

Comparative Performance Report

January 2014

Test 1 & Test 2

In this report we will start by comparing CDN's with and without aiScaler. We have chosen the Amazon Web Services CDN Cloudfront as it is a very generic CDN offering. We compare this to Akamai the largest CDN provider with several sophisticated service offerings. aiScaler is an [Application Delivery Controller \(ADC\)](#), featuring Dynamic Site Acceleration and DDoS protection.

Test 3

In the final section we will compare a cloud-based Application Delivery Network (aiCDN), with traditional CDN's

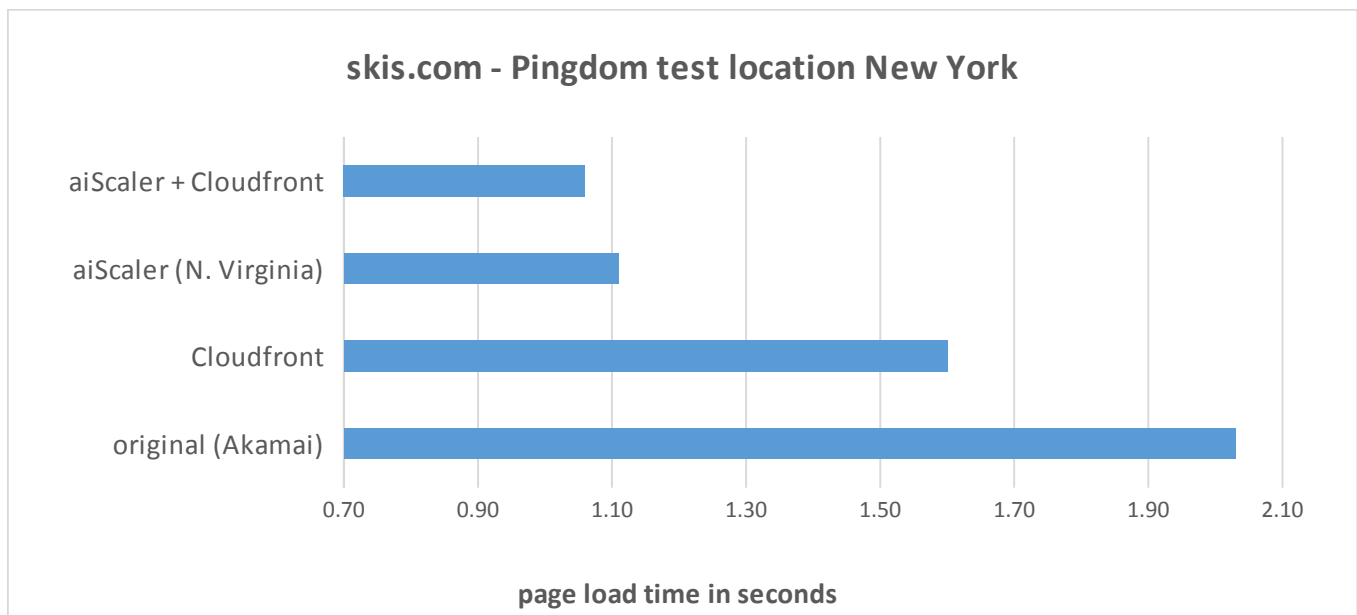
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The logo for aiScaler, featuring the letters 'ai' in red and 'Scaler' in black.The logo for Akamai, featuring a blue circular graphic with a white swoosh and the word 'Akamai' in orange.The logo for Limelight Networks, featuring a green and yellow circular graphic with a white swoosh and the text 'Limelight NETWORKS'.

Test 1 accelerating Akamai: skis.com

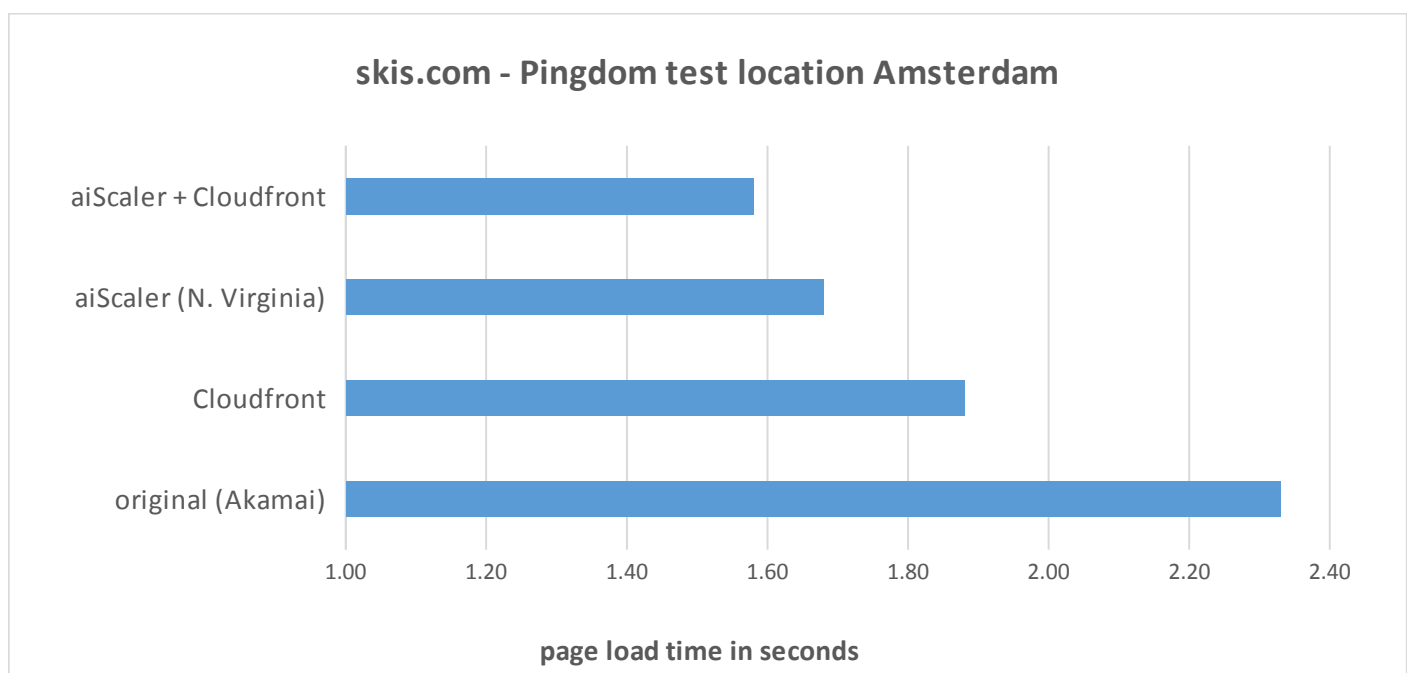
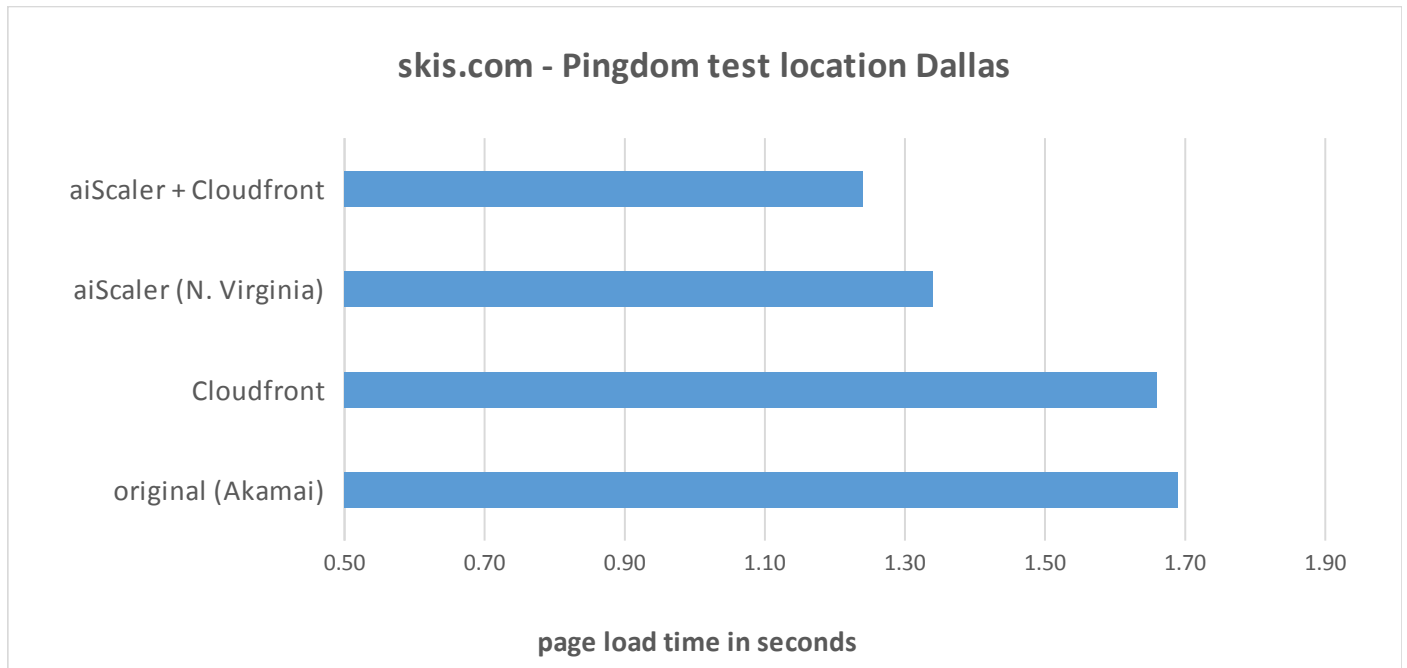
Skis.com is an ecommerce website using Akamai as its CDN. It is a heavy, dynamic site with thousands of different articles. Speed is important to this customer as internet users can easily move to competitive offerings if they feel performance is not excellent. A joint study by Amazon, Microsoft and Google found that a 100 millisecond delay caused a 1% drop in revenue. This drop in revenue continued even when the speed issue was fixed. Once an impression is made with a customer it is very difficult to alter.



Testing details:

- First we tested the original site, which is served through Akamai.
- We then saved the site as a complete .htm copy, checking the source to make sure that all static files are served from a local folder and uploaded it to our testing EC2 instance (N. Virginia, m1.large). We then created a version of the .htm file, and accelerated it through CloudFront, by replacing the local paths with the CloudFront ones (eg. site.com/image.jpg becomes xyz.cloudfront.net/ image.jpg). We had to save the site as a local copy to test CloudFront, because one must use their subdomain for assets.
- aiScaler was functioning as a reverse proxy, using full page caching, running on an m1.medium EC2 instance in N. Virginia.
- aiScaler + CloudFront – is similar to simply aiScaler, but with static files hosted on CloudFront.
- Tests were done using a third party tool from “Pingdom”. A popular and widely available testing tool with results verifiable here <http://tools.pingdom.com/fpt/>. Each test was made multiple times.
- We had to make a local copy to test Cloudfront, because we didn't have access to the live site. The original initial skis.com request took 500ms, while a the local copy on Cloudfront took just about 100ms, because it is a static html copy. We added those 0.4 seconds to the obtained results to simulate a real-world comparison between Cloudfront and Akamai. As you can see, Cloudfront is still beating Akamai.

Since we are comparing delivery networks, we did page loading tests from other locations too: Dallas and Amsterdam.

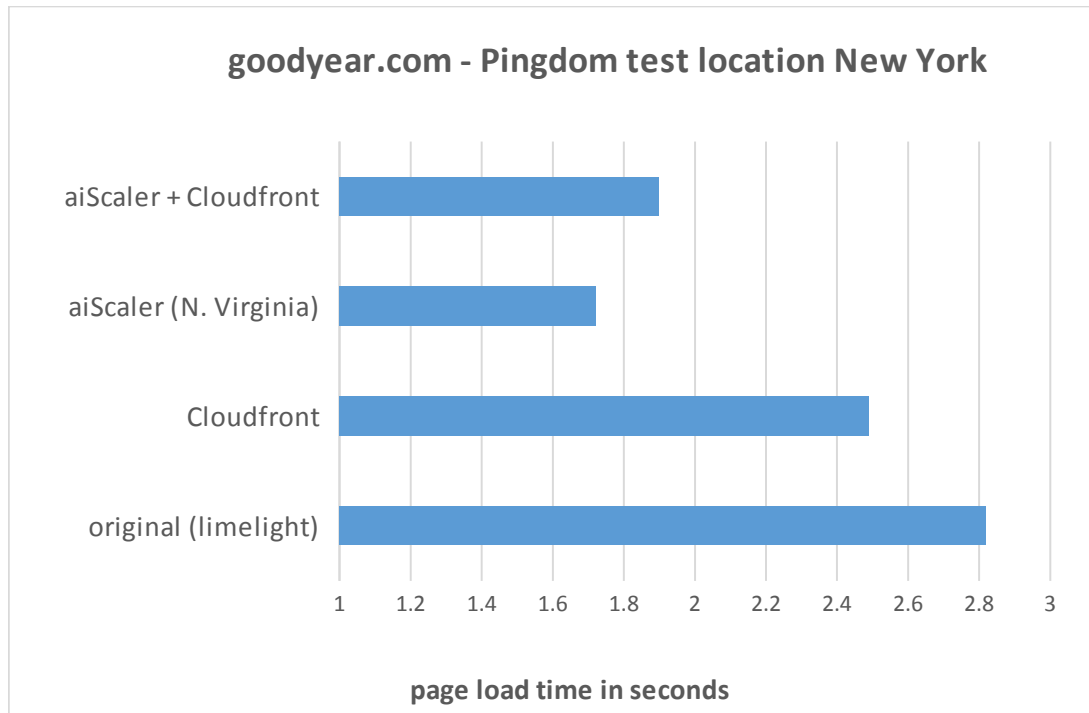


In Dallas, Akamai must have a data center nearby, because it's almost as fast as Cloudfront. aiScaler (with Cloudfront) is still the fastest, but the difference not being as big as in the NYC test. This makes sense, since aiScaler has only one end-point location in North Virginia, which is fairly close to NYC. (In test3 we will compare aiScaler with multiple endpoints around the world). Next is Amsterdam:

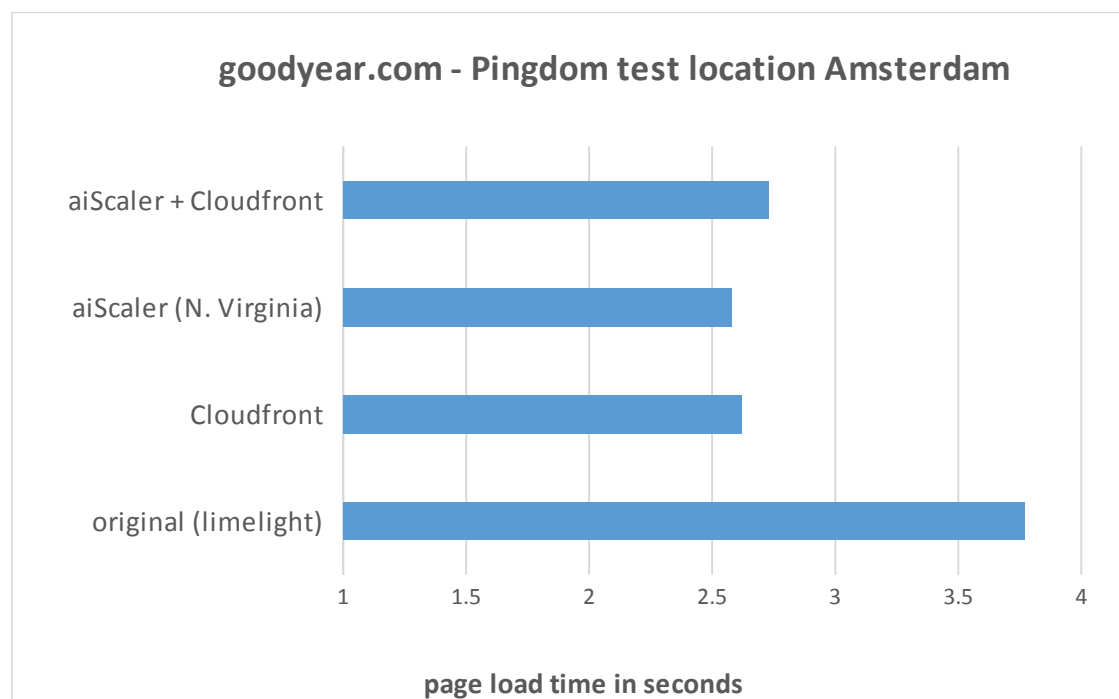
Cloudfront and Akamai both have endpoints in Europe, which explains why difference between aiScaler is smaller than in the US-based tests. It's surprising to see aiScaler still being the fastest, given that all data must cross the ocean. In test 3 we will add an aiScaler instance in Ireland, to test the effect of multiple end-point locations. Akamai is lagging far behind again.

Test2: Accelerating Magento CMS: goodyear.com

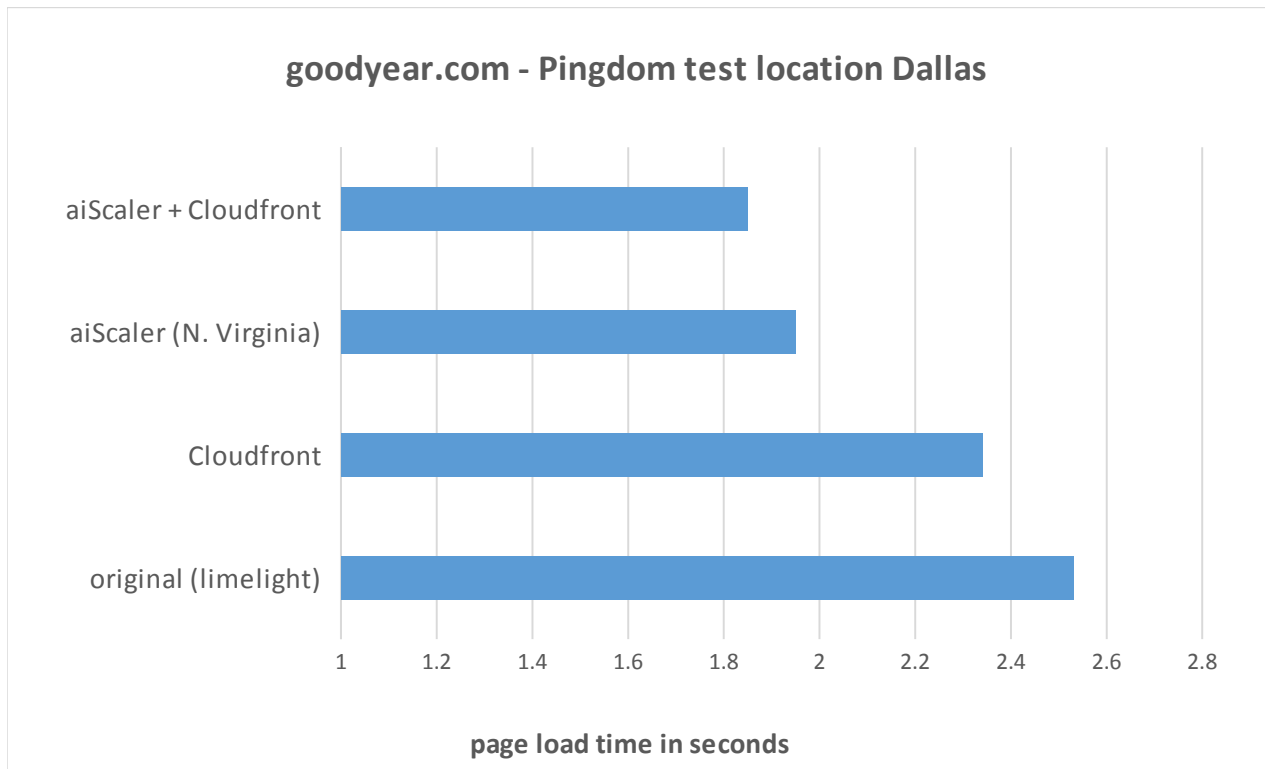
Magento is one of the most popular content management systems (CMS) for e-commerce websites. A 2012 study by AheadWorks showed that Magento has a leading marketshare of 31% in the e-commerce industry. Goodyear is one of the world's biggest rubber and tire companies with an international customer base. Their website is using Magento as a CMS and Limelight as their current CDN provider.



The results in New York are similar to the results from skis.com. The only inconsistent result comes from the combination of aiScaler + Cloudfront in Amsterdam. In all the other tests this combination was the fastest or second fastest, while in Amsterdam it's taking the third place. The only explanation that we could come up with is that the nearest Cloudfront location was unusually busy at the time of testing. It's a downside of using a CDN provider: you share edge locations with other customers using the same CDN, which can cause performance drops. When you set up a private CDN (see test3), you are in full control of your edge locations.



In Dallas we see the same results as in the previous tests:



Conclusion test 1 & test 2

1. Cloudfront was faster in our tests, than both Akamai and Limelight.
2. CDN users benefit significantly from adding aiScaler to their setup.
3. aiScaler also features DDoS protection, something for which Akamai charges extra, while Cloudfront doesn't offer any kind of DDoS protection at all.
4. aiScaler works out of the box and setup of a site like skis.com would take no more than a single hour.. No code changes are required, although the same can be said for Limelight and Akamai.

Test 3 aiCDN (aiScaler + Route53)

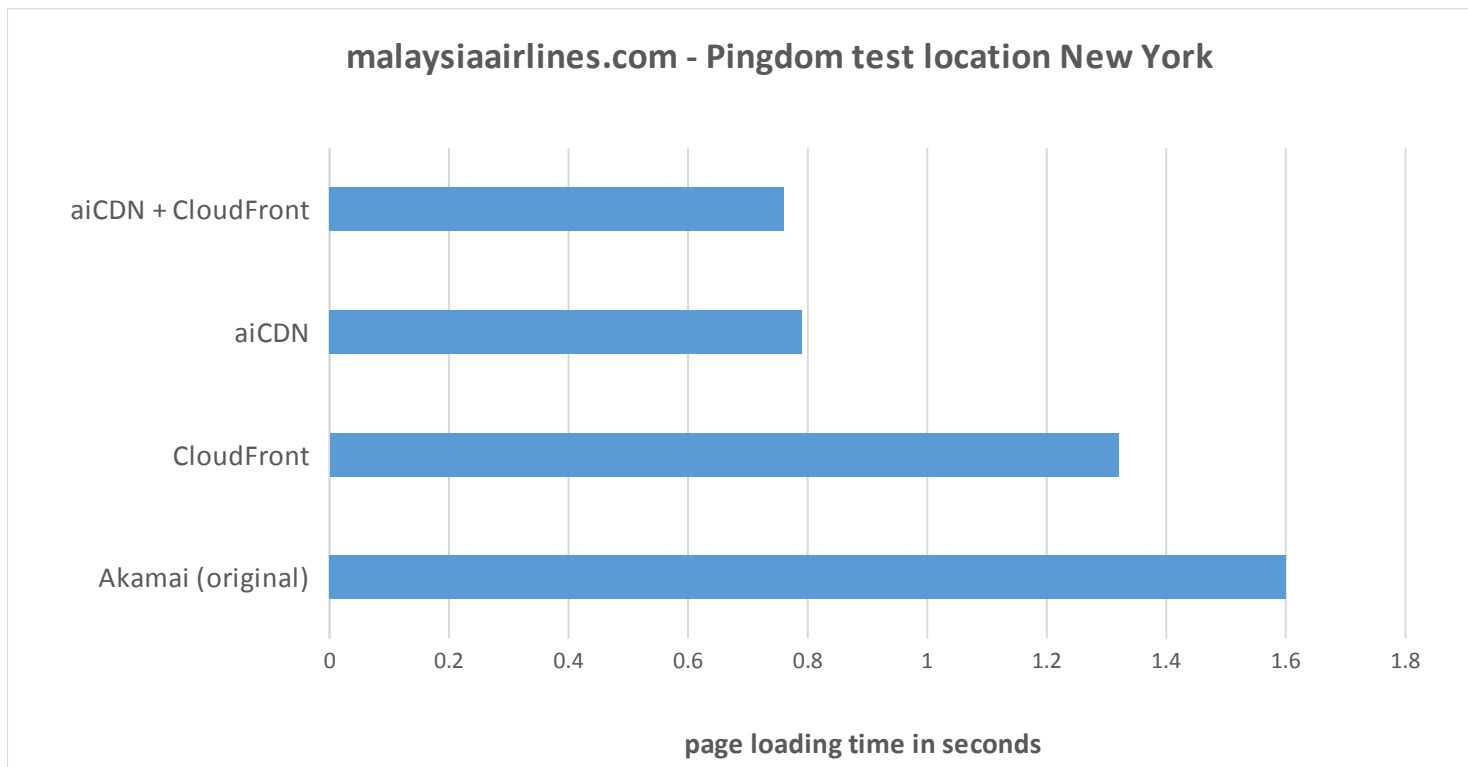
aiScaler can be used to enhance the performance of CDN's or -alternatively- to completely replace them. A CDN consists primarily of three elements. (1) The routing of traffic, (2) the network itself and (3) the caching endpoints.

The performance issues with most CDN's is that the endpoints are shared and not capable of sophisticated optimization. They provide basic caching options, but lack advanced technology like dynamic site acceleration, front-end optimization or mobile content acceleration. This is why putting aiScaler at the edge can dramatically improve results even without a CDN.

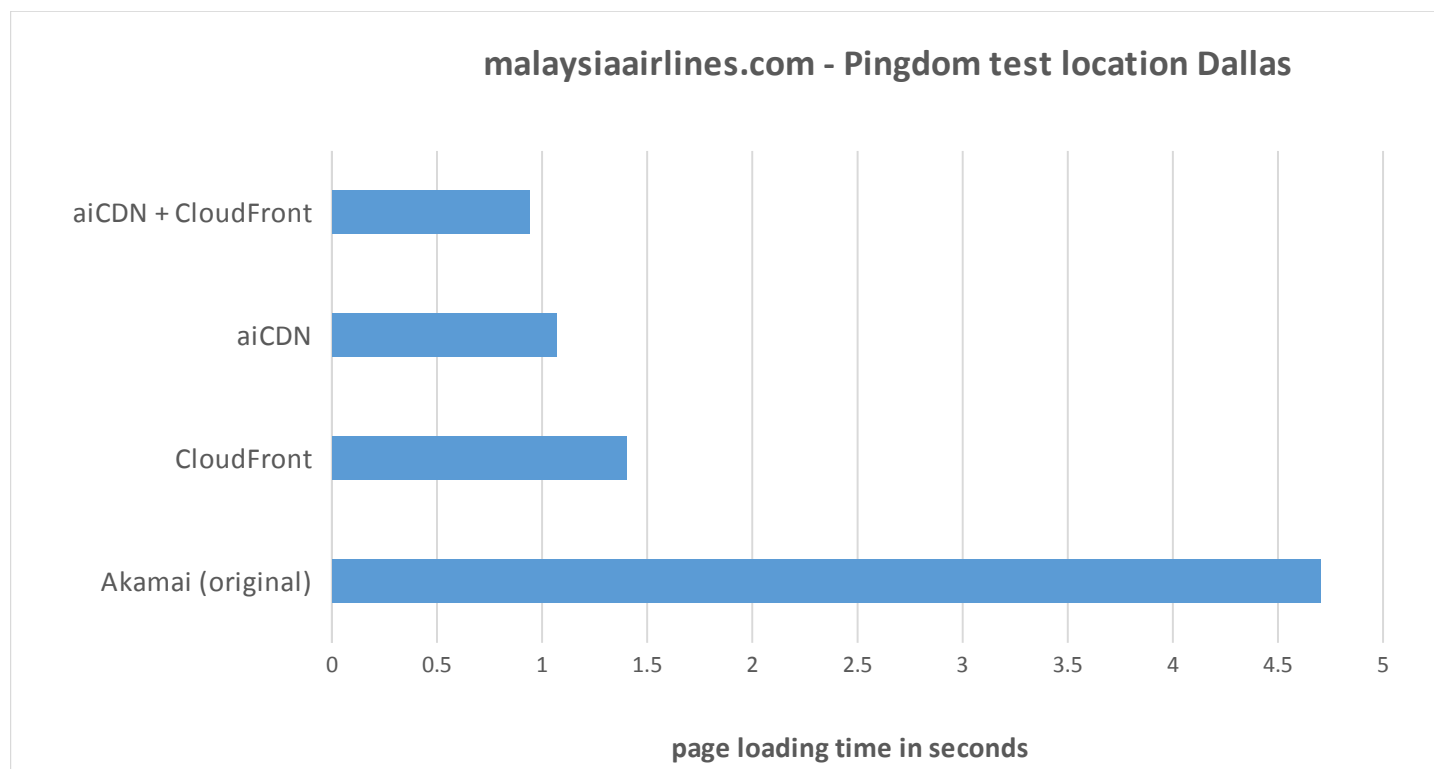
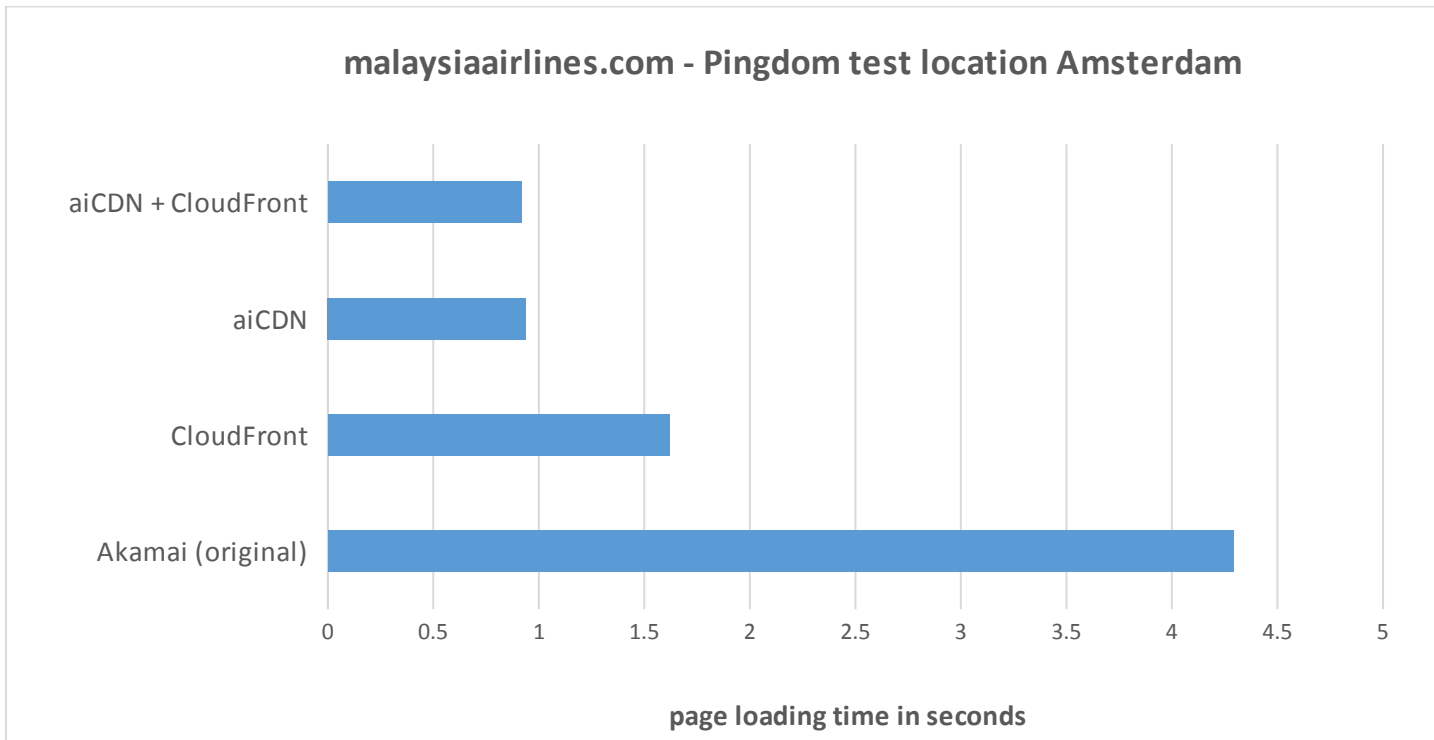
Using cloud providers like Amazon or the HP cloud, you can launch ADC's in different regions. This creates your own private CDN, or -technically- it's an ADN, which stands for Application Delivery Network. aiScaler has been offering this product called aiCDN on the Amazon cloud since 2009. aiCDN combines several aiScaler instances, with Amazon's DNS service, called route 53 or another geo-DNS service. Below are the results compared with traditional CDN's:

We decided to set up aiScaler instances in Northern Virginia, Ireland and Northern California. Then we configured route53 to use "georouting", according to this guide <http://aiscaler.com/wiki/dcc-wiki>. This function of Route 53 is DNS-based georouting, which route traffics to the closest aiScaler instance by latency. The combination of aiScaler endpoints and geo-DNS creates the **aiCDN** offering.

We tested malaysiaairlines.com, using Pingdom from Amsterdam, Dallas and New York. Instead of having one single aiScaler instance, we compared the results with aiCDN, using the aiScaler instances in Northern Virginia, Ireland and Northern California.



In Amsterdam we don't see any drop in aiCDN's performance, which we saw earlier in test1 and test2. This is probably due to the proximity of the aiCDN node (aiScaler instance) in Ireland.



Conclusion of test 3

malaysiaairlines.com is using Akamai as their current CDN. We noticed that the page load times were slowed down by adding the Akamai network in between the customer and origin. The difference between the Akamai and aiCDN was up to 3x. Malaysiaairlines would save money and dramatically increase performance by removing Akamai and simply running aiScaler instances with or without Cloudfront.