Connectivity Augmentation | Cost Saving | Application Delivery | Network Simplification

Common Use Cases for Enterprise Network Deployments

This use case brief illustrates the cases about how Q-Balancer solutions improve network performance and reliability for enterprises.

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Agenda

> Internet Access for Single-Site Network

> Incoming Requests to Internal Servers

> Site-to-Site Network with Leased Line

> Multi-Location VPN Network

> Multi-Location MPLS Network

> Leased Line Alternative

> Video Streaming

Internet Access for Single-Site Network

Internet Access for Single-Site Network

Internet enables businesses to enjoy the convenience and advantage to increase the revenue and productivity. However, poor Internet connectivity can cause less productivity and loss of business opportunity, and even damage the business reputation.
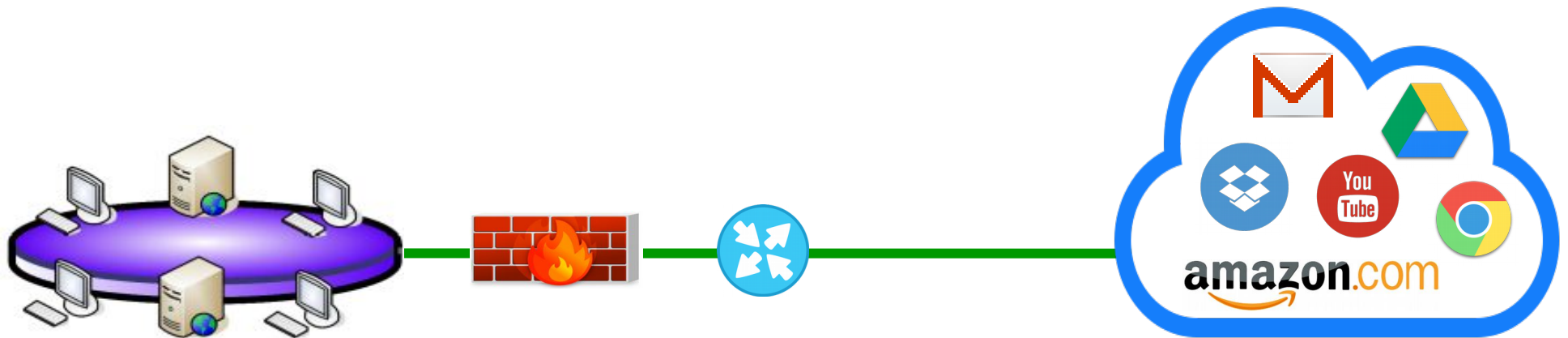
Internet Access for Single-Site Network

Challenges:

> Downtime caused by unexpected WAN outages

> Possible waste on bandwidth as backup links mostly stay idle

> Unpredictable application performance due to changing network conditions

> Lack of business-oriented WAN scalability

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Internet Access for Single-Site Network

Solution: Internet Failover & Failback

Add a secondary internet connection and let Q-Balancer handle WAN failover and failback in case one of links fails.

WAN Failover & Failback

Internet Access for Single-Site Network

Solution: Internet Load Balancing

Distribute outbound traffic across all available paths based on user-defined policy-based load balancing rules.

52 WAN Links +
10 Algorithms
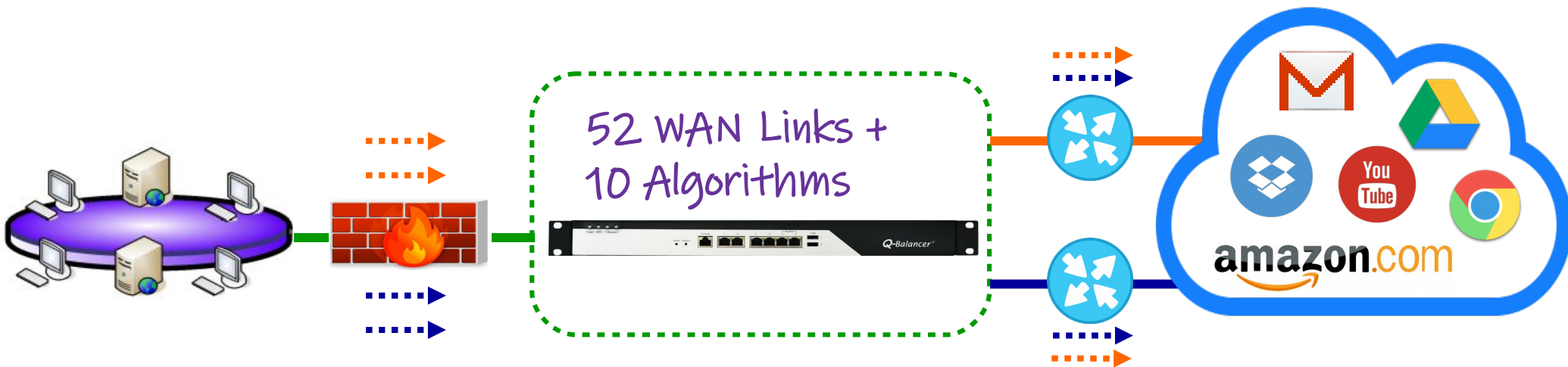
Internet Access for Single-Site Network

Benefits and Business Outcomes with Internet Load Balancing & Failover:

> 99.99% network uptime with WAN redundancy

> Assurance of application delivery despite changing condition of WAN links

> Greater WAN efficiency through granular policy control

> Flexible WAN scalability

> Increased employee productivity through increased network speed via WAN aggregation

> Lowered cost by leveraging cheap broadband lines

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Incoming Requests to Internal Servers

Incoming Requests to Internal Servers

In a typical DNS deployment, a DNS server hosts and serves data for the domain(s); when an incoming DNS request for, e.g. web services appears, DNS server then replies it with IP resolution for the hosted server. This mechanism is designed for translating domain name into IP address, while it does not check if there are any network outages or congestion when replying. Thus, in case the primary WAN link fails, incoming requests might not be able to access hosted service(s) with the IP address resolved by DNS.



Web Server
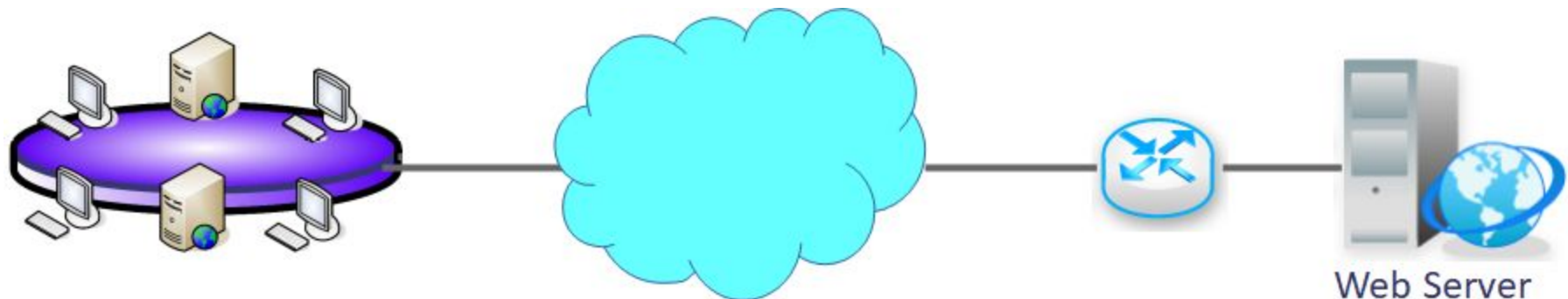
Incoming Requests to Internal Servers

Challenges:

> Hosted service disruption can hardly be prevented even during the planned downtime.

> Hosted services can be sometimes unavailable to incoming requests due to either WAN outages or congestion.

> Unpredictable application performance due to changing network conditions

> Inefficient uplink bandwidth utilization

> Bandwidth scalability

Incoming Requests to Internal Servers

Solution: Inbound Load Balancing & Failover

Direct incoming requests to the best-performing or responsive path.

Web
Server
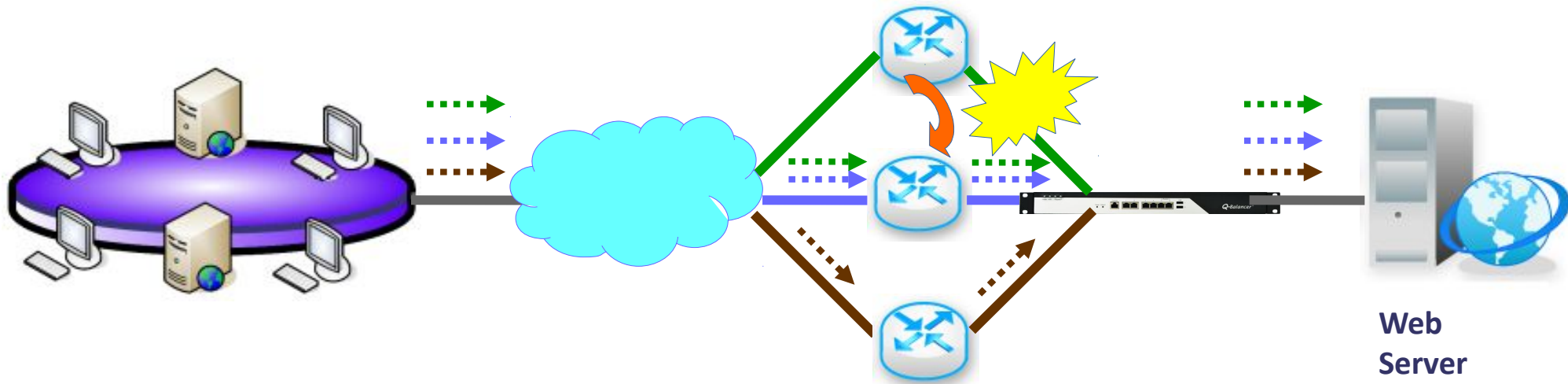
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Incoming Requests to Internal Servers

Benefits and Business Outcomes with Inbound Load Balancing & Failover:

> Assurance for incoming access to hosted services even though the primary link fails.

> Accelerated content delivery to incoming requests as the best-performing or least-loaded link is always selected.

> Greater bandwidth utilization for uplinks by distributing incoming requests across all available paths.

> Flexible WAN scalability for more uplink bandwidth

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Site-to-Site Network with Leased Line

Site-to-Site Network with Leased Line

To connect two geographically separate sites, a point-to-point leased line usually will be chosen to use. However, it will be impractical if the distance between locations is far or the locations are in different countries; furthermore, there are some other challenges faced by the multi-location enterprises on leased-line networks.

Point-to-Point Leased Line

Branch Office

**Head Office**
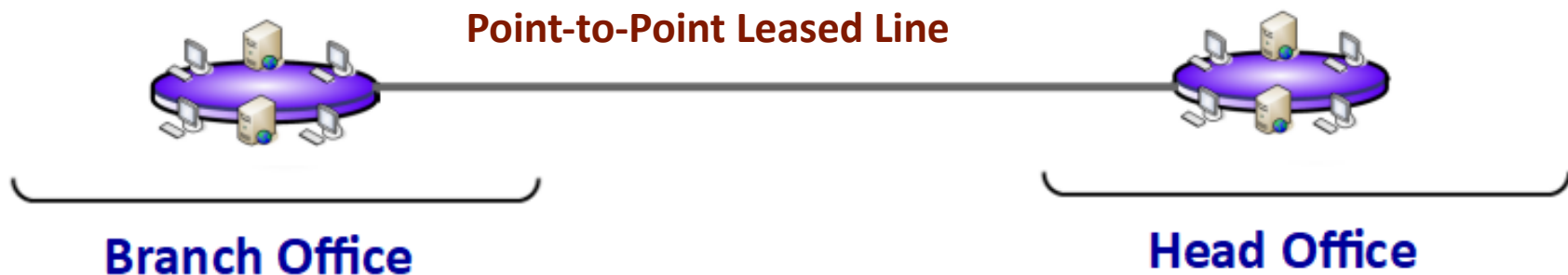
Site-to-Site Network with Leased Line

Challenges:

> Single point of failure can not be prevented as there is only a single path.

> Adding a new site will be problematic.

> Adding commonly requested services, for example, Internet surfing, is hardly possible.

Site-to-Site Network with Leased Line

Solution: Multi-Path VPN Tunnels Load Balancing

> Additionally add broadband connections and build site-to-site VPN tunnels on the connections.

> Distribute LAN-to-LAN sessions across multiple paths

> Flexibly send internet requests through broadband connections



Q-Balancer®
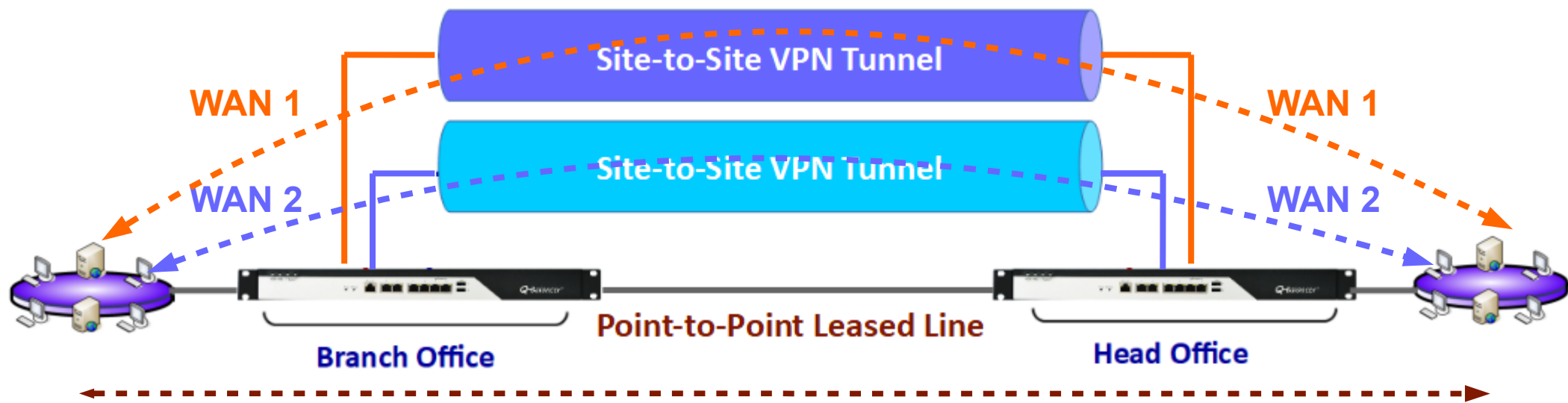
Site-to-Site Network with Leased Line

Benefits and Business Outcomes with Multi-Path VPN Tunnels Load Balancing:

> Uninterrupted connectivity in case the leased line fails

> Increased transmission speed

> Flexible Internet access

> Leased line offload

> Improved network scalability

> Enhanced availability for routing protocols (OSPF & BGP)

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Multi-Location VPN Network

Multi-Location VPN Network

Site-to-site VPN is a secure communication network that tunnels through a public network. Through VPN, you can designate one office location to house the main servers, or repository for your data and allow remote office locations to work with the data through the private tunnel.

Branch Office

Site-to-Site IPSec VPN Tunnel

Branch Office

WAN

Head Office
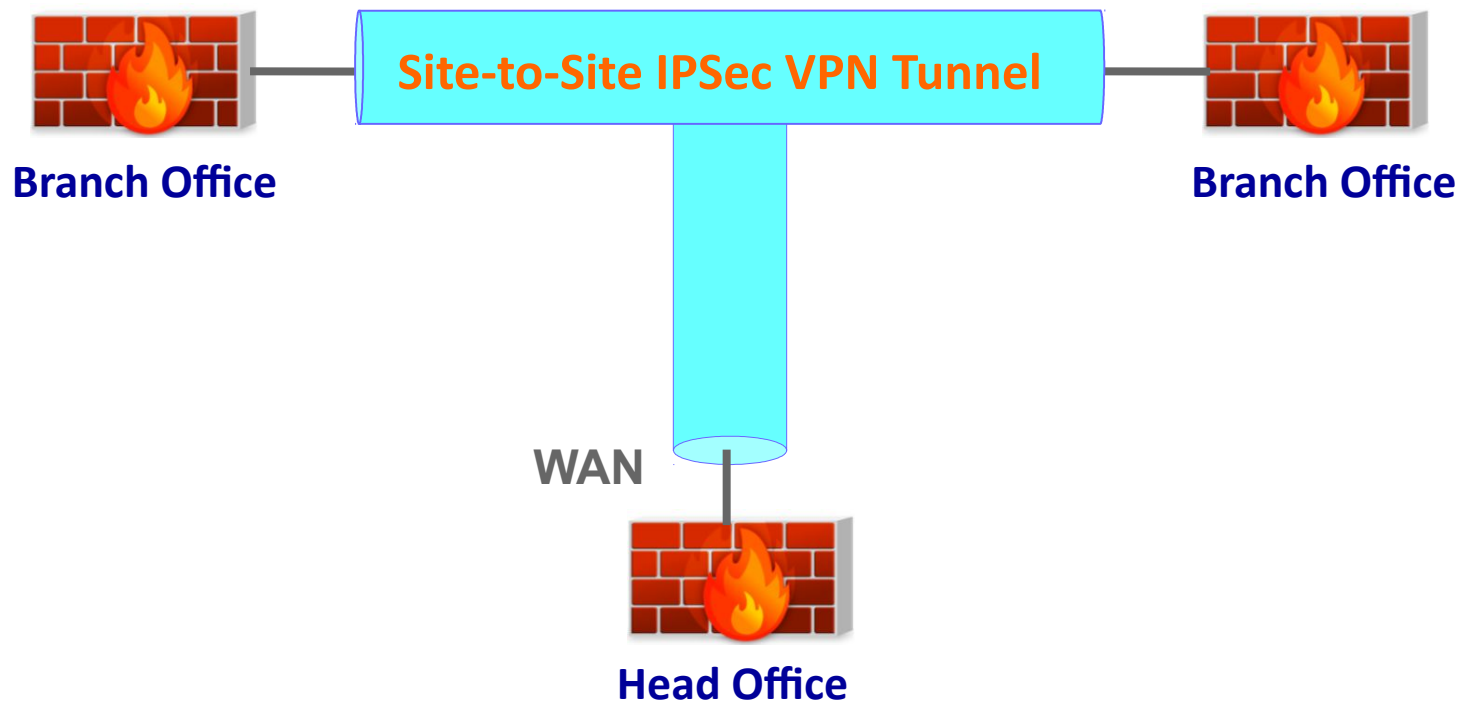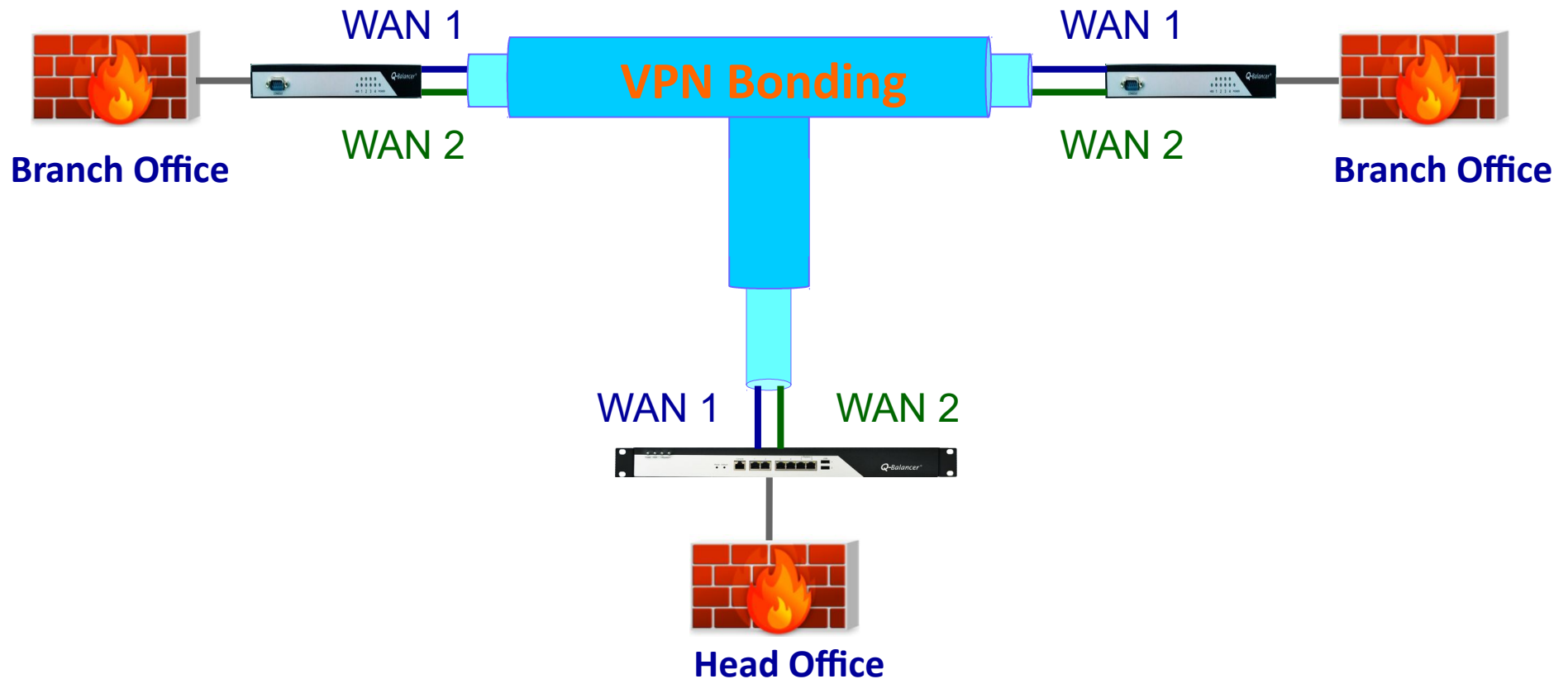
Multi-Location VPN Network

Challenges:

> VPN is usually based on broadband connections and its outage is unpredictable, and so not to mention failover through manual intervention.

> Adding WAN links for more bandwidth is possibly difficult to achieve as traditional NAT-based load balancing doesn't work for it.

> Changing legacy VPN configuration to add new links can possibly lead to issues.

Multi-Location VPN Network

Solution: Multi-Location VPN Bonding

> Add additional broadband lines and install Q-Balancer at all locations

> Distribute site-to-site VPN traffic across multiple Internet paths based on PbR.


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Multi-Location VPN Network

Benefits and Business Outcomes with Multi-Location VPN Bonding:

> 99.99% uptime through automatic VPN tunnel failover & failback

> Accelerate VPN access via bandwidth bonding

> Installation without changing legacy the VPN configuration

> Flexibly add internet connections because the VPN bonding is WAN transport agnostic

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Multi-Location MPLS Network

Multi-Location MPLS Network

With offices spread all over separate locations, multi-location enterprises commonly choose MPLS network to connect all their offices. Therefore, their staffs can work, communicate, and share information easily, instantaneously, and effectively.

Branch

Branch

Headquarters

Private / MPLS

Branch

Q-Balancer®
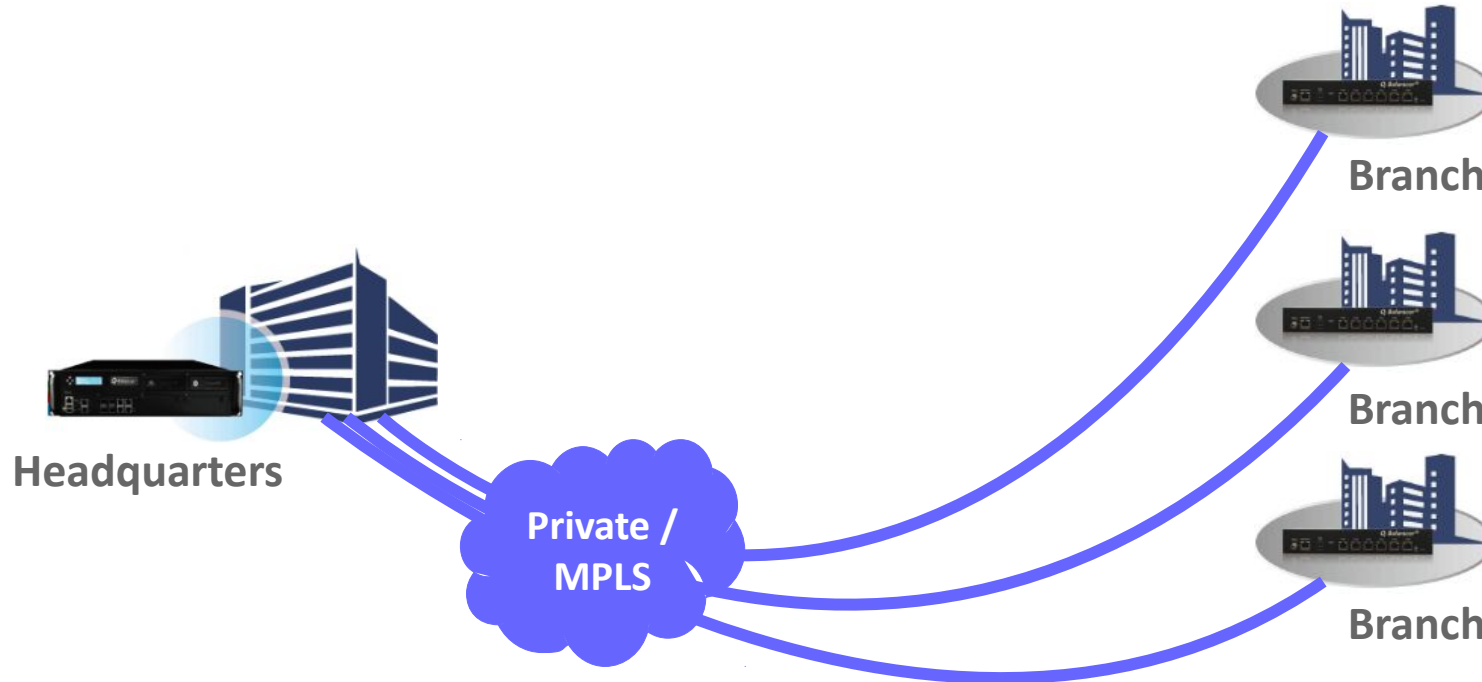
Multi-Location MPLS Network

Challenges:

> MPLS is not addressing performance challenges for cloud applications

> Single point of failure

> MPLS service is costly

> Limited bandwidth

> Long lead time

> Available in selected areas only

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Multi-Location MPLS Network

Solution: MPLS Augmentation

> Additionally add broadband connections, on which site-to-site VPN tunnels can be built.

> Direct traffic to best-performing path and/or distribute traffic across all available paths.

Multiple Internet Connections

Private / MPLS

Headquarters

Branch

Branch

Branch

Q-Balancer®
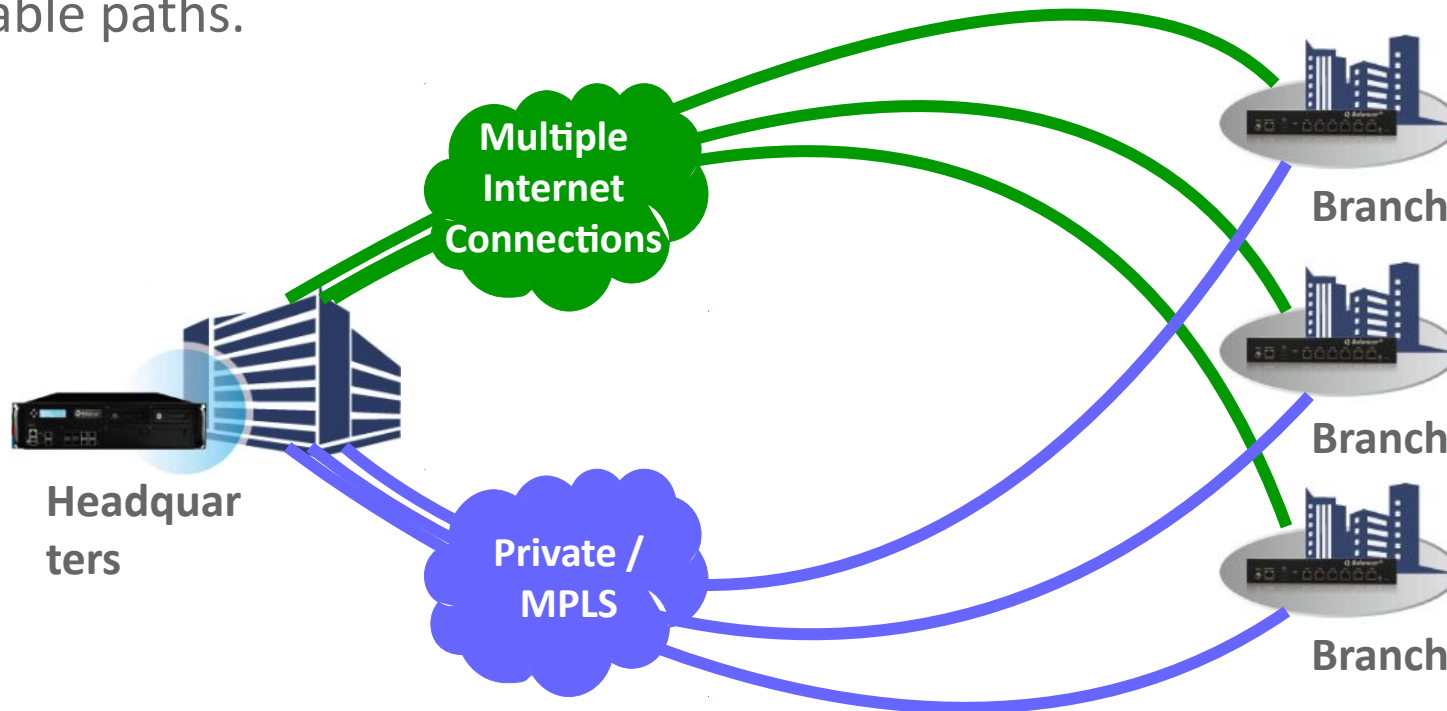
Multi-Location MPLS Network

Benefits and Business Outcomes with MPLS Augmentation:

> No single point of failure

> Increased speed as full bandwidth is available when needed

> Improved application performance by intelligently directing traffic to the best path

> Reduced total WAN costs by leveraging broadband WAN services

> Better delivery for cloud applications through local internet breakout

> Simplified branch deployment with all-in-one feature

> Flexibility to add WAN links of any type (4G, DSL, etc)

> Enhanced availability for dynamic routing (OSPF or BGP)

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Leased Line Alternative

Leased Line Alternative

Leased line services provide enterprises with stable connectivity and bandwidth they need. For service providers, the challenge of delivering high-speed Internet access at lower cost to enterprises is significant.

Leased Line

Service Provider

Enterprise Network

Internet

*Q-Balancer*®
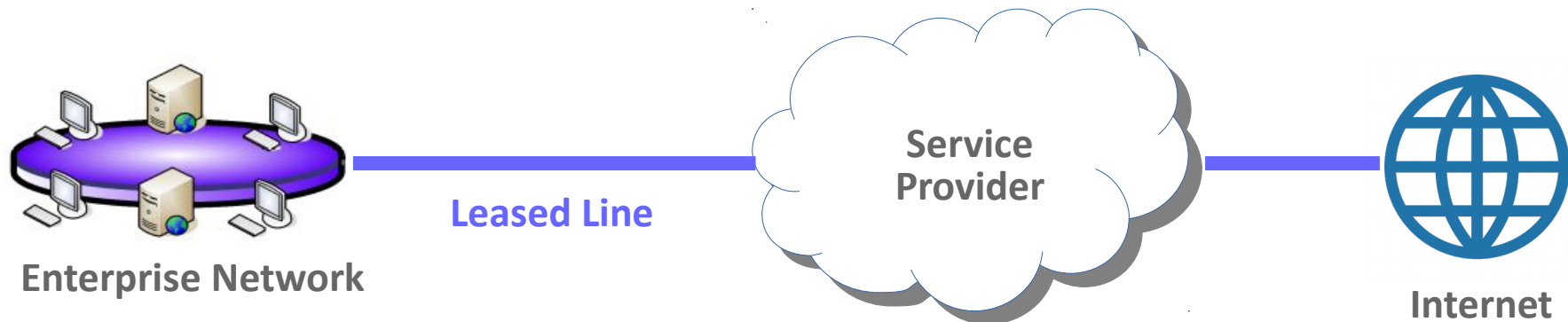
Leased Line Alternative

Challenges:

> High cost for business-grade Internet services

> Unpredictable network outages

> WAN scalability

Leased Line Alternative

Solution: Virtual Leased Line

Virtual Lease Line (VLL) delivers a cost-effective, flexible, and high-performing WAN to enterprises. VLL sends traffic for any protocol or application across bonded tunnels, using the link bonding technology, which enables overlay tunnels with packet-level load balancing.

Enterprise Network

Bandwidth Bonding

Service Provider

Internet
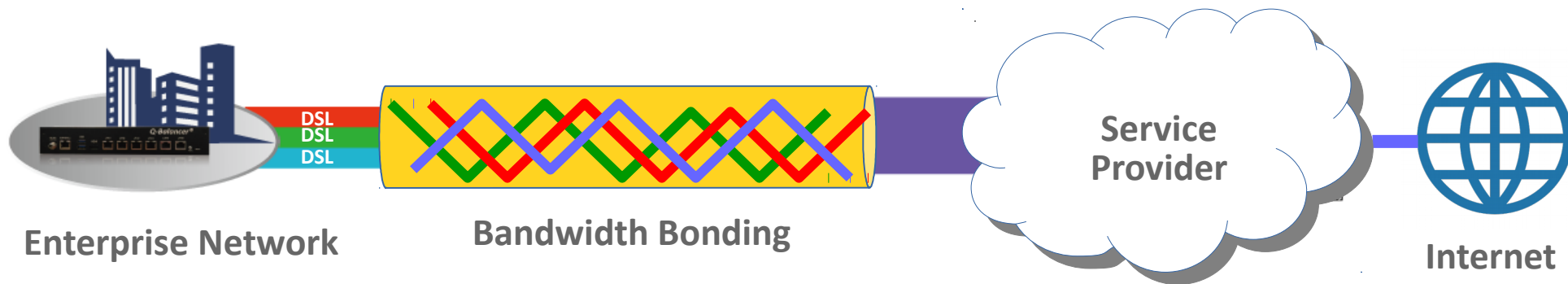
Leased Line Alternative

Benefits and Business Outcomes with Virtual Leased Line:

> Lowered cost through leveraging broadband technology

> Maximum uptime

> Greater WAN efficiency through granular policy control

> Flexible WAN scalability

> ISP Independent

> Better WAN efficiency with QoS

Video Streaming

Video Streaming

There are still challenges faced by video content providers today despite network technology has been evolved quickly over the past decade. Cost, bandwidth limitations, latency, and packet loss all prevent viewers from experiencing superior-quality video streaming.
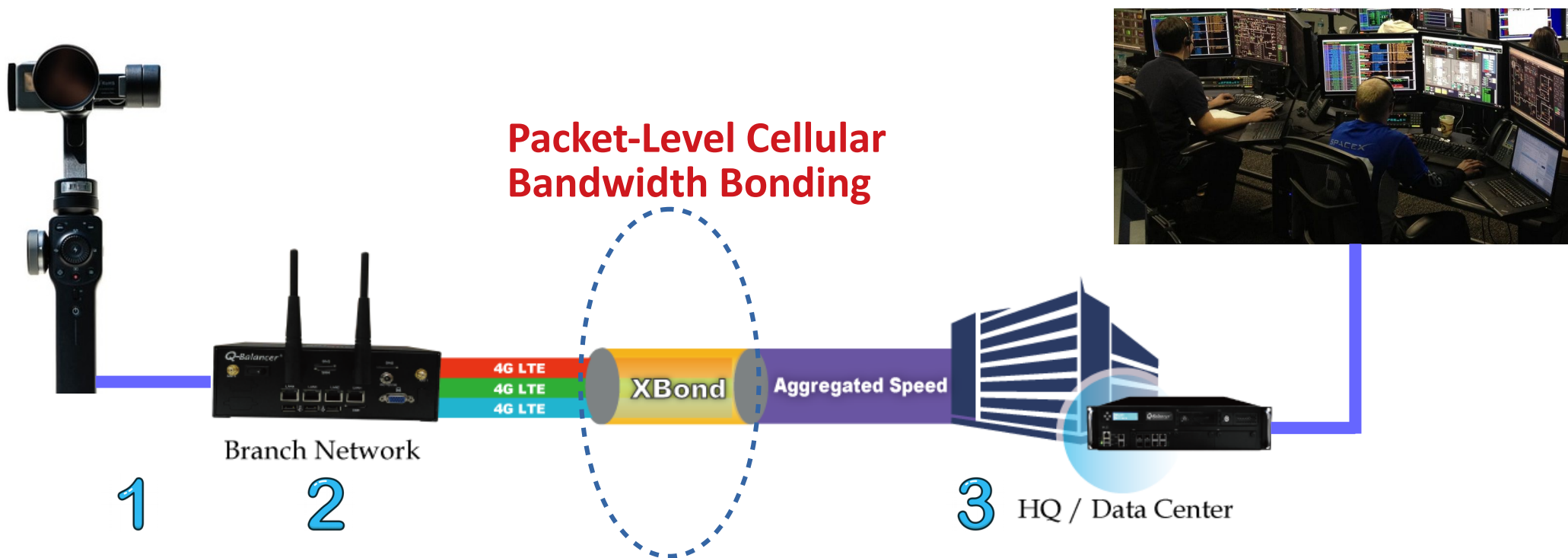
Video Streaming

Challenges:

> Bandwidth limitations

> Internet latency and packet loss

> Unexpected disruption

> Budget concern for satellite and microwave services

Video Streaming

Solution: Cellular Bandwidth Bonding

> Bond all available cellular links to achieve a fat-pipe connection

> Prevent unexpected disruption in single connection through seamless failover

> Enable HD video streaming to be smoothly transmitted via mobile bandwidth

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Video Streaming

Packet-Level Cellular Bandwidth Bonding

Branch Network

1   2

3   HQ / Data Center

1. The connected video camera sends captured video to the remote Q-Balancer.

2. The remote Q-Balancer splits the video stream into packets and then transmits the packets through the bonded 4G links.

3. The Q-Balancer at central site receives the packets from the remote Q-Balancer, and then sends them to the connected video server after having the packets reassembled.

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Video Streaming

Benefits and Business Outcomes with Cellular Bandwidth Bonding:

> High-Speed WAN wherever the event is

> Always-on connectivity

> Greater video content delivery

> Cost saving