



## What it takes to develop a PowerEdge Server

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### SUMMARY

Development of a new PowerEdge Server typically takes two or more years and requires tight coordination between multiple Engineering teams. Before a customer ever sees a new model, Dell EMC Engineering will have built multiple different evolutions of the design and spent countless hours validating in areas such as the Mechanical design, Electrical design, Power and Thermal design, and management tools to automate deployment and reduce the total cost of ownership (TCO).

Design teams can range in size from dozens to hundreds depending on the complexity of the solution.

The goal of all these efforts is to continue the PowerEdge tradition of delivering Industry leading Quality, Performance and Manageability.

To deliver leading quality, functionality, and performance, Server development teams at Dell EMC follow a comprehensive development process. Before a customer purchases their first Dell PowerEdge Server, they should feel confident that the design will have been refined and validated through multiple design and test cycles each aiming to ensure the final product will meet or exceed all requirements.

PowerEdge Server product planning starts with a thorough understanding of the customer requirements. Thousands of hours of direct customer research, competitive analysis, a roadmap review of new technologies, and key learnings from past designs are combined to form a definition of what the new product should achieve.

Server architects and technologists provide requirements for technologies and interfaces to be incorporated, physical and behavioral implementation specifications, user interfaces and system management requirements, and performance goals. One or more “Proof-of-concept” (POC) efforts may be utilized to establish technology feasibility or get an early start on new or advanced hardware or firmware technologies.

Next, functional teams work together to create interlocks, establish clear commitments and document a master plan that the Dell EMC Engineering teams will use to guide their designs. Once defined, the hardware and software development can begin.





## Design

Dell EMC Hardware Engineers design the mechanical chassis and other structural elements, printed circuit boards and assemblies, power and cooling subsystems, etc., and Dell EMC Software Engineers design the software and firmware using industry's best practices like secure development lifecycle (SDL) to ensure secure and robust software. After the designs are reviewed, the engineers begin development of the initial operating and manageability firmware using hardware emulation tools. Once complete, a small number of initial prototypes will be built and tested to ensure basic functionality of each subsystem.

## Development

Once the basic design and operation is validated, Hardware Engineers test and validate the technology innovations in CPU, Memory, Storage, Networking, IO and Fabrics, Security, and other areas to ensure the new features and capabilities are working to specification. In conjunction, Software Engineers will have worked to support this new functionality in the firmware, as well as develop the associated software drivers, tools, and management utilities. Agile methodology is used to improve the quality and agility of software development. Static and dynamic software analysis tools are used to detect memory leaks, security exposures, and other code vulnerabilities. Code reviews and automated unit tests provide additional layers of software quality assurance. Operating Systems are installed onto the systems so that a complete validation of Server hardware, firmware/BIOS and systems management can be accomplished. Once complete, a new set of prototypes may be built to incorporate any necessary modifications, and then the servers undergo thousands of hours of exhaustive tests to ensure correct operation and compliance with the product requirements, including dozens of Dell EMC Internal and International Standards for system quality, environmental operating conditions, safety, electromagnetic interference, etc.

## Solutions testing

The final level of validation ensures proper operation in a customer environment. The systems will begin Application level validation and testing in a range of customer environments. This testing typically includes replication of typical customer environments with external Storage, Networking and other elements to validate that the system can provide full functionality without compromise. Automated test suites stress the systems and ensure robust and consistent operation. To extend this testing even further, "Beta units" are built to allow "real-world" testing at customer facilities.

## Manufacturing validation

The final step in the design process utilizes production quality Hardware and Software to demonstrate the ability to not only meet the quality, performance and compliance requirements of the previous phases but also to demonstrate that all of the previous successes will be replicated in a high volume manufacturing environment.

## Preparation for Launch

In preparation for the product's introduction to the market, the teams will work to establish forecasts that will be used to pre-position supply at all Dell EMC manufacturing facilities. They will complete sales and services training, establish spare parts inventories and enter the appropriate information into the Dell EMC logistics and ordering systems to ensure a seamless experience for customers.

## Post Launch

After launch, the teams will work to establish the processes necessary for sustaining the product including checkpoints for on-going quality reviews and continuity of supply and support. During the lifecycle of the product, the teams will closely monitor field issues, rapidly identify "root-cause" of any issues and establish processes to resolve them.