

MySQL Databases: Protect Data Loss, Reduce Cost, Save Your Reputation

How much does data loss cost your business?

Continuous Data Protection for Linux and Windows

An R1Soft White Paper

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Introduction

Whether you run one or thousands of MySQL databases, they are at risk for corruption resulting in data loss, leading to possibly thousands of dollars in lost revenue. MySQL databases are susceptible because of their “always open” data files. In addition to MySQL’s data files being open, there are reasons MySQL databases can become corrupt, dropped, or deleted altogether. The four most common causes of data loss are shown below.

- Network, Application, or Hardware Failure
- User Error
- Natural Disaster
- Crime

Defining the Top Four Reasons That Cause Data Loss

Every server and organization is vulnerable to the four common causes of data loss. Without the proper solution, an organization may experience data loss at some point during the course of its existence.

1. Network, Application, or Hardware Failure

- Power failure resulting in data in volatile memory not being saved to permanent memory.
- A server can malfunction due to improper maintenance.
- Hardware failure including a hard disk crash or sudden power surge.
- Application interaction with databases using SQL statements to retrieve data from the MySQL database or inserting data into the MySQL database.
- Database drop due to hardware or network failure causing full or partial data loss.

2. User Error

- A system administrator, support technician, or helpdesk representative working with a MySQL database can use the wrong command or SQL statement and cause data corruption.
- Accidental or intentional deletion of a MySQL database while running maintenance.
- Database can become corrupt or data loss can occur during data migration when moving data from one MySQL database to another location.

3. Crime

- Hackers and data thieves using malicious viruses, worms, trojans and other methods to steal important data.

4. Natural Disasters

- Natural disasters include earthquakes, floods, tornados, hurricanes, and even fire.

The acts described above can cause serious loss in data and company revenues. Downtime or permanent data loss could possibly result in bankruptcy, law suits, and damaged reputation for a company.

Two Outcomes of Data Loss

There are two outcomes of severe data loss.

1. Data can be recovered with the help of a trained support technician at a high cost.
2. Data is permanently lost and requires data to be re-entered.

Both of these outcomes can cost an organization thousands, even millions in lost revenue. However, with the right solution in place, both outcomes can be easily avoidable and data can be recovered quickly.

The High Price of Data Loss

The cost of a data loss event is directly related to the value of the data, the length of time that the data is unavailable, and the amount of data that was lost. The ability to recover data depends on the cause of the data loss incident. The five most common costs associated with data loss include the following:

- Continuing without the data.
- Recreating the data.
- Notifying users in the event of a compromise.
- The value of the lost data if the data cannot be retrieved.
- Collateral costs such as damaged hardware.

The cost of data recovery can be expensive. Organizations have to consider all of the resources needed to recover data.

Cost of Data Recovery

The National Archives and Records Administration in Washington found some startling results after a data loss. Of companies that lost their data center for 10 days or more due

to a disaster, 93% filed for bankruptcy within one year of the disaster. Half of the businesses filed for bankruptcy immediately.¹

It is difficult to precisely measure the intrinsic value of data and the value of different types of data varies. Several sources suggest that the value of 100 megabytes of data is valued at approximately \$1 million. This sum translates to \$10,000 for each megabyte of lost data.² When data is lost, value-creating opportunities are lost. And in a networked environment these losses are multiplied. Consider the following estimated costs needed to recover MySQL database data.

Paying a Support Technician (In-House)

According to the Bureau of Labor Statistics, a support technician with sufficient experience earns an estimated \$31.37 an hour.³ Generally, the skills needed to recover a MySQL database require a Level III or IV support technician with system administration knowledge. Support technicians with system administration skills cost an average of \$11.43 per hour more than a Level I or II support technician.

Typically hosting companies use a combination of rsync and homegrown programs to backup database files. Using rsync and homegrown programs does not provide the level of protection and reliability needed for data recovery. These companies generally have in-house support technicians with limited system administration skills. Often times, rsync and homegrown programs are not ideal solutions for recovering data.

If a proper backup and recovery solution is in place, the time it takes a technician to perform the recovery manually can be fast. On the other hand, if the data is not readily available, it can take hours to find the data and perform the necessary recovery procedures adding up to hundreds, even thousands of dollars in labor.

Hiring an Outsourced Data Recovery Specialist

Finding and hiring an outsourced data recovery specialist can be time consuming and cost double or more per hour than an in-house employee. Outsourced data recovery specialist fees can range between \$300 and \$5800 per incident depending on the severity of data loss. In some cases, outsourced data recovery specialists charge \$149 or more per billable hour with a minimum two hour commitment.

¹ National Archives & Records Administration in Washington:
http://www.rbs2000.com/index.php?cat_id=103&nav_tree=179,10

² “Keep Those Data Protection and Recovery Options Open,” *Storage Management Solutions*, November 1997; and ONTRACK Data International, Inc., “[The Data Recovery Solution](#),” (1998).

³ [Bureau of Labor Statistics](#), [Employer Costs for Employee Compensation](#), and [Occupational Employment Statistics Survey](#)

Companies can hire remote data recovery specialists to perform data retrieval and recovery services, but could end up with an invoice of \$800 to \$1000 per server for a Windows or Linux operating system.

Summing Up the Cost of Data Recovery

Data loss and the high cost of data recovery services from in-house technicians or outsourced data recovery specialists can be avoided. Even if you have the resources in-house or the funds to hire an outsourced data recovery specialist, neither one of these options are an ideal solution. They do not provide the protection upfront and ease of restoring data with a solution specifically designed for data backup and recovery at the granular level.

Prevent Data Loss Before It Cost You Thousands

You can prevent data loss with the right solution. When you implement a solution designed exclusively for MySQL databases, your organization can backup data minutely, hourly, daily, weekly, or monthly depending on how often your data changes. MySQL databases are the lifeline of businesses.

According to Dynamic Markets Ltd, “Only 38 percent of businesses have any kind of business continuity plan in place to keep them operating in the event of disaster or disruption.”⁴

Traditional backup solutions are vulnerable to the “always open” status of data files and indexes. If SQL-based data files and indexes are not backed up properly, the process will ultimately fail, resulting in a complete loss of data. Businesses that depend on MySQL to store their important data now have the ability to implement a solution that works seamlessly with the complexities of MySQL technology.

The only near continuous data protection and backup solution on the market, developed by R1Soft, includes a CDP for MySQL Add-on, designed exclusively for MySQL databases.

What is CDP for MySQL?

The CDP for MySQL Add-On works in conjunction with R1Soft’s CDP Agent for Linux Servers and is the first high performance backup and restore product for MySQL. R1Soft is the only software company to offer True Granular Restore™ for MySQL.

⁴ Dynamic Markets Ltd.: http://www.rothstein.com/links/arch/rothstein_recommended32.html

True Granular Restore™ provides you with the ability to restore at the individual database and table level. Tables and databases can also be restored to alternate locations with the software. This feature offers maximum flexibility for MySQL database administrators and developers at an affordable price.

With the CDP for MySQL Add-on, you can do all of the following at the granular level:

- Backup a MySQL database and/or its associated tables.
- Restore a MySQL database and/or its associated tables.
- Restore a MySQL database and/or its associated tables to an alternate location or server.

A CDP for MySQL Restore Scenario

If you accidentally drop a database or individual tables from it, all of the related content on your web server will be lost. For example, some tables from a database have been unintentionally dropped and now you need to restore them to make your web server functional again.

MySQL databases can be backed up and restored separately. If you want to compare the data in a current database on your server to another version of the database that has already been backed up, you can restore the data to an alternate location. The database restore process will take more or less time depending on the size of your database. However, it will take significantly less time than it does to restore an entire server. When the database restore is complete, your site and/or database you restored will be operational again.

In some cases, you may only want to restore one table versus taking the time to restore an entire database. You have control over the number of tables you restore and when you want to restore them to a previous backup. You no longer have to waste resources when you have the power to restore your databases at the granular level. It makes sense economically to choose a solution that gives you the power and freedom to restore how and when you want.

If you do not use the CDP for MySQL Add-On, you will not receive consistent backups of your MySQL databases. Since your raw MySQL files can be restored as regular files or along with a complete system image, they are likely to become corrupt due to the way MySQL caches patches and changes in memory.

If you use the CDP for MySQL Add-On, you will always receive consistent and accurate copies of MySQL databases for MyISAM and InnoDB with zero transaction loss or interruption. Users can perform granular restores of individual databases or tables to original or alternate locations.

Note: CDP Agent releases warn users if they are backing up a volume that has MySQL databases and no MySQL instance configured on the CDP Server.

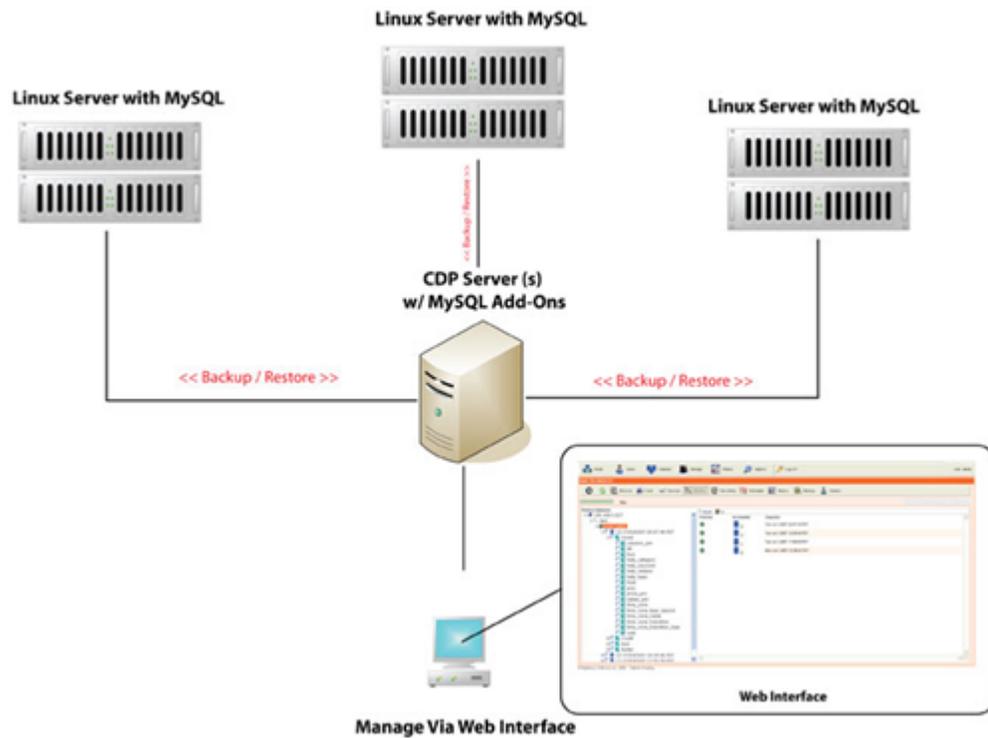
CDP For MySQL Key Features

CDP for MySQL has many features that make it unique to CDP software. Below is a list of features available in every copy of CDP for MySQL.

- The Only Near-Continuous Online Backups for MySQL Servers on the market.
- Database and Table Level Recovery with True Granular Restore™ for MySQL.
- The Only Online Backup System for InnoDB and MyISAM including InnoDB and MySQL 5.1.
- Consistent Point-in-Time Snapshots for MyISAM and InnoDB Storage Engines.
- Restore any combination of tables or databases to original or alternate locations.
- Manage backups for all of your MySQL Servers through an easy to use web interface.
- Store over 50 Recovery Points per Day.
- Bare-Metal Restore for MySQL Servers.
- Only changed disk sectors are read from the disk during a scheduled synchronization, or backup.
- Compression (up to 100:1 compression ratios).
- End-to-End Strong Encryption.
- Easy to install and configure.
- Full online searchable HTML Help documentation available.

CDP for MySQL Technical Overview

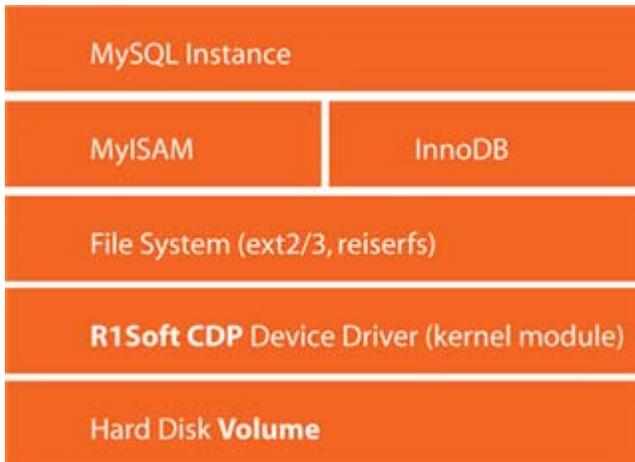
With an R1Soft Near-Continuous Data Protection Server running Windows or Linux, you can backup one or more MySQL Servers running Linux.



The R1Soft Near-CDP (Continuous Data Protection) process for Linux provides consistent point-in-time block level snapshots of running MySQL instances. Because of R1Soft's unique kernel level backup process both InnoDB and MyISAM are supported. During the backup process locks are held for less than a couple of milliseconds. This ensures continuous operation of your busy MySQL server, even for very large databases, throughout the entire backup process.

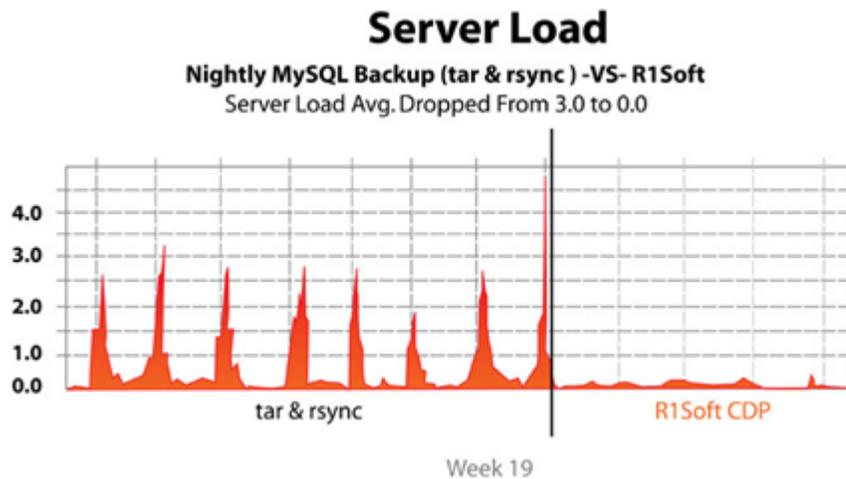
Online Backups for MyISAM and InnoDB

- Lock Tables.
- Snapshot Hard Disk Volumes using R1Soft CDP for Linux.
- Unlock Tables.
- Copy only changed disk sectors from point-in-time snapshot.



R1Soft’s unique Near-CDP process for Linux tracks changes at the block level of your storage volume. During synchronizations, or backups, only changed blocks are read from the disk. These disks are sent over the network to the CDP Server to be archived in a recovery point.

Very large volumes and databases can be backed up quickly after the initial seed backup. The image of the load graph below represents the dramatic results seen on a customer’s server after switching to R1Soft CDP for MySQL software backups.



Generate Additional Revenue

As a service provider, advertising to your customers that you use the most advanced backup solution on the market can help you generate additional revenue. Your company has more opportunity to attract customers who depend on MySQL databases to run their organization. When you advertise that you use CDP for MySQL to backup all MySQL databases at the minutely, hourly, daily, weekly, or monthly intervals, your customers find confidence in your company's ability to provide the top level service they need in order to stay in business.

Who is R1Soft?

Founded in 2006, Houston, Texas based R1Soft develops innovative disk based backup products for Linux and Windows servers. Continuous Data Protection (CDP) products deliver nearly continuous data protection, open file backups, bare-metal disaster recovery, and an easy to use web interface. Priced affordably for any sized hosting company, R1Soft makes it possible for every organization to implement and utilize the benefits of a solid backup and recovery system.

Why R1Soft?

R1Soft has become the leader in backup and recovery software solutions. CDP products have been deployed on thousands of servers across the world. Small, medium, and large organizations depend on R1Soft products to automate the demanding tasks of backing up large amounts of data minutely, hourly, daily, weekly, or monthly.

R1Soft recently received MySQL's Enterprise Certified Technology seal. R1Soft's MySQL product currently works with MyISAM and InnoDB storage engines and all MySQL Enterprise and Community releases, versions 4.1 and higher.

Evaluate the CDP for MySQL Add-On Free

All users with a CDP Server license can evaluate the CDP for MySQL Add-On free for 15 days. The Add-On can be easily enabled using the CDP Server interface. To get started, contact the R1Soft sales team for your full 15 day trail period license.

Contact R1Soft Today

To learn more about R1Soft, CDP for MySQL, and CDP products, visit <http://www.r1soft.com> or call 1-800-956-6198.