



Optimizing SaaS with HPE Aruba Networking EdgeConnect SD-Branch

How does HPE Aruba Networking SaaS Express optimize application experience?

Introduction

One of the key drivers for SD-WAN (and SD-Branch) is the increased adoption of software as a service (SaaS) in the enterprise environment. Sending all SaaS traffic to the data center or headquarters and then have it go out to the internet is no longer an acceptable solution. Thus, the main goal of any SD-WAN solution is to maximize the performance of applications such as Microsoft 365, Google Workspace™, Salesforce, Workday, Zoom, and so on. To do so, SaaS providers recommend enterprises to break out SaaS traffic directly over the internet from each branch office. This, however, could raise concerns about a loss of visibility and policy controls for application usage, performance, and user experience.

Key benefits

- Identifies optimal routes to SaaS solutions by connecting to nearest SaaS application servers
- Improves service reliability through dynamic steering of SaaS traffic
- Provides network-wide visibility for all SaaS applications
- Supports predefined and custom SaaS applications to be monitored and optimized, enabling tailored enhancements

Local breakout is often assumed to be the starting point to optimize the SaaS experience, but there are other factors to consider:

- The solution should direct SaaS traffic to the closest SaaS node. This is often challenging in distributed environments where the corporate Domain Name Server (DNS) may not be colocated with the users.
- The solution should take the best internet service providers (ISPs) for every application. To do this, it's important to consider the full communication path, and not just the last mile. Different ISPs may have different levels of peering with different SaaS applications.
- Given the business-critical nature of certain SaaS applications, the solution should provide rich visibility of the experience as measured by the network and as perceived by the users.

HPE Aruba Networking SaaS Express addresses all these challenges to seamlessly connect users to SaaS applications.





How does HPE Aruba Networking SaaS Express work?

HPE Aruba Networking SaaS Express uses a combination of different techniques to identify the ideal WAN circuit for every application, find the closest SaaS nodes, and finally ensure traffic is forwarded through the local breakout, over the ideal circuit. It does so while providing rich monitoring tools to let network administrators understand how traffic is being forwarded and what is perhaps more important, how users are perceiving the service. To understand the different technologies involved, this guide will first focus on how traffic is being forwarded to then close with monitoring and traffic analytics tools.

In essence, HPE Aruba Networking SaaS Express can be better understood by breaking it down into four aspects:

- 1.** Finding the optimal path to the SaaS application
- 2.** Ensuring traffic is routed to the closest SaaS application node
- 3.** Enhancing application responsiveness by measuring latency and jitter and dynamically routing traffic through the best path
- 4.** Continuously monitoring the health and performance of network paths to various SaaS applications

Finding the best paths for a SaaS application

HPE Aruba Networking EdgeConnect SD-Branch Gateways monitor the state of every WAN circuit by probing their default gateway, tunnel destinations, and a distributed probe responder service to measure the health and status of each upstream path. Based on these measurements, branch gateways select the best path for overlay traffic and internet local breakout, as both SD-WAN overlay and internet last-mile communications are continuously monitored.

HPE Aruba Networking SaaS Express complements this by monitoring the complete communication path to business-critical SaaS applications. HTTP probes are continuously sent by the gateway to the front doors of the applications being optimized. Based on the response and the service-level agreement (SLA) threshold, branch gateways determine the best path for each application. HPE Aruba Networking SaaS Express then effectively behaves as an extension of dynamic path steering (DPS) and forwards the traffic associated with business-critical SaaS applications through the path selected for each one. Thus, HPE Aruba Networking SaaS Express optimizes the quality of experience (QoE) per circuit and per application.

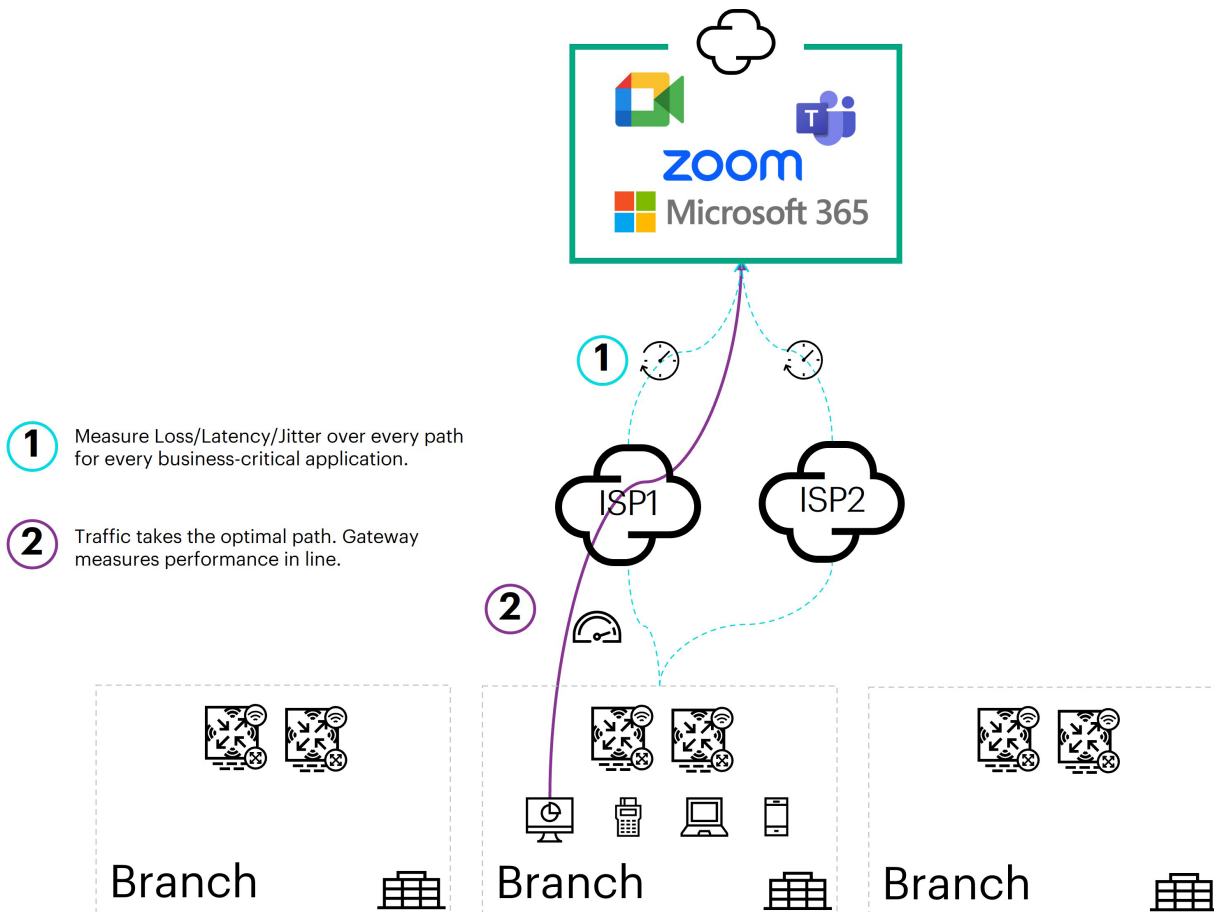


Figure 1. Using HTTP probes to select the best-performing paths for SaaS applications

Finding the closest SaaS application node

In enterprise networking, it is very common to have users resolve addresses against a corporate DNS server, either hosted in the data centers or in some virtual private cloud. This, in addition to allowing the resolution of internal IP addresses, gives companies additional control and security mechanisms for traffic going out to the internet.

This can lead to challenges when used in distributed environments, as the IP addresses of these business-critical SaaS applications would be resolved by a DNS server in a different location. As an example, a user connecting from a branch in Australia could be resolving the IP address of office.com against a DNS in Europe. This would then result in this user connecting to the SaaS node closest to the DNS server (in Europe) instead of another one that may be closer (most SaaS applications have SaaS nodes all around the world).

To overcome this, HPE Aruba Networking EdgeConnect SD-Branch Gateways capture DNS requests going to fully qualified domain names (FQDNs) associated with the different applications being optimized and proxy these DNS requests to the DNS server associated with the WAN circuit selected for that application. This helps ensure that traffic will always go to the closest node for each SaaS application.

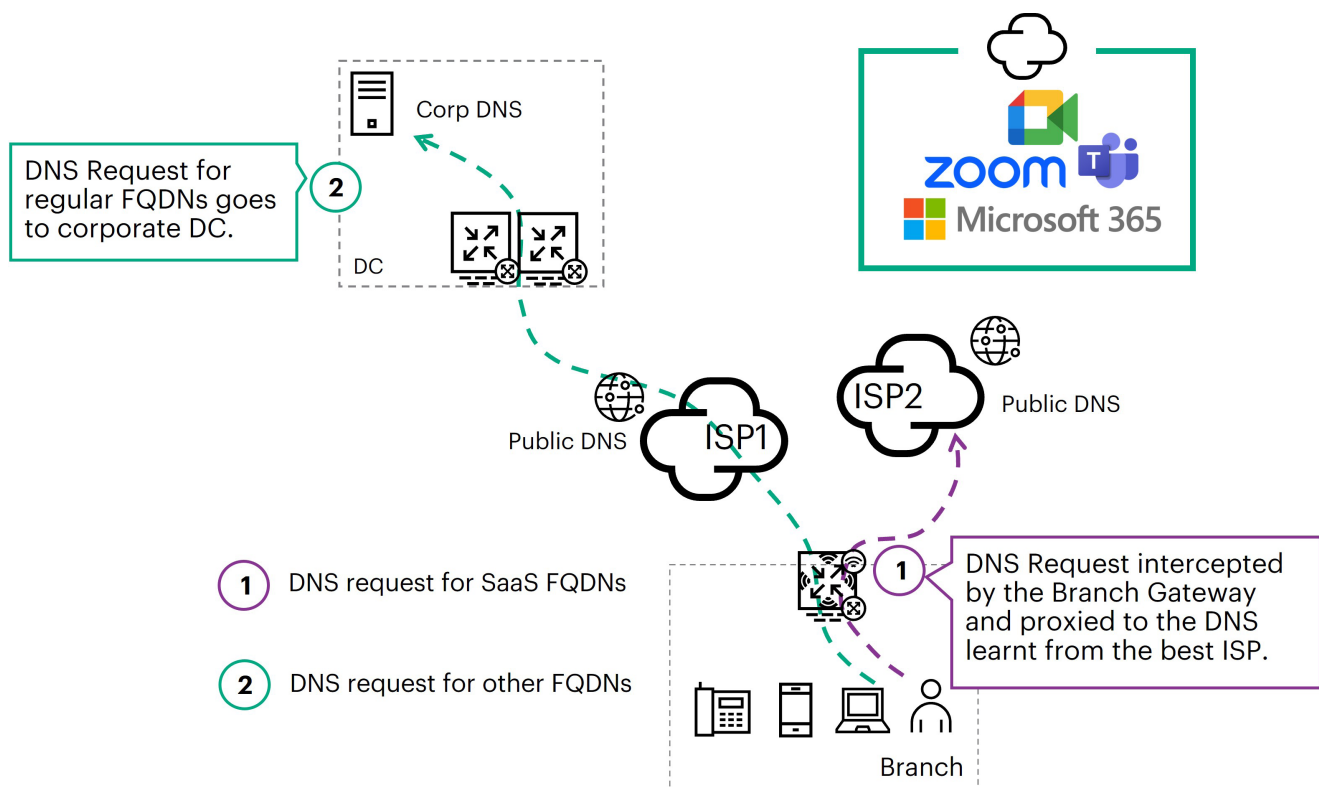


Figure 2. Gateways proxy DNS requests for SaaS FQDNs to the public DNS server associated with each ISP

Forwarding SaaS traffic through the optimal local breakout

As mentioned, local breakout is generally preferred for SaaS applications, as it involves a more direct path to an application that may often be latency-sensitive. When the branch gateway is operating in split-tunnel mode, gateways simply forward internet-based SaaS applications according to their routing table directly into the local breakout.

However, enterprise networks often use policy-based routing (PBR) to forward internet traffic through a data center or a security service edge (SSE) to apply additional security inspection and enforcement. In those cases, exceptions must be made to these PBR policies to ensure traffic to business-critical SaaS applications is routed directly from the branch. When doing so, it is imperative that gateways perform first-packet classification, as traffic that gets routed through the internet breakout exits the branch using a different IP address than it would when routed through the data center or SSE.

To facilitate this task, HPE Aruba Networking SaaS Express generates application-based aliases representing the application being optimized. These application definitions use a combination of techniques to facilitate first-packet classification and support PBR effectively:

- The **DNS Proxy** used for all the FQDNs associated with the SaaS application caches the IP addresses it resolves and associates them to the application definition. This allows gateways to route traffic accordingly.
- The **deep packet inspection (DPI)** engine caches the public IPs and ports associated with every SaaS application, allowing the gateway to route traffic accordingly.
- HPE Aruba Networking Central subscribes to **partner application programming interfaces (APIs)**, such as those of **Microsoft 365**, to periodically download the list of public IP prefixes used by SaaS applications and distribute them to all managed gateways.

This ability to identify applications from the first packet allows the branch gateway to determine when to break out traffic locally. This is then combined with the understanding of which WAN circuit is best for each application to forward the application through its optimal path.

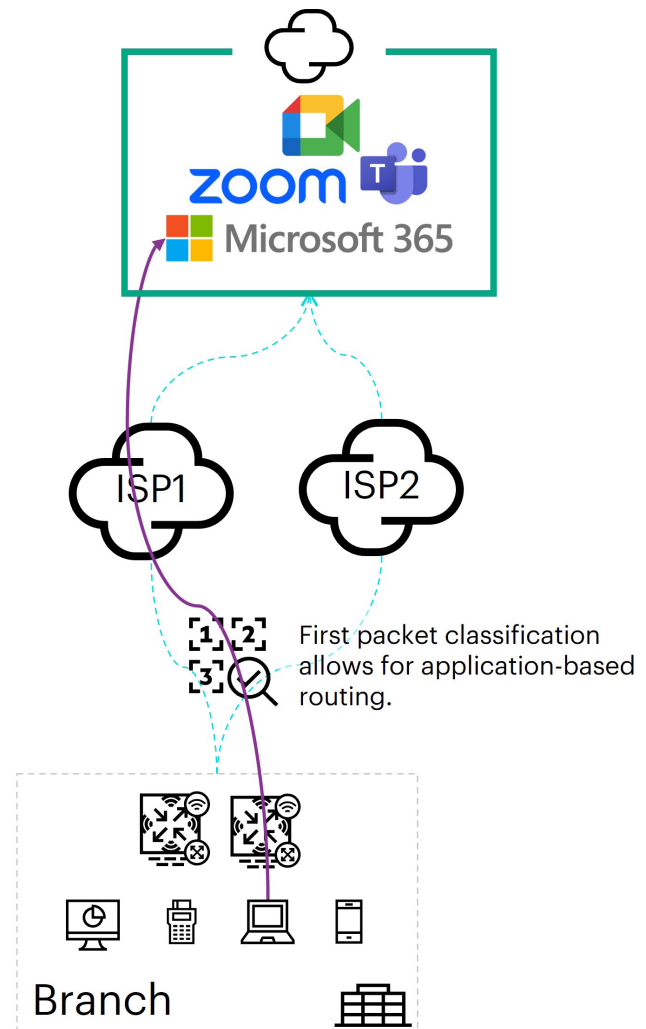


Figure 3. Gateways perform first-packet classification to forward applications through the desired path.

Network-wide visibility for all critical SaaS applications

In addition to optimizing SaaS performance, HPE Aruba Networking Central provides comprehensive visibility for SaaS applications. HPE Aruba Networking Central provides a single dashboard to view the SaaS performance across all branch sites. This dashboard functions as a heat map, allowing administrators to quickly identify problematic SaaS applications and poorly performing sites.

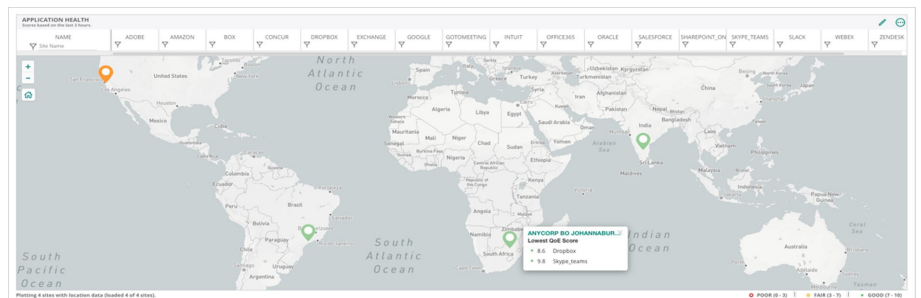


Figure 4. Dashboard showing network-wide visibility for critical SaaS applications

The network administrator can also double-click on problem sites to view more detailed performance SLA trends per application across WAN circuits. When doing so, HPE Aruba Networking Central contrasts the measured QoE (obtained from probing the SaaS application front doors) with the observed quality experience, resulting from analyzing TCP communication flows as they traverse the gateways. This can be observed over a period of up to three months to facilitate understanding performance trends in a broader context.



Figure 5. HPE Aruba Networking Central displaying measured versus observed QoE

Conclusion

HPE Aruba Networking EdgeConnect SD-Branch provides comprehensive visibility into SaaS application performance across the network. Network administrators can proactively track SaaS application health with detailed drill-downs to troubleshoot application performance issues before users report problems. By implementing SaaS Express, enterprises can ensure that their branch users have reliable and improved access to critical SaaS applications, thereby enhancing productivity and user experience.

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