The Requirement for a New Type of Cloud Based CDN

Executive Summary

The growing use of SaaS-based applications has highlighted some of the fundamental weaknesses of the Internet that significantly impact the viability of content providers being able to use the Internet for services such as streaming video or file sharing. Existing Content Delivery Networks (CDNs) address some of these weaknesses, but most CDNs have a traditional architecture and management model that precludes them from offering the benefits that are associated with a cloud-based approach. The Teridion solution reflects a contemporary cloud-based approach to designing a CDN and as a result, the Teridion solution offers SaaS providers a new type of global CDN and optimization solution with characteristics that are typically missing in a traditional CDN.

Introduction

Many industry reports have documented the broad adoption of public cloud computing. One recent report[1] stated that while most of IT spending is flat, spending on cloud computing is growing at a 22.8% compound annual growth rate (CAGR), and will reach $127.5 billion in 2018. The report added that enterprise spending on SaaS-based applications is approaching 30% of all application spending and that the spending on SaaS-based applications is currently growing at a 17.6% CAGR.

The dramatic increase in the use of cloud services has impacted IT in a number of ways. One way is that there is now a widely accepted *cloud model* for application delivery. Some of the characteristics of that model are:

- A reliance on virtual resources;
- The ability to dynamically instantiate resources;
- A consumption-based pricing model;
- An infrastructure that is highly scalable;
- A reduction in total cost;
- A reduction in complexity.

In the vast majority of instances, cloud resources are accessed over the Internet. As a result, the growth in the use of cloud-based applications and services has highlighted some of the fundamental weaknesses of the Internet. Those weaknesses include:

- Internet Latency
  One of the reasons for the Internet's large and highly variable latency is the use of BGP to route the traffic that goes between the millions of networks that comprise the Internet. Since BGP doesn't know the specific, real-time characteristics of the networks that

[1] http://dazeinfo.com/2015/07/01/the-future-of-cloud-computing-127-billion-market-by-2018-report/

comprise the Internet, it is highly unlikely that the end-to-end path chosen by BGP is the path with the lowest latency.

- Characteristics of TCP
  The TCP slow start algorithm calls for the initial data transfer between two communicating devices to be severely constrained. The algorithm calls for the data transfer rate to increase only if there are no problems with the communications. The slow start algorithm is also applied in those situations in which a packet is dropped, which as described below is a frequent occurrence.

- Packet Loss
  Part of the reason why the Internet has high packet loss is because there isn't any direct financial or governance incentive for Internet Service Providers (ISPs) to design peering points for low packet loss, and so they often don't.

The Teridion Solution

The Teridion Global Cloud Network (GCN) creates one or more private, overlay networks for each Teridion customer. The CGN eliminates the Internet latency that is caused by the use of BGP by determining in real-time the best routing for each end-user according to their location, Internet connection type (wifi, mobile, wired, etc.) and other parameters. The Teridion solution is cloud based and hence Teridion customers and their end-users don't require any installation, setup, code change, hardware or software. As a result, customers can start using Teridion within minutes.

As shown in Figure 1, the Teridion GCN has the following components:

- Teridion Cloud Routers (TCRs) act as traffic gateways. The TCR is a virtual router that can be deployed and scaled dynamically at any cloud provider's facility.

- Teridion Measurement Agents (TMAs) provide real-time metrics about the performance of the global Internet.

- The TMS (Teridion Management System) maintains an end-to-end logical view of the network. The TMS is responsible for running proprietary algorithms which provide a real-time congestion-map of the Internet that is used to make dynamic performance based routing decisions. The TMS updates its set of optimal routes every five minutes.

- Traffic-optimized tunnels connect the TCRs, either minimizing latency or maximizing throughput. Traffic optimization is provided by continuous monitoring of the performance between the TCRs using measurements from both TCRs and TMAs.

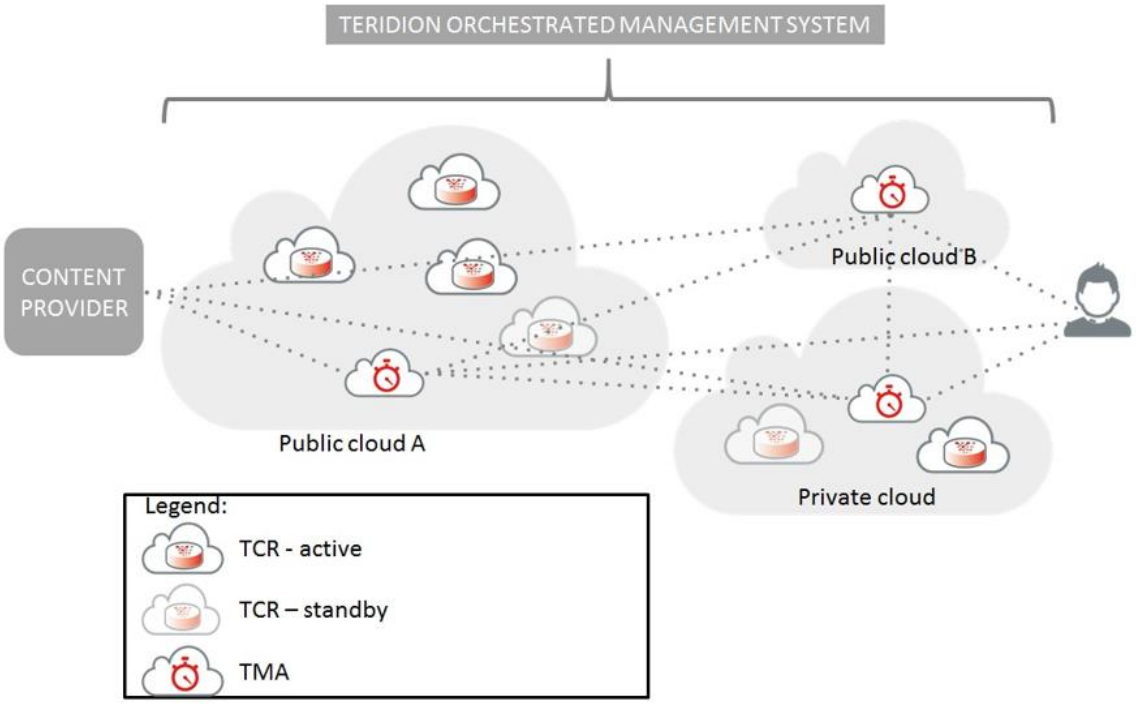

Figure 1. The Teridion Management System spans multiple cloud providers.

Some of the other key characteristics of the Teridion CGN solution are that it:

- Dynamically adapts to shifting traffic patterns, allocating and de-allocating resources as needed.
- Doesn't store the customer data. This reduces cost because it eliminates the need to maintain the data on a Teridion facility. This also eliminates any security or compliance concerns relative to a third party having access to a customer's data.
- Inherently supports bi-directional traffic.
- Operates at the routing and transport layers and hence eliminates the need to customize the network for each application or for specific protocols.
- Provides for high availability by using techniques such as having alternatives paths pre-configured.

The Teridion Value Proposition

One of the limitations of many traditional CDNs is that they can't overcome the previously discussed weaknesses of the Internet. In addition, because they cache a customer's data a traditional CDN provides the most value when specific content is delivered over a short period of time to multiple end-users

who are in the same geographic location. Cloud based services, including file hosting, don't fit very well into such a scenario as the content is personal and it is either private or shared with just a small number of users who are connecting from different geographic locations. In addition, a traditional CDNs fits best when connecting to websites that only require downstream communications. This is not the case with cloud hosting offerings that also focus on upstream end-user content.

To better understand Teridion's value proposition, three users of the Teridion solution were interviewed. The interviewees were the:

- Co-founder of a file sharing company;
- Business development manager at a mobile advertising company;
- Co-founder of a provider of voice services.

Since like most IT professionals, the interviewees can't be identified by name or by company, they will be referred to in this white paper as The File Sharing Co-Founder, The Business Development Manager and The Voice Services Co-Founder.

The File Sharing Co-Founder said that in his experience it takes at least a week to onboard a site with other CDNs but that when he did that with Teridion "It happened over night." He also said that Teridion's ability to quickly add resources in order to respond to spikes in demand is very important as is their ability to support his business growth in places such as mainland China. When asked about the importance of the fact that Teridion doesn't store customer data, The File Sharing Co-Founder stated that many of their customers will only do business with them if they can demonstrate that they don't touch their customer's data. The File Sharing Co-Founder was also pleased that Teridion works at the network layer because some of the file sharing company's customers use FTP and by working at the network layer, Teridion can accelerate that traffic.

The Voice Services Co-Founder said that he was familiar with a number of CDNs and that the Teridion solution "Was much easier to implement and was more user friendly than the other solutions". He added that the Teridion solution was priced lower than the other solutions he was aware of and that it significantly reduced the end-to-end delay through the Internet.

By his own admission, The Business Development Manager isn't very technically sophisticated. He is more interested in the business impact of using the Teridion solution. As part of explaining his environment, The Business Development Manager stated that today's ads aren't the same as they were just two years ago. Two years ago ad were primarily banner ads. Now ads are "Much more visual and interactive and require much more bandwidth."

The Business Development Manager said that "Everything is moving to the cloud and that as a result, the next big concern will be latency – how much time does it take for the system to respond." He added that "We are living in a world in which every second is like a week was 20 years ago" and that in his business "Time is really money." He elaborated by saying that his industry is very competitive and that when he shows a potential customer an ad and it loads quickly, they choose him over his competitors.

Summary and Call to Action

The way that applications and services are delivered to users is increasingly following a cloud model that is characterized by:

- A reliance on virtual resources;
- The ability to dynamically instantiate resources;
- A consumption based pricing model;
- An infrastructure that is highly scalable;
- A reduction in total cost;
- A reduction in complexity.

Most traditional CDNs don't implement a cloud delivery model nor do they minimize the delay associated with the Internet nor do they effectively support two-way communications. Key characteristics of the Teridion solution includes that it:

- Determines the shortest path through the Internet;
- Dynamically adapts to shifting traffic patterns, allocating and de-allocating resources as needed;
- Doesn't store the customer data;
- Operates at the routing and transport layers;
- Provides for high availability.

For more information on the Teridion solution see:

- Rethinking Network Performance[2]
- Teridion Behind the Scene[3]

[2] http://www.teridion.com/wp-content/uploads/2015/09/WhitePaperforcloudhosting-Teridionrethinkingnetworkingperformance.pdf

[3] http://static.teridion.com/download-whitepaper