6 Wireless Failover Strategies for Enterprise Branch Continuity

Using cellular broadband to build resilience and uptime in offices, stores, and other fixed locations

Addressing critical risk points in branch networks

When your branch network is down, how much business can your organization conduct? Your mission-critical and cloud-based applications have made wide-area networks (WANs) an essential component for branch operations continuity. Already, most companies' workloads run or are stored in the cloud, and employees use an increasing number of cloud-based services every day, such as file sharing, collaboration, and communication tools.

Increasing the diversity of network components and connections reduces single points of failure that can significantly impact your operations. Wireless WAN links built on 4G LTE and 5G technologies are powerful, flexible, and cost-effective additions to branch operations. They improve network uptime, application performance, and business continuity — especially when integrated with, and adding to, the capabilities of software-defined WANs (SD-WANs).

A small set of risk points in each branch network is responsible for most network issues. This paper outlines how hybrid Wireless WAN capabilities can boost the resilience of your business with six essential branch networking strategies:

No. 1
Add link diversity

No. 2
Ensure dual-carrier connections

No. 3
Add hardware redundancy

No. 4
Construct resilient, intra-company connections

No. 5
Accommodate traffic spikes

No. 6
Troubleshoot networks remotely out of band

No.1 Add link diversity

Your branch WAN connection probably depends on a single wire running to your chosen Internet service provider (ISP). This thin link to the corporate network and cloud can be disabled in a variety of ways, including serious weather events, construction accidents, or human configuration errors.
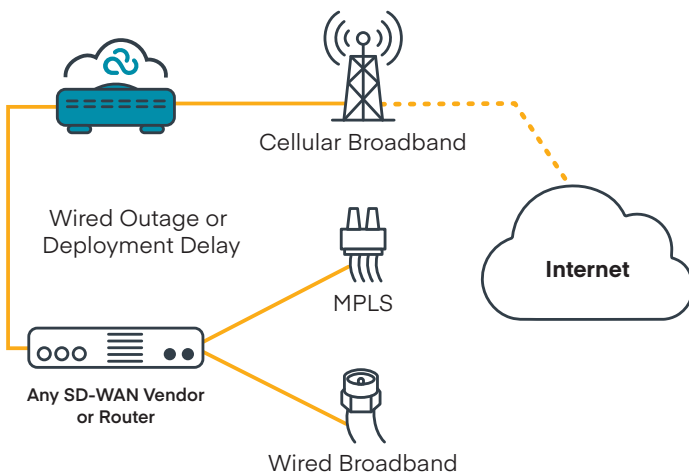
A quick and easy way to reduce the risk of a branch disconnect is to add another WAN connection. A second wire is susceptible to the same risks as the first one, and the wait for installation may be lengthy. Adding a wireless link provides both backup and diversity to the network. Rapid failover seamlessly switches from one link to another, minimizing network and service disruption.

Lower-bandwidth LTE connections may only carry critical traffic, as configured by WAN and traffic management policies. But higher-bandwidth links, such as Gigabit-Class LTE and 5G, can fail over the full traffic load.

This wireless connection can also be a network and IT management lifeline into the branch, enabling you to remotely monitor, manage, and troubleshoot the router and other branch equipment over the air.

There are a couple of ways to add Wireless WAN connections to your existing branch network, enabled and enhanced by cloud-based, centralized management service. Purpose-built Cradlepoint LTE and 5G routers provide reliable connectivity, advanced management, and failover capabilities as well as Ethernet and Wi-Fi interfaces, making them a simple, drop-in addition at the branch. These sophisticated devices can be configured at scale with Cradlepoint NetCloud Manager™ to offer a full range of SD-WAN, security, application QoS, and management features that integrate into existing configurations with standards-based routing and VPN support.

Another option is adding a wireless connection with an LTE or 5G adapter to an existing router, relying on its SD-WAN and failover functionality. Best of all, you can deploy wireless failover much faster than waiting for a new wire. Both routers and adapters offer zero-touch deployment features, removing the need for an on-site visit to the branch.

Cradlepoint Wireless WAN	Wireless Connectivity	Device Throughput	Security	Traffic Steering	Failover Reporting	When to Choose
5G-Enabled Routers	Mid-band & low-band 5G	2.3 Gbps	Zone firewall & NetCloud Perimeter	✓	✓	Larger site 5G for routing, SD-WAN & failover
LTE-Enabled Routers	Gigabit LTE	940 Mbps	Zone firewall & NetCloud Perimeter	✓	✓	LTE performance for routing, SD-WAN & failover
5G Adapter	Mid-band & low-band 5G	2.3 Gbps	Zone firewall & NetCloud Perimeter	✓	✓	— Higher performance 5G with Cradlepoint, third-party router or SD-WAN appliance — Captive modem for Cradlepoint router — Out-of-Band Management
LTE Adapter	Gigabit LTE, LTE	95 - 275 Mbps	Zone firewall & NetCloud Perimeter	✓	✓	— Basic link diversity & continuity — Out-of-Band Management

No.2 Ensure dual-carrier connectivity

Relying on a single telecom carrier or Internet provider is another risk point for branch continuity. Network congestion, routing and DNS issues, and core network outages are just some of the potential incidents that can disrupt your business operations.

You can reduce the risk of carrier disruptions by using two links with different wireless carriers. The separate infrastructure adds network diversity, making it highly unlikely that both would be unavailable at the same time. You can establish policies to operate the two links as a primary and backup, or increase your bandwidth by using both links in concert.
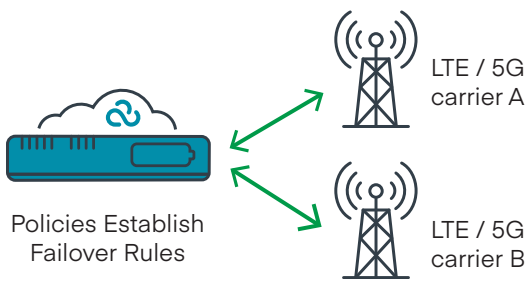
Wireless WANs also bring greater agility to many branch locations, making it easier to open new locations or move existing ones. You decide when and where to set up, making wireless even more important for short-term or temporary locations. Larger organizations may find it cheaper and easier to negotiate and operate two national wireless contracts, instead of a varied mix of Internet service providers.

The simplest way of using two wireless carriers is to use an LTE or 5G router that supports two modems. Most Cradlepoint routers have this capability, making deployment as easy as adding a second modem and SIM card to the device. SD-WAN capabilities and smart routing policies manage the different links, from seamless failover to burst capacity in peak periods. You can identify and route traffic independently, sending specified devices or applications on different paths for security or performance reasons.
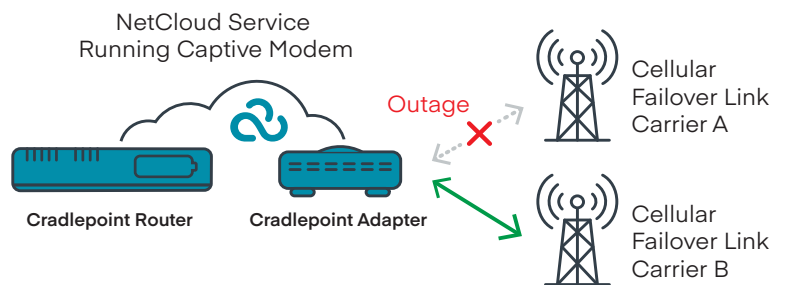
It is also possible to use two carriers by adding two wireless adapters to an existing router, but lacks the advanced network awareness and routing capabilities of an integrated solution.

— Dual-carrier connectivity three ways —

A router with dual modems

LTE / 5G carrier A

LTE / 5G carrier B

Policies Establish Failover Rules

An adapter adds carrier failover connectivity

NetCloud Service Running Captive Modem

Cradlepoint Router   Cradlepoint Adapter

Outage ✕

Cellular Failover Link Carrier A

Cellular Failover Link Carrier B

Two adapters add carrier failover connectivity

Cellular Failover Link Carrier A

Outage ✕

Cradlepoint Adapter

Router or SD-WAN

Cradlepoint Adapter

Cellular Failover Link Carrier B

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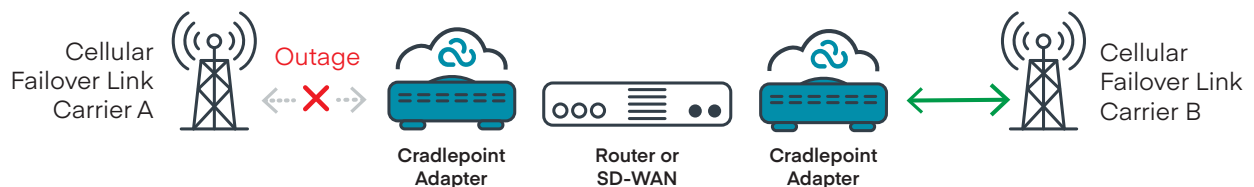
No.3 Add hardware redundancy

A single branch router can go offline for several reasons, from configuration errors and software update failures to security attacks and even cable issues. These often require a site visit to fix, leaving the branch isolated until tech support arrives.
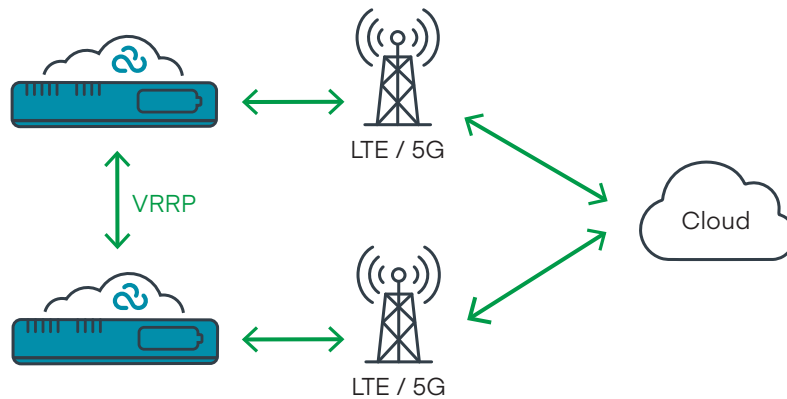
As shown, up to four carriers could be connected with dual-modem routers. Cradlepoint routers can also mirror already installed VRRP-capable routers.

Business functions that rely on continuous operations and 24x7 network uptime can be adversely impacted by service disruptions. Redundant or mirrored routers are an effective protection against router downtime from maintenance or failure. The routers monitor each other, and the backup automatically takes over if the primary router or WAN link fails, and then switches back when the primary is restored. With a primary and backup router you can safely stage updates, configuration changes, and other periodic maintenance without risking business-critical communications.

Adding different WAN links or carriers to each router provides additional protection from common business continuity risks. Configuring both routers with the same security capabilities ensures that operations continue without additional risk. If the backup router has a lower-bandwidth connection, traffic policies ensure that essential traffic is prioritized.

Cradlepoint branch endpoints use Virtual Router Redundancy Protocol (VRRP) to configure and coordinate router failover. The routers are linked together via direct cable or through an Ethernet switch. NetCloud configuration parameters identify the primary and backup router as well as the desired timing and conditions for determining WAN link failure. Both routers share a virtual gateway address and DHCP table, so other devices on the network continue as if nothing has changed.

During the failover state, the former primary router will continue checking its WAN connection and automatically signal to the backup that it is time to switch back when service has been restored.

No.4 Construct resilient, intra-company connections

Direct Internet connections using VPNs in branch offices provide security and are simpler and less expensive than dedicated links to the head office. Multiple VPN tunnels to different headend devices are a solution for uninterrupted branch-to-HQ communications over the Internet.

Dynamic Multipoint Virtual Private Network (DMVPN) tunnels can be configured from each branch to redundant headends. With DMVPN, the endpoints can use dynamic IP addresses and only a single tunnel configuration is required, regardless of the number of branches. Each tunnel is routed independently across the internet, and traffic is dynamically routed from the branch via the most effective link at the time. The preferred routing protocol takes care of normal traffic management. If network or hardware issues disrupt one tunnel, traffic is just sent via the alternate path. Leveraging other branch continuity strategies, these tunnels can also be set up across different WAN links, carriers, and routers for extra redundancy.
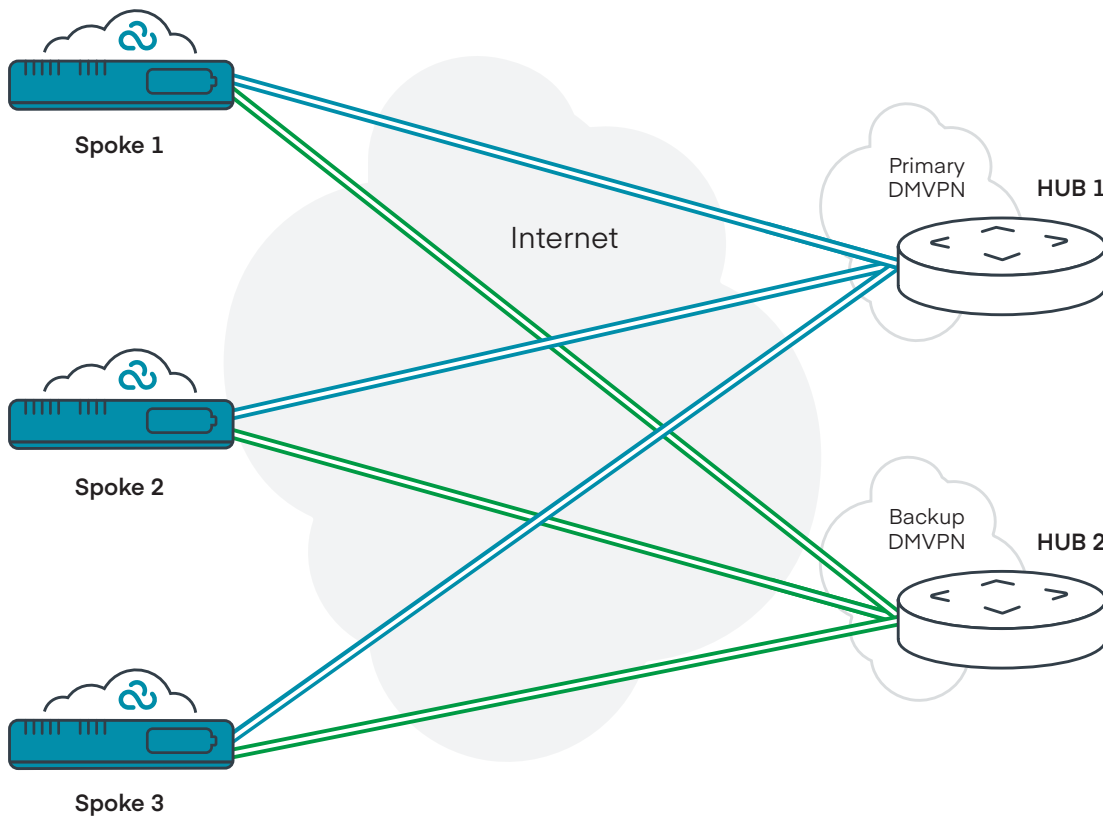
No.5 Accommodate traffic spikes

Sometimes everything is working fine, but the amount of traffic is just too much for the available bandwidth, causing some or all applications to slow down. Increasing use of video is a leading cause, but file sharing apps, software updates, and the rising number of connected devices are also likely contributors to traffic spikes and network congestion.

One simple solution to traffic congestion is to use the backup wireless link to augment or offload the primary connection. As traffic builds, the secondary link is activated, and traffic is dynamically routed to the best available path. Once the spike has passed, the wireless connection is released. All of this is fully automatic and completely invisible to branch office staff. You can also use the secondary link to regularly augment the network during peak periods or reserve it for specific applications or devices.

Cradlepoint routers with SD-WAN capabilities can easily handle these scenarios. There are many ways to configure this function, based on WAN conditions, specific applications, or security considerations, among other criteria. You build policies to define the necessary conditions for using the alternate wireless link, with full awareness of your wireless services and any restrictions or caps. Take advantage of advanced SD-WAN capabilities to separate applications or devices and assign them to a specific link. For example, you may want to keep business-critical financial or database applications separate from generic web traffic and guest networks.

— Cradlepoint WAN capabilities —

Dashboards: Capacity, Data Usage, QoE	Capacity information at a glance is updated every two minutes to give an admin fast information on whether the router capacity has been reached by enabling too many services.
	For example, a NetCloud dashboard shows the current cellular plan data usage and drills down to a data usage forecasting tool. Quality of Experience (QoE) dashboards show customer performance insights into their network and how applications perform across the WAN.
WAN Uptime	NetCloud capabilities, combined with LTE and 5G endpoints, help maintain connections even when the primary link fails. NetCloud automatically switches the connection to wireless link so that applications and data continue to perform and connect uninterrupted.
Traffic Steering: Application-Aware QoS & WAN Performance	**Application-aware QoS** — provides the ability to identify applications and establish policies dictating how to apply quality of service (QoS) levels at the application layer.
	WAN performance — measures network performance, such as latency, jitter, packet loss, R factor and MOS scores, plus applications' latency measurements for QoE (quality of experience) to gain a better understanding of the user experience.
Smart WAN Selection (SWANs)	SWANs notifies the router that the primary link is deteriorating, then, based on policy-based routing, moves specific business-critical traffic to the second LTE connection, allowing the most important data to flow smoothly.
Extensibility	Build custom applications through the cloud across an entire fleet or network using the SDK, NetCloud Container Orchestrator, and NetCloud API.

No.6 Troubleshoot networks remotely out of band

When the branch loses connection to the corporate network or the cloud for whatever reason, you also lose visibility of and access to all of the branch devices. Network management becomes much more difficult, often requiring a site visit or painstakingly walking a local employee through the troubleshooting process.

Wireless links provide an alternative network management option when the primary link or endpoint device is unreachable. You can easily add Out-of-Band Management (OOBM) capabilities to your branch network with a Cradlepoint wireless router, or by connecting a wireless adapter directly to the console port of your primary router. Wireless connectivity gives network managers easy and secure access to the device, enabling them to diagnose and fix problems over the air.

You can also get to the branch LAN and any other important business devices on the local network with in-band management services. Cradlepoint routers and NetCloud services make LAN devices accessible and manageable from anywhere. As a device joins the network, its IP address and host name appears in NetCloud Manager. With Remote Connect, the IT team can make it cloud managed with one click.

— NetCloud Remote Connect capabilities —

Remote Connect, a part of NetCloud subscription management, has the following capabilities:

Out-of-Band Management	With a direct connection from the console port of the LTE adapter to the primary router or SD-WAN appliance, network administrators can connect to the router over the air, even if IP and Ethernet are not functioning or available on the router.
In-Band Management	Administrators can connect to nearly any device that has an IP address on the LAN through Cradlepoint NetCloud (using HTTP, HTTPS, RDP, SSH or VNC). Previously inaccessible devices are now capable of being managed securely through the cloud — without any additional software or hardware.
Insights & Reports	A failover report can be generated to share with stakeholders, showing quantity and duration of events, prevented downtime costs, and locations where failovers occur most frequently.

Greater resilience at the network edge

Network uptime is vital to the business, and wireless WAN links are critical for business continuity. Cloud services, IoT devices, and greater mobility are pushing businesses beyond the architectural constraints of wired networks and driving the need for greater diversity and resilience.

Establishing network redundancy and resilience does not have to be expensive or complicated. Cloud management, network and data plan monitoring, and zero-touch deployment make implementation and operations quick and easy. Advanced wireless capabilities understand what, when, and how to connect to cellular networks, with enhanced link reliability to get and stay connected. Modern SD-WAN capabilities let you build and apply traffic policies based on multiple criteria, including WAN performance, application needs, and security. Wireless WANs solve multiple problems for business networks, create new opportunities, and lay the foundation for further transformation and innovation.

Learn more at **www.misco.co.uk**

About Cradlepoint

Cradlepoint is a global leader in cloud-delivered 4G and 5G wireless network edge solutions. Cradlepoint's NetCloud™ platform and cellular routers deliver a pervasive, secure, and software-defined Wireless WAN edge to connect people, places, and things – anywhere. More than 25,000 businesses and government agencies around the world, including many Global 2000 organizations and top public sector agencies, rely on Cradlepoint to keep mission-critical sites, points of commerce, field forces, vehicles, and IoT devices always connected. Cradlepoint was founded in 2006, acquired by Ericsson in 2020, and operates today as a standalone subsidiary within Ericsson's Business Area Technologies and New Businesses. Cradlepoint is headquartered in Boise, Idaho, with development centers in Silicon Valley and India and international offices in the UK and Australia.

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