



LSTC LS-DYNA on Dell EMC Infrastructure

Tap into the power of high performance computing to speed finite element analysis and simulation

Customer results

10,000

simulations per season¹

4.5X

faster simulations²

burst

for extra capacity³

Growing consumer expectations and intense global competition are driving manufacturers to find new ways to produce more sophisticated products faster and with lower costs. High performance computing (HPC) can help by enabling engineers to test design concepts much faster and more cost-effectively compared to building physical prototypes. For example, HPC-powered LS-DYNA[®] from Livermore Software Technology Corporation (LSTC) is an advanced general-purpose finite element analysis (FEA) program capable of simulating complex real-world problems. Manufacturers in the automotive, aerospace, construction and other industries use LS-DYNA to perform complex FEA workloads.

With years of experience, Dell Technologies is working to enhance performance for digital manufacturing workloads like LS-DYNA with scalable, flexible Validated Designs for HPC Digital Manufacturing. These standardized HPC building blocks simplify design and speed configuration and ordering of clusters, with modular designs that include servers, storage, networking, software and services in customizable configurations that deploy quickly and provide better performance and easier scaling with less risk. In addition, these solutions have been rigorously tested for digital manufacturing applications.

LS-DYNA is one of the most flexible FEA software packages available. It is a multi-purpose explicit and implicit finite element and multiphysics application used to analyze the nonlinear response of structures. Any of LS-DYNA's many features can be combined for a given simulation to model a wide range of physical events. Its potential applications are numerous and can be tailored to many fields.

The Dell Technologies Validated Design for LSTC LS-DYNA uses a flexible approach to HPC system design, where individual building blocks can be optimized specifically for LS-DYNA workloads and use cases.

Validated Designs and performance benchmarking

Dell Technologies HPC engineers have released [Dell Technologies Validated Design for HPC Digital Manufacturing — LSTC LS-DYNA Performance](#), which outlines the performance of LS-DYNA on the engineering-validated design for LSTC LS-DYNA. The document also outlines the system building blocks used in the benchmarking testing. The configurations are built on Dell EMC PowerEdge servers with Dell EMC PowerSwitch networking and Dell EMC PowerVault storage. For the benchmarking, workload management and job scheduling were performed with Bright Cluster Manager[®] software.

¹ Dell Technologies Case Study, "[McLaren Racing Delivers DoubleDigit Performance Improvements](#)," July 2021.

² Dell Technologies Case Study, "[Driving golf forward with iron-clad digital tools](#)," June 2021.

³ Dell Technologies Case Study, "[Cloud bursting for engine speed](#)," June 2021.

A table of recommended options, along with decision criteria, are in the document to assist in development of solution configurations based on your unique application mixes and simulation types. Dell Technologies high performance computing (HPC) and AI experts are available throughout the process to assist you with designing HPC solutions for your specific needs. And [Dell Technologies Services](#) — ranging from consulting and education to deployment and support — are available when and where you need them.

Infrastructure servers	Compute building blocks	Basic building blocks	Operational storage	System networking	Management software
<ul style="list-style-type: none"> PowerEdge R640 Server with dual Intel® Xeon® 3106 processors 	<ul style="list-style-type: none"> PowerEdge R640 or C6420 Servers with Intel Xeon 6200 series processors 	<ul style="list-style-type: none"> PowerEdge R840 Server with quad Intel Xeon 6142 processors 	<ul style="list-style-type: none"> PowerEdge R740xd Server with dual Intel Xeon 4110 processors 	<ul style="list-style-type: none"> PowerSwitch S3048-ON Ethernet switch Mellanox® SB7890 36-port EDR InfiniBand® switches (recommended) 	<ul style="list-style-type: none"> Bright Cluster Manager

Resources

- See the [Validated Design](#)
- Get more performance testing information at hpcatdell.com.
- Explore the [Dell Technologies HPC & AI Innovation Lab](#).
- Join the Dell Technologies HPC Community at dellhpc.org.

Learn more

[Dell Technologies InfoHub](#)
[delltechnologies.com/
referencearchitectures](http://delltechnologies.com/referencearchitectures)
delltechnologies.com/hpc

LSTC LS-DYNA and Dell Technologies

LS-DYNA is a general-purpose finite element program capable of simulating complex real-world problems. It is used by the automobile, aerospace, construction, military, manufacturing, and bioengineering industries. LS-DYNA is optimized for shared and distributed memory UNIX®, Linux® and Windows®-based, platforms.

Dell Technologies enables organizations to modernize, automate and transform their data center using industry-leading converged infrastructure, servers, storage and data protection technologies. Businesses get a trusted foundation to transform their IT and develop new and better ways to work through hybrid cloud, the creation of cloud-native applications and data analytics solutions.

