

RRDtool vs VictoriaMetrics

A detailed comparison

Compare RRDtool and VictoriaMetrics for time series and OLAP workloads

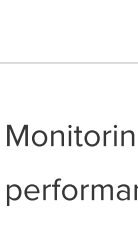
Updated September 13, 2023

[Learn About Time Series Databases](#)

Choosing the right database is a critical choice when building any software application. All databases have different strengths and weaknesses when it comes to performance, so deciding which database has the most benefits and the most minor downsides for your specific use case and data model is an important decision. Below you will find an overview of the key concepts, architecture, features, use cases, and pricing models of RRDtool and VictoriaMetrics so you can quickly see how they compare against each other.

The primary purpose of this article is to compare how RRDtool and VictoriaMetrics perform for workloads involving [time series data](#), not for all possible use cases. Time series data typically presents a unique challenge in terms of database performance. This is due to the high volume of data being written and the query patterns to access that data. This article doesn't intend to make the case for which database is better; it simply provides an overview of each database so you can make an informed decision.

RRDtool vs VictoriaMetrics Breakdown

		
Database Model	Time series database	Time series database
Architecture	RRDtool is a single-node, non-distributed database generally deployed on a single machine	VictoriaMetrics can be deployed as a single-node instance for small-scale applications or as a clustered setup for large-scale applications, offering horizontal scalability and replication.
License	GNU GPLv2	Apache 2.0
Use Cases	Monitoring, observability, Network performance tracking, System metrics, Log data storage	Monitoring, observability, IoT, real-time analytics, DevOps, application performance monitoring
Scalability	Limited scalability- more suitable for small to medium-sized datasets	Horizontally scalable, supports clustering and replication for high availability and performance

Looking for the most efficient way to get started?

[See Ways to Start](#)

RRDtool Overview

RRDtool, short for Round-Robin Database Tool, is an open-source, high-performance data logging and graphing system designed to handle time series data. Created by Tobias Oetiker in 1999, RRDtool is specifically built for storing and visualizing time-series data, such as network bandwidth, temperatures, or CPU load. Its primary feature is the efficient storage of data points, using a fixed-size database that automatically aggregates and archives older data points, ensuring that the database size remains constant over time.

VictoriaMetrics Overview

VictoriaMetrics is an open source time series database developed by the company VictoriaMetrics. The database aims to assist individuals and organizations in addressing their big data challenges by providing state-of-the-art monitoring and observability solutions. VictoriaMetrics is designed to be a fast, cost-effective, and scalable monitoring solution and time series database.

RRDtool for Time Series Data

RRDtool was created for time series data storage and visualization, making it a great fit for applications that require efficient handling of this type of data. Its round-robin database structure ensures constant storage space usage while providing automatic data aggregation and archiving. However, RRDtool may not be suitable for applications that require complex queries or relational data storage, as its focus is primarily on time series data.

VictoriaMetrics for Time Series Data

VictoriaMetrics is designed for time series data, making it a solid choice for applications that involve the storage and analysis of time-stamped data. It provides high-performance storage and retrieval capabilities, enabling efficient handling of large volumes of time series data.

RRDtool Key Concepts

- Round-robin database:** A fixed-size database that stores time-series data using a circular buffer, overwriting older data as new data is added.
- RRD file:** A single file that contains all the configuration and data for an RRDtool database.
- Consolidation function:** A function that aggregates multiple data points into a single data point, such as AVERAGE, MIN, MAX, or LAST.

VictoriaMetrics Key Concepts

- Time Series:** VictoriaMetrics stores data in the form of time series, which are sequences of data points indexed by time.
- Metric:** A metric represents a specific measurement or observation that is tracked over time.
- Tag:** Tags are key-value pairs associated with a time series and are used for filtering and grouping data.
- Field:** Fields contain the actual data values associated with a time series.
- Query Language:** VictoriaMetrics supports its own query language, which allows users to retrieve and analyze time series data based on specific criteria.

RRDtool Architecture

RRDtool is a specialized time series database that does not use SQL or a traditional relational data model. Instead, it employs a round-robin database structure, with data points stored in a fixed-size, circular buffer. RRDtool is a command-line tool that can be used to create and update RRD files, as well as generate graphs and reports from the stored data. It can be integrated with various scripting languages, such as Perl, Python, and Ruby, through available bindings.

VictoriaMetrics Architecture

VictoriaMetrics is available in two forms: Single-server-VictoriaMetrics and VictoriaMetrics Cluster. The Single-server-VictoriaMetrics is an all-in-one binary that is easy to use and maintain. It vertically scales well and can handle millions of metrics per second. On the other hand, VictoriaMetrics Cluster consists of components that allow for building horizontally scalable clusters, enabling high availability and scalability in demanding environments. The architecture of VictoriaMetrics enables users to choose the deployment option that best suits their needs and scale their database infrastructure as required.

Free Time-Series Database Guide

Get a comprehensive review of alternatives and critical requirements for selecting yours.

[Download now](#)

RRDtool Features

Efficient Data Storage

RRDtool's round-robin database structure ensures constant storage space usage, automatically aggregating and archiving older data points.

Graphing

RRDtool provides powerful graphing capabilities, allowing users to generate customizable graphs and reports from the stored time series data.

Cross-Platform Support

RRDtool is available on various platforms, including Linux, Unix, macOS, and Windows.

VictoriaMetrics Features

High performance

VictoriaMetrics is optimized for high-performance storage and retrieval of time series data. It can efficiently handle millions of metrics per second and offers fast query execution for real-time analysis.

Scalability

The architecture of VictoriaMetrics allows for both vertical and horizontal scalability, enabling users to scale their monitoring and time series database infrastructure as their data volume and demand grow.

Cost-effectiveness

VictoriaMetrics provides a cost-effective solution for managing time series data. Its efficient storage and query capabilities contribute to minimizing operational costs while maintaining high performance.

RRDtool Use Cases

Network Monitoring

RRDtool is often used in network monitoring applications to store and visualize metrics such as bandwidth usage, latency, and packet loss.

Environmental Monitoring

RRDtool can be used to track and visualize environmental data, such as temperature, humidity, and air pressure, over time.

System Performance Monitoring

RRDtool is suitable for storing and displaying system performance metrics, like CPU usage, memory consumption, and disk I/O, for server and infrastructure monitoring.

VictoriaMetrics Use Cases

Monitoring and Observability

VictoriaMetrics is widely used for monitoring and observability purposes, allowing organizations to collect, store, and analyze metrics and performance data from various systems and applications. It provides the necessary tools and capabilities to track and visualize key performance indicators, troubleshoot issues, and gain insights into system behavior.

IoT Data Management

VictoriaMetrics is suitable for handling large volumes of time series data generated by IoT devices. It can efficiently store and process sensor data, enabling real-time monitoring and analysis of IoT ecosystems. VictoriaMetrics allows for tracking and analyzing data from factories, manufacturing plants, satellites, and other IoT devices.

Capacity Planning

VictoriaMetrics enables retrospective analysis and forecasting of metrics for capacity planning purposes. It allows organizations to analyze historical data, identify patterns and trends, and make informed decisions about resource allocation and future capacity requirements.

RRDtool Pricing Model

RRDtool is an open-source software, freely available for use under the GNU General Public License. Users can download, use, and modify the software at no cost. There are no commercial licensing options or paid support services offered directly by the project.

VictoriaMetrics Pricing Model

VictoriaMetrics is an open source project, which means it is available for free usage and doesn't require any licensing fees. Users can download the binary releases, Docker images, or source code to set up and deploy VictoriaMetrics without incurring any direct costs. VictoriaMetrics also has paid offerings for on-prem Enterprise products and managed VictoriaMetrics instances.

Product & Solutions	Developers	Company
InfluxDB	Guides	About
InfluxDB 3 Enterprise	Blog	Careers
InfluxDB Cloud Serverless	Customers	Partners
InfluxDB Cloud Dedicated	Support	Newsroom
Telegraf Enterprise	Webinars	Contact Us
Integrations	Documentation	Customers
Data Lake / Warehouse	Events & Live Training	
Data Collector	InfluxDB University	
Pricing	Community Forum	
Use Cases	InfluxDB 3 Core (OSS)	
Time Series Data	Telegraf	
Time Series Database	AWS	
Time Series Forecasting	Product Integrations	
Data Warehousing	Telegraf Inputs	
Network Monitoring	Telegraf Outputs	
	Glossary	

548 Market St, PMB 77953
San Francisco, California 94104

Follow Us

By clicking "Accept All Cookies", you agree to the storing of cookies on your device to enhance site navigation, analyze site usage, and assist in our marketing efforts.

[Cookie Policy](#) [Privacy Policy](#)

[Accept All Cookies](#)

[Reject All](#)

[Cookies Settings](#)