The number '10' is rendered in a large, outlined font. The '0' is filled with a gradient of blue horizontal bars, transitioning from dark blue at the top to light blue at the bottom. The rest of the text is in a white, outlined, sans-serif font.

10 PLACES YOU DON'T WANT A DATACENTER

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FOREWARD

The “10 Places You Don’t Want a Datacenter” is the most popular page on our web site.

Representatives from over 130 countries have downloaded the report.

It was our goal to produce an objective assessment that would serve as a guide for others and to relate case studies in an interesting and informative way. The widespread use of the report suggests that we met this objective.

We welcome your feedback.

Sincerely,

A handwritten signature in black ink that reads "Tom Deaderick". The signature is fluid and cursive, with a large initial "T" and "D".

Tom Deaderick
Director, OnePartner, LLC

INTRODUCTION

“This list provides context for one of the most important decisions an organization will make,” begins Tom Deaderick, OnePartner Director. “Since we opened the facility in 2008, a lot of people have asked us to share our site selection criteria. How did we decide to build America’s first commercial Tier III datacenter amidst the Appalachian Mountains of Southwest Virginia?”

Rather than listing specific locations, OnePartner’s list identifies types of places, allowing the list to be useful to anyone considering building, expanding or leasing datacenter space. “The goal was to give people some solid guidelines, along with some examples,” says Deaderick. “The list has some really interesting examples. As we compiled the report, there were some surprises. Google Earth is a terrific research tool if you’re considering leasing space in a commercial datacenter. As we were compiling examples, we identified a very large commercial datacenter that matches at least three of the 10 place types.”

OnePartner expects another Tier III or even Tier IV commercial datacenter to be built, or at least announced in the U.S. in 2010. “When we first launched the ATAC, I thought it would be only a matter of time before the established datacenters followed suit. I’m actually surprised to still have the only commercial Tier III datacenter design in America.”

Update

Two other commercial datacenters were certified in 2010, as predicted above.

One is located in Chattanooga, Tennessee and the other is in Gaithersburg, Maryland. Both have Tier III certifications similar to OnePartner’s.

No other datacenter in America is certified higher.

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BELOW SEA LEVEL OR IN A FLOODPLAIN

The National Flood Insurance Program (NFIP), created by the U.S. Congress in 1968 created Flood Insurance Rate Maps (FIRM). FIRMS show floodplains in the same way topographic maps show terrain. A 10-year floodplain can be expected to meet or exceed a given flood level every 10 years, a 100-year floodplain every 100 years, etc. FIRMs are accessible on the FEMA web site (address below). Input State, then County, then Community (cities or areas) and available maps are presented for review.

Designations

Moderate to Low Risk Areas (ideal for datacenters)

B and X: between 100 and 500-year floodplains

C and X: above the 500-year flood zone (best)

High Risk (poor datacenter locations)

A: 1% chance of flooding in a given year with a 26% chance of flooding over 30 years

V: Coastal area with similar probabilities to "A"

Descriptions of FIRM designations (FEMA web site):

<http://tinyurl.com/onepartner-10places-1>

Map search (research the flood level of your datacenter on the FEMA web site):

<http://tinyurl.com/onepartner-10places-2>

2

IN A LOCATION THAT SUFFERS FROM FREQUENT NATURAL DISASTERS

Between 1955 and 2004, Florida averaged 55 tornadoes (F3-F5) annually, according to NCDC (National Climactic Datacenter).

Texas averages 139 annually. By comparison, Virginia averages 10.

Between 1851 and 2004, Texas experienced direct hits from 19 major (F3-F5) hurricanes (approximately 21% of total U.S. hits), according to NOAA memorandum NWSTPC-4. Florida experienced 35 major hurricane hits (approximately 38% of total U.S. hits). Virginia experienced a single F3 hurricane hit between 1851 and 2004.

Locations at highest risk for dangerous weather and are not ideally suited for datacenters.

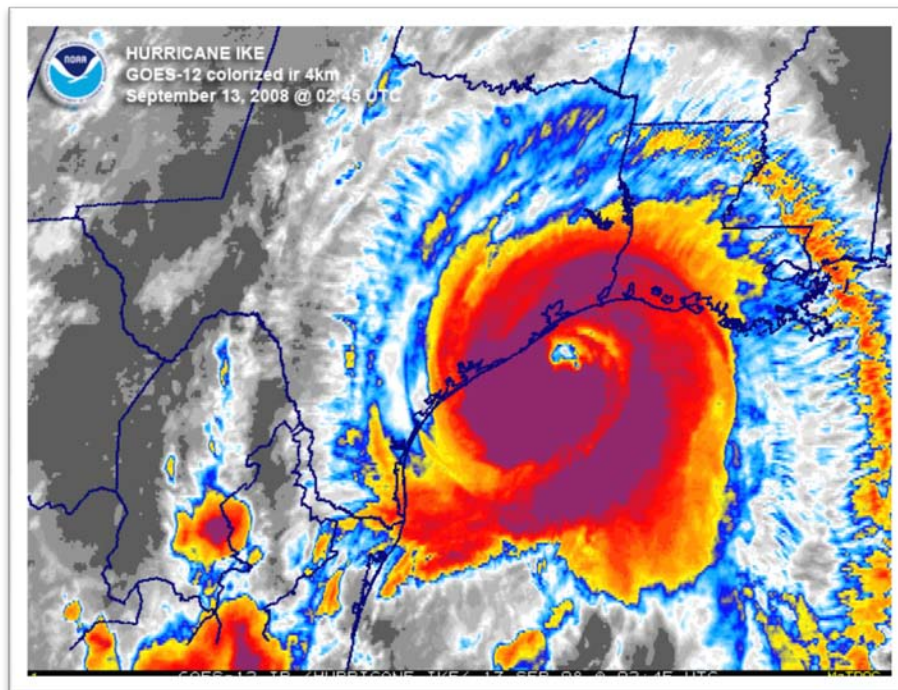


Figure 1: Hurricane Ike hits Texas coast in 2008 (NCDC)

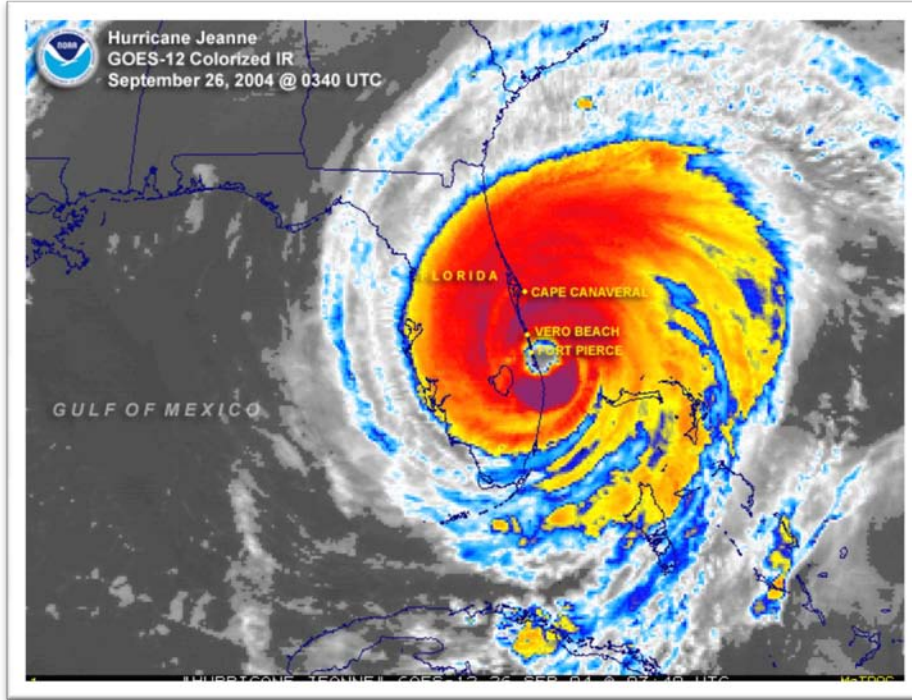


Figure 2: Hurricane Jeanne covers Florida in 2004 (NCDC)



Figure 3: Map of hurricanes by state (1950-2008)

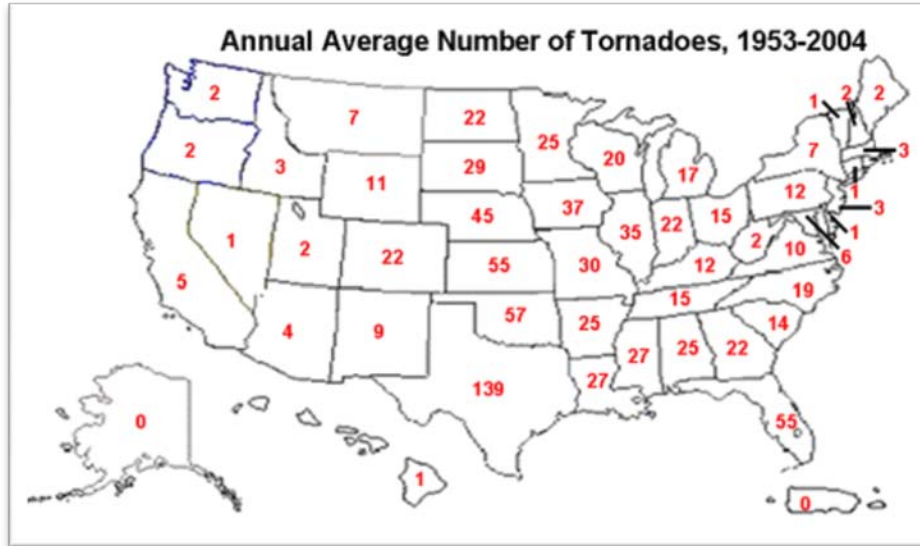


Figure 4: Map of tornadoes by state (1950-2004)

U.S. Mainland Hurricane Strikes by State, 1851-2004

<http://tinyurl.com/onepartner-10places-3>

3

NEAR THE MANUFACTURE, STORAGE OR TRANSPORT OF HAZARDOUS MATERIALS

You don't need a fedora and whip for adventure when the company's computing infrastructure is your responsibility. Adventure comes right to your doorstep. As if weather, fire and power supply risks weren't enough risk factors, the trains and freeways that conveniently supply your business could well be one of your biggest risk factors.

How close are the nearest railroad tracks to your datacenter? They are right on out the back door of one of the largest datacenters in the U.S (Figure 5).

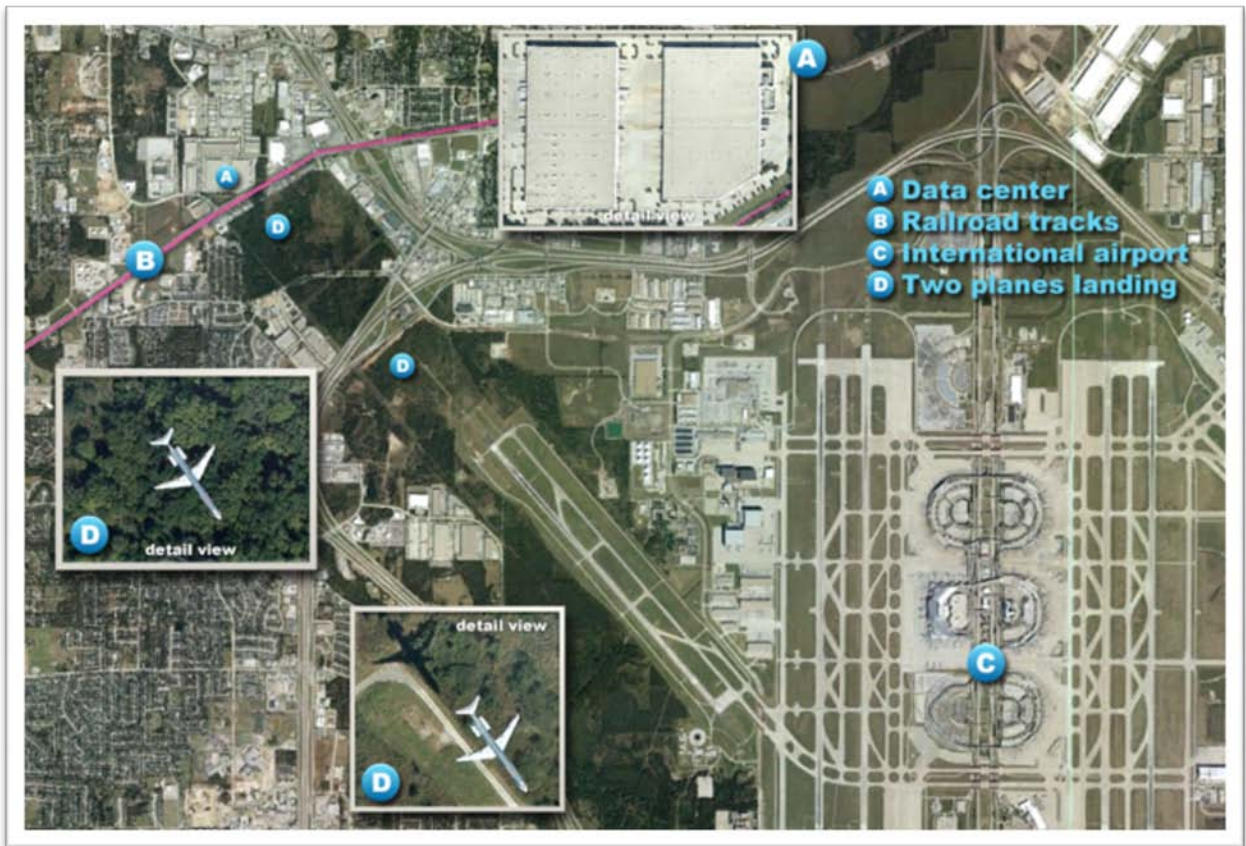


Figure 5: Railway on a datacenter doorstep

On June 28, 2004, a Burlington Northern Train with 123 empty cars and one white tanker containing 15,000 gallons of liquid chlorine crashed into a Union Pacific train. The chlorine trapped dozens of people for as long as eight hours in homes where the chlorine gas was so concentrated that it dissolved metal car keys. The horrifying story is the subject of an episode of the series "I Survived" on the Biography Channel.



IN THE BASEMENT

“Basement datacenters are a mistake.”

Sir Isaac Newton, 1643-1727

Many datacenters are located in the basements of large buildings. Let’s walk through this logic; we’ll put in dry fire suppression systems, and dry-pipe secondary sprinklers. We’ll ban soft drinks from the server room. Then we locate 200 toilets right over it. What could possibly go wrong?

The best presentation I ever gave followed a presentation by a nurse who shared her Hurricane Katrina experience. Preparing for the hurricane, they moved every server cabinet from the basement to the top floor over a period of days in preparation. The IT staff had to use the elevators and because there was so much to move, the rest of the staff was forced to use stairs to carry everything else up. They used a ticket system to manage an orderly and strategic use of the elevators for the highest priority items. The move required days and exhausted the staff before the hurricane even hit. Then they spend the next week living in the building trapped by water and wearing the same clothes.



IN A BUILDING THAT USED TO BE SOMETHING ELSE

If the building wasn't designed specifically to be a datacenter, the costs to retro-fit it will prevent the datacenter from achieving operational efficiency. If I had a nickel for every time someone said "this room would make a great datacenter, look at this solid concrete floor," I could retire. There are literally hundreds of design facets in a good datacenter design. You'll never find a really good datacenter in a building that was originally something else. (Refer to number 7 below for additional rationale).



LARGE METROPOLITAN AREA

Watch YouTube. See if you can identify the most dangerous and unpredictable creature on the planet. No creature has greater propensity to create catastrophe than a human being. Human-produced catastrophe can be accidental (“fire in a nearby building”) or intentional (“Police evacuate area businesses in search for gunman”). More people, more risk. These are simple statistics.

February 17, 2010 – Two underground transformers exploded in downtown Indianapolis knocking out power to three buildings, including the Old Indiana National Bank. Over a thousand employees were evacuated as the subsequent fire raged through one of the three buildings. A similar incident occurred in 2004 with the same transformers. People reported seeing flames shooting up the buildings. “IPL says there are 300 of these transformers downtown – and it owns and maintains most of them”. Reassuring.

Watch the video news broadcast:

<http://tinyurl.com/onepartner-10places-4>



IN A BUILDING WITH ANY OTHER BUSINESS

Most private datacenters and many colocation facilities are located in buildings that also serve another function. Most private datacenters are located in the company's headquarters, along with administrative staff. A computing infrastructure is a remarkably fragile ecosystem. Temperatures, humidity and dust can decrease the operational life and even the efficiency of computer processors. If the humidity in the Human Resources department is too low, probably no one notices. If your computer room humidity is too low – KaPow!

The average private server room will overheat in a matter of minutes if the air conditioning system fails.

When you're talking about an environment so fragile and resource-intensive, a spring lightning storm, a blown fuse and a tornado converge upon equivalence. Down is down.

A building that's well-designed for a human's wide operating range rarely meets the precision demands for the fragile computing environment.

There's only one situation where locating the computing infrastructure within the corporate office should even be considered. If 100% of the company's employees work within the same building the computing infrastructure should be located within that building, provided the datacenter can be retro-fitted to provide as reasonably controlled and resilient environment. If all the employees are in the same building and power, environmental or telecommunications in the building fail, the staff can't work anyway – and locating the datacenter in this building reduces the reliance on telecommunications. If the organization has multiple office locations – a distributed environment – the datacenter should be located in a commercial datacenter so a disruption in one location doesn't prevent the others from continued operations.

Private datacenters aren't the only ones that make this mistake. Commercial datacenters are located on one floor of large buildings with other businesses above and around them. It's not uncommon to see combination datacenter/call centers with hundreds of employees working within yards of the server room environments. Humans increase risk, see number 6 above.

8

IN THE FLIGHT PATH OF A MAJOR AIRPORT

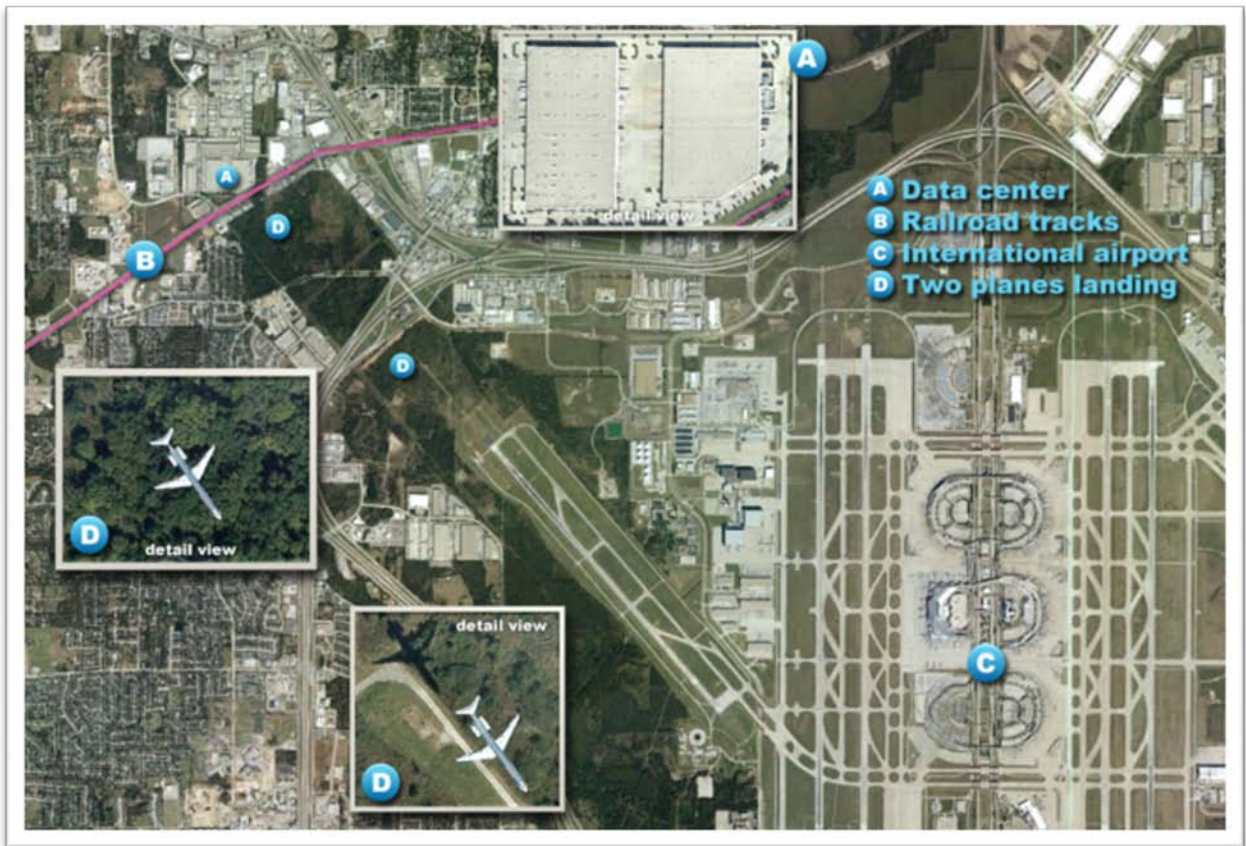


Figure 6: Datacenter in commercial flight path

Figure 6 is a Google Earth overview of the largest datacenters in the U.S. You can actually see the planes flying over from a nearby International airport.

Even though plane crashes are thankfully rare, there are two reasons you don't want a datacenter in the flight path of a major airport. As the number of planes overhead increases, so does the exposure of the businesses in the flight path. Fewer planes mean less risk. The second reason is that, according to a study by Boeing (page 22) on the worldwide commercial jet fleet, only 8% of fatal accidents occur during the "cruising" phase of flight even though the actual time aloft during the cruising phase is greater than take-off and landing maneuvers. 92% of fatal accidents (between 1999 and 2008) occur during take-off and landing.

February 17, 2010 – A private plane crashed in Palo Alto, CA northwest of the airport. The plane clipped a PG&E transmission tower causing a power outage for 28,000 utility customers. The power outage lasted approximately eight hours, disrupting both power and telecommunications. A fantastic, first-hand report of the incident is available. Hospitals and emergency services had to run on emergency power and many other businesses shut down.



IN A LOCATION WITH EXPENSIVE OR LIMITED TELECOMMUNICATIONS

A datacenter should have multiple telecommunications providers. A telecom provider with a monopoly will have no competitive pressure to perform or set reasonable prices.

10

TOO CLOSE TO YOUR OTHER ONE

Often organizations with multiple office locations will choose to locate a primary datacenter in one location and a secondary (“disaster recovery”) datacenter in another. Many times, these locations are too close (Figure 6) to provide any significant protection against anything except a very localized disaster. The hospital shown in this photograph has located a “disaster recovery” site less than two miles from the primary datacenter. Both datacenters even trunk into the same municipal power station. Although there is no universally agreed upon minimum distance, two miles is too close to protect the organization from most catastrophic events. Twenty miles is a more acceptable distance.

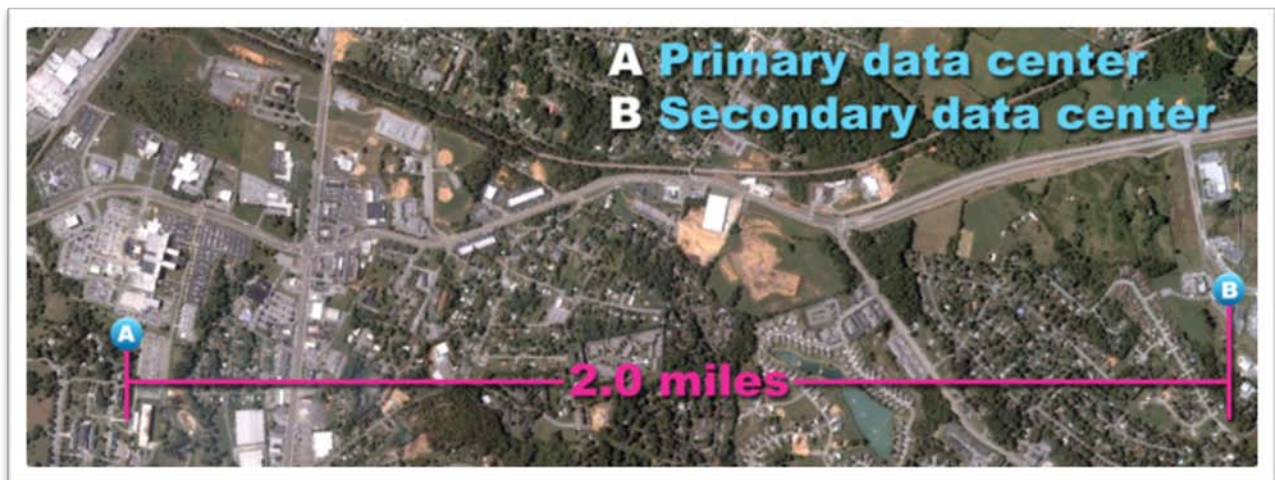


Figure 7: Primary and secondary datacenters are too close

ONEPARTNER & THE 10

How does OnePartner's ATAC (Advanced Technology & Applications Center) datacenter stack up against the 10 criteria?

- 1** **BELOW SEA LEVEL OR IN A FLOODPLAIN**
OnePartner's ATAC datacenter is located beyond the 500 year flood plain.
- 2** **IN A LOCATION THAT SUFFERS FROM FREQUENT NATURAL DISASTERS**
OnePartner's ATAC datacenter is located in a geologically stable area with no historic record of natural disaster. Scott County, Virginia, home of OnePartner's ATAC datacenter has never experienced even a F1 tornado.
- 3** **NEAR THE MANUFACTURE, STORAGE OR TRANSPORT OF HAZARDOUS CHEMICALS**
OnePartner's ATAC datacenter is over a mile from the nearest railway and away from manufacture or storage of chemicals.
- 4** **IN THE BASEMENT**
OnePartner's ATAC datacenter is above ground level.
- 5** **IN A BUILDING THAT USED TO BE SOMETHING ELSE**
OnePartner's ATAC datacenter was designed and built, from the ground up, to achieve the Tier III certification.
- 6** **LARGE METROPOLITAN AREA**
Duffield, Virginia population 62.
- 7** **IN A BUILDING WITH ANY OTHER BUSINESS**
Only datacenter employees and customers work in OnePartner's ATAC datacenter.
- 8** **IN THE FLIGHT PATH OF A MAJOR AIRPORT**
In the three years since OnePartner's datacenter construction employees have yet to even spot a single small private plane in the skies above.
- 9** **IN A LOCATION THAT HAS EXPENSIVE OR LIMITED TELECOMMUNICATIONS**
OnePartner's ATAC datacenter sits at the center of a \$60M fiber network.
- 10** **TOO CLOSE TO YOUR OTHER ONE**
You're definitely not too close to Duffield, Virginia.

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