Adding Cellular (WWAN) to the **SD WAN Connection Mix**

3 IMPORTANT TRANSPORT TECHNOLOGY DEPLOYMENT CONSIDERATIONS

WHITE PAPER

inseego™

Introduction

For enterprises, software defined wide area network (SD WAN) solutions are very appealing for their flexibility and low TCO compared to traditional WAN solutions. But when it comes to supporting cloud-based solutions and meeting service level requirements across the enterprise while cutting costs, choosing the right transport technologies for an SD WAN implementation can be tricky.

This paper highlights three transport-technology related considerations that are critical to reliable SD WAN, how cellular or wireless wide area network (WWAN) can help, and what it takes to get the most out of cellular connections.

More Connection Options, **Different Tradeoffs**

Before SD WAN came along, the connection options for a WAN were relatively straightforward; enterprises typically relied on carrier ethernet or T1 lines using MPLS services. WAN deployment and management, on the other hand, has always been complicated and only compounds as you add branch locations, offices, kiosks and ATMs and other technologies in the mix. Since WANs cannot prioritize traffic for business-critical applications, rolling out new services or capabilities often requires upgrading network bandwidth, adding specialized networking technology or even re-architecting. And the associated costs add up fast.

The big picture looks much different with SD WAN, since SD WAN solutions enable you to:

Set policies that prioritize and direct network traffic.

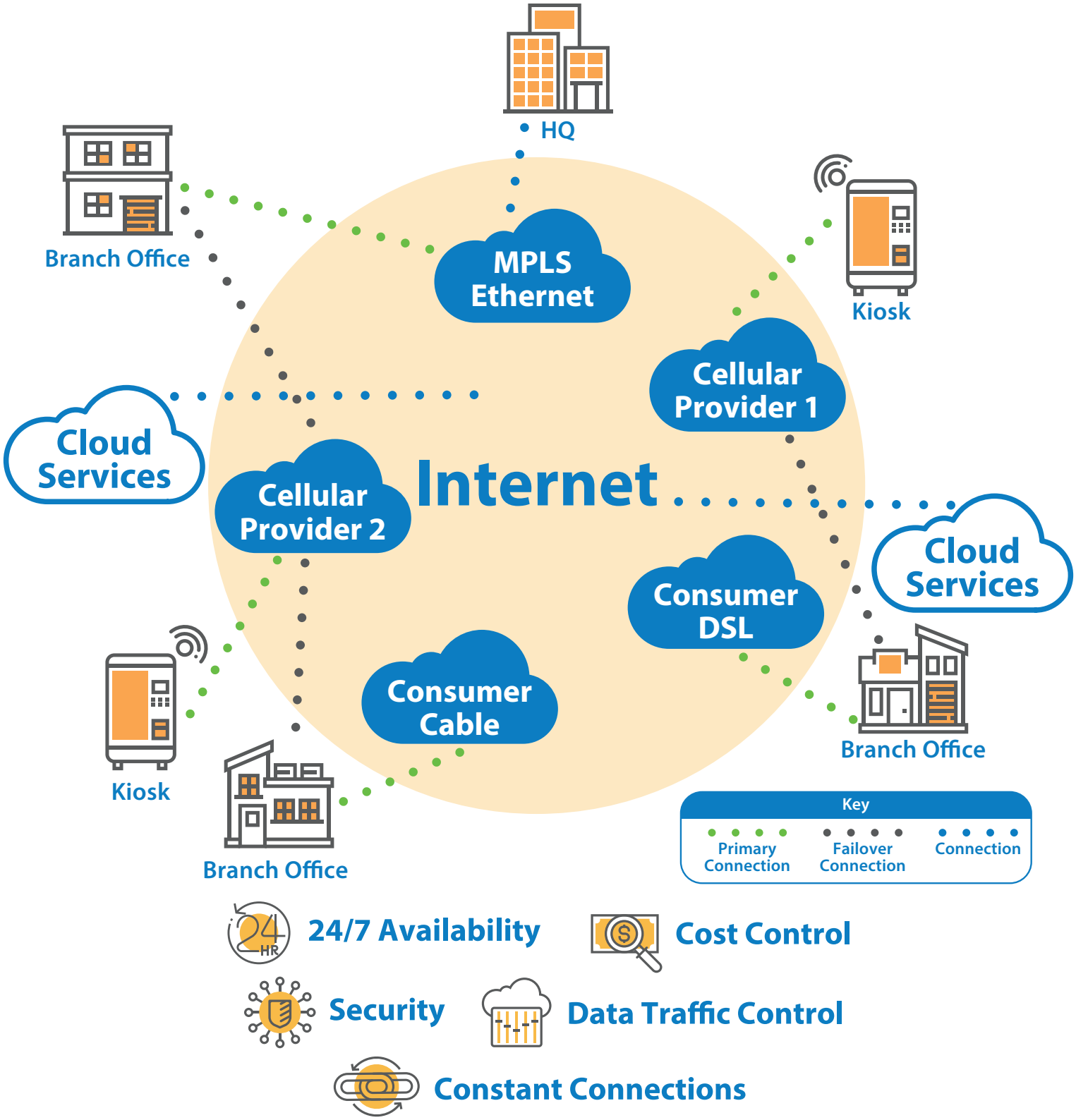
Directly access cloud services from remote locations versus tunneling traffic through headquarters to maintain security and control.

Easily add ATMs, kiosks, POS systems or other technologies to your network.

Simultaneously rely on multiple lower-cost connection options, including cable, DSL, ethernet, and cellular, in addition to MPLS, to automatically maintain or boost network availability and performance.

One of the key challenges to maximizing the benefits from SD WAN, however, is figuring out which access technologies best meet organizational requirements.

Figure 1: **Key Enterprise Needs in SD WAN Environments**



Given the flexibility of SD WAN solutions, it may seem like you can just add a connection, set policies and then let your new solution work its magic. But the reality is more complicated.

Here are three reasons why.

01 Reliability Issues with **Consumer-grade Options**

Without a doubt, the additional transport technology options provide welcome cost savings for the IT department, but there are tradeoffs with all of the options.

Table 1: **Average Access Technology Costs and Speeds at a Glance***

	Average Cost	Average Download Speeds	Average Upload Speeds	Factors Impacting Service Quality
Cable[1]	$50 - $170/mo	20 - 300 Mbps	7 - 20 Mbps	Shared service
Cellular	$50 - $70[2]	23 Mbps[3]	8 Mbps[3]	Lower data cap, shared service proximity to cellular towers
DSL[1]	$20 - $300/mo	1 - 500 Mbps	384 Kbps - 8 Mbps	Shared service, proximity to carrier facility
Ethernet	$1,278/mo[4]	10 Mbps – 1 GB Average = 122 Mbps[5]	10 Mbps – 1 GB	High installation costs, includes SLA
Fiber[1]	$50 - $650/mo	25 Mbps - 1 Gbps	5 - 880 Mbps	Limited availability in many areas

1 DSL vs. Cable vs. Fiber vs. Satellite Internet—Compare Internet Types, Business.org, March 2018.
2 Best Unlimited Data Plans: Stop Paying Too Much, WhistleOut.com, May 2018.
3 Speedtest Report: Mobile, Speedtest.net, September 2017.
4 How Much Does Business Internet Cost? BusinessInternet.com, July, 2017.
5 Ibid.

** The numbers in this table were gathered from across multiple sources and they are only meant as a rough illustration of typical speeds and costs for access technologies.*

Although DSL and cable are very affordable and deliver promising peak speeds, the quality of service can vary noticeably from day to day or hour to hour, depending on a variety of factors, such as traffic from other subscribers. Companies often find that the consumer-grade transport technology solutions they deploy with their SD WAN implementations don't sustain the level of availability they require to support their user requirements and cloud strategies.

Don't expect consumer-grade options to consistently deliver advertised speeds.

02 Lack of a Failover Strategy **(and Failure to Test)**

Virtually all enterprises today need to maintain high availability for business-critical applications during regular business hours (if not 24x7), and most now rely on some form of cloud-based services. Part of the appeal of SD WAN solutions is that they enable direct access to secure cloud services from remote locations rather than requiring you to tunnel traffic through your headquarters to maintain security and control.

At the same time, as we saw in the last section, putting too much faith in any one consumer-based access technology for business-critical applications or services is risky. That's why it's critical to have—and have tested—a failover strategy. After all, the op-ex of downtime associated with a service failure or degradation can quickly eclipse the savings from using a consumer-based service. And with SD WAN, there is no one-size-fits-all strategy for failover.

A backup strategy and the associated testing should:

- IDENTIFY THE BUSINESS-CRITICAL APPLICATIONS AND SERVICES NEEDED DURING AN OUTAGE OR SLOWDOWN
- CONSIDER REQUIREMENTS FOR THE MINIMUM LEVEL OF BUSINESS OPERATIONS
- BE ABLE TO MIMIC THE EXPECTED RESULTS

Case study: Bank branch

Scenario

SD-WAN environment with a fiber connection.
No tested failover solution.
Workers accidentally cut fiber line.

Impact

Branch offline and closed for 18 hours during fiber line repairs.

Solution

Added inseego Skyus modem and cellular plan.

Benefits

Immediate failover for future fiber connection issues, minimizing potential downtime.

Don't wait until something happens to establish and test a failover strategy.

03

Misunderstandings
About Data Limits

If your enterprise relies heavily on data-intensive cloud-based solutions, it's worth paying attention to data usage across all of your access technologies. Clearly, if you add a consumer-grade cellular plan to your SD-WAN environment, you need to be aware of your data limits since most "unlimited" plans are capped at 5 – 10GB before speeds are throttled or other penalties kick in. But even with consumer-grade DSL or cable, data limits are usually capped at 1TB before you face a steep per-GB cost increase.

The beauty of SD-WAN is that once you reach the data limit on one technology, you can switch over to another option to contain costs. But unless you are aware of and plan for the eventuality of data overages, you could end up paying far more in monthly and annual bills than expected. If your router includes alert functionality for data overages, it's relatively easy to keep costs in check. Otherwise, you will need keep an eye on your service providers' dashboards and adjust connections or plan choices based on usage.

To get the most value from cellular, it's a good idea to carefully weigh key business needs against plan limits and set rules accordingly. For example, if you plan to rely on a consumer-grade cellular plan as a failover solution, you could set rules to prioritize mission-critical traffic to limit potential overages. In a vast majority of scenarios, however, the costs of a complete business or branch outage far outweigh the data overage costs you would incur on a cellular plan (and it often only takes a quick call to your provider to upgrade plans and increase limits).

Quick tip: If your router includes alert features, be sure to use them.

Tapping the Potential of **Cellular Connections in SD WAN**

A few years ago, cellular technology would have best been considered as a backup solution for the various wired options. But given the rapid progress of cellular technologies in recent years, today cellular is not only an ideal failover option in SD WAN environment, it has become a viable primary connection option in many cases. Cellular connections already often surpass DSL speeds. Moreover, as carriers start rolling out 5G technology, which will deliver gigabit download speeds, cellular will soon be a serious competitor to broadband. Cellular can even provide a failover solution for MPLS lines that is just secure as an MPLS, if you set up a private network through your preferred carrier.

Of course, it's important to proceed with caution since cellular connections are susceptible to coverage, signal or noise issues in some areas, which can lead to negative user experiences. But if you approach cellular correctly, you can expect comparable or superior quality to other transport options.

Common Cellular Use Cases:

- QUICK DEPLOY NETWORK OPTION FOR BRANCH OFFICES
- QUICK DEPLOY ENTERPRISE NETWORK CONNECTIVITY
- ROBUST PRIMARY CONNECTION FOR REMOTE OFFICES
- BACKUP FOR REMOTE OFFICES
- REDUNDANT WIRELESS CONNECTIVITY FOR WIRED CIRCUITS
- HOT STANDBY FOR RAPID FAILOVER AND BUSINESS CONTIUITY

Maximize Performance of Cellular Connections **with Skyus Enterprise-Grade Modems**

Inseego's line of Skyus wireless modems are rugged and purpose-built for enterprise applications. They provide a highly reliable and cost-effective platform for adding cellular access technology to your SD WAN environment.

Celluar is an ideal failover option in SD-WAN environments, as well as a viable primary connection for many uses cases.

Learn more

If you are considering using cellular as a failover option or a primary connection in your SD WAN environment, we can help you make sure your approach is successful. Contact our sales team today to discuss your specific use case and requirements.

About Inseego

Inseego enables high performance mobile applications for large enterprise verticals, service providers and small-medium businesses around the globe. Our product portfolio consists of Enterprise SaaS Solutions and IoT & Mobile Solutions, which together form the backbone of compelling, intelligent, reliable and secure IoT services with deep business intelligence. Inseego powers mission critical applications with a "zero unscheduled downtime" mandate, such as asset tracking, fleet management, industrial IoT, SD WAN failover management and mobile broadband services. Our solutions are powered by our key innovations in IoT, purpose-built SaaS cloud platforms and mobile technologies, including the newly emerging 5G technology.

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