator is activated for a Virtual Server running in an OnApp cloud (VS), its web content is automatically optimized, compressed and distributed to locations around the world - so end users accessing that content can download it as efficiently as possible from the location nearest to them.

The result is an immediate performance improvement for web content hosted in OnApp clouds, without any configuration, recoding or CDN expertise required - either from the service provider or their customer.



Accelerator context: the CDN market

To understand the importance of OnApp Accelerator in the service provider/hosting market, it is first necessary to review the benefits of a Content Delivery Network (CDN), and the reasons why the vast majority of websites, service providers and their customers still don't use one.

CDN benefits

A CDN improves performance for web applications by distributing web content – pages, scripts, images and other files – to locations around the world, and ensuring each local user gets that content from the location closest to them. CDNs bring numerous benefits to service providers and their customers:

- **Reduced latency:** a CDN improves key metrics like page load time, resulting in a better user experience, improved search rankings and, for transactional websites, improvements in sales, repeat visits and abandonment rates.
- **Higher availability:** by distributing web content, a CDN takes the load off the origin server (the server where the web application is hosted) and provides multiple alternative sources for each piece of content, should one or more locations become unavailable.
- **Greater scalability:** by distributing web content across multiple locations, web applications can cope with much greater visitor volumes without impacting performance.
- **Reduced load:** for service providers, CDNs reduce the load on the origin server by routing content requests (e.g. for a page or an image) to a location on the CDN instead.
- **Commercial benefits:** for service providers, CDN provides an additional source of revenue alongside web hosting, VPS hosting, cloud hosting and other products.

Barriers to CDN take-up

In spite of the benefits, it's estimated that only about 6% of websites take advantage of CDN. Why is this?

- **Lack of technical knowledge:** unless they've made the decision to specialize in CDN - and hired the appropriate staff - many service providers lack specific expertise in CDN technology. In addition, outside of tech-savvy users, the majority of their customers have little or no understanding of how CDNs work, or what the benefits are.
- **Difficulty:** CDNs are not easy to implement: they require changes to DNS, HTML and CMS (Content Management Systems) that also prevent take-up.
- **Cost:** with the launch of alternative CDN platforms for the service provider mass-market – such as OnApp's federated CDN – the number of CDN providers has begun, at last, to grow – but the CDN market today is still in the grip of a handful of very large providers whose monopoly has kept prices out of the reach of all but the largest, or most cash-rich companies.
- **Commercial understanding:** most service providers focus on a handful of core hosting products, such as public and private cloud hosting, Virtual Private Servers, Virtual Datacenters and bare metal servers. If they offer CDN at all, it is typically by reselling a third party CDN. In this market – outside the specialist CDN providers - there is limited understanding of how to price, package and go to market with CDN services.

Accelerator benefits

The technical and commercial barriers to CDN adoption have prevented many service providers from capitalizing on the CDN opportunity, and delivering the benefits to their customers.

OnApp Accelerator is designed to overcome these obstacles, and provide all service providers with a simple way to deliver those CDN benefits - without any CDN expertise or technical knowledge required, either from the provider or from their customer:

- **Zero effort:** Accelerator provides instant CDN for web content hosted in OnApp clouds: it accelerates the entire Virtual Server.
- **Instant performance:** Accelerator can deliver up to a 100% performance improvement for web content - increasing stickiness for a service provider's cloud product.
- **Competitive advantage:** Accelerator provides an immediate competitive advantage for service providers running OnApp: it's a unique feature not available from cloud providers like AWS or Azure.
- **No technical knowledge required:** from either the service provider or the customer. OnApp manages the CDN.
- **No integration work** or implementation effort is required from the provider - Accelerator is fully integrated with the OnApp Cloud platform.
- **No config or recoding required:** with Accelerator, no DNS or HTML changes are required to enable CDN for web content.
- **No entry or exit barriers:** Accelerator is free of charge with OnApp v6.0 and higher: there is no license cost, and (subject to a fair use policy) OnApp covers the CDN bandwidth costs.

OnApp Accelerator or OnApp CDN?

For service providers with the necessary CDN experience, OnApp provides a fully-fledged CDN platform, which enables providers to build and manage their own CDN, take full advantage of any network and datacenter infrastructure they already own, and extend it with new locations via OnApp's network of clouds – the OnApp Federation.

For customers with complex requirements or very high traffic volumes, OnApp CDN provides full control over CDN design, management, locations and features. For the majority of cloud providers, however, Accelerator delivers the immediate, hands-free performance improvement that most customers actually need.

The following section examines the technology components that make up the OnApp Accelerator product.

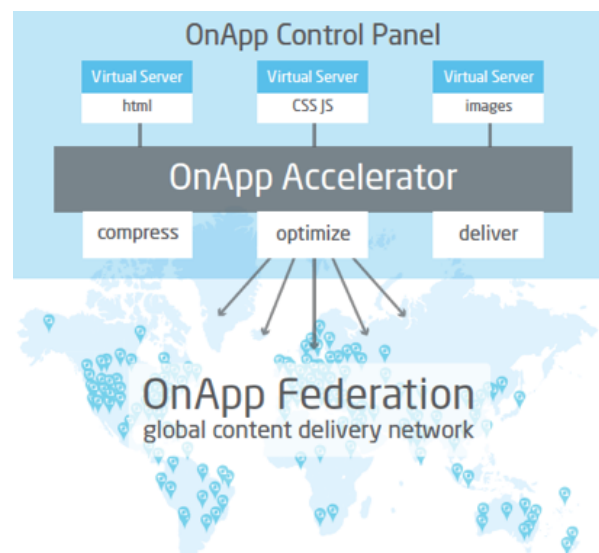
Accelerator technology

There are three main components to OnApp Accelerator: a hypervisor in an OnApp cloud; an Accelerator VS appliance, that sits between the hypervisor and the virtual server being accelerated; and a global Content Delivery Network, which is provided and managed by OnApp.

Accelerator VS appliance

The Accelerator is a Virtual Server appliance that sits between the hypervisor and the Virtual Server hosting the web application.

- When a virtual server is accelerated, traffic is rerouted through the Accelerator.
- The Accelerator handles the HTTP/HTTPS request from the end user's browser, and proxies it to the Virtual Server.
- Automatically provides SSL certificate for HTTPS traffic with Lets Encrypt.
- The response is optimized by being minified, compressed and CDNified.
- This is performed with nginx and pagespeed.



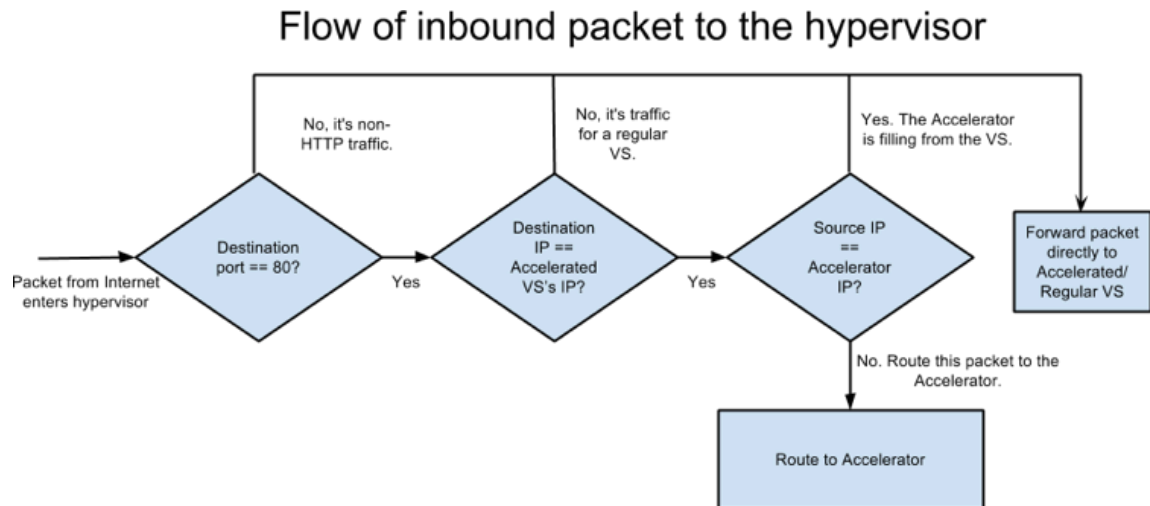
The Accelerator is also the origin for the CDN edge servers, which pull the optimized content from the Accelerator for caching.

File types optimized by OnApp Accelerator

HTML	CSS	GIF	JS	JPG	PNG	WEBP
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Hypervisor & rerouting

When a virtual server is accelerated, *ebtables* and *iptables* firewall rules are applied on the hypervisor host to reroute HTTP/HTTPS traffic through the accelerator.



OnApp Accelerator has a built-in monitoring and failover mechanism. Should the Accelerator VS appliance malfunction, the *ebtables* and *iptables* rules are removed, and HTTP/HTTPS requests are immediately routed back to the target VM.

Content Delivery Network (CDN)

OnApp Accelerator distributes content to 20 locations on a global Content Delivery Network managed by OnApp. It automatically rewrites the URLs of static content to the CDN. For example:

Original URL: <http://example.com/a.jpg>

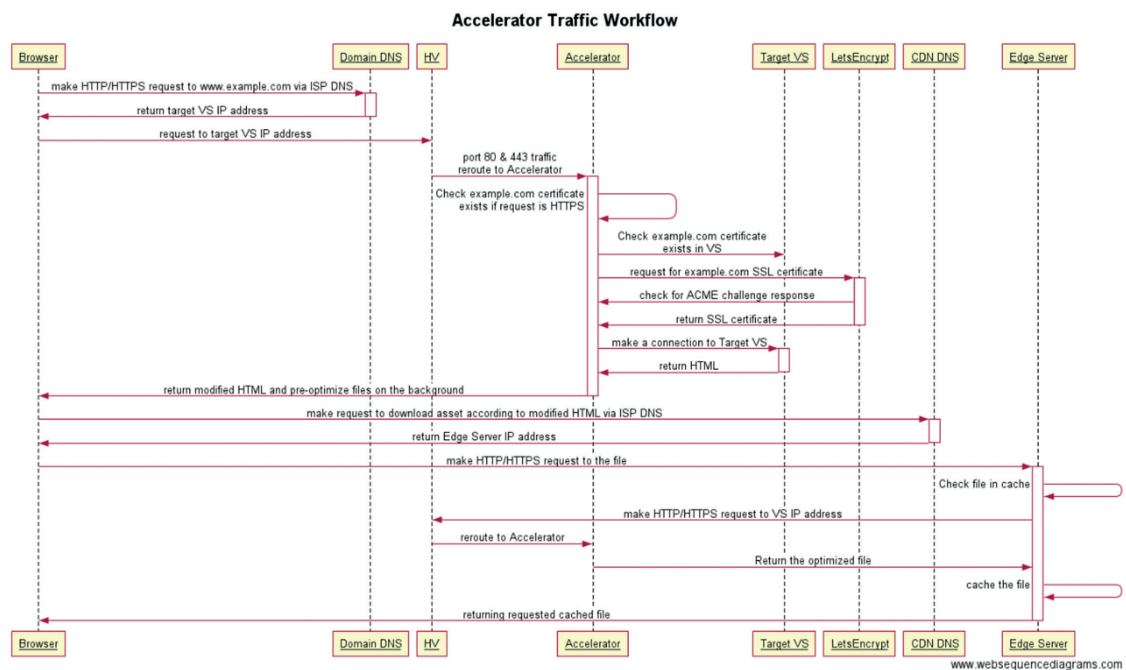
CDN URL: <http://invicdn.worldcdn.net/123/1.2.3.4/xA.jpg.io.pagespeed.webp>

The CDN locations (PoPs) have been chosen by OnApp to provide broad global coverage:

Americas	Europe	Asia	Australia
Dallas	Amsterdam	Hong Kong	Melbourne
Montreal	Frankfurt	Jakarta	Sydney
San Jose	Karlskrona	Singapore	
Sao Paulo	London	Tokyo	
Seattle	Milan		
Toronto	Paris		
Queretaro			
Washington			

Website request sequence with Accelerator

The following diagram describes the normal HTTP request sequence with Accelerator:



Current limitations & roadmap

- The VS being accelerated must be in the same network zone as the Accelerator VS appliance
- One Accelerator is allowed per network zone
- Load balancing of multiple accelerators will be added in a future release
- All web applications are accelerated when a VS is enabled with acceleration - it is not possible to include or exclude specific websites running in a VS
- The CDN locations (PoPs) used by OnApp Accelerator are selected and managed by OnApp - it is not possible to customize PoP selection. Service providers that need more control over their CDN should deploy the OnApp CDN platform instead

Accelerator benchmarks

Website performance with Accelerator

The table shows the results of benchmarks for a virtual server running a typical e-commerce website, with and without Accelerator enabled.

OnApp Accelerator decreased the entire file size close to 60%, reduced load time by more than 50%, and resulted in 75% fewer file requests to the accelerated virtual server compared to the original.

	Original	Accelerated
File size	1.14MB	0.47MB
Load time	3.9s	1.9s
File request	52	13

A simple way to benchmark 'before and after' performance is to measure the performance of a website running on an accelerated virtual server, and then measure the same website with "?PageSpeed=off" appended to the URL being tested. This will ignore the Accelerator function while you test.

E.g. <http://www.example.com/?PageSpeed=off>.

Accelerator appliance performance

We also conducted performance benchmarks for the Accelerator VS appliance itself, to determine the kind of hardware resources needed in an OnApp Cloud to accelerate virtual servers.

Testing the Accelerator appliance using 1 vCPU with 8GB RAM, with 300 concurrent users, Accelerator served 323 requests per second with a CPU utilization of 90%. The benchmark file used was a 100KB HTML file.

Pricing and go-to-market strategies

Pricing to service providers

OnApp Accelerator is included free of charge with OnApp Cloud v6.0 and later.

All costs for CDN bandwidth consumed by accelerated VMs is absorbed by OnApp, subject to a fair usage policy.

OnApp reserves the right to disable acceleration should we feel this feature is being abused – first discussing any issue with the service provider concerned.

Go to market strategy

OnApp Accelerator is an important differentiator for service providers running OnApp clouds:

- **Performance** - you can offer up to twice the performance for website owners and their users, with no effort. This is a big selling point for the huge cloud website hosting market.
- **Net neutrality** - by making CDN accessible to everyone, you're democratizing Internet performance - at least on the web. Everyone can have optimized performance, without needing to have deep pockets.
- **Instant CDN** - even for CDN-savvy customers, the ability to get CDN speed benefits without the cost of paying for an additional service (or the time to configure it) is likely to be attractive.

Accelerator can help with customer retention, too: if customers move to a different cloud provider, they'll either have to accept a performance downgrade or pay more for a CDN service.

OnApp Accelerator is a fully managed, fully automated product. OnApp manages the CDN and PoP selection.

For a demo and more information:

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