



White Paper

# The Evolution of IT Resilience & Assurance



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# Executive Summary

Protection of business data and applications has evolved dramatically over the past several decades mostly driven by businesses' increased dependence on technology. Traditional forms of backup may be sufficient when you need to recover a single file or one machine, but today's businesses need more. Even disaster recovery solutions are developed on the premise that the disaster has occurred and now you need to recover. Today, you need systems that can help provide early warning of malicious activity, automatically mitigate the damage and then recover your business operations within a guaranteed timeframe and with performance assurance backed by a Service Level Agreement (SLA). Disruptions come from many causes including: mistakes, malicious activity or mother nature, your IT system needs built-in resilience to withstand all of these potential disruptions. Historically only the largest companies with massive IT budgets could afford business continuity and even then, the cumbersome and manual processes meant an RTO of hours or even days. There was no easy and affordable way for mid-sized business to recover quickly. Today's solutions must be available to businesses of all sizes and all industries which means they must be affordable, automated and easy to configure. This white paper will explain the evolution of data protection and why the move to IT Resilience & Assurance (ITRA) is necessary and ready for prime time.

## The Evolution of Data Protection

Initially, simple data backup was the most protection companies could hope for, but now full business continuity is achievable for even small to medium sized businesses because of advances in technology and some innovative solutions available in the market. Historically, backup was a time consuming and very costly exercise that involved significant downtime and recovery was a crap shoot. Recovery times (RTO) were measured in hours at best and often in days in more catastrophic situations. At the same time the recovery point (RPO) resulted in loss of an entire day's worth of data.

As technology evolved, businesses were able to process more and more transactions each day making the impact of long RPO and RTO more painful. This put pressure on the data protection industry to innovate and deliver solutions that better address the RPO/RTO needs of modern business. Data protection innovations included snapshots, bare metal restore to dissimilar hardware, disaster recovery and image backup where you could recover an entire system with a single restore



## Introducing The Backup Appliance

Vendors began offering appliance-based solutions to store backup information locally in a purpose-built device designed for protection of the client data. Soon after the concept of the appliance was introduced, it became desirable to be able to boot a system image off the appliance as part of a rapid recovery capability but was limited to what could be run on the single appliance. Some vendors also supported the ability to have two appliances with data replicated between the two locations so you could have one appliance on site and another at a secure offsite location. This allowed you to boot off the second appliance if something happened that rendered the primary location inaccessible.

Next virtualization was designed into the solution. Virtualization allowed multiple systems to be spun up and run on a single appliance, thus providing better continuity in the event of multi system failure. By leveraging driver injection, backup system images were stored in the format for the target virtual machine with the appropriate drivers installed making the failover process fast, seamless and with minimum human involvement. The failed resources would be back up and running on an appliance and the business could continue operation.



Boot it in a dissimilar environment with different hardware and driver requirements

## The Introduction of Virtual Servers for Disaster Recovery

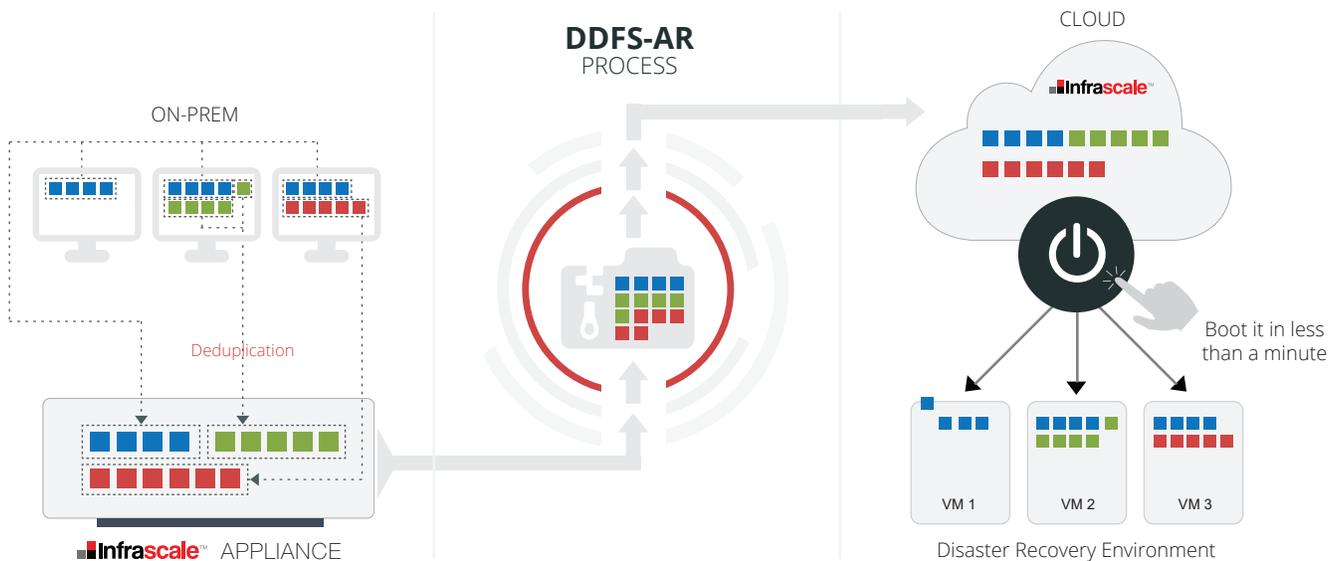
Virtualization provided a transformative shift in the evolution of data protection because you no longer had to configure new hardware and restore data from disk or tape backups instead you could recover by booting a virtual server or servers on a single appliance. This, in turn, allowed a business to recover from multiple resource failures quickly. Recovery is dependable because the image backups were created in a native format for the virtual environment and they are ready to boot with no configuration required.

## The Emergence Of IT Resilience

Infrascale introduced the idea of putting virtual appliances in their datacenters. This eliminated the need for a local appliance and allowed customers' IT operations evolve from simple continuity to resilience. Customers would simply replicate their backups to the virtual appliance. Now with the virtual appliance in a remote datacenter along with system images in virtual machine ready format, customers could run any or all their systems from the remote datacenter, thus surviving the loss of an entire office. This is the birth of IT Resilience.

## Make it Faster

One remaining challenge was speed. Because the data is not being moved over the internet to a remote datacenter, it was not feasible to move full images every day. To address this challenge, Infrascales DeDuplicated File System (DDFS) makes it possible to only move blocks that contain unique data to the remote datacenter. The DDFS creates a map of the locations of each unique block and reconstructs the filesystem at boot time. In the event of a failure, Infrascale's DDFS clones the needed blocks in the correct location to recreate the original image ready to run in the target virtual machine. Because of the efficiency of the DDFS, the amount of data that is moved is minimized, so the process is fast and the machine boots in less than a minute.

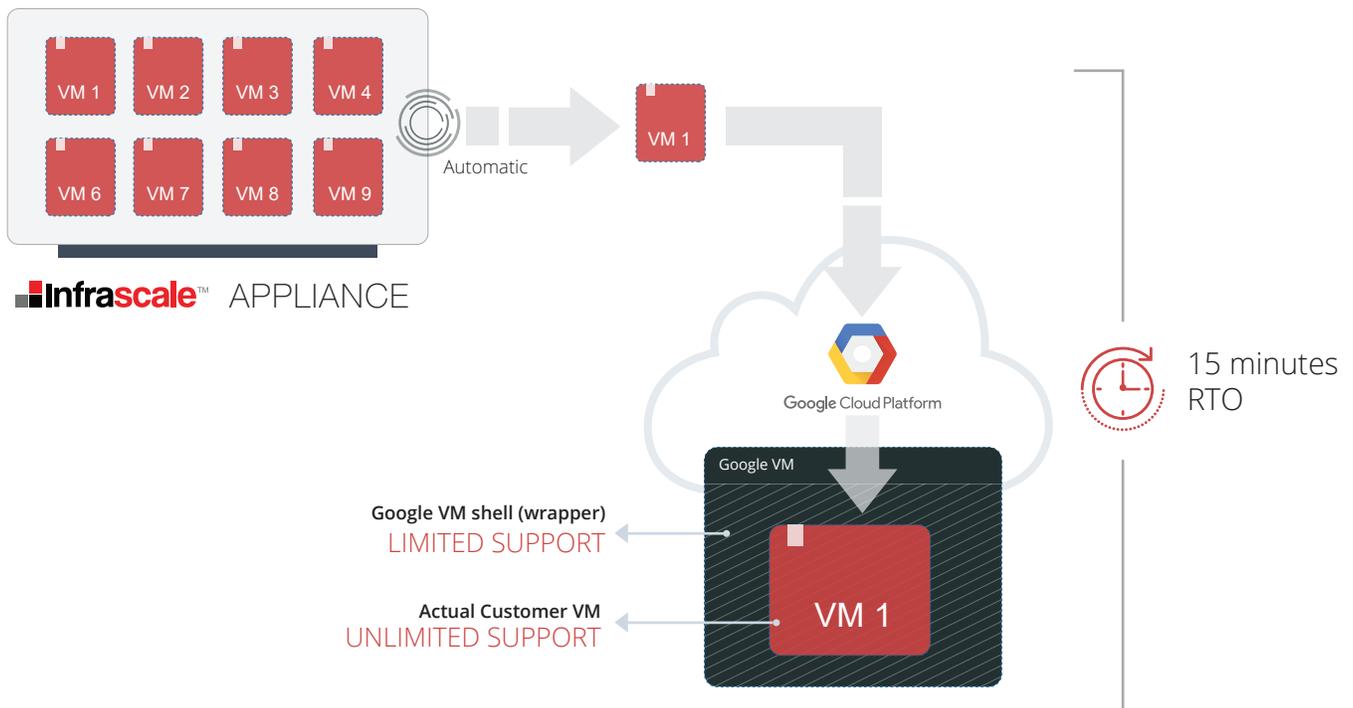


# The Impact of Orchestration and Nested Virtualization

The next problem that had to be addressed was to eliminate human error and allow the entire process to run unattended and with no human intervention. Orchestration and nested virtualization were needed to make this a reality.

Orchestration is a technology that manages the boot process of restoring the data, booting each of the systems in their virtual machines and managing the process so that all the systems come up and talk to each other as intended. To meet the needs of small and medium business the orchestration needs to be easy to use, yet powerful enough to manage the complexities of today's environments. To meet this requirement, Infrascale developed a fully drag and drop orchestration engine that allows the user to select the resource and its location in the restart sequence all from a graphical user interface and with no previous experience in orchestration.

To make everything completely automated the orchestration system, that is running within its own virtual machine, needs to be able to spin up additional virtual machines for each of the resources needed to recover the environment. Because the controlling hypervisors are designed to provide absolute isolation between each virtual machine, this is not possible unless virtual machines can actually run sub virtual machines. This concept is referred to as nested virtualization. When combined with orchestration, nested virtualization can restore an entire environment with all the operating systems, applications and data with little or no human involvement. Without nested virtualization, the process to instantiate all these systems in virtual machines is manual and ultimately impractical.



Infrascale worked with Google to leverage the functionality of the Google Cloud Platform (GCP) new nested virtualization capability. This meant the system was now capable of supporting secondary images running on GCP with one-minute boot times because of the support of nested virtualization and the fast copy capability of Infrascale's DDFS technology. Now for the first time all the capabilities came together in an affordable and highly scalable public cloud environment.

Infrascale and Google are partnering to develop additional ways to enhance ITRA to provide the most cutting edge solutions to their customers. One new idea is "Lift and Shift" which means migrating workloads into the Google Cloud. Rather than just using the Google Cloud as a disaster recovery platform, you could push systems directly into the Google cloud. Because of its performance, you could potentially run servers from the Google Cloud permanently. Imagine being able to right click a job and say, "Move to GCP" and the system would do everything necessary to create a VM in GCP, upload the disk images and make it run there. This means that you would have a built-in migration tool as well.

## Assurance

Data protection evolved into business continuity. IT Resilience Assurance (ITRA) is the next evolution. ITRA is designed to maintain the required service levels at all times. This means that the vendors offering solutions in this space are only as good as their willingness to provide a guarantee for their solution. Infrascale's ITRA solution provides a 15-minute recovery guarantee and a simple one-click recovery capability. It is imperative that you find a vendor able and willing to stand behind their solution in the form of a clear, measurable guarantee.

## Conclusion

Sometimes when you take a look at where you are, it is important to understand how you got there. IT Resilience is the result of combining many technologies that have been shaping data protection and business continuity for decades. The concept of bare metal restore, combined with orchestration and nested virtualization is a fundamental game changer. Image backup provides the foundational technology to create the system copy. The Google cloud allows you to take that image and move it to an easy and flexible place for the virtualized servers and data. Google's support of nested virtualization allows Infrascale to automate the entire process and dramatically reduce the time to resume normal operation. Infrascale's 15 minute recovery guarantee solidifies the "A" in ITRA. For more information on how Infrascale can help you establish IT Resilience for your business please contact us.