Verizon Managed SD WAN with Cisco IWAN.

October 28, 2015

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Agenda

- Evolution of the WAN
- SD WAN delivers business outcomes
- Verizon's Managed IWAN solution
- Challenges for SD WAN adoption
- Deployment guidelines

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Demands on the network are evolving.

Through 2017, large networks will see a **28%** compound annual growth rate for bandwidth due to use of cloud computing, mobile devices, and video.

50%
of application deployments will suffer performance impacting due to networking limitations

71%
of organizations use or plan to use custom mobile apps on wireless devices with potential cloud access

57%
of enterprises plan to use MPLS VPN to connect to TPV cloud application services during the next 1 to 2 years

3X
threefold increase in espionage attacks year on year.

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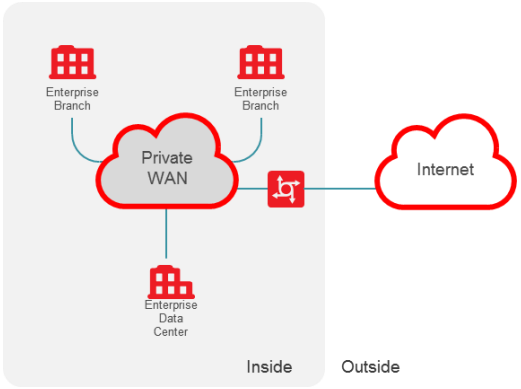
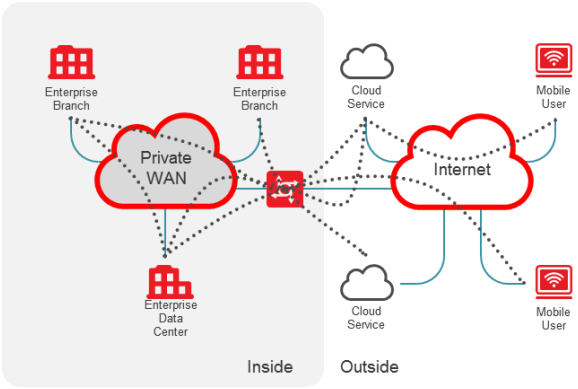
Evolving the WAN for the application economy.

WAN		SD-WAN
Internet failover	Capacity	Active – active Bandwidth paths
Circuit path	Routing	Application path
Embedded	Security	Overlaid End to end tunnels

Reliable and resilient



Elastic and responsive



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Software Defined Wide Area Network (SD WAN).

Manage from the application down, not the element up.

Optimize available connectivity options.

User experience based on application not location.

More than technology; requires end to end solution from architecture through operations.

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SD WAN can provide:

Central control
For management and security services.

Manage Risk

Reduce operational complexity
Centralized policy management for applications & network intelligence.

Reduce Cost

Improve speed & flexibility
For application deployment.

Drive Business Growth

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How we support our customers' success.

Consulting services

Implementation and integration

Operate and lifecycle support

- System design, installation, and deployment.
- System upgrades and migrations.

- Staff augmentation with our experts.
- Streamline current processes.

CAPABILITY & EXPERTISE:

- 25+ years managing customer networks.
- Over 400,000 managed network, hosting, and security devices.
- 4000+ networks in 140+ countries.
- 20+ year partnership with Cisco (Network, Cloud, Security and Unified Communications).

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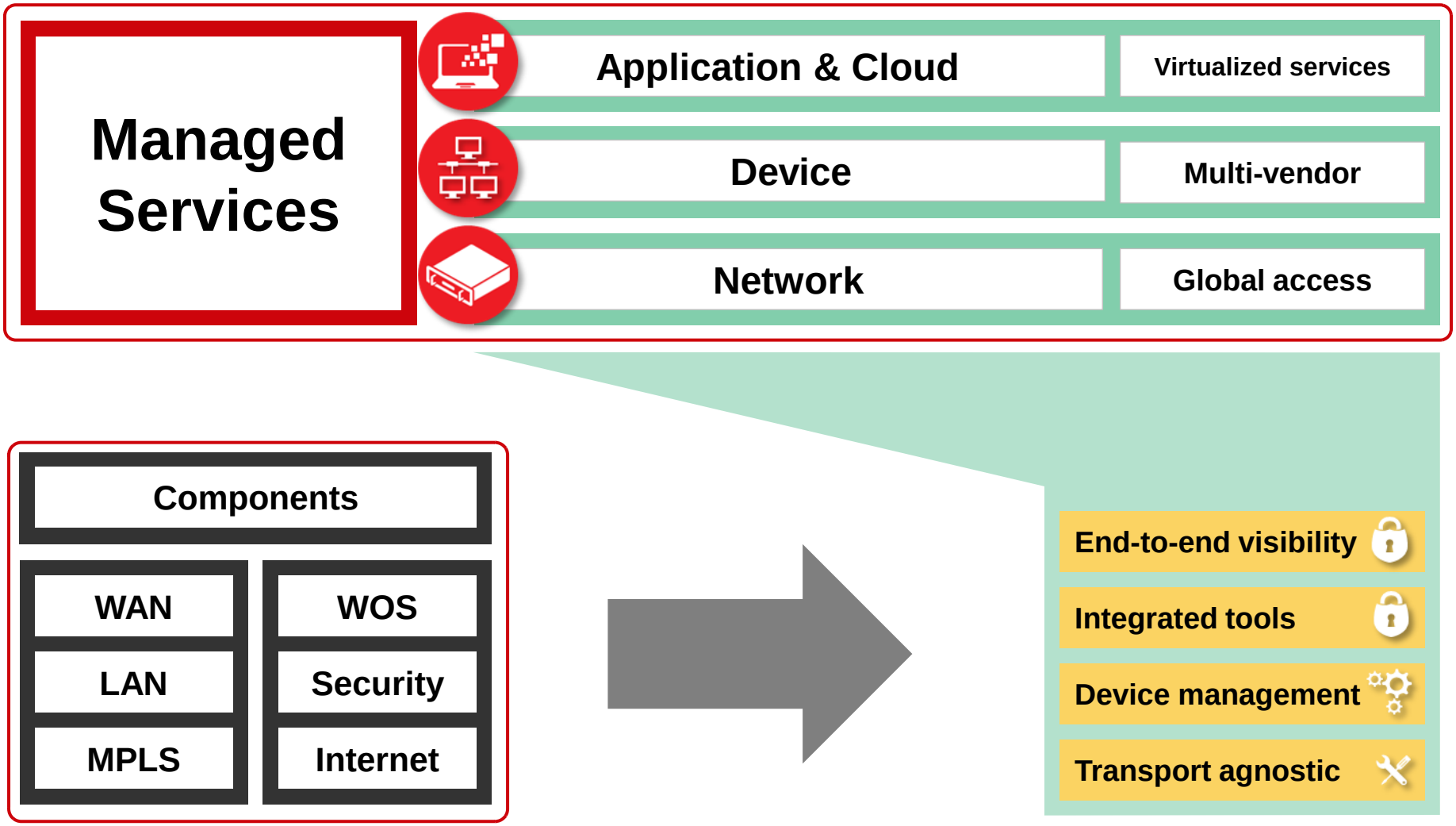
Verizon Managed Services.



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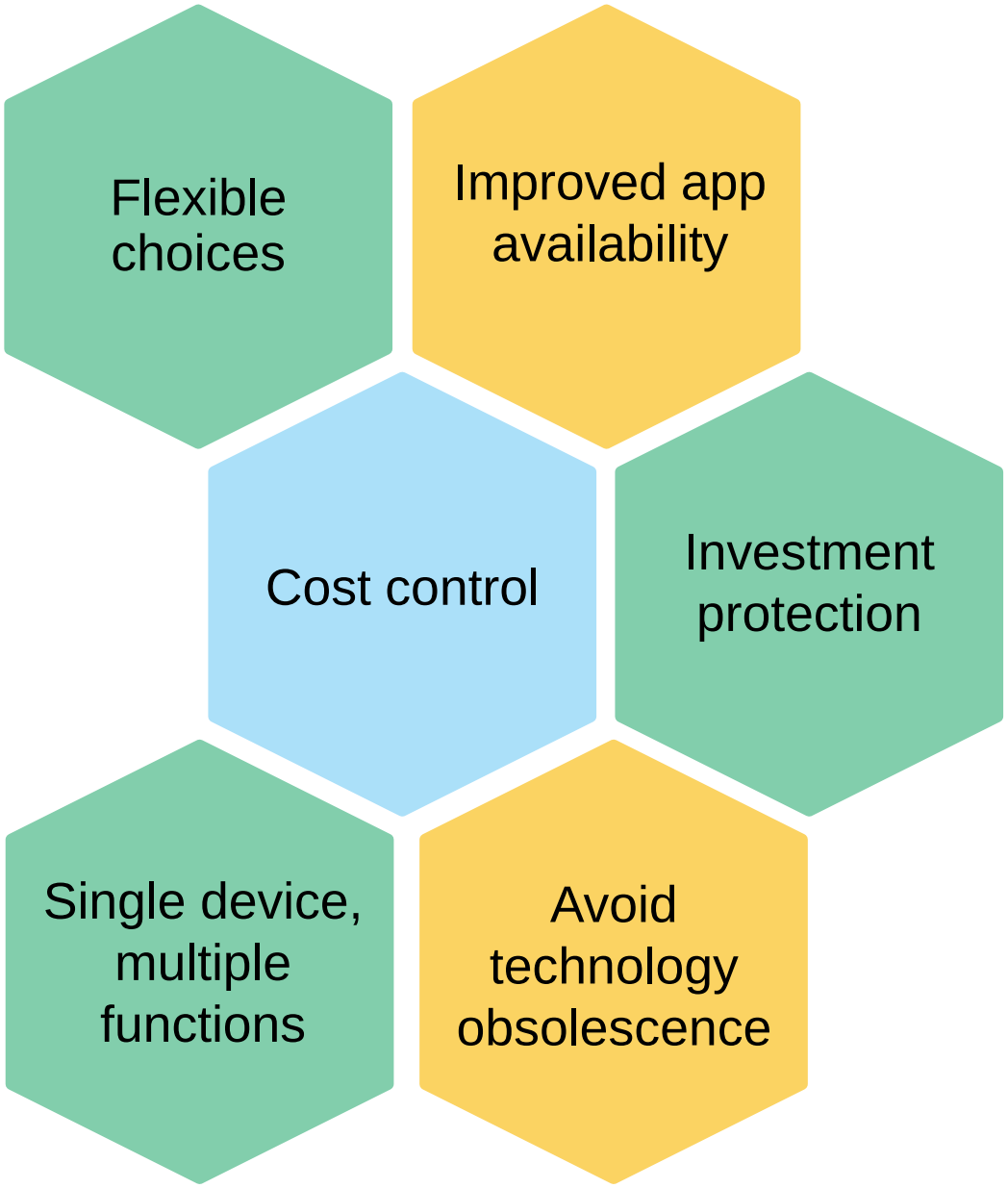
Why Cisco IWAN?



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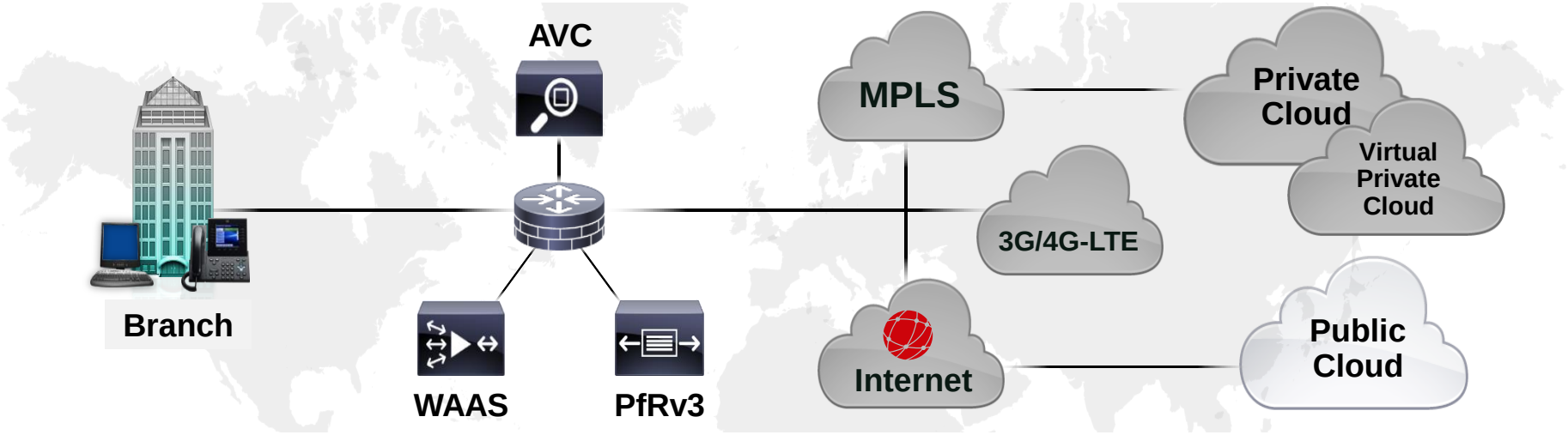
Cisco IWAN with Verizon solution components.



Management and orchestration by Verizon

Transport Independence	Intelligent Path Control	Application Optimization	Secure Connectivity
• IPSec WAN overlay • Consistent operational model	• Optimal application routing • Efficient use of bandwidth	• Performance monitoring • Optimization and caching	• NG strong encryption • Threat defense
DMVPN	Performance Routing	AVC, WAAS,	Suite-B, CWS, ZBFW

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SD-WAN: Adoption business challenges.

Cost/ROI:

- Savings from alternate access
- Performance improvements
- CapEx -> OpEx

Overhaul of existing investment:

- Cisco IWAN does not a require additional infrastructure
- Investment protection from ISR G2

Complexity and time investment in adopting a new solution:

- **Verizon Managed Services**: technical expertise, ongoing optimization, technology refresh, trouble management
- **Migration support**: optimal planning and design, project management, transition designs

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SD-WAN: Adoption technical challenges.

Security

Requirements for adding Internet at the branches.

Tunneling exceptions

Handing applications that run outside of SD WAN tunneling design.

QOS standards

Unified global QoS standards and application prioritization for centralized policy definitions.

Requirements and parameters

Reliable transport requirement and wireless network design parameters.

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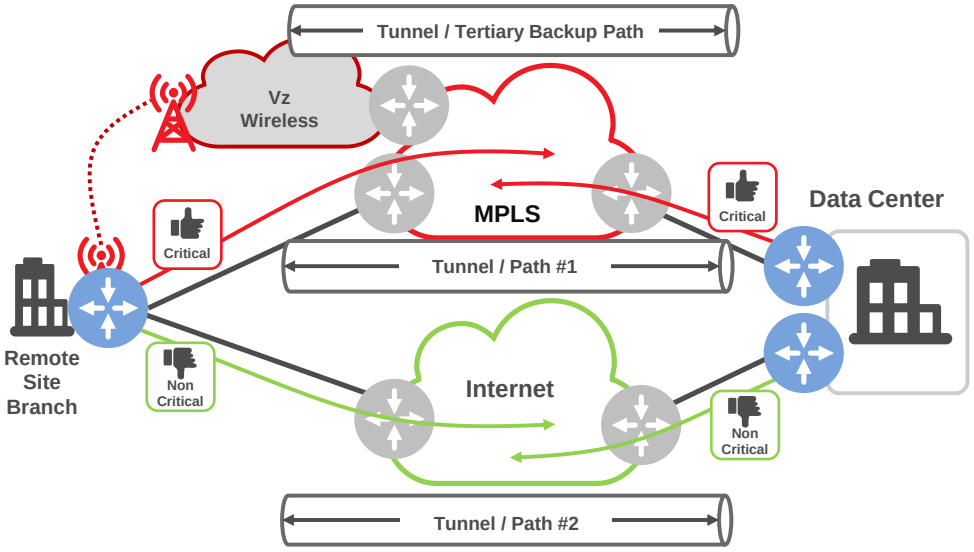
Deployment Guidelines for SD WAN.



Wireless design considerations:

- Timers for IGP and tunneling protocols for dormancy of the wireless connection.
- Probing packet usage towards the usage plan associated with the wireless connection.
- PFR wireless configuration options – availability tbd.

MPLS+ internet:

- Encryption is optional based on security requirements.
- Critical traffic is mapped across MPLS and non-critical across the internet.
- PFR application aware routing currently is only applied to the MPLS and internet paths.

Verizon private wireless:

- The wireless path provides a tertiary path in this design example.
- Failover to wireless occurs when both the MPLS and internet are down.
- The wireless failover will be based on scripting or backup port configurations.
- Wireless provides a last mile physical diversity option.

SD WAN common customer use case examples

Large retail bank

SD WAN

MPLS + Internet Scenario

PROBLEM:

- The bandwidth at the branch is not supporting the network requirements of the business units.
- Video conferencing and Internet applications are responsible for a large amount of the bandwidth utilization.
- Control cost of the bandwidth increase without sacrificing availability.

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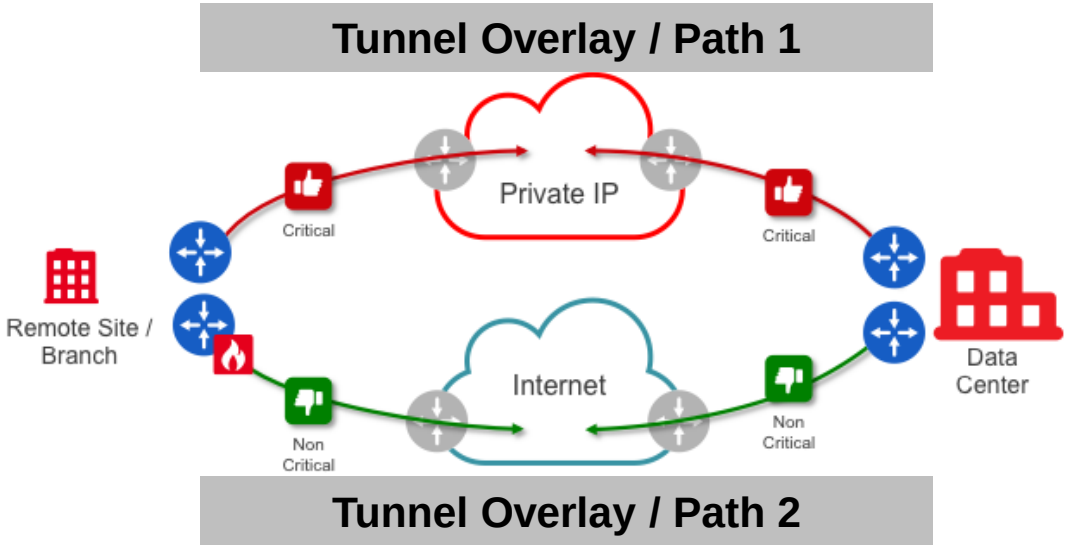
Dual path solution.



Firewall on the internet remote site circuit is optional per customer design

- Example FW Options :
  - Cisco Zone Based FW
  - External FW
  - Verizon Unified Security Services – UTM Appliance

- Paths encrypted on the internet
- Optional encryption on MPLS
- MPLS carries mission critical traffic: traffic fails over to the internet for circuit failure and policy violation
- Internet carries non-critical traffic: traffic will selectively failover from a failure to the MPLS
- Circuits may have unequal bandwidth
- Global corporate QoS scheme for application COS marking
- Global corporate PFR policy applying to all site types

Cloud Svcs. Co.

Dual MPLS Scenario

PROBLEM:

- Current network is an active – backup MPLS design.
- Load sharing is not an option due to the unequal bandwidth between the primary and backup MPLS networks.
- MPLS performance is required, but bandwidth needs to be increased with negligible cost increases.

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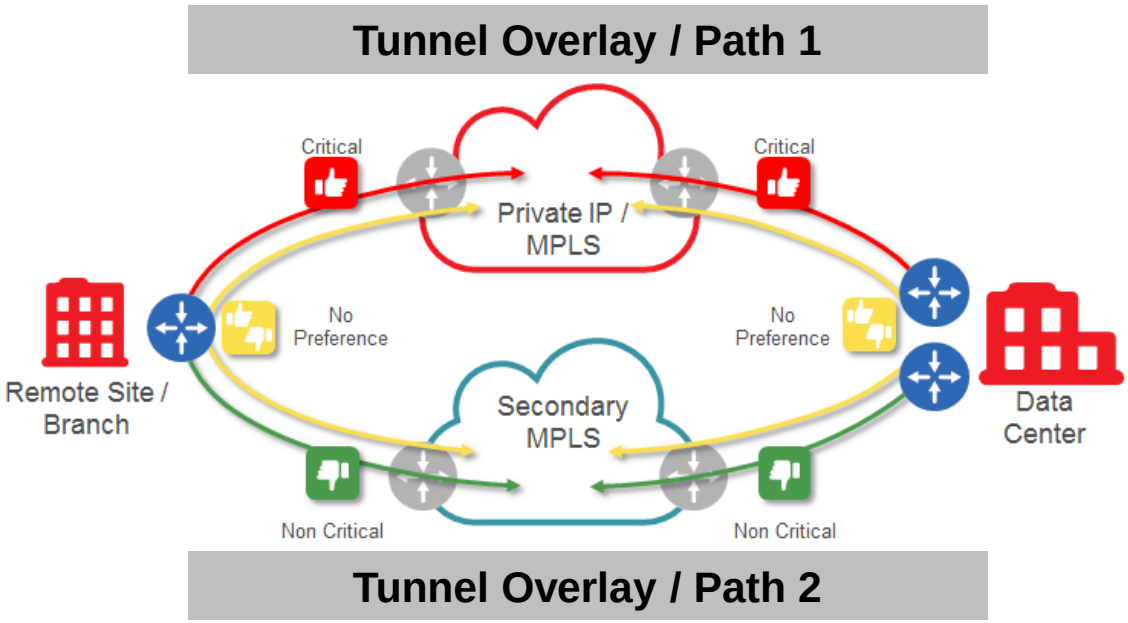
Dual MPLS design.



- Paths encrypted end to end
- Each network may be configured to carry specific applications or COS
- Each path/application/COS may be configured to fail over to the alternate path
- (Optional) load sharing for traffic that is not mapped to a path
- Circuits may have unequal bandwidth
- Each path may have unique path policy metrics for failover

Financial Services Franchise Network

Single Internet at remote site scenario

PROBLEM :

- Current network is a datacenter controlled IP VPN dual tunnel network.
- Internet performance issues (i.e. Latency) or regional brown outs require manual fail over of the tunnel infrastructure.

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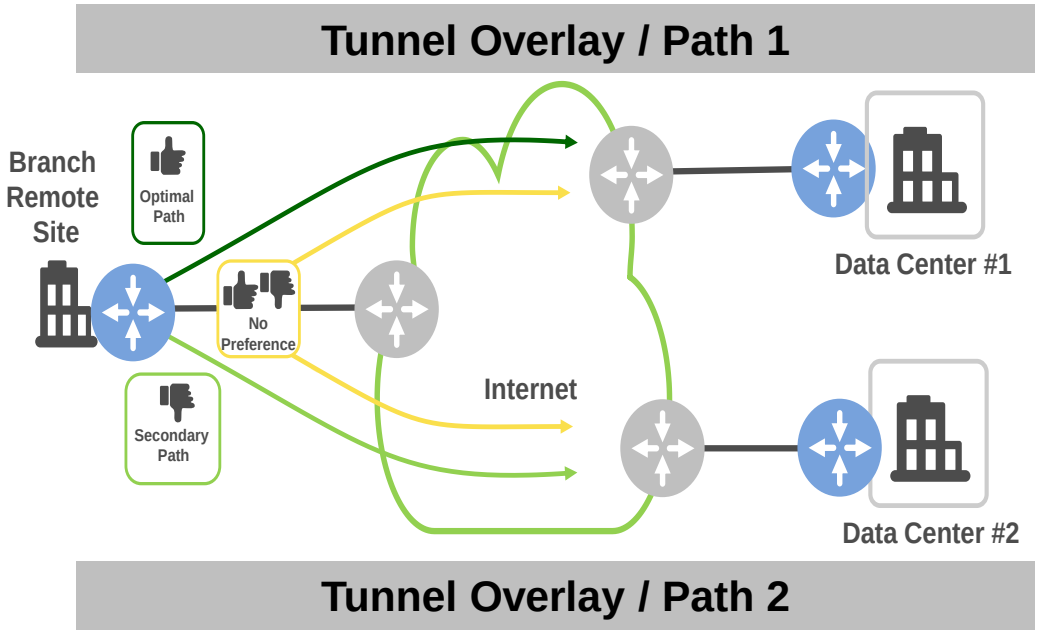
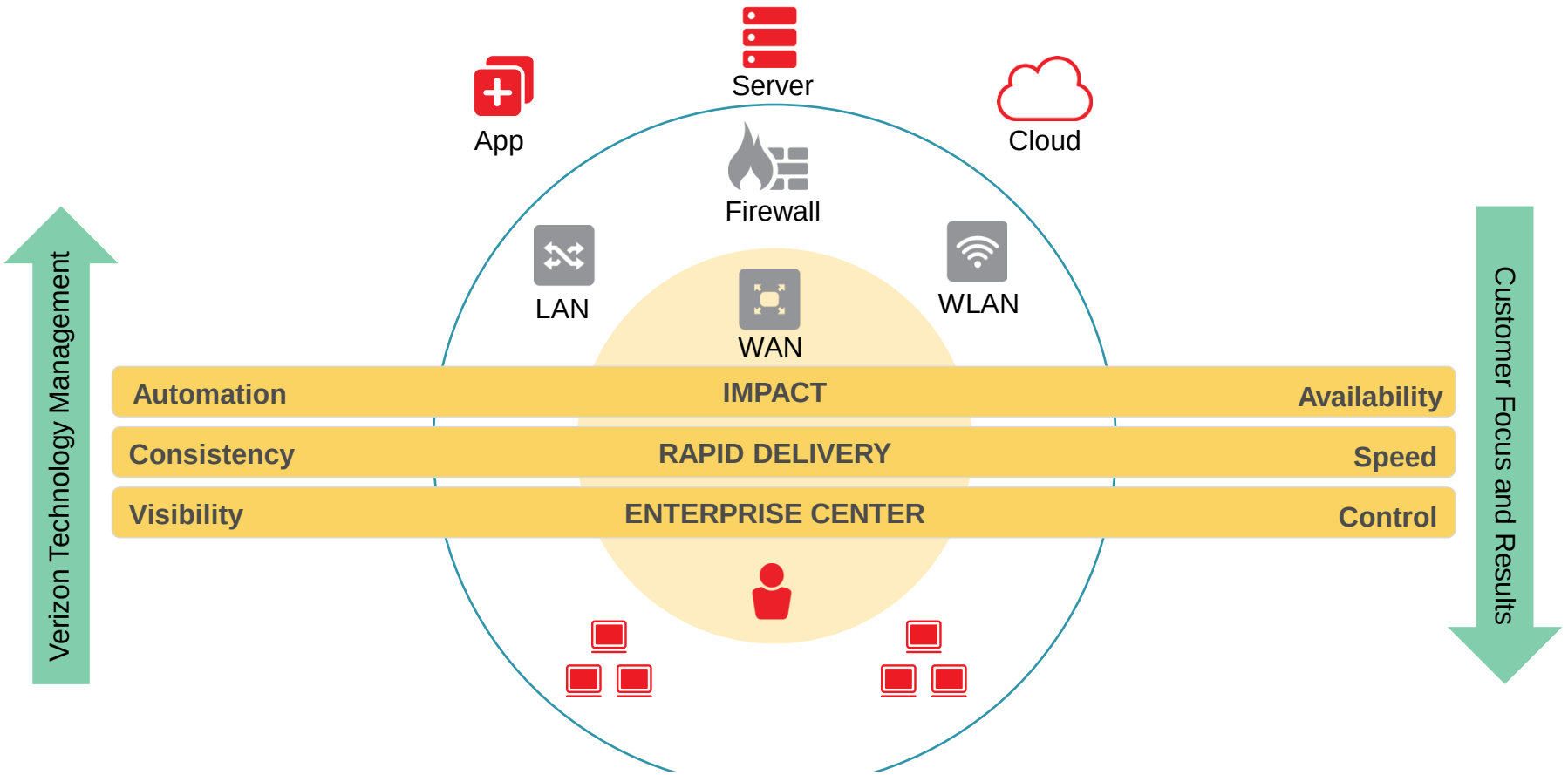
Single internet at the remote site.



- Both paths use the same internet access at the remote site.
- Two tunnels / paths are established across the same internet access to different remote internet egress points.
- Traffic can be load shared across the internet paths or mapped selectively per application or COS.
- Application aware routing provides the ability to route around internet brown outs or service degradations in the path.
- This design allows a dynamic failover per remote site to the alternative data center path based on performance of the end to end internet path to the application.

Verizon – An IT partner that scales.



Less time integrating, monitoring, and managing infrastructure.
More focus on delivering business results.

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