



Acronis

# Simplifying Server **Workload Migrations**

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This document describes the migration challenges that organizations face and how the Acronis AnyData Engine supports physical-to-physical (P2P), physical-to-virtual (P2V), virtual to physical (V2P), and cross-virtual (V2V) migration scenarios to address these challenges.

**USECASE**

September 2014

# Introduction

Most large enterprises and small to medium-size businesses (SMBs) have physical servers, virtual machines, or a combination of both supporting production operations.

These organizations also have a variety of production workloads such as Microsoft® Exchange for email, SharePoint® for collaboration and content management, and various vendor-supplied or internally developed line-of-business applications running SQL database servers.

Workloads such as these are your organization's lifeline and many times, you need to migrate these workloads to different hardware or virtual machines (VMs).

The reasons for migration are varied. You need to perform maintenance on or upgrade your servers, optimize your system resources, move your physical machines to a virtual environment, replicate servers, or modify your IT infrastructure because of a merger, acquisition, or explosive company growth.

When disaster strikes and your data center is no longer available, you need to migrate your data to a disaster recovery site. Since the disaster recovery (DR) site is not a production site and sits idle most of the time, it is too expensive for most organizations to invest in an exact production site replica. In this case, you need to migrate to different hardware or virtual machines (VMs).

This whitepaper describes the challenges you face when migrating your production systems to dissimilar hardware or another hypervisor platform and how the Acronis AnyData Engine can address these migration problems. The use case then steps you through a 3-stage process to demonstrate how Acronis captures your production system data and safely, reliably, and easily migrates it to any hardware or virtual machine(s) of choice.

Whether you occasionally migrate a system, or are developing a DR plan that requires you to migrate your workloads to a different site, this use case validates Acronis as the best solution to choose to support your system migration.

# The Challenges of Data Migration

Production workloads consist of data, applications, user settings, access rights, user preferences, browsing histories, the operating system, and more. Each workload is linked to the specific hardware or virtual machine where it is stored. There is no clear separation between the production workload and the operating system platform; the operating system is part of the production workload and contains the settings and drivers designed for that specific server.

There are several complications when you migrate to dissimilar hardware or a different virtual environment. First, migrating an entire environment – operating system, registry, settings, applications, and data – will cause the operating system to malfunction because of the link between the production workload and the original server, e.g., the RAID controller drivers or CPU HAL settings.

If you have a virtual environment and need to migrate to a physical machine, no hypervisor vendor offers virtual-to-physical (V2P) tools and few IT professionals know how to do this.

In cases where you need to migrate a virtual environment to a different virtual environment (V2V), hypervisor vendors do not provide these tools.

While you can choose to use the inexpensive and free hypervisors on the market, these products tend to be unreliable and unpredictable.

To make matters even more complicated, few organizations have a 100 percent virtualized environment, which means IT needs to support both V2V and P2V migration. To overcome these challenges in a DR scenario, some organizations spend their money to purchase expensive hypervisors to replicate the production site.

For other types of migrations, organizations end up locking themselves into a specific vendor solution such as VMware® Site Recovery Manager.

However, Acronis offers a solution that lets you avoid making a heavy investment in a DR site or locking yourself into a specific vendor.

This solution is one universal method that lets you safely and easily migrate your server workloads and production systems - whether they are physical or virtual - to other physical or virtual platforms (P2P, P2V, V2P, and V2V).



of companies surveyed are running 2 or more hypervisors\*



of companies surveyed are running at least one hypervisor other than Hyper-V and vSphere.\*

\*Source: ["Complexity and Data Growth Driving Small and Medium-Sized Environments Toward a New Generation of Data Protection"](#), IDC, June 2014. Sample: 401 SMB Businesses, <1000 employees



# Migrating Server Workloads with the Acronis AnyData Engine

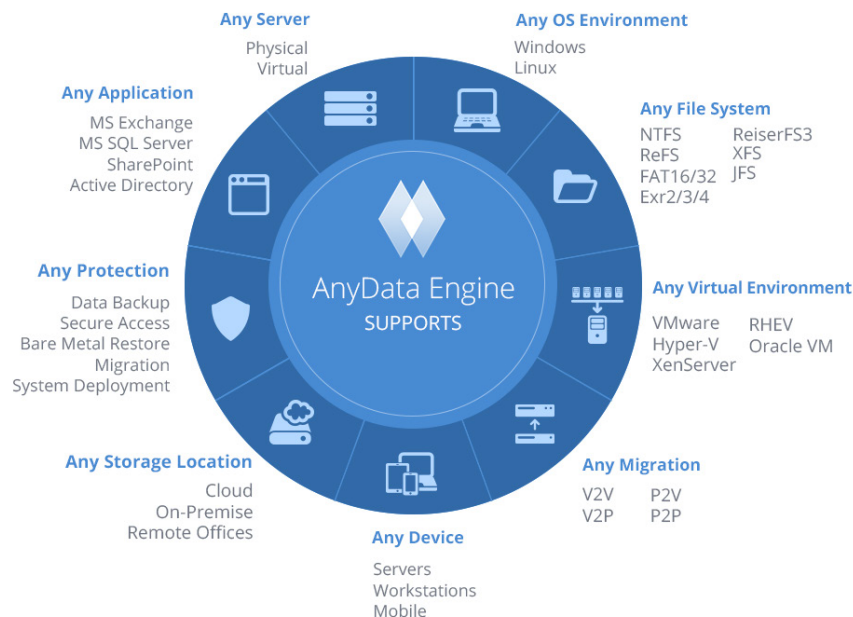
The Acronis AnyData Engine is the core suite of technology that powers all Acronis new generation data protection products to capture, store, recover, control, and access data in virtual, physical, cloud, and mobile environments. The Acronis AnyData Engine leverages a patented disk-imaging technology that lets you rapidly backup and maintain a complete image of a disk or volume in a unified backup format so that you can easily recover to any platform, regardless of the source system. Acronis disk-imaging technology:

- Safely and reliably captures every component of the production workload – the operating system, settings, registry, application, and data
- Works faster than traditional one-size-fits-all backup software because it accesses hard disk storage directly, bypassing operating and file system drivers when capturing the image
- Uses a snapshot technology, which makes the backup transparent to applications and users; the process runs live but does not affect the workload

- Executes a single pass backup for Microsoft SQL Server®, SharePoint®, and Active Directory®, providing ultra-fast performance

The Acronis AnyData Engine also includes Acronis Universal Restore technology, which lets you migrate your systems to different hardware, to and from virtual machines, and across different hypervisors.

You can also quickly migrate your entire server onto bare-metal. The combination of Acronis disk imaging and universal restore technology lets you easily migrate the production workload to dissimilar hardware or virtual environments, protecting and preserving every piece of data on any system.



# How the Acronis AnyData Engine Works

The migration of a workload using the Acronis AnyData Engine is a 3-stage process.

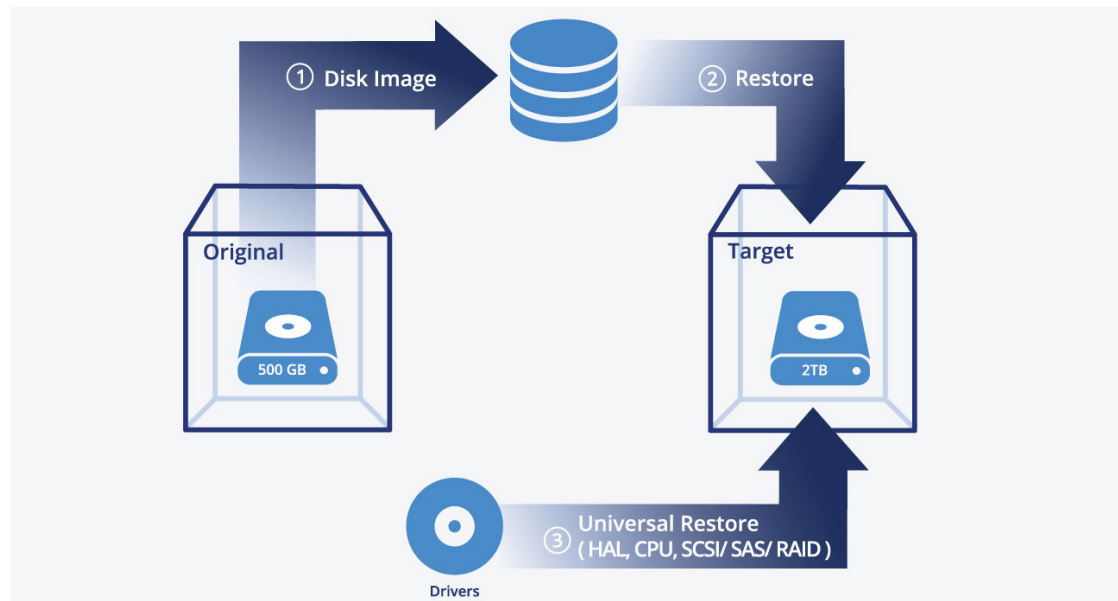
## Stage 1: The Acronis AnyData Engine Detaches the Server Workload from the Original Platform

The migration process starts with the Acronis AnyData Engine creating a disk image; that is, a full copy of everything that is on the disks and partitions of a particular server or virtual machine.

To preserve the consistency of data, the Acronis AnyData Engine takes a snapshot of the disk before creating the copy using Microsoft VSS, Linux LVM, or Acronis own drive snapshot technology, SnapAPI. The resulting disk image contains everything on the disk at the precise moment that the snapshot is taken. This creates a crash-consistent image.

The database saves all the transactions to the disk and freezes all activities. The snapshot is taken and the resulting disk image is application-consistent. During the copy process, the data is abstracted - a process of removing platform specifics from the data elements in order to reduce it to a set of essential characteristics and put it into a general, unified format.

The Acronis AnyData Engine also creates the copy at the sector level so the opening and locking of files by the operating system does not affect the process. The disk image now contains everything required to run a workload.



### Stage 2: The Acronis AnyData Engine Applies the Server Workload to the new hardware

The next step is to apply the disks' and partitions' content to the target physical server or virtual machine. When migrating to a physical server, you do not need to install an operating system on the new physical machine but simply load the image for bare metal recovery. Furthermore, the disk configuration of the target machine does not have to match the original machine because the Acronis AnyData Engine resizes the disks and partitions.

The disks only have to be large enough to hold all the data. For migration to virtual machines, the Acronis AnyData Engine connects directly to the managing hypervisor and creates a full virtual machine, including the CPU, RAM and disk configuration. The Acronis AnyData Engine can also create virtual machines as a set of files on any disk storage.

### Stage 3: The Acronis AnyData Engine tunes the Server Workload to match the new hardware

The Acronis AnyData Engine analyzes the new hardware platform or hypervisor and tunes the operating system settings to match the new requirements.

#### CPU:

- The Acronis AnyData Engine analyzes the change in CPU type (Intel or AMD), the number of CPUs (single-CPU or SMP), and then changes the settings of the operating system.

#### HAL (Hardware Abstract Layer):

- The Acronis AnyData Engine analyzes each machine type, the motherboard and chipsets, hypervisor configuration, and changes the HAL setting of the operating system.

#### Boot-critical hardware drivers:

- Acronis Universal Restore technology analyzes the target hardware and injects all the drivers that are required to boot the operating system. These include SATA, SAS, SCSI and RAID drivers, as well as SAN HBA adapters.
- Universal Restore disables all critical hardware drivers that are not present on the new machine in order to eliminate compatibility issues.
- You can load standard Microsoft Windows® drivers (INF/SYS files) from any CD or network location.
- For Linux, Universal Restore leverages the driver modules built into the kernel, even if they are not active.

#### Network drivers:

- The Acronis AnyData Engine injects and activates any required network drivers.
- On Windows systems, the Acronis AnyData Engine disables and removes the configuration of the old network adapters so you do not need to delete hidden, missing devices when configuring the network.

#### UEFI-BIOS conversion:

- Many modern servers use the UEFI method of booting the operating system, while virtual servers and older machines predominantly use BIOS. Acronis Universal Restore technology changes the partition layout, boot loader settings, and boot configuration, so you can restore the image of the original BIOS machine to the UEFI platform or vice versa. The conversion works for most operating systems, in any direction.
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# The Acronis AnyData Engine - Key Features to Support Workload Migration

- Easily and safely migrate a complete system to any physical or virtual machine and do not lock your organization into a single hardware or virtual platform.
  - Quickly migrate your entire server onto bare-metal hardware and minimize downtime.
  - Leverage free-of-charge WAN optimization with built-in, block-level, source data deduplication and compression. This lets you reduce backup data volumes by up to 90 percent, optimize backup speed, reduce storage requirements, and minimize network loads.
  - Protect your data from unauthorized access by encrypting data, in transit and in rest, using military grade AES-256 encryption.
  - Application-aware restore provides granular recovery of Microsoft Exchange Server, Microsoft SQL Server, SharePoint and Active Directory for rapid recovery of only the data you need.
  - Convert backups to one of seven VM formats – whether you need high-performance from production-level hypervisors or you want to save costs with free alternatives.
  - Backup physical RDMs, pass-through drives, fault tolerance, guest-level iSCSI, or Free VMware vSphere Hypervisor (free ESXi) with OS-level backup agents.
  - Protect the hypervisor hosts for easy, complete and safe protection of your entire virtual environment.
  - Migrate your data to the same or different hypervisor.
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- ### **Additional Features to Support V2V Migrations**
- Protect VMs on any hypervisor including VMware, Microsoft Hyper-V, Citrix XenServer, Red Hat Enterprise Virtualization, Linux KVM and Oracle VM Server.
  - Protect your virtual machines with agentless backup, running from the hypervisor level.

# Summary

Your IT environment is becoming heterogeneous and more complex with physical, virtual, and cloud computing and storage becoming the norm. Regardless of your IT challenges, your business must minimize costs while continuing to improve productivity.

You need to ensure business continuity, efficiency, and agility. You also need be flexible because the IT infrastructure is rapidly evolving; you do not want lock your organization into specific hardware platforms or hypervisors.

Fueled by over 100 patents, Acronis products are powered by the Acronis AnyData Engine, a set of unique, deep, and powerful new generation data protection technologies that capture, store, recover, control and access data in virtual, physical, cloud, and mobile environments.

With products developed for small to medium-size business environments, and solutions that solve complex data protection problems for the enterprise,

Acronis new generation data protection technology lets you seamlessly migrate your production workloads from any platform, to any platform, to easily support disaster recovery and system replication, improve IT productivity and data recovery time, and reduce management complexity.

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# Acronis Products and Solutions for Server Migration



## **Acronis Backup**

Created for specific business systems, Acronis Backup simplifies backup and disaster recovery of your critical data, protecting your entire system – even if you aren't an IT expert. Powered by the Acronis AnyData Engine, Acronis patented disk-imaging technology combines single-pass backups with an easy-to-use interface to capture everything in one single step – operating systems, applications, data, and more. You can then recover an entire system to any hardware or virtual machine – with all data intact – in minutes, or you can restore files, folders, and applications to any location in record time. Each product in the Acronis Backup family is an all-in-one complete solution tailored to manage your Windows Server / Windows Server Essentials® / Linux server, VMware, and individual PCs - reducing downtime, data loss, and IT management.

For more information on Acronis Backup, [click here](#).



## **Acronis Backup Advanced**

Powered by the Acronis AnyData Engine, Acronis Backup Advanced products deliver robust, yet easy-to-use unified data protection and disaster recovery for multi-system environments. Based on your business needs, deploy individual solutions or seamlessly integrate together into one efficient backup solution and manage using a single unified console.

The suite includes local and cloud backup and recovery for virtual and physical Windows / Linux environments; VMware, Microsoft, Citrix, Red Hat, Linux KVM, and Oracle hypervisors; and Microsoft Exchange, SQL Server, SharePoint and Active Directory.

In minutes, you can recover individual files, application data, or a complete system to any location - reducing downtime and ensuring maximum data protection.

With key features including bare metal restore and Acronis Active Restore, our customers have reduced their recovery time by an average of 50 percent.

Developed for multi-systems environments requiring a complete, efficient, and easy-to-use solution, Acronis new generation technology simplifies backup, disaster recovery, and secure access of your critical data, reducing data loss, IT management time and total cost of ownership.

For more information on Acronis Backup Advanced, [click here](#).

# Top 5 Reasons to Choose Acronis Backup for Disaster Recovery

1. Capture everything - Patented disk and VM image backup rapidly backs up and maintains a complete image of a disk or volume on a physical or virtual machine in one easy step.
2. Any- to-any migration - Acronis stores data in a unified backup format so that you can easily recover to any platform, regardless of the source system.
3. Flexible, reliable - P2P, P2V, V2V and V2P migrations reduce risk and IT workload.
4. Complete application migration - Acronis application-aware restore provides flexible recovery of Microsoft Exchange Server, Microsoft SQL Server, SharePoint, and Active Directory.
5. Business continuity – Safe recovery improves IT and user productivity and helps ensure business continuity.

## Useful Links

[Acronis Website](#)

[Acronis Backup for Windows Server Free Trial](#)

[Acronis Backup Advanced for Windows Server Free Trial](#)

[Acronis Snap Deploy Free Trial](#)

# ABOUT ACRONIS

Acronis sets the standard for new generation data protection through its backup, disaster recovery, and secure access solutions. Powered by the AnyData Engine and set apart by its image technology, Acronis delivers easy, complete and safe backups of all files, applications and OS across any environment—virtual, physical, cloud and mobile.

Founded in 2002, Acronis protects the data of over 5 million consumers and 300,000 businesses in over 130 countries. With its more than 100 patents, Acronis products were named best product of the year by Network Computing, TechTarget and IT Professional and cover a range of features, including migration, cloning and replication.

For additional information, please visit [www.acronis.com](http://www.acronis.com). Follow Acronis on Twitter: <http://twitter.com/acronis>.

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For additional information, please visit <http://www.acronis.com>

To purchase products, please visit <http://www.acronis.com/en-us/company/contacts.html#international> to find an Acronis office or authorized dealer.

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