

THE BEST IT PROTECTION STRATEGIES AGAINST WORLDWIDE DISASTERS

EIGHT STEPS YOU CAN TAKE TO BUILD YOUR DR PLAN TODAY.

INTRODUCTION

With the movement towards DR programs and standards being set by a centralized team, and a reduction in IT resources in remote offices, IT professionals are more and more likely to be asked to manage services at remote offices. This trend is even extending to managing foreign locations as technology advances makes it less necessary for IT staff to be physically located in the data center at every corporate site. While many threats to corporate data have no bearing on geography, such as human error and hardware failures, there are several IT challenges that truly are unique to each region of the globe. A different combination of data and application protection strategies may be required for each foreign site depending on local threats to data and application uptime.



This paper will outline data and application threats that affect IT resources worldwide as well as those that are prevalent in nine geographic zones. We will also describe specific strategies you can deploy to protect corporate data and enhance your application uptime.

WORLDWIDE THREATS AGAINST IT SERVICES

Threats against data and applications come from many different sources. Internal threats are, by far more common than those from external sources and include employee issues and poor-quality software accounting for almost half of all downtime. Add server room issues and almost two thirds of application downtime emanates from inside the organization. These affect all organizations regardless of geographic location.

INTERNAL THREATS

Employees Issues

Employees are the number one cause of application downtime. Failing to configure systems correctly, poor training, and not recording changes to system settings can all cause of system downtime.

Included in this category are malicious employees that purposefully delete files or disable systems as revenge for a perceived offense. **The ability to roll back systems and data to versions that operated correctly before they were affected is the only real defense against this**, the greatest threat to your IT operations.

Bad Software

The number two cause of downtime is bad software.

Software updates that introduce more issues than they fix, and upgrades that break links to integrated systems, introduce hangs, and uncontrolled restarts can bring production applications to a halt. While software releases are generally marketed as being production ready, you never really know how they will perform until they are installed in your unique environment.

A backup and recovery solution that offers Copy Data Management will allow you to easily bring up a test / dev environment from your backups to try new software in an environment identical to, but isolated from your production infrastructure. **Testing should be mandated prior to any new software installations.**

Local Hardware Failure

Servers and storage arrays are prone to disk, mother board

and power supply failures. While manufacturers have implemented redundancy and rapid recovery strategies, **data center hardware failures still account for anywhere between five to 20% of application downtime** depending on how you classify them. Every data center should have local backup and recovery appliances to provide basic data protection and near instantaneous local application recoveries.

EXTERNAL THREATS

Ransomware

Enterprises in 150 countries reported they were infected with the WannaCry virus in 2017. Ransomware will encrypt your data files and extort bitcoin ransoms as high as 100's of thousands of dollars. Basic virus scanners will not protect against the newest variants as they are more likely to exploit gaps in Microsoft operating systems or come in via network interconnections.

Advanced ransomware protections should be deployed, including automated ransomware detection, data backup and fast rollbacks to pre-infected versions.

Power Outages

The loss of power can be very local (backhoe hitting a buried power line) to grid-wide events (hurricane). In addition some regions of the world suffer from system wide black and brown (reduced voltage) outs due to the lack of generation capacity. Fully redundant power generators are expensive but Uninterruptable Power Supplies (UPS) can provide enough power to save data to disks, gracefully shut down servers, and perform data backups to non-volatile media such as removable disks, tape or the cloud.

UNIQUE REGIONAL THREATS

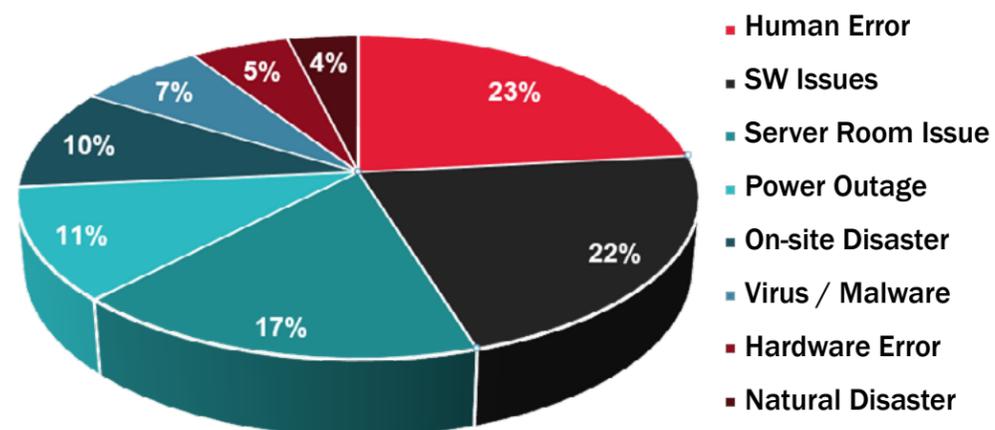
Threats that vary by geographic location come in two categories – nature and politics. Earthquakes, storms, and floods affect different regions of the world more directly and political instability will vary greatly depending on local situations.

Listed below are nine geographic zones and the dominant disasters that will affect local application uptime as well as recommended protection strategies. Click on a strategy for more detailed information.

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Threats Against IT Services*



In Napa, California, 23 commercial businesses were destroyed by wildfire in 2016.

NORTH AMERICA EAST COAST / GULF COAST



Hurricanes

Each year, on average, 10 tropical storms, of which six become hurricanes, develop over the Atlantic Ocean, Caribbean Sea, or Gulf of Mexico from June to November. Many of these remain over the ocean; however, about five hurricanes strike the United States coastline every three years. These have the power to totally destroy buildings, including any IT infrastructure inside. Hurricane zones are quite large and require widely dispersed secondary sites to ensure IT recovery infrastructure is not affected by the same storm.

Floods

Flooding can be caused by a wide variety of factors, including heavy rains, rising sea levels, storm surges, and dam and levee failures. Along the east coast of North America, the main reason for flooding is due to hurricanes and strong storms. In 2005, when Hurricane Katrina struck, the ensuing storm surge caused extreme flooding, especially in New Orleans. However storm surges and flooding have occurred as far north as New York and New Jersey from hurricane Sandy. Floods are becoming more frequent in the US and affect more locations as climate change increases.

NORTH AMERICA WEST COAST / MIDWEST



Tornadoes

Tornadoes are more commonly found in the Midwest and central states, but have also been known to occur in the east coast states. Between April 25th-28th, 2011, the largest tornado outbreak ever recorded struck the southern, Midwestern, and eastern United States. In the outbreak, there were 358 tornadoes in total across 21 states and even into Canada. While the damage from each storm can be limited to a

small geography, the number and frequency of tornadoes is increasing and more directly affecting IT infrastructure in their path.

Floods

In California, there is a long history of costly flooding. Starting on December 24th 1861, and lasting for 45 days, the largest flood in California's history, known as the Great Flood of 1862, caused chaos and loss. Floods will also occur near rivers and as a result of strong seasonal rainstorms. Some floods can be very isolated events but take place in locations with little previous history of damage such as occurred in Nashville in 2010.

Earthquakes

If you live on the west coast, you've probably heard the warnings the big one is coming. Minor earthquakes strike California regularly, with some causing considerable damage. But it is not just in California. Three of the largest earthquakes in Canadian history have occurred along the Queen Charlotte Fault. The fault is named for the Queen Charlotte Islands (now Haida Gwaii) and runs along Canada's west coast and into Alaska. Earthquakes ranging from 7.4 to 8.1 on the Richter scale are common with the second strongest recorded earthquake (magnitude of 9.2) in world history occurring in Alaska.

Wildfires

Wildfires are a continuing threat in US west coast. As development has spread into more mountainous areas the threat of sudden fire threatens those homes and businesses. Building codes and defensive zones are improving but the threat is expanding. From January 1 to December 22, 2017, there were 66,131 wildfires, compared to 65,575 wildfires in the same period in 2016, according to the National Interagency Fire Center. About 9.8 million acres were burned in the 2017 period, compared with 5.4 million in 2016. In Napa, California alone, 23 commercial businesses were destroyed over the course of the single fire event.

REGIONAL PROTECTION STRATEGIES*

DR Planning

Recovery Testing

Local Backup

Ransomware Detection

Remote Site Replication

SaaS App Protection

Cloud Archiving

Cloud DRaaS

* Index with details on Protection Strategies located in the last three pages of this whitepaper.

The Pacific Coasts are located along the proverbial “Ring of Fire”

CENTRAL AND SOUTH AMERICA



Earthquakes

Earthquakes are common on the Pacific coasts of Central and South America as this is the proverbial “Ring of Fire”. The Ring of Fire is a horseshoe shape pattern of volcanoes, ocean trenches and plate movements from New Zealand up to Japan, through to Alaska and down to South

America. There are 452 volcanoes located within the Ring of Fire, housing 75% of the entire world’s volcanoes. Approximately 90% of earthquakes around the world occur along the Ring of Fire as well. Three or more earthquakes over 4.0 on the Richter scale occur each day in Peru, Bolivia and Chile. The strongest recorded earthquake in history was a 9.5 in Chile in 1960.

Hurricanes

From 1992 to 2011, Central America was hit by nearly 70 hurricanes with an average of 8 events per year. Many times, it’s not the wind or storm surge that cause loss of life and negative impact on businesses, but rather rainfall flooding and the resulting mudslides. This is particularly the case with slow-moving storms or storms that move into regions with mountainous terrain, where rainfall is enhanced. Even a Category 1 hurricane can cause over \$1B in damage to homes and businesses.

Volcanos

Located along the Ring of Fire, the Central America isthmus contains many volcanoes, some are clearly dormant, while others are considered potentially active, and a few are currently active and have erupted in modern times. The vast majority of potentially damaging volcanoes stand in Costa Rica, El Salvador, Guatemala, and Nicaragua. The second most potentially dangerous volcano in

the world is Apoyeque in Nicaragua, which is next to its capital Managua, with a population of more than 2m. Apoyeque has the threat of an underwater eruption, which could cause a large lake tsunami, as well as the danger posed by the eruption itself. While lava flows will damage terrain and building only in the immediate area, ash plumes can spread for hundred of miles, shutting down airports and interrupting businesses no where’s near the site of the eruption.

Political Unrest

Executives in Latin America are concerned with political and economic risks. Business leaders in the region display a lack of confidence in the state, both in terms of the legal frameworks in which business operate, levels of corruption, and the economic and social management of several countries. Flexibility and the option to replicate corporate information quickly out of the country should be part of every disaster plan.

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cause
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EUROPE



Earthquakes

From 1998 to 2009, earthquakes were the natural disaster with the greatest impact in Europe, with almost 19,000 fatalities and losses of approximately \$29 billion Euros. One of the worst earthquakes to ever occur in European history

happened in Spain in 1954. The earthquake measured at 7.8 on the Richter scale, and was followed by a strong tsunami. In Europe, the countries that see earthquakes most commonly are Greece, Italy, and Turkey.

Floods

Flooding has a long history throughout Europe. In late May and early June of 2017, central Europe was hit with one of the worst floods in over 500 years. The Danube, Rhine and Elbe rivers reached extremely high levels, and paired with heavy rain, caused \$16 billion in damages across Germany, Austria, Czech Republic and Switzerland, including losses of 20 to 25 lives. In 2002, week-long floods ravaged parts of Central Europe. Areas affected included Germany, Austria, Slovakia, Czech Republic, Romania, Hungary, Poland, and Croatia, with approximately 90 fatalities.

Volcanoes

There are over 60 active volcanoes throughout Europe, and two of the most active volcanoes in the world are found in Italy Mount Etna and Mount Vesuvius. In the past 200 years, Vesuvius has erupted four times, all of which were quite

explosive. Mount Etna stands as the highest European volcano, and is continuously active, releasing smoke, ash and magma. It recently erupted on October 26th, 2013. Besides Italy, there are active volcanoes in Germany, Iceland, Turkey, Greece, and Spain.

Heat Waves

While not generally thought of as a direct threat to businesses, the effect of heat waves is to cause widespread power failures or brownouts. Thermal power plants (coal and nuclear) had to ramp down production in numerous countries due to a lack of cooling water, but the heat also affected solar power production. Solar power arrays efficiency drops .5% per degree Celsius of the panel, not the air around it. In France in July 2015, a heat wave led to power outages at the beginning of July when transformer stations failed and businesses were ordered to reduce power consumption.

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SOUTH AND SOUTHEAST ASIA



Typhoons / Cyclones

A typhoon differs from a cyclone or hurricane only on the basis of location. A hurricane is a storm that occurs in the Atlantic Ocean and northeastern Pacific Ocean, a typhoon occurs in the northwestern Pacific Ocean, and a cyclone occurs in the south Pacific or Indian Ocean. Over the past 40 years, typhoons that strike East and Southeast Asia have become stronger — and presumably will only continue gathering strength, due to climate change. The likely cause is warming ocean waters near the coasts. The number of category 4 and 5 typhoons — those with wind speeds between 130 mph and 157 mph or higher, increased to around seven per year from less than five in late 1970s.

Flooding

Floods are primarily caused by Monsoons and typhoons, particularly in India, Bangladesh, Vietnam, and Thailand, but can occur with just unusually heavy rains due to the prevalence of low lying areas. Most major rivers in south China and South East Asia have a long history of flooding during spring rains.

NORTH AND EAST ASIA



Earthquakes

A huge triangle-shaped tectonic region in eastern Asia plays host to numerous major earthquakes. The three boundaries of this region are roughly the Himalayan arc to the Thai border, from Thailand up to Mongolia and from Mongolia back to the Himalayan region. This area includes some of the most densely populated areas of the world. Earthquakes also emanate from the “ring of Fire” along the coasts of Taiwan, China,

Philippines, and up into Japan.

Typhoons

The Philippines receive the brunt of the landfalls, with China and Japan being impacted slightly less. Some of the deadliest typhoons in history have struck China. Southern China has the longest record of typhoon impacts for the region, with a thousand-year sample within their archives. Taiwan has received the wettest known typhoon on record for the northwest Pacific tropical cyclone basins.

AUSTRALIA / NEW ZEALAND



Historically, bushfires, floods, and cyclones have caused loss of life and significant damage to property and infrastructure. Since bushfires occur away from cities and data centers we will focus on the others. While

there are minor earthquakes, most are under 4.0 on the Richter scale and there has never been one over 7.0.

Cyclones

Cyclones regularly hit Australia. The largest cyclone to ever hit Australia was Cyclone Tracy which wreaked havoc across Darwin on Christmas Eve 1974. By the next morning most of the town’s inhabitants were completely homeless and Darwin was cut off from the world without any means of communication.

Floods

The Queensland floods of 2010-2011 left three quarters of the state declared as a disaster zone and resulted in the forced evacuation of thousands of people. Communities and towns were left damaged when the Fitzroy and Burnett Rivers flooded as did the Condamine, Ballone and Mary Rivers. The Lockyer Valley was also hard hit and devastated communities. Eventually the overflow of water impacted Brisbane River, which lead to 70 towns being flooded, killing 35 people.

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AFRICA



Political Unrest

The vast majority of armed conflicts in West Africa since independence have been internal, marked by 5 large-scale civil wars in the last 30 years. In the new millennium, the incidence of civil wars and large-scale conflicts dropped off dramatically, representing a watershed in the political

stabilization of the region. However, other forms of political violence and new threats have emerged such as election related violence, longstanding ethno-national conflict, drug trafficking, maritime piracy, and religious extremism.

Other Natural Disasters

Africa's natural hazards are mainly epidemics, endemic diseases, drought, floods, agricultural pests and bush fires, but some areas are also susceptible to earthquakes, cyclones and volcanic eruptions. Floods - In 2017 the rains have created flood disasters which have led to a death toll numbering in hundreds. Many of the recent flood disasters in Africa have been exacerbated by years of poorly planned drainage systems.

Earthquakes

The reason Africa gets fewer and less severe earthquakes is because of their tectonic plates borders are in the middle of the ocean. However they do get some, mostly in the north in countries like Morocco, Yemen and the Gulf of Aden.

Volcanoes

Africa, somewhat surprisingly, consistently ranks in the top five volcanic regions in numbers of people living in proximity to volcanoes within distances of 5-100 km. This largely reflects the high number of broad volcanic fields and calderas in proximity to cities such as Adis Abeba, Nairobi, and Goma in the East African

Rift and along the Cameroon Line of SW Africa. This means while there are fewer eruptions than other parts of the world, when there is one the damage can be catastrophic.

MIDDLE EAST



Earthquakes

Earthquakes are by far the largest natural disaster in the Middle East. Over the last 50 years there have been six earthquakes of at least 6.0 on the Richter scale that have killed hundreds of people each. These include Cairo in 1992, Yemen in

1982, two in Turkey in 1999 and 2011, and two in Iran in 1990 and 2003.

Political Unrest

The Arab Spring created political uncertainty in many countries including Tunisia, Libya, Egypt, and Algeria. Add this list to already existing unstable political situations in Lebanon, Syria, Yemen, and Iraq and you have a region where the business climate can change very rapidly. Even NATO member Turkey is going through rapid political change that could affect business operations.

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Recovery sites should not be subject to the same risks. They should be in separate electrical grids, flood plains and have different fire risks.

PROTECTION STRATEGIES INDEX

Remote management capabilities have advanced greatly over the last decade. New, intuitive software can support central management of 1000's of widely distributed appliances with a collective data volume measured in Exabytes. A host of advanced features simplify remote management. These include Distributed Enterprise Manager – allows management of an entire enterprise backup architecture from a single console, Self-Service for Application Owners – allows local admins to control their own backups and recoveries, and Copy Data Management - enables backup data to be used for testing, development, and compliance while the production environment continues uninterrupted. Backup appliances integrate monitoring, recovery, and security tools to simplify workflows for local associates, while giving IT staff at headquarters enterprise-level functionality.

Given this new level of capabilities here are the tools enterprises should use to protect their global IT assets:

DR Planning

Planning in advance what protection strategies to deploy will keep you from making expensive mistakes. In advance of the writing a DR plan do a risk and business impact analysis to help determine where to focus resources for a recovery process. **A disaster recovery strategy should determine which applications are most important to running the organization.** Once disaster recovery strategies have been developed and approved, they can be translated into DR investment and action plans.

Local Backup and Recovery

Today's backup and recovery appliances are themselves full computing platforms, equipped with CPUs, a large amount of storage, backup software and remote management capabilities. These appliances are the first line of recovery. If a single server or data center rack goes off-line the appliance can run the failed applications with the most recent copy of backed up data. **A purpose-built, all-in-one appliance is easy**

to install, upgrade, and manage. Today's leading appliances are able to protect all computing platforms, including virtual systems, physical Windows and Linux systems, and legacy operating systems. A modern, intuitive user experience is a priority it should always be possible to operate your backup system without referring to a manual so substitutes or managers can stand in when primary admins are unavailable.

Remote Site Replication

Replicating data via WAN to a remote location is a very effective way to ensure data protection and application recovery. Copies of data, operating systems, data bases and application settings need to be made regularly so data loss from downtime is kept to a minimum. Recovery appliances can host replicated applications. According to a study by Forrester and Disaster Recovery Journal **the average distance between remote backup sites is approximately 354 miles, with a median of 74 miles.** While there is no absolute right answer for how far apart recovery sites should be, the rule of thumb is that

they should not be subject to the same risks - be in separate electrical grids, flood plains and have different fire risks.

Recovery Testing

During a disaster is not the time to discover that you cannot recover your applications. Software is available to run comprehensive testing. Run a disaster recovery test regularly and automatically to see how an outage would impact business continuity and how much data your business might lose. **If the automated DR tests show that you can't meet your recovery goals, make adjustments in your backup process** and re-run the tests to check the changes for improvement.

Automate Ransomware Detection

Advanced backup and recovery appliances now include AI and machine learning to automatically detect ransomware activity. Machine learning uses change rate prediction, data entropy and randomness of data creation in backup files as measurements to detect infection by malware in near real-time. Small changes to expected behaviors can be

Today's backup and recovery appliances are full computing platforms, equipped with CPUs, a large amount of storage, backup software and remote management.

The cloud should be able to cost-effectively store and protect enterprise data for as long as you need it protected and supply white-glove recovery services.

detected early and AI-based remediation can automatically initiate actions to help businesses recover with less impact.

Software-as-a-Service (SaaS) Application Protection

A virtual software appliance deployed in a hyperscale cloud can protect any SaaS application just as effectively as a hardware-based backup appliance protects on-premises workloads. Regular backups in the cloud are scheduled and replicated to another portion of the cloud or, for optimal protection, to a different cloud provider. This integrated solution provides redundancy to your cloud workloads and delivers data retention and recovery capabilities from cloud outages and their disasters.

Cloud Disaster Recovery-as-a-Service (DRaaS)

DRaaS has greatly evolved from its first iterations. World-class DRaaS providers now offer “White Glove” services that free enterprise IT from having to learn, manage and deploy recoveries.

DRaaS White Glove providers will do complete DR planning, including setting up the server reboot order so business-critical applications are the first to recover. Recovery is initiated by a simple phone call with the service provider doing all the work. And the best part is that DRaaS White Glove providers offer both 1-hour and 24-hour Service Level Agreements (SLAs) for application recovery with financial recourse for any delays. This high-touch version of DRaaS can be managed and deployed from any location and protect remote sites around the world..

Cloud Archiving

Keeping historical data on-site and co-located with the primary data takes up valuable space and resources, and invites catastrophic data loss in the event of a single disaster. You need to get your backups offsite to a location specifically designed for cost-effective, secure retention that meets both legal and compliance requirements. Your DRaaS cloud should be able to do double duty. The cloud should be able to cost effectively store and protect enterprise data for as long as you need it protected, 1 year, 3 years, 7, or forever.

CONCLUSION

Follow this guide and identify the disaster events most likely to impact your distributed locations. A mix of these protective technologies will provide the required level of redundancy so that fast recoveries can be made. The cloud is the highest level of protection and can protect your data and applications from all of the disasters above as backups can be moved to a far removed geography. There the data can be preserved, recovery applications deployed and archives maintained with long-term storage.

The good news is that all these tools can be managed from a remote location, even one in another continent. When speaking to a potential vendor request both a demo and a proof of concept to ensure a single user interface can be used to effectively manage all your solutions.

Once deployed, test regularly as an earthquake or flood is no time to find out if your protections will work as planned.

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