THE VALUE OF NETWORK DIVERSITY

Go Beyond Redundancy.
Wave Provides Diverse Network
Paths To Protect Your Business.

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Executive Summary

With most companies being overly dependent on the internet today, reliable network connectivity is as vital as electricity to business operations. As such, it needs to be available and protected 24/7.

Having a diverse fiber path delivers true network redundancy that ultimately protects a company's productivity, revenue generating capabilities, and operations. Wave Business provides mission-critical, high-speed fiber infrastructure solutions that are designed to keep a business up and running in the face of any disaster.

But some people confuse network *redundancy* with network *diversity*. This white paper examines the differences, benefits, and outcomes of adopting a truly diversified network strategy, and why businesses should consider partnering with Wave, a top tier national fiber solutions provider delivering mission-critical connectivity solutions to ensure business continuity.

NETWORK DIVERSITY: THE KEY TO BUSINESS CONTINUITY
How Long Can Your Business Survive Without Network Connectivity?

In today's networked world, reliable connectivity is essential to most every business. Poor or lost connections can negatively impact operations and even put companies out of business. But reliable network connectivity does not just happen. It takes careful network design and implementation to ensure cable paths are *diverse* and *survivable* in the event of a prolonged outage.

Don't Wait Until it's Too Late

The painful lessons learned from natural disasters, climate change, accidents, and intentional human-caused catastrophes continue to remind us of the importance of IT preparedness. And the impact of these events on business operations will only grow in proportion to our increasing reliance on digital technology and the cloud.

As a byproduct of these events, it has become clear that not just redundancy, but physical diversity in fiber plants, cable pathways, service providers, and data center locations must be part of standard operating procedure for network design going forward. Cabling for primary and back-up connections can no longer traverse the same conduits. Carrier switching hubs, data storage facilities, and hyperscale data centers must be spread out to prevent a single disaster from disabling entire businesses or industries. Networking assets must be redesigned with redundant connections and separate entry and exit conduits for every building to eliminate outages stemming from a single point of failure. We learned mission-critical connections and facilities must be protected from flooding, and to have a connection to a backup data center in a geographic location far enough away from the business that it will be unaffected by a local event.

ARE YOU READY?

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Next time—and there's always a next time—a crippling network failure may be the result of another human-caused event, intentional or accidental, or perhaps a hurricane, fire, or earthquake. A backhoe chopping through a fiber trunk happens more often than you think with equally devastating results for connected businesses. It doesn't matter when; there's never a good time for an extended outage.

The questions to ask are, (1) *Can your business operate if your network is down?* (2) *How long can your business survive without network connectivity?* And (3) *Are you prepared to get back up and running ASAP?*

Network Connectivity: The Lifeblood of 21st Century Business

Reliable network connectivity is as vital as electricity to most businesses today. As such, it needs to be available and protected 24/7. Indeed, network diversity is the key to business continuity, and that should not be confused with network redundancy.
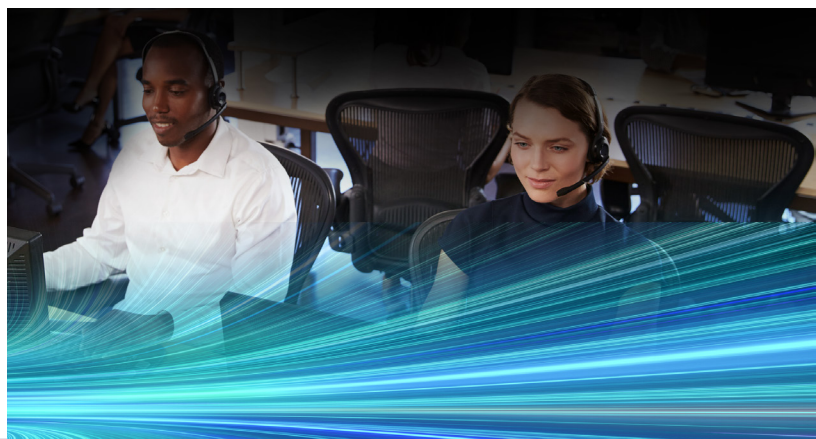
Redundancy Versus Diversity

Network redundancy refers to the duplication of IT assets—having multiple means to connect to the same hosting site to keep operations running. This applies to internet connectivity, switching equipment, trunks and data lines, and even service providers. For example, a business may have both hardwired Ethernet and Wireless LAN connections to the data center, primary and secondary fiber pathways between locations, and perhaps even an entire parallel network instance on standby. Redundancy creates a safety net for the enterprise. In the event something were to happen to the primary network, services could continue uninterrupted using backup equipment and/or connections. Network redundancy is a highly recommended insurance policy to mitigate disaster, and it's a good place to start. But that's not network diversity.

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Network diversity takes the concept of redundancy to the next level. It's about having multiple service providers with independent connections to route data and communications between all networked locations without sharing common cable pathways, equipment, and entry points. Having a secondary connection running through the same conduit or riser as the primary link is <u>not</u> network diversity, as a single event can disable both connections. A truly diverse network will offer some or all of the following:

- ✅ **Cable path diversity**, meaning separate runs of CAT 5, 6, and 7 and/or fiber optic cables enter the building using a different conduit than the primary provider.

- ✅ **Service provider diversity**, meaning separate companies are responsible for maintaining primary, secondary, and even tertiary internet connections, with each being equally capable of handling normal business operations.

- ✅ **Data center diversity**, meaning the routing of identical data streams to separate data centers in different physical locations for duplicate processing and storage.

- ✅ **Equipment diversity**, meaning the switches and hardware for the secondary connection are housed in a totally separate closet or even another building from the primary provider.

- ✅ **Riser diversity**, meaning the secondary fiber lines and cables running inside the building to and from the server racks are not in the same duct as the primary provider.

So, for example, should a fire break out on one side of the building, connectivity can be seamlessly switched to the conduit and/or carrier entering from another side. For some highly data-dependent businesses, like hospitals and financial institutions, diversity is not a *nice-to-have*, it's a *need-to-have*, and they may even have a third or fourth level of failsafe network diversity in place. The back-up system(s) stand ready to execute the cutover instantaneously so that end users are completely unaware of any network issues and do not experience service interruptions.

Wave Offers Diverse Paths to Protect Your Business
Wave presents a range of solutions to help minimize business disruptions in the event of a failure to the primary—or secondary—connectivity provider. We're comfortable in any role. Our fiber-rich network offers an alternate high-speed fiber path to protect against loss of data or connectivity to keep your business up and running if one network becomes compromised.

Keeping your eggs (or cables) in one basket by using common conduits for primary and secondary network connections may prove to be the path of least resistance and the cheapest option for the installing service provider, but offers the least protection. Businesses located within landmark buildings or skyscrapers, for example, may find limited opportunities for physical diversity due to restrictions on construction or available conduits. But with a little ingenuity it can be done. Wave will work with you to develop the best level of diversity whether that is through fiber path diversity, an alternate entry point, equipment diversity, terminating service on a different floor or communications room, or diverse cloud access through our expansive network of data centers and hub locations.

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NETWORK DIVERSITY BENEFITS & RESULTS

There are degrees of network diversity. There may be instances in which a customer wants to connect to a data center on the other side of the country to insulate it against larger regional events, and others where a secondary server installed in another room or wing of the same building will be sufficient. Whether implementing network diversity on a macro or micro scale, once deployed, companies adopting network diversity strategies in partnership with Wave will realize:

- ✅ **Business continuity.** In case of a failure to one network environment, the business will remain up and running with customer service unaffected.

- ✅ **Minimized business disruptions.** Having an alternate cable path protects against loss of data or workflow interruptions during the actual event.

- ✅ **Protection against unforeseen disasters.** Stop worrying about when the other shoe will drop, or what shape the next disaster will take. Your business is protected 24/7 no matter the cause.

- ✅ **Customized route planning.** Where possible, Wave will build the best level of diversity into your network design, whether that is through independent cable/fiber route paths, alternate entry points, or some type of equipment diversity to ensure complete separation in connectivity services.

- ✅ **Customized support.** Wave provides 24/7 proactive monitoring and support to ensure the network is performing optimally whether we are serving as the primary or secondary provider.

Keep the Lights On With Wave

Having a diverse fiber path delivers true network redundancy that ultimately protects a company's productivity, revenue generating capabilities, and operations. Wave provides mission-critical high-speed fiber infrastructure solutions that include:

- ✅ **Deep experience owning, operating, and constructing highly scalable networks and connectivity solutions** like dark fiber, wavelength technology, and Ethernet at speeds up to 100 Gbps. Wave can intelligently route traffic to different data centers to provide the required level of redundancy and diversity.

- ✅ **Unified Communications as a Service (UCaaS)**, a collection of voice and video services, from classic telephony to virtual presence, chat, messaging, and video conferencing solutions all owned and operated by Wave and hosted on our own infrastructure for communications diversity.

- ✅ **Cloud networking services with interconnection agreements to more than 70 data center locations nationwide.** Wave can push data to wherever it needs to be, to any cloud—public or private—and to any partner in your business ecosystem. For example, AWS divides its data centers into global availability zones. Wave can help you achieve cloud service provider diversity through multiple independent connections to different AWS availability zones.

- ✅ **Direct connection options to AWS, Azure and other cloud service providers.** In fact, Wave was recently named as an Amazon AWS Select Tier Consulting Partner, able to install and support direct connections anywhere on the AWS cloud backbone on behalf of our customers.

- ✅ **SD-WAN technology for cloud orchestration of services and centralized control over network connectivity.** Wave provides the tools necessary for remote monitoring and complete network visibility to the cloud for administrators to manipulate traffic patterns, change security policies, and provision or re-allocate network resources as needed in response to any event.

- ✅ **Round-the-clock, local support** from Wave's dedicated account managers and trained service technicians, ready to quickly restore service whenever and wherever it's needed.

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WHY WAVE FOR NETWORK DIVERSITY?

For total transparency, Wave is not a classic telco like some of the larger players, nor are we a large incumbent cable TV and internet service provider.

However, when combined with our sister companies (Grande and RCN), we are a top-tier national fiber solutions provider that delivers mission-critical connectivity solutions to businesses of every size in eight of the top 10 U.S. metropolitan markets. We have the ability to connect to dozens of data centers and cloud service provider networks from coast-to-coast. But chances are, if you engage us, we'll likely have to build some new infrastructure to support your diversity needs. Isn't that exactly what you want, an independent parallel fiber network built to the latest standards? This is the time to think about network diversity and how your IT environment can be connected to and protected by diverse fiber paths at all times and against all threats.

National Map

Most legacy telcos try to squeeze the last bit of performance from existing infrastructure components, some of which are up to 30 years old. Not us. Wave is an independent service provider focused on constructing brand new, robust hybrid networks to deliver the next generation of fiber and cable services with crystal-clear clarity. Nimble and passionate about service and innovation, Wave is constructing a fiber-rich, resilient network that's built for data first, with services that can be tailored to fit your connectivity and fiber path diversity needs through our:

- ✅ **Wholly owned, fiber-rich network delivering superior uptime and clarity.** Wave is not a reseller and does not rent equipment from other providers. We own and operate a sophisticated fiber network with a nationwide network backbone.

- ✅ **24/7/365 local support.** Rest assured the person on the other end of the support call understands your business, local market, and urgency to solve your concern. Wave is dedicated to minimizing any impact to your business.

- ✅ **Customized, robust solutions.** Wave takes a consultative approach by first understanding your distinct needs and then designing and implementing a unique network diversity solution designed especially for your business.

- ✅ **Speed to market.** Unlike larger competitors, Wave focuses on rapid deployments and upgrades. As the sole owner of a fiber-rich network and dedicated employees, we do not rely on third parties to meet installation deadlines.

The Flip Side: Diversity in Provider Support Services

It takes more than hardware and software to run a network; there's a human element to maximizing performance that is often overlooked. It's one thing to have a back-up network, it's quite another to have the talent to staff it. That's the advantage of diversity.

In truth, network diversity can be attained using a single service provider. ISPs are often asked to install a second fiber conduit independent of its first into the same customer location, or add a connection to another data center. However, this scenario locks the business into one provider that may or may not have outstanding customer support like Wave, as evidenced by our Net Promoter Scores.*

But what happens when a major event knocks out the provider's network operations center (NOC) or a switching hub handling both primary and secondary connections? They'll likely be were in emergency mode, preoccupied with replacing their own equipment and services before turning their attention to those of affected customers.

That's the peace of mind Wave offers when serving as your primary network provider, or as an alternative to your first ISP. When an outage does occur, the problem will be addressed with the responsiveness your business demands by local support team members who are intimately familiar with your IT environment and focused on solving your problems. Wave has the people, equipment, and expertise to quickly install connectivity services or quarterback recovery operations with a business as usual attitude. If Wave is acting as the secondary provider, our independent NOC and support personnel are ready 24/7 to restore service and handle traffic in case of a failover. That's the difference between redundancy and diversity.

When the Going Gets Tough, the Tough Get Diversified

A little forethought and planning goes a long way toward survivability. Don't wait until disaster strikes to begin the search and develop a relationship with an alternate service provider. By then it's too late. Ensure business continuity by starting the conversation with Wave today. We can be part of the team—front line or backup service provider— that keeps your business running in the event of an outage with redundancy boosted by network diversity for an always-on connection.

Talk to the experts at Wave to learn how you can get diversified.

NPS available upon request