THE CASE FOR SD-WAN NETWORK TRANSFORMATION

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A CIOPAGES.COM CONCEPT BRIEFING

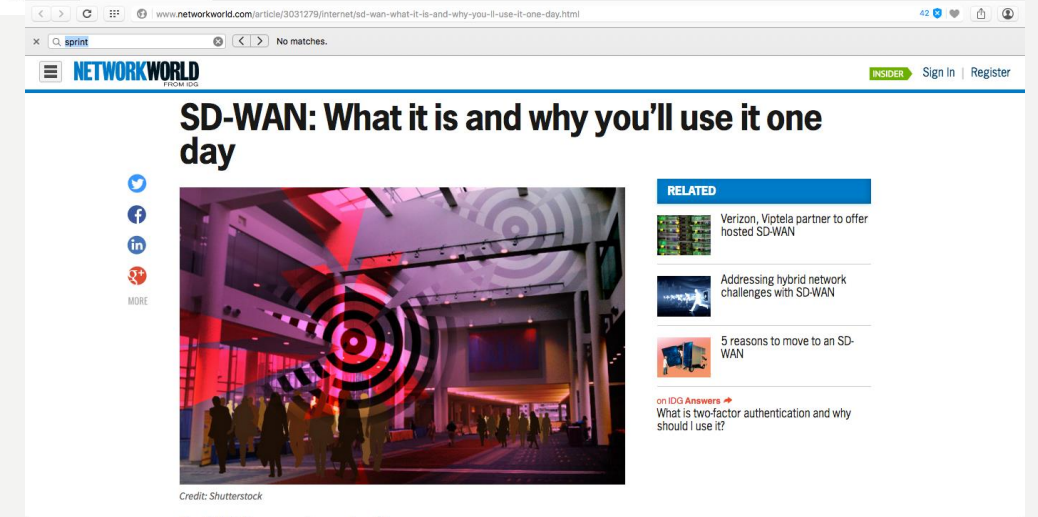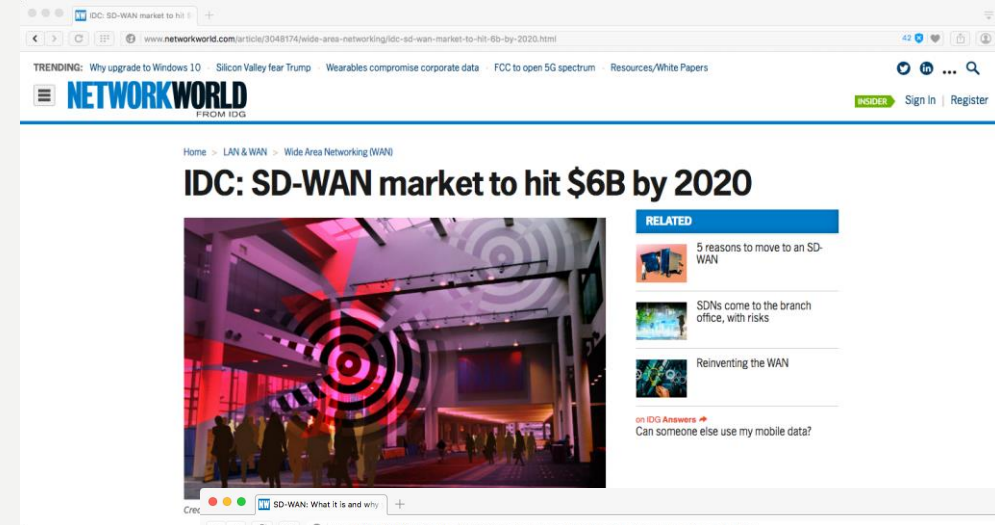# SDN WAN & HYBRID NETWORKS

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SD-WAN BASICS

- It is impossible to have a discussion about network infrastructure today without the topic of Software Defined Networks (SDN) surfacing

- SDN has immediate applicability for network customers in two areas:

  1. At cloud aggregation sites where bandwidth is becoming elastic through the use of SDN technologies:
     - More cost effective approach than dedicated MPLS or Point to Point facilities
     - Bandwidth can automatically flex with peak demand during busy season, campaigns, etc.

  2. At branch locations where SD-WAN and hybrid networks can drive cost savings and improve operational efficiencies:
     - Often an overlay for existing MPLS, Broadband and Wireless connections
     - SD-WAN technology provides load-sharing across multiple links to improve resiliency and bandwidth utilization
     - Allows the use of lower cost Broadband connectivity in lieu of higher cost MPLS connectivity in many applications
     - Critical flows can be segmented for sensitive applications such as Card Transactions

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THE IMPACT OF SD-WAN IS SIGNIFICANT

- Gartner suggests:

  < 1% Customers Using SD-WAN Today

  30% Customers Using SD-WAN by end of 2019

- NetworkWorld suggests:

  – SD-WAN Savings of >50% vs. Legacy Architecture

  – SD-WAN will be a $6B Market Segment by 2020

IDC: SD-WAN market to hit $6B by 2020

SD-WAN: What it is and why you'll use it one day

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PRESENTATION GOALS

1. Provide an overview of the key providers that are driving the market

2. Explore the history of networking specifically in the branch environment to frame the problem that SD-WAN providers are seeking to solve

3. Share a few common approaches to how firms are using the technology to drive cost savings and improve network uptime

4. Offer a few key insights pertaining to best practices and partner selection

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MANY SDN PROVIDERS

- Many new players shaping the market; many traditional providers following along

- Approach varies by segment providers are attempting to serve:
  - Larger providers positioning both core SDN technology for carrier use and SD-WAN solutions for enterprise clients
  - New entrants focusing primarily on providing SD-WAN solutions for enterprise clients

- Many of the new entrants are Venture Capital based

- Some are broader service providers including other core network offerings in addition to SD-WAN

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CARRIER SD-WAN OFFERINGS

- Carriers Paying Attention – Technology shift will impact core MPLS Offerings:
    - Verizon launched with Viptela & Cisco in late 2015
    - ATT SD-WAN offering with Juniper launched late 2015
    - CenturyLink offering launched in June, 2016 with Versa
    - No product announcements from Sprint & Level 3
    - Comcast well positioned with acquisition of Contingent Networks, no commercial SD-WAN offering as of July, 2016.
- Most carriers working on Network Function Virtualization (NFV) as well as SD-WAN:
    - Software Based Firewalls, Routers, Load Balancers, Etc. offered as an extension of the Carrier's network
    - May offer a path forward to SD-WAN like services with generic appliances

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LEGACY BRANCH NETWORK

- Separate Connections for Voice, Corporate Data and Internet

- Mix of IP Services and TDM services

- Multiple Internet Connections to support Kiosk/Guest WIFI or other standalone applications

- Broadband Internet in place but often used only if MPLS fails

- Significant variation between sites

- Multiple Vendors

- Multiple Networks

- Multiple SLA Targets
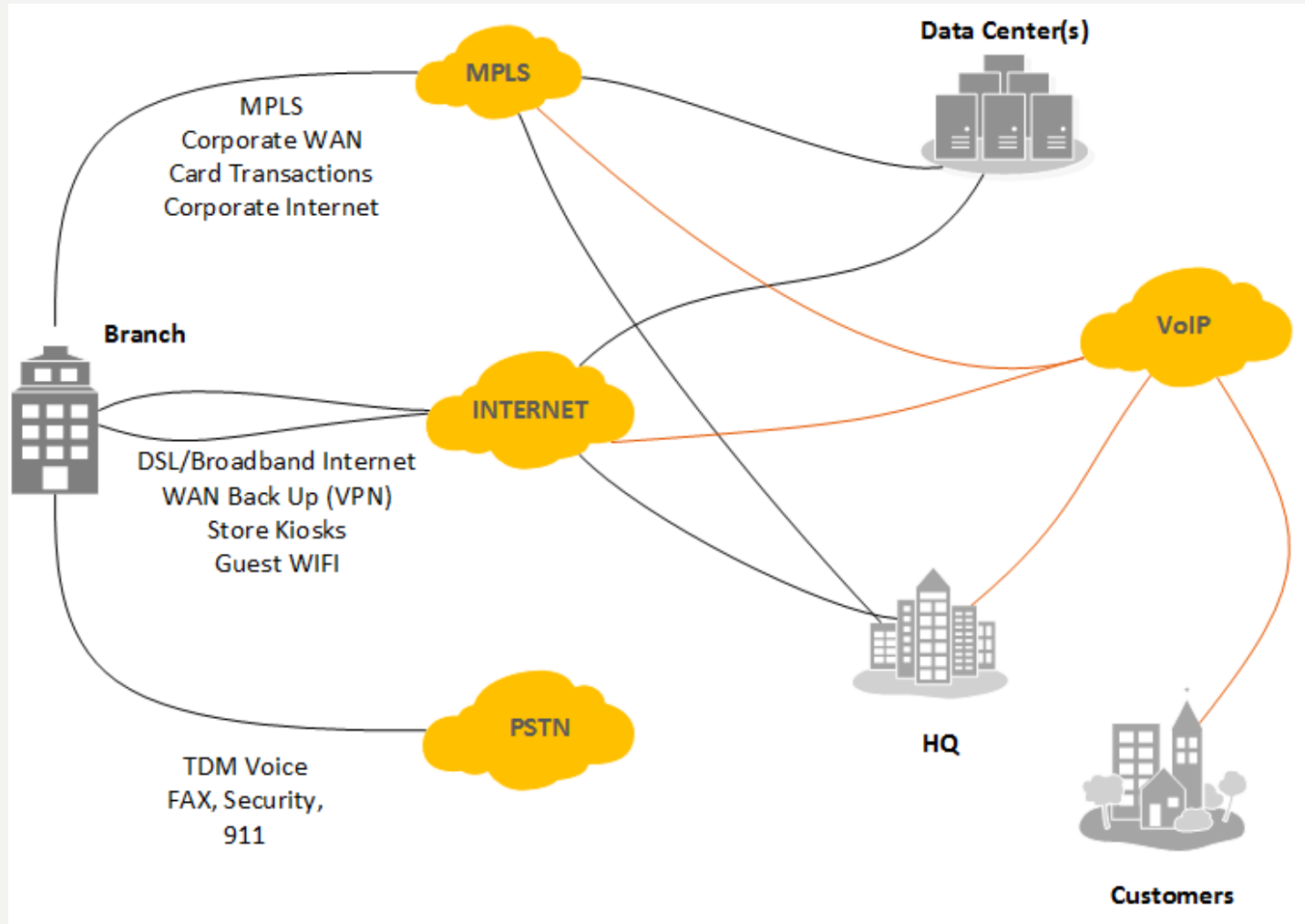
INTRODUCTION OF VOIP

- VoIP Introduced to capture savings from local & long distance calls

- Rates per minute dropped by ~3X, overall voice savings >20% not uncommon

- Carrier based VoIP Services offered guaranteed Quality of Service (QOS) but at a price

- Internet based VoIP Services a less expensive alternative but QOS varies causing customer perception concerns

- Both approaches viable, but add complexity to infrastructure already at branch locations

- Savings from VoIP not always realized
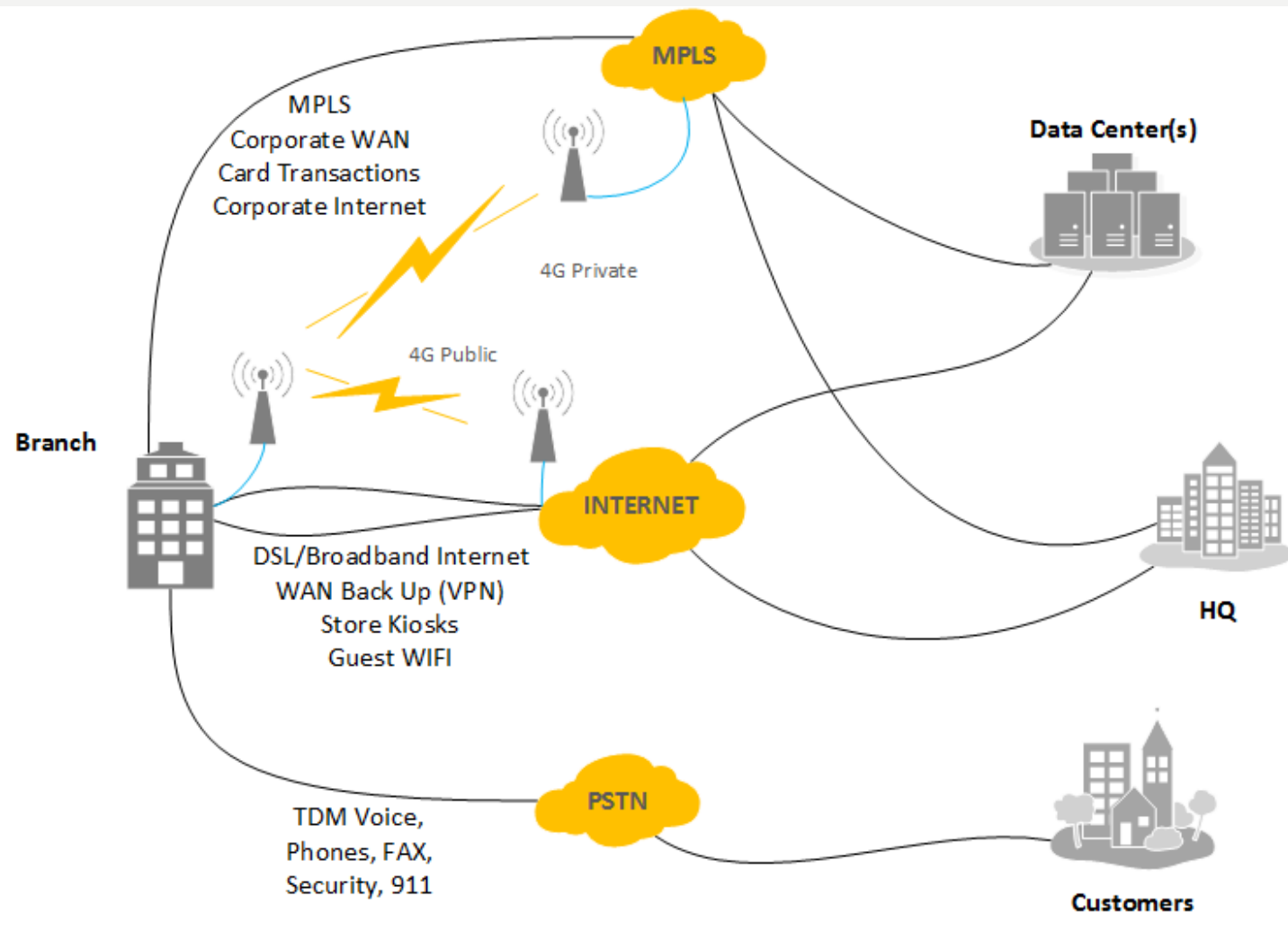
- 4G offers a low-cost back up alternative for MPLS and Internet

- Carriers providing on-demand pooled plans across locations

- 4G cards often integrated in branch routers by OEMs – Failover is seamless to end users

- Backup Bandwidth paid for on a usage basis vs. fixed cost

- Great solution for back up, not as cost-effective for permanent long-term use

- Excellent alternative for pop-up stores or temporary connectivity

CURRENT INFRASTRUCTURE IS VERY COMPLEX

- Network infrastructure at branch locations is complicated by incremental decisions made over a span of several years

- Multiple networks in place, much of the available bandwidth not utilized

- VoIP often implemented to drive savings as a stand alone project with varying results

- 4G introduced as a spot solution to improve resiliency but added yet another network to manage

- Few firms able to step back and lay out a holistic approach

- SD-WAN offers a new path forward

Common Issues:

1. Multiple Networks

2. Multiple Vendors

3. Multiple Contracts

4. 3-4X cost premium for MPLS Private Networking

5. Broadband links more cost effective but often underutilized and lack QOS

6. Carrier VoIP Offerings Complex and Primarily MPLS Based

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WHAT IS SD-WAN ?

Gartner Definition Includes four main criteria:

1. SD-WAN solutions provide a lightweight replacement for traditional WAN routers and are agnostic to WAN transport (that is, support MPLS, Internet, LTE, etc.)

2. SD-WAN solutions allow for load sharing of traffic across multiple WAN connections in an efficient and dynamic fashion that can be based on business and/or application policies

3. SD-WAN solutions dramatically simplify the complexity associated with management, configuration and orchestration of WANs

4. SD-WAN solutions must provide secure VPNs and have the ability to integrate additional network services

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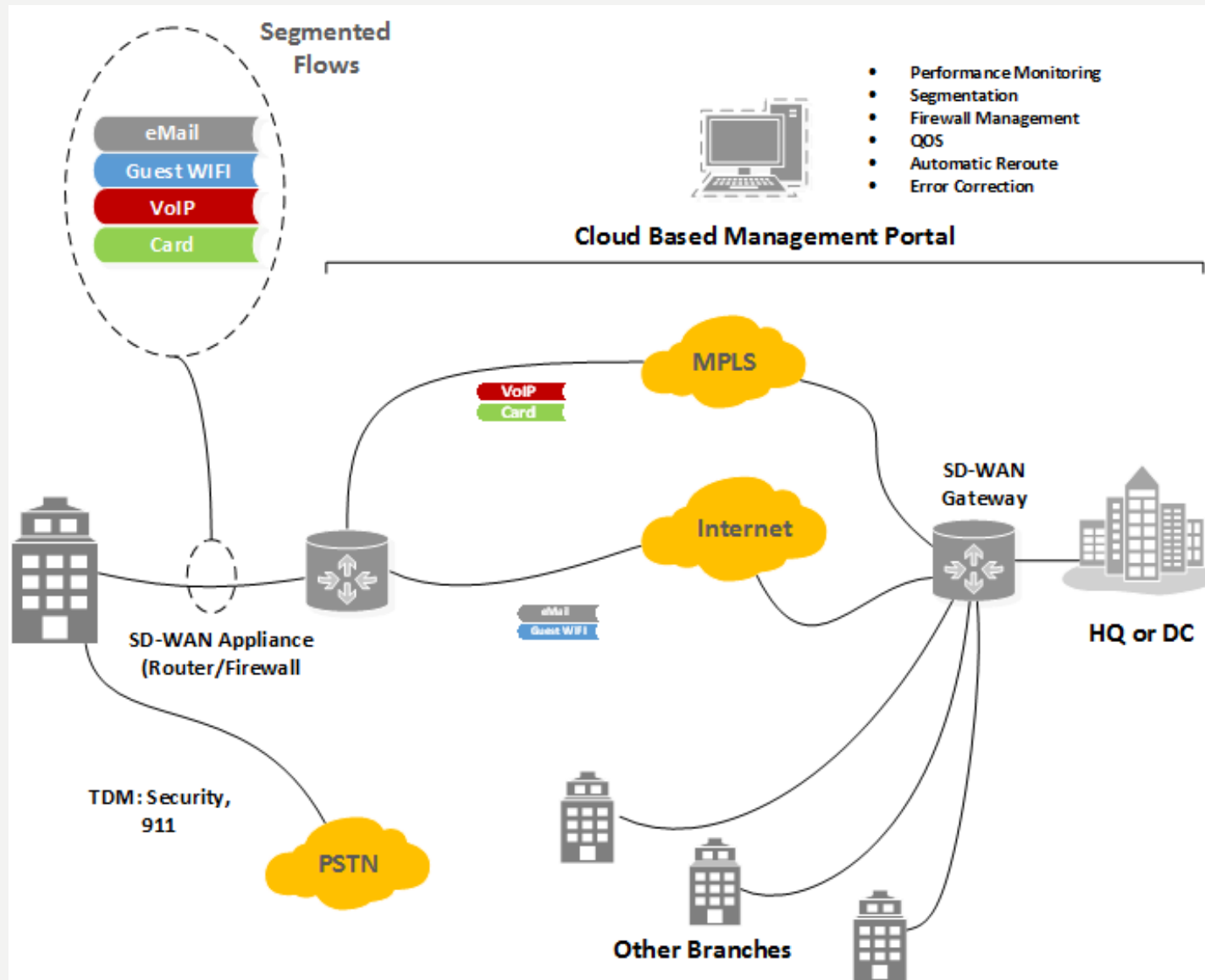
SD-WAN HYBRID NETWORK

- New SD-WAN appliances at branch locations and HQ (or Data Center) define the SD-WAN solution end-points

- Appliances are purpose built with Integrated Routers, Load Balancers, and Firewalls

- Network Management platform manages all flows to/from branch across all network segments

- Automatic routing for failover and around network degradation

- Automatic load balancing across segments

- Virtual gateways an option with selected SD-WAN providers
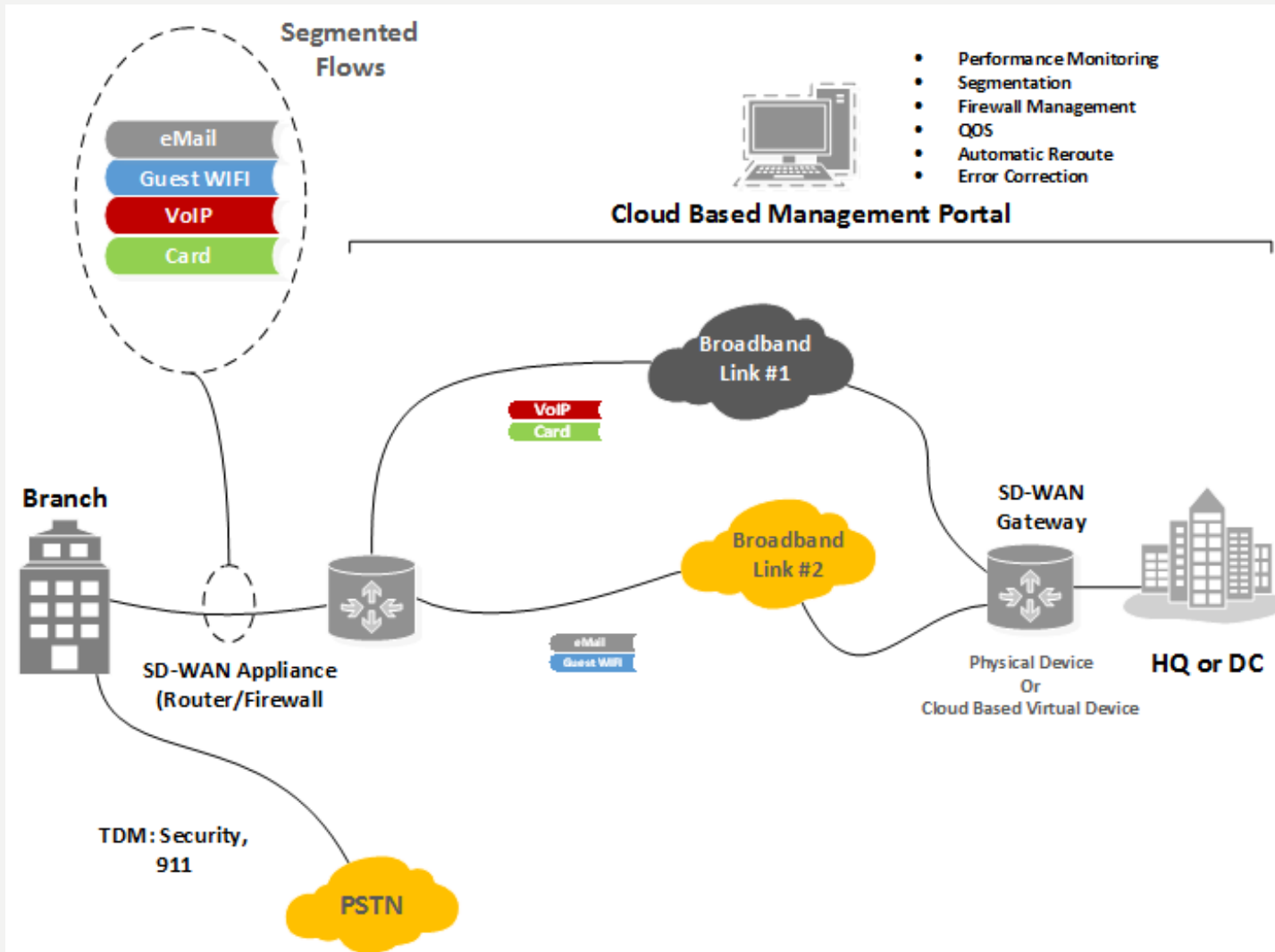
SD WAN DUAL BROADBAND

- Many users adopting a more aggressive approach to leverage cost savings of broadband by using dual broadband links

- SD-WAN technology makes this highly resilient option, particularly where multiple broadband providers serve the location

- Broadband does not provide true carrier based QOS for VoIP but with Forward Error Correction many users find voice quality quite acceptable

- Solution maintains benefits of segmentation, security, automatic failover etc.

- > 10X Bandwidth at ~ 50% of Cost not Uncommon vs. MPLS 1.5MB
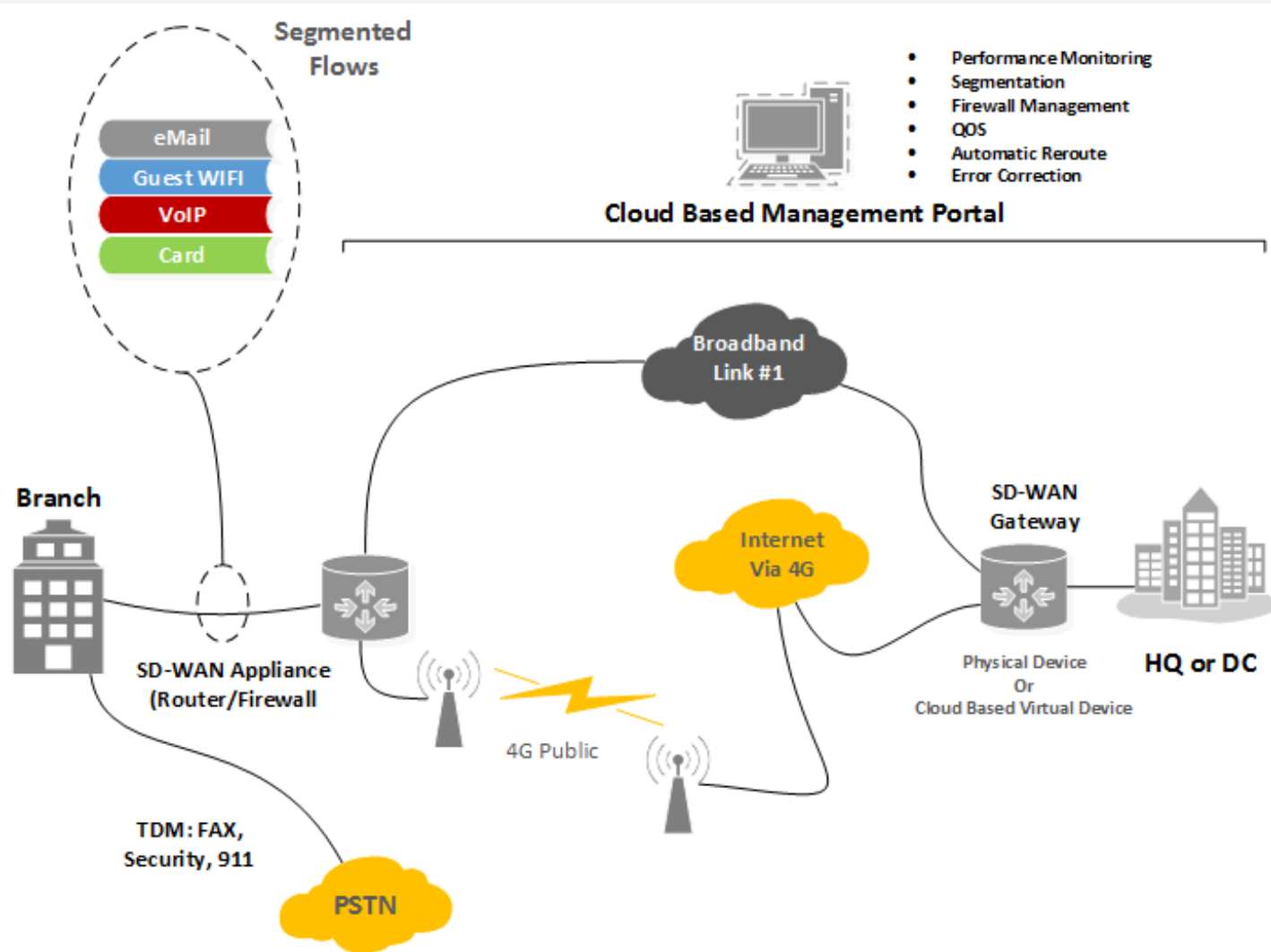
SD-WAN SINGLE BROADBAND

- One single Broadband Connection may suffice for Smaller Locations

- 4G remains a very cost effective second path for resiliency

- SD-WAN appliance manages both 4G and Broadband connections

- Uptime expectations >99.9% not unreasonable

- Latency may be an issue with 4G connections with some applications (50-150ms)

- Very cost effective alternative for smaller branch or store locations
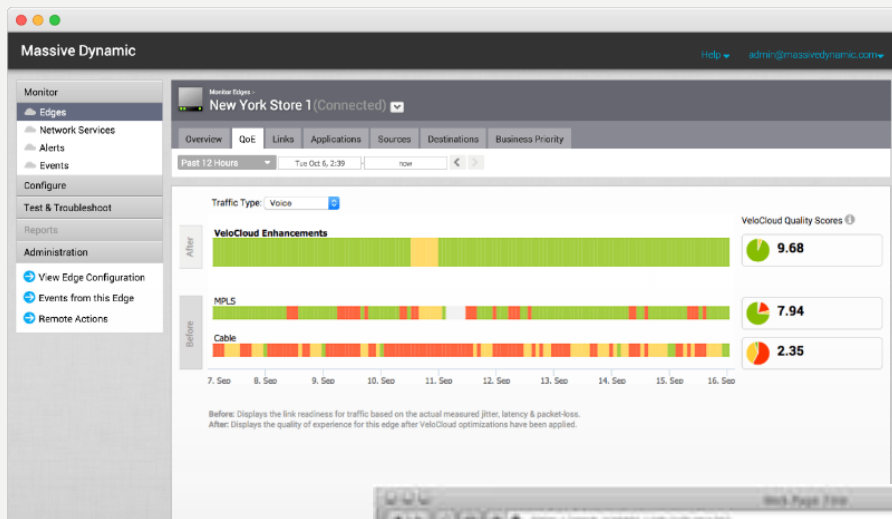
NETWORK MANAGEMENT TOOLS

- SD-WAN Network Management Tools Very Robust

- Key Features from Providers Include:

  - Control & management of edge and gateway devices

  - Real Time and Historical Link Performance

  - Link quality scores – separate and combined for multiple connections

  - Segmentation Control

  - Access Policy Control

- Tools are designed for the end-user vs. Carrier administrators

- Management platform and appliances are the core of the SD-WAN offer from providers

ZERO TOUCH PROVISIONING

- Much hyped benefit of SD-WAN over traditional network deployment

- Edge Devices for Branch Locations are preconfigured and drop-shipped to branch or store locations

- Once connected, the appliances "phone home" to management platform and auto configure

- Simplest installation similar to installing home WIFI

- May offer deployment and support benefit depending on complexity of install

Redmond — Velocloud

COMPANY PROFILE
Industry: Retail
Headquarters: Heber City, UT
Locations: Utah, Colorado, etc.
Key statistic: Company grew 800%+ in the last 10 years

Challenges
- Consistently deliver voice and virtual desktops in multiple remote locations
- Reduce IT costs
- Meet PCI 3.0 compliance in all branches

Solution
A VeloCloud SD-WAN solution replaced an aging branch infrastructure with cloud-delivered, enterprise-class performance over multiple ordinary broadband links.

Benefits
- Delivered high-quality corporate VOIP and virtual desktops
- Improved performance for corporate applications and Internet-bound traffic by 50%
- Avoided network redesign and zero branch CAPEX costs
- Reduced OPEX costs significantly
- Met PCI 3.0 mandates in WAN to support point-of-sale compliance

Velocloud

Bremer Bank — Talari

Executive Summary

Company
Bremer Bank

Location
Headquartered in St. Paul, Minnesota and serves multiple locations across Minnesota, North Dakota and Wisconsin

Key Applications
VOIP and videoconferencing

Challenge
Prevent branches from going down in the event of network failure with a more cost-effective solution

Solution
- Talari SD-WAN
- Talari Aware

Results
- Fast failover ensures voice and data sessions go uninterrupted with circuit failure
- Gained ability to use backup circuits full time
- Significant savings by replacing costly MPLS links with inexpensive cable and DSL circuits
- Increased visibility to monitor circuit performance
- Improved network operations through continuous monitoring, quality of service and encryption ensure high performance and greater security

http://www.talari.com

Talari

Customer: Kingston Technology — Silver-Peak

Business Challenges
- Lengthy replication workloads put DR plan in jeopardy
- MPLS too expensive and complex for connecting remote sites
- Sluggish enterprise applications

Network Background
- 11 locations throughout Asia Pacific, North America, and Europe
- Data centers in Shanghai, Shenzhen, Taiwan, the US, the UK, and Ireland
- Internet speeds ranging from 1.5 Mbps to 100 Mbps

Silver Peak Results
- Secure, optimized broadband enabled in just two hours
- Maxava and Zerto replication performance improved by 10x
- Internet throughput increased by as much as 80%

Silver-Peak

CASE STUDIES

- Most of the major providers are highlighting wins in customer profiles and case studies

- Three examples shown here, more available on-line

- Peer to Peer contact with stated end-customers is an excellent approach to validation of results

- Published cases often gloss over the complexities of the transformation effort

Source: www.velocloud.com, www.talari.com, www.silverpeak.com

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PARTNER SELECTION

- SD-WAN Market is immature with many new entrants and start-ups – <u>Attrition is likely</u>

- Understanding who is backing and partnering with your prospective provider is critical

- Some provides offer rental edge devices which may be, in part, a way to reduce risk

- Working with a carrier may be less risky, but be clear of their motivations re. preserving MPLS as part of the solution

- Many large implementations already in place or underway, lessons learned will be valuable

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THE PATH FORWARD WITH SD-WAN

1. Document the Current Baseline:
   - Current Infrastructure & Related Costs:
     - MPLS/Broadband/4G
     - Router/Switch/WIFI/Firewall
     - In-Store Cabling
     - Voice PBX/KSU
   - Current Performance:
     - Monthly Uptime Trend
     - Resiliency/Back Up Design
     - Current Site Type Categorization
   - Contractual Commitments:
     - Carrier Contract Commitments & Underlying Circuit Term
     - Potential Shortfall Penalties

2. Establish a Future State Design:
   - ID Key Apps: VoIP, Card, HR, Web, Video, WIFI
   - Set Uptime Expectations for Each App
   - ID Site Types by Store Foot Print/Store Revenue, etc.
   - Frame out preliminary design for Voice, Data, & Security by Site Type
   - Select and SD-WAN provider (or two) to work with
   - Finalize store network design for each site type:
     - Voice & Data Connectivity
     - Security/Encryption/Access Policies
     - Voice & Data Hardware Requirements

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THE PATH FORWARD WITH SD-WAN CONT'D

3. <u>Establish a Transition Roadmap:</u>

   – Overall Project Plan & Funding

   – Provider Negotiations & Contracting:

     • SD-WAN Provider

     • Connectivity Providers

     • Site Services Vendor

   – Pilot Site Selection/Deployment

   – Staged Full Site Deployment

   – Post Installation Service vs. Baseline Metrics:

     • Uptime/MTTR

     • Cost/Site/Month

   – Post Install Cadence with Providers & Key Stake Holders

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SUMMARY

- SD-WAN technology offers a viable approach to improving network uptime and simplifying network connectivity at branch/store locations

- Several options are available including services directly from SD-WAN providers and traditional Carriers

- Deployment may not as simple as portrayed by providers due to existing legacy infrastructure complications

- The market is immature with many new entrants; partner selection is important

- The economic and operational benefits will undoubtedly drive SD-WAN adoption forward rapidly

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RESOURCES

- NetworkWorld
  - http://www.networkworld.com/article/3053705/lan-wan/how-to-choose-a-software-defined-wan-sd-wan.html
  - http://resources.networkworld.com/ccd/assets/111079/detail
  - http://www.networkworld.com/article/3048174/wide-area-networking/idc-sd-wan-market-to-hit-6b-by-2020.html
  - http://www.networkworld.com/article/3020746/network-management/addressing-hybrid-network-challenges-with-sd-wan.html
- LightReading:
  - http://www.lightreading.com/lg_redirect.asp?piddl_lgid_docid=724298
  - http://www.lightreading.com/carrier-sdn/sdn-architectures/centurylink-sets-sights-on-sd-wan/d/d-id/724285
  - http://www.lightreading.com/carrier-sdn/nfv-(network-functions-virtualization)/sdn-and-nfv-advancing-the-network-to-2020/a/d-id/721167
  - http://www.lightreading.com/carrier-sdn/sdn-technology/cisco-joins-$27m-round-for-sd-wan-startup-velocloud/d/d-id/720390

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RESOURCES

- Provider White Papers/Resources

  - http://www.velocloud.com/sd-wan-resources/white-papers/software-defined-wan-for-dummies

  - http://sdn-wan.cloudgenix.com/Q315DummiesBookWebAutoFill_SDWAN4Dummies.html

  - http://sdn-wan.cloudgenix.com/Q315GartnerSDWANTechnologyOverviewWebAutofill_GartnerSDWANTech.html

  - http://sdn-wan.cloudgenix.com/Q116GartnerSD-WANMarketGuideWeb_registration.html

  - http://viptela.com/resources-2/#whitepapers

- Other

  - http://searchsdn.techtarget.com/tip/Understanding-the-relationship-between-SDN-and-NFV

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Contributing Consultant Profile

CHRIS PARADY

Topic Expertise

- 15 years of experience supporting Retail and Branch Banking customers
- 30 years of experience designing, implementing and supporting core network voice and data infrastructure
- Hands on experience with branch network transformations up to 1,5000 locations

Professional Experience

- 13 Years of IT Support with Chevron Corporation supporting on-shore and off-shore communications infrastructure. Supported IT services from the desktop to the datacenter.
- 17 Years of Experience supporting Verizon's enterprise customers in the West and North East. Responsible for all aspects of the business with assigned clients.
- Currently providing infrastructure consulting services for clients in the North East.

Skills and Competencies

- Licensed Electrical Engineer – State of CA
- ITIL V3 Certified

Educational Background

- BSEE – Cal State Chico - Telecom
- MBA – Rice University – Finance & Ops Mgmt.

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NEXT STEPS

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