Dell EMC Ready Solutions for Hadoop

Leverage optimized Hadoop solutions designed to address data analytics requirements, reduce costs and deliver outstanding performance

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Get the power of Hadoop faster, with less risk

Digital transformation is causing churn, uncertainty and disruption for many business leaders who need to act quickly as pressure increases from all directions. Big data and analytics are at the core of this transformation. However, without the right tools for big data analytics, you’ll have to conduct multiple, limited data analyses and then find a way to synthesize the results, involving a lot of manual effort and subjective analysis. With Apache® Hadoop® as a foundational component of the big data and analytics solution stack, you gain the ability to quickly process large sets of disparate data for a more comprehensive view of your customers, operations, opportunities, risks, and more.

Despite these tantalizing benefits, many organizations struggle — either to begin their data analytics journey or to make Hadoop projects successful once they’ve begun. They are often impeded by a lack of Hadoop expertise and end up spending too much time and effort on front-end work before they can get to the results of an operational solution.

Expertise and infrastructure matter when building a Hadoop environment. That’s why Dell EMC has teamed up with industry leaders — such as Intel®, Hortonworks®, Cloudera® and Syncsort® — to remove the uncertainty and barriers that may dissuade you from deploying Hadoop.

Cost-effective, future-ready Dell EMC Ready Solutions for Hadoop can be easy-to-implement solutions that help you efficiently harness Hadoop and the power of data analytics to drive competitive advantage.
Hadoop use cases

The use cases for Hadoop are very diverse, but there are common patterns across industries and verticals. Here is a sampling of possible use cases utilizing Dell EMC Ready Solutions for Hadoop.

### Operational efficiency use cases

<table>
<thead>
<tr>
<th>Data warehouse augmentation</th>
<th>Log aggregation and analytics</th>
<th>Dual storage and active archive</th>
<th>Archive-intensive and tiered Hadoop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduces total cost of ownership (TCO) and increases return on investment (ROI)</td>
<td>Secures your enterprise</td>
<td>Reduces TCO and eases compliance</td>
<td>Provides enterprise storage features for storage-centric Hadoop workloads with large capacity requirements</td>
</tr>
<tr>
<td>• Offload extract, transform, load (ETL) workloads</td>
<td>• Prevent security breaches and threats</td>
<td>• Lower data storage costs while maintaining accessibility</td>
<td>• Lowers costs for active archive</td>
</tr>
<tr>
<td>• Reduce licensing costs</td>
<td>• Detect operational anomalies</td>
<td>• Ease compliance and reporting</td>
<td>• Use for long-term tiered storage for regulatory compliance</td>
</tr>
<tr>
<td>• Enhance data accessibility</td>
<td>• Increase infrastructure efficiency and automation</td>
<td>• Streamline inquiry processes</td>
<td>• Get multi-protocol support for storage consolidation</td>
</tr>
<tr>
<td>• Enable better data exploration and analytics</td>
<td>• Manage performance more effectively</td>
<td>• Enjoy business operations improvement</td>
<td></td>
</tr>
</tbody>
</table>

### Business transformation use cases

<table>
<thead>
<tr>
<th>Marketing</th>
<th>Finance</th>
<th>Healthcare</th>
<th>Pharmaceutical</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipating customer needs</td>
<td>Reducing risk and detecting fraud</td>
<td>Improving patient care and reducing costs</td>
<td>Ensuring regulatory compliance and validation</td>
<td>Achieving continuous process improvement</td>
</tr>
<tr>
<td>• Customer 360 insight</td>
<td>• Credit scoring</td>
<td>• Quality of care</td>
<td>• Biomedical analytics</td>
<td>• Product quality</td>
</tr>
<tr>
<td>• Customer retention</td>
<td>• Customer analytics</td>
<td>• Patient safety</td>
<td>• Stability and shelf life</td>
<td>• Customer insight</td>
</tr>
<tr>
<td>• Customer segmentation</td>
<td>• Fraud detection</td>
<td>• Risk mitigation</td>
<td>• Primary research</td>
<td>• Demand forecasting</td>
</tr>
<tr>
<td>• Customer loyalty</td>
<td>• Risk management</td>
<td>• Fraud detection</td>
<td>• FDA compliance manufacturing</td>
<td>• Improved operations</td>
</tr>
<tr>
<td>• New product/service launch</td>
<td>• Sarbanes-Oxley Act (SOX) compliance</td>
<td>• Claims management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Are you facing these challenges?

“We’re struggling to make our analytics projects successful.”

Many businesses have trouble getting started with analytics solutions or making sure projects are successful once they’re completed. Lack of in-house Hadoop expertise is common, and can lead to project delays and configuration problems. For nearly a decade, Dell EMC has helped organizations solve the Hadoop skills gap by providing expert guidance and knowledge to streamline the architecture, design, planning and configuration of Hadoop environments. Today, this expert guidance and knowledge is embodied in the Dell EMC Ready Solutions for Hadoop, helping make Hadoop projects easier to start and more successful once completed.

“We need to reduce costs across the data center.”

IT budgets are typically constrained, which can make it difficult to free up resources for new Hadoop projects. Cost-optimized, industry-standard servers and storage are at the core of Dell EMC Ready Solutions for Hadoop. This helps decrease the cost of your total analytics solution. Dell EMC Services help shorten project timelines and can reduce production issues that might affect costs and ROI down the road.

“We’re not sure how to provide the blazing performance that makes Hadoop projects successful.”

Data is critical to every aspect of running a modern business. Teams need fast, concurrent access to data from every corner of the business to delight customers, outpace the competition, secure the enterprise, and maintain regulatory compliance. But testing and tuning Hadoop can be difficult and time-consuming. Dell EMC Ready Solutions for Hadoop have been engineered and certified so that users get outstanding performance with minimal intervention from IT.

Dell EMC Ready Solutions for Hadoop

Dell EMC Ready Solutions for Hadoop are integrated Hadoop solutions, designed to address data analytics requirements, reduce costs and deliver outstanding performance.

Dell EMC has been working with the leading innovators in big data since 2008, and started designing and building custom Hadoop solutions in 2009. With our deep roots in data analytics solutions and Hadoop — and other leading partners in data analytics — Dell EMC has the expertise, tools and solutions needed to drive successful, flexible and scalable Hadoop deployments.

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Choose your Hadoop distribution

Dell EMC Ready Solutions support both Cloudera Enterprise and the Hortonworks Data Platform®, so you can choose the right Hadoop solution for your needs. Both offer optional Syncsort ETL processing, allowing you to capitalize on the advantages of Hadoop while making better use of existing enterprise data warehouse (EDW) investments.

Cloudera Hadoop

A fast, easy and secure modern data solution

The Cloudera Hadoop design delivers the core elements of Apache Hadoop, including scalable storage and distributed computing, within a solution based on Cloudera Enterprise software and Dell EMC hardware delivered with optional services.

- **Fast for business:** From analytics to data science and everything in between, Cloudera delivers the performance you need to unlock the potential of unlimited data.
- **Makes Hadoop easy to manage:** With Cloudera Manager, automated wizards let you quickly deploy your cluster, no matter what the scale or the deployment environment. Through a centralized interface, your operations team can easily tune configurations and resourcing, manage a wide range of user roles for cross-departmental, self-service access, and even manage multiple clusters for multi-tenant environments.
- **Secure without compromise:** Meet stringent data security and compliance needs without sacrificing business agility. Cloudera provides an integrated approach to data security and governance.

Dell EMC machine learning with Hadoop

Dell EMC machine learning with Hadoop builds on the power of tested and proven Dell EMC Ready Solutions for Hadoop, created in partnership with Cloudera. The design includes an optimized stack along with data science and framework optimization, so you can get up and running quickly.

If you’re running Apache Spark®, you can take advantage of the BigDL distributed deep learning library for Apache Spark, for a faster path to enabling machine learning and to making deep learning more accessible. BigDL integrates into the Apache Hadoop frameworks and tools, enabling deep learning on the same Hadoop/Spark cluster where data is stored.

See the Ready Solutions for AI solution overview at dellemc.com/readyforai.

Hortonworks Hadoop

An open and stable foundation with a growing ecosystem to build and deploy big data solutions

Hortonworks Data Platform makes business intelligence on Hadoop a reality, combining a fast in-memory SQL engine to create data marts with an online analytical processing (OLAP) cube engine that enables huge data set queries in seconds. Dell EMC has worked with Hortonworks to develop a well-designed and scalable solution for Hortonworks Hadoop.

- **Open:** Hortonworks is committed to a 100% open approach to software development that spurs innovation.
- **Interoperable:** Its 100% open-source architecture enables Hortonworks Data Platform to interoperate with a broad range of BI and other applications.
- **Enterprise ready:** Hortonworks is built for enterprises, providing consistent operations with centralized management and monitoring of clusters through a single pane of glass.
Configuration details

Dell EMC Ready Solutions for Hadoop offer a variety of configurations to meet your needs.²

<table>
<thead>
<tr>
<th>Dell EMC Ready Solutions for Hadoop configuration options</th>
<th>Direct-attached storage</th>
<th>Modular infrastructure</th>
<th>Isilon Scale-out NAS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rack servers</td>
<td>Modular infrastructure</td>
<td>Modular infrastructure</td>
</tr>
</tbody>
</table>
| Cloudera Hadoop                                          | • Cloudera Enterprise 5.12  
• PowerEdge R740xd or R640 Servers | • Cloudera Enterprise 5.12  
• PowerEdge FX2 FC630 Servers | |
| Hortonworks Hadoop                                       | • Hortonworks Data Platform 2.6  
• PowerEdge R730xd Servers | • Hortonworks Data Platform 2.6  
• PowerEdge FX2 FC630 Servers | • Hortonworks Data Platform 2.5  
• PowerEdge FX2 FC630 Servers  
• Isilon X410 Storage |
| Quickstart                                               | • Cloudera Enterprise 5.12  
• PowerEdge R740xd Servers | | |

Dell EMC Ready Solutions for Hadoop configuration characteristics

<table>
<thead>
<tr>
<th>PowerEdge server</th>
<th>Isilon Scale-out NAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>R740xd - 3.5&quot;</td>
<td>R640</td>
</tr>
<tr>
<td>R730xd - 2.5&quot;</td>
<td>R730xd - 3.5&quot;</td>
</tr>
<tr>
<td>FX2 FC630</td>
<td>FX2 FC630</td>
</tr>
</tbody>
</table>

| Scalability       | Up to 288 nodes      |
|                   | Up to 252 nodes      |
| Raw storage       | 64TB / node          |
|                   | 24TB / node          |
|                   | 24TB / node          |
|                   | 48TB / node          |
|                   | 23TB / node          |
| Maximum HDFS      | 6PB                  |
| storage           | 2.3PB                |
|                   | 1.9PB                |
|                   | 3.8PB                |
|                   | 1.8PB                |
|                   | 8.6PB                |
| Processors        | Dual Intel Xeon® Gold 6140 2.3GHz, 18C/36T |
|                   | Dual Intel Xeon Gold 6136 3.0G, 12C/24T |
|                   | Dual Intel Xeon E5-2690 v4 2.6GHz, 14C/28T |
| iDRAC network     | S3048-ON             |
| Pod network       | Z9100 25GbE          |
|                   | S4048-ON 10GbE       |
| Cluster aggregation network | Z9100 100GbE |
|                   | S6010-ON 40GbE       |
| PowerEdge Server infrastructure nodes | 3x R640 name |
|                   | 1x R640 edge         |
| PowerEdge Server worker nodes | R740xd - 3.5" chassis |
|                   | R640 - 12x 2.5"      |
|                   | R730xd - 2.5"        |
|                   | R730xd - 3.5"        |
|                   | FC630 + FD332        |
|                   | FC630 + FD332        |

² The quantity and configuration of each system depends on the specific size and use case.
• Dell EMC PowerEdge R740xd Server: Maximum storage performance and scalability ideal for software-defined storage. With up to 24 NVMe drives, the R740xd ensures application performance scales to meet company demands.
• Dell EMC PowerEdge R640 Server: Get scalable computing and storage in a 1U, 2-socket platform with an ideal mix of performance, cost and density for most data centers.
• Dell EMC PowerEdge R730xd Server: Impressive processor performance, a large memory footprint, extensive input/output (I/O) options and a choice of dense, high-performance storage or low-cost, high-capacity storage.
• Dell EMC PowerEdge FX2 Server: Modular server, storage and networking blocks are neatly combined in a compact, converged 2U rack chassis to redefine data center agility.
• Dell EMC PowerEdge FC630 Server: The 2-socket, half-width 1U workhorse server blocks are ideal for a wide variety of business applications.
• Dell EMC Networking S3048-ON 1GbE Switch: 1GbE top-of-rack (TOR) switch with an industry-hardened operating system (OS) and support for open networking, providing freedom to run third-party operating systems.
• Dell EMC Networking S4048-ON 10/40GbE Switch: TOR, high-density 1U switch, with 48 10GbE uplinks, offers ultra-low latency and line-rate performance.
• Dell EMC Networking S6010-ON 10/40GbE Switch: Disaggregated hardware and software TOR networking solution that empowers you to deploy modern workloads and applications designed for the open networking era.
• Dell EMC FD332 Storage: Flexible, high-density, half-width 1U storage modules enable you to rapidly scale direct-attached storage (DAS).
• Dell EMC Isilon X-Series: The Isilon X-Series enables companies to store and analyze large volumes of data (> 100TB) economically. This is especially relevant for companies that need to store and analyze historical data. The OneFS file system software helps consolidate IT workloads by managing both Hadoop data and enterprise IT data — accessible through several file and object interfaces — in one place. Isilon also delivers enterprise-grade file management capabilities such as data protection, data tiering, security, and data-at-rest encryption (DARE) with self-encrypting drive (SED) options to make it easier for companies to conform to regulatory requirements and data management policies.
Shared storage Hadoop vs. distributed storage Hadoop

It’s a testament to Hadoop’s flexibility that it supports multiple deployment models accounting for varying budget, performance, capacity and density requirements. Dell EMC

Isilon is a shared-storage model where the persistent file system data for Hadoop is stored in an Isilon network-attached storage (NAS) cluster versus in the distributed model where data is spread across the local storage of the Hadoop nodes themselves.

These two approaches offer varying advantages:

<table>
<thead>
<tr>
<th>Shared-storage Hadoop</th>
<th>Distributed-storage Hadoop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single copy of data for IT workloads and analytics</td>
<td>Massive (hundreds of petabytes)</td>
</tr>
<tr>
<td>Reduced data center footprint (storage density)</td>
<td>Ability to use commodity servers</td>
</tr>
<tr>
<td>Enterprise file management: data protection, security, storage tiering</td>
<td>Linear scaling</td>
</tr>
<tr>
<td>Independent scaling of storage and compute</td>
<td>Flexible replica model</td>
</tr>
</tbody>
</table>

Why Dell EMC?

Dell EMC holds leadership positions in some of the largest growth categories in the IT infrastructure business, and that means you can confidently source your IT needs from one provider — Dell EMC.

- #1 converged and hyper-converged infrastructure³
- #1 in traditional and all-flash storage⁴
- #1 virtualized data center infrastructure⁵
- #1 cloud IT infrastructure⁶
- #1 server virtualization and cloud systems management software (VMware®)⁷
- #1 in data protection⁸
- #1 in software-defined storage⁹

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³ IDC WW Quarterly Converged Systems Tracker, Q4 2017, April 2018, Vendor Revenue.
⁵ Dell EMC Annual Report, 2015.
⁶ IDC WW Quarterly Cloud IT Infrastructure Tracker, April 2017, Vendor Revenue — EMC Q4 2016.
¹² Dell EMC case study, “Unlocking data’s value for better insights and decisions,” May 2015.
Solution overview

“We’ve completely redesigned how we capture, store and provision data with the new Dell Hadoop cluster. We can gather larger amounts of data, and our analysts and statisticians can mine that data in ways they couldn’t before.”

— Tony Giordano, Executive Vice President of the Technology Solutions Group, Merkle, United States

“Addressing exhausted enterprise data capacity can cost up to $800,000 per terabyte of data. But with Hadoop’s extreme scalability, adding terabytes can cost as little as $5,000 using MetaScale’s big data appliances based on Dell PowerEdge Servers.”

— Ankur Gupta, General Manager, MetaScale, United States

Complete your solution with Dell EMC services and financing

Dell EMC Professional Services
Solutions customized for your needs

- **Dell EMC Big Data Vision Workshop** focuses on Hadoop for business leaders. We have a unique methodology to identify and prioritize a single analytics use case with a combination of implementation feasibility and business value. It’s a three-week engagement that applies research, interviews and data science expertise and techniques to the organization — culminating in a one-day workshop to identify and agree on the analytics use case and path forward. This approach sets us apart from the “bring in a bunch of technology and see what it can do” approach that’s pushed by many vendors.

- **Dell EMC Hadoop Consulting** is delivered by certified Hadoop experts to help you get the business value of data analytics using Hadoop. The services include a data analytics assessment, workshop, testing, proofs of concept and production implementation. These Hadoop experts help determine where Hadoop is a good fit for your organization. They also help you build your own internal team of Hadoop experts through knowledge transfer at each step.

- **Dell EMC Jumpstart Services** offer best-practice guidance, hands-on labs, roadmap planning and knowledge transfer on Hadoop installations, so you can get from install to productivity with the skills and knowledge to get the greatest value from your big data solution.

- **Dell EMC Hadoop Health Check Service** reviews your current data technologies and processes, and makes recommendations for tools, testing and operational practices.

- **Big Data Technology Assessment Services** assess Isilon customers with Hadoop installations on the current state of your Hadoop environment and make recommendations with no implementation of changes.

- **Big Data Technology Implementation Services** help current and prospective Isilon customers with Hadoop installations of one to three clusters and up to hundreds of nodes. Involves installing and configuring Hadoop to work with an Isilon storage cluster, including security.

- **Dell EMC Hadoop on Isilon Implementation Starter Kit** is ideal if you’re interested in installing a proof of concept, or developing or testing Hadoop clusters using best practices to leverage Isilon for HDFS storage.

Deployment assistance when you need it
Dell EMC offers a broad menu of custom installation and implementation services for our Hadoop solutions. Dell EMC Services include on-site hardware and operating system software installation, optional rack integration at a Dell EMC facility and validation of the installed solution. Hadoop software deployment is a custom project that is delivered based on your needs. Dell EMC takes care of project management, from order drop to your acceptance.

Support always on for you
**Dell EMC ProSupport** offers a single point of accountability from experts with solution-specific training, along with premium hardware and software support available 24x7x365. ProSupport also includes collaborative software support for Cloudera and Hortonworks software. Additionally, ProSupport includes next-business-day, on-site service with four- and eight-hour parts and labor response options, and escalation management with customer-set severity level options.

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14 Dell EMC case study, “Accelerating big data ROI with Hadoop,” April 2015.
Dell Financial Services
- Leasing and financing solutions are available throughout the U.S., Canada and Europe.
- Dell Financial Services can finance the total technology purchase.
- Efficient electronic quoting and online contracts offer an efficient customer experience.

Learn more about Dell Financial Services.

Dell EMC Customer Solution Centers
Our global network of 21 dedicated Dell EMC Customer Solution Centers are trusted environments where world-class IT experts collaborate with customers and prospects to share best practices; facilitate in-depth discussions of effective business strategies using briefings, workshops, or proofs-of-concept (PoCs); and help businesses become more successful and competitive. Dell EMC Customer Solution Centers reduce the risks associated with new technology investments and can help improve speed of implementation.

Find out more today
Don’t wait to harness the benefits of Hadoop on an optimized solution designed from the ground up to address data analytics requirements, reduce costs and deliver outstanding performance for deep data mining and analytics. Contact your Dell EMC representative to find out more today.

Our solution partners

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