

ENOVIA V6 Technical Advantages Whitepaper

ENOVIA V6 Architecture Performance Capability Scalability

**a Product Lifecycle Management Whitepaper
Prepared by ENOVIA, a Dassault Systèmes Brand**



Executive Summary

Dassault Systèmes (DS) is a world leader in 3D and Product Lifecycle Management (PLM) solutions. One of six DS brands, ENOVIA is a recognized leader in delivering collaborative PLM solutions. In its latest version of ENOVIA software, DS has introduced V6, the first proven Service-Oriented-Architecture (SOA) based solution in the PLM marketplace.

The V6 values include:

- *Global Collaborative Innovation*
- *Online Creation and Collaboration*
- *A Single PLM Platform for IP Management*
- *Lifelike Experience*
- *Ready-to-use PLM Business Processes*
- *Lower Cost of Ownership - ROI Breakthrough*

Driven by meeting customer needs with optimized PLM solutions, DS and IBM created a test methodology known as Performance, Capacity and Scalability (PCS). The PCS methodology tests the ability of a PLM solution to deliver the same experience to every user and ensures optimization of the working environment between hardware, middleware, and PLM application software.

Extensive testing proved the following benefits:

- *Predictable software performance based on the number of users and workload*
- *A reusable sizing methodology with tuning parameters that has its roots in a proven research and development (R&D) study*

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Introduction

Dassault Systèmes (DS) is a world leader in 3D and Product Lifecycle Management (PLM) solutions, bringing value to more than 90,000 customers in 80 countries. A pioneer in the 3D software market since 1981, DS develops and markets PLM application software and services that support industrial processes and provide a 3D vision of the entire lifecycle of products from conception to maintenance.

One of six DS brands, ENOVIA is a recognized leader in delivering collaborative PLM solutions. The ENOVIA solutions enable companies from a broad range of industries to accelerate innovation, time to market, and reduce costs by collaboratively developing, building, and managing products.

In its ENOVIA V6 software, DS delivers a single PLM platform for Intellectual Property (IP) management that enables global collaborative innovation via an HTTP connection. With V6, ENOVIA serves as the nerve center of the customer's business processes, managing and delivering the right data at the right time to the right person.

This white paper discusses the Performance, Capability and Scalability (PCS) study that followed the V6 development process. To ensure the efficiency of the V6 software, DS conducted the study at the IBM/Dassault Systèmes International Competency Center (IDSICC). Driven by meeting customer market needs for optimized PLM solutions, DS and IBM created the IDSICC, a common test laboratory that supports the integration and optimization of IBM technologies in Dassault Systèmes projects and products. Over the years, the IDSICC lab has been integrated more and more in the DS development process to validate new architecture choices as early as possible.

ENOVIA V6 Architecture

The V6 architecture is built on the MatrixOne architecture and enhanced with technology from VPM and ENOVIA SmarTeam. Many components inherited the proven, stable and scalable ENOVIA MatrixOne architecture.

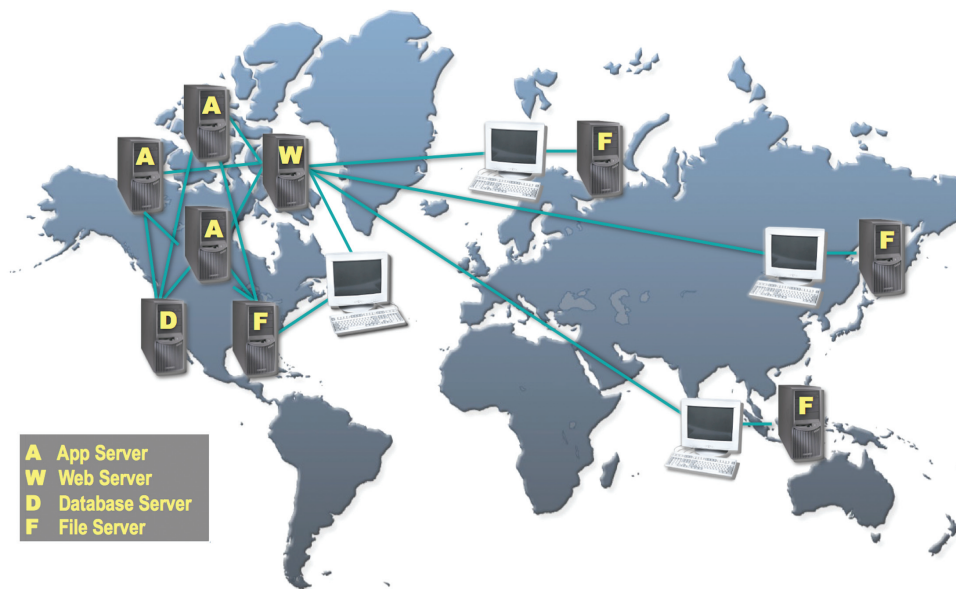
The V6 SOA architecture enables global deployment while centralizing the meta data repository in a master site and distributing the file within the different remote locations. The Application Server architecture enables optimal usage of the database usage and horizontal scalability as the number of users increases due to its load balancing capability.

The centralized ENOVIA database is accessible to all users, regardless of location. To support such

usage and enhance network communication, the network functions as an HTTP protocol. The different distant sites use a local file server to load large representation files, eliminating time consuming network transmissions. In addition, the V6 architecture improves internet communication by reducing the number of server round trips to minimize latency in wide area networks.

The architecture uses an HTTP connection—for security all the communication between sites supports Proxy-Reverse Proxy implementation, as well as encryption capabilities through the HTTP protocol. In addition to the IT security schemas, the V6 applications deliver specific security schemas on data usage and user roles.

Centralized Database Architecture with Distributed File Stores



ENOVIA V6 Architecture Benefits

Designed for global collaborative engineering, ENOVIA V6 provides investment protection and smooth transition paths for all users of DS and non-DS applications.

The main benefits are:

- *The single platform approach reduces costs by eliminating the complexity and replication required with a distributed system.*
- *The HTTP connection provides stable performance and access globally to “always up to date” data.*
- *Memory consumption is stable, enabling companies of all sizes to take advantage of V6.*
- *Response times are quicker enabling enhanced collaboration.*

V6 PCS Key Factors

The commonly used definitions within the IT community for PCS are:

Performance is the time and system resources required to complete a set of scenarios. This indicates system speed and reliability, two aspects of the system critical to obtaining user acceptance.

Capacity represents the number of concurrent users supported by a given hardware configuration. Knowing the system capacity level is critical to maintaining performance and planning system upgrades.

Scalability is the ability to add proportional amounts of workload and resources while maintaining performance. Demonstrated predictability allows customers to anticipate how much computing might be required to support an increasing user population.

The PCS methodology tests the ability of a PLM solution to deliver:

- A responsive and stable application
- A high level of performance (response time and resource consumption)
- An optimized working environment between hardware, middleware, and PLM software

PCS Benefits to Customers

Figure 1 below illustrates PCS methodology, based on single user and multi-users tests.

The benefits to customers are:

- Predictable software based on the number of users and workload
- A sizing methodology with tuning parameters that has its roots in a proven research and development (R&D) study

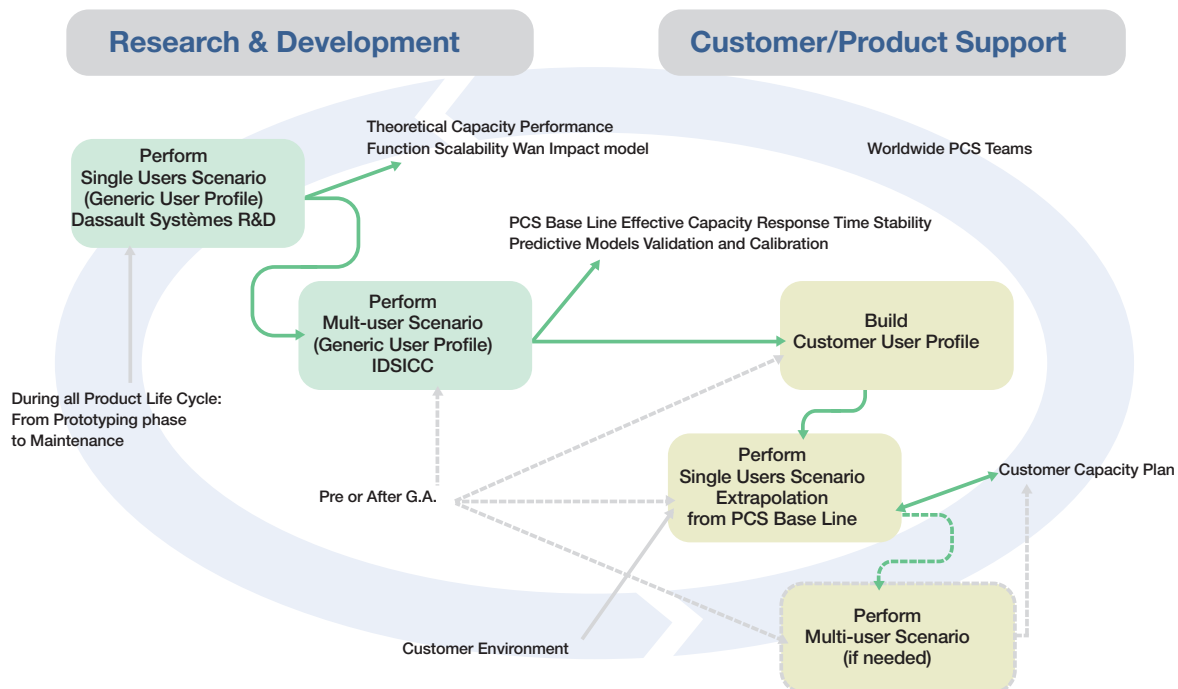


Figure 1

Performance Overview

The Performance testing on the V6 architecture delivered the following results:

- Low memory consumption (V6 dynamically loads only the memory required for the current operation)
- Optimized packet transport (the V6 architecture is tolerant of high latency networks and corrects performance between remote sites globally by compressing and uncompressing packets, dramatically reducing the size of messages sent and received)
- Smart caching mechanism (To lower operational costs between a remote client and server, an intelligent cache system selectively loads large assemblies used during peak hours)

Capacity Overview

The Capacity testing on the V6 architecture simulates a large number of users accessing data on a server. For example, during a test at the IDSICC, over 3,000 V6 users accessed 38 million data objects for a given set of scenarios and workload.

The software allows customers to extend the infrastructure through application server add-ons and associated load balancing (such as IBM WebSphere Edge software), enabling high availability in association with adequate storage capability from Network Attached Storage (NAS) and Storage Area Network (SAN). Usage of such dedicated hardware for store management showed an improvement on Capacity and Performance. For each of the architecture components used in Figure 2, customers can extend the capacity by scaling up, adding more servers, or scaling up and adding new server resources (CPU and memory).

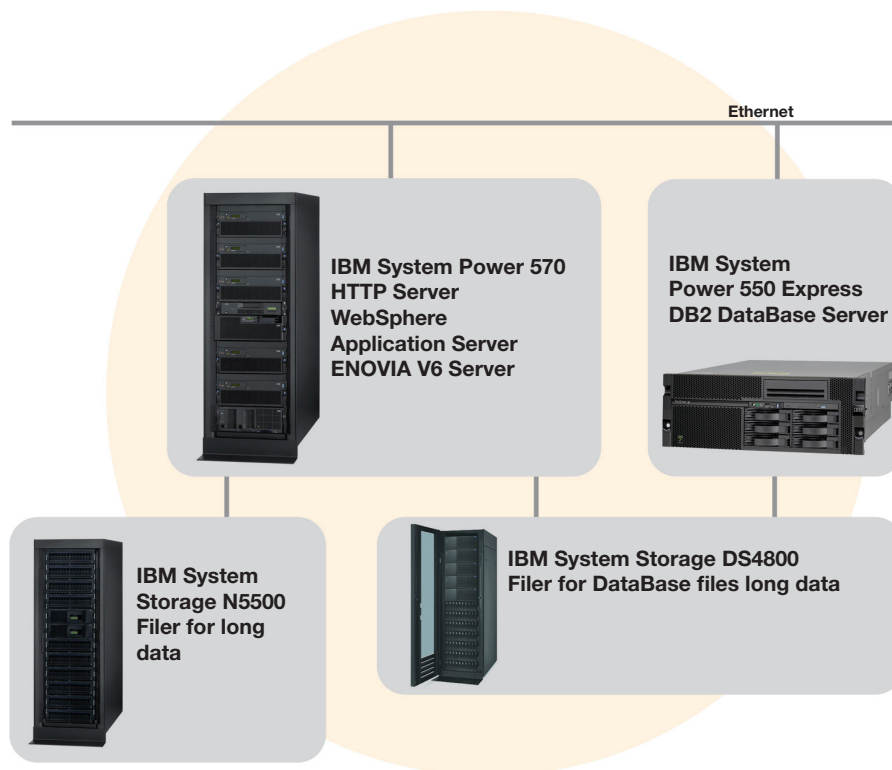


Figure 2

Figure 3 depicts the stability of end-user response time when testing with two million data volumes or 38 million data volumes and 3,000 users. The test scenarios in this bar chart represent usual single user operations among Login, Query, Open, Expand, and Logout.

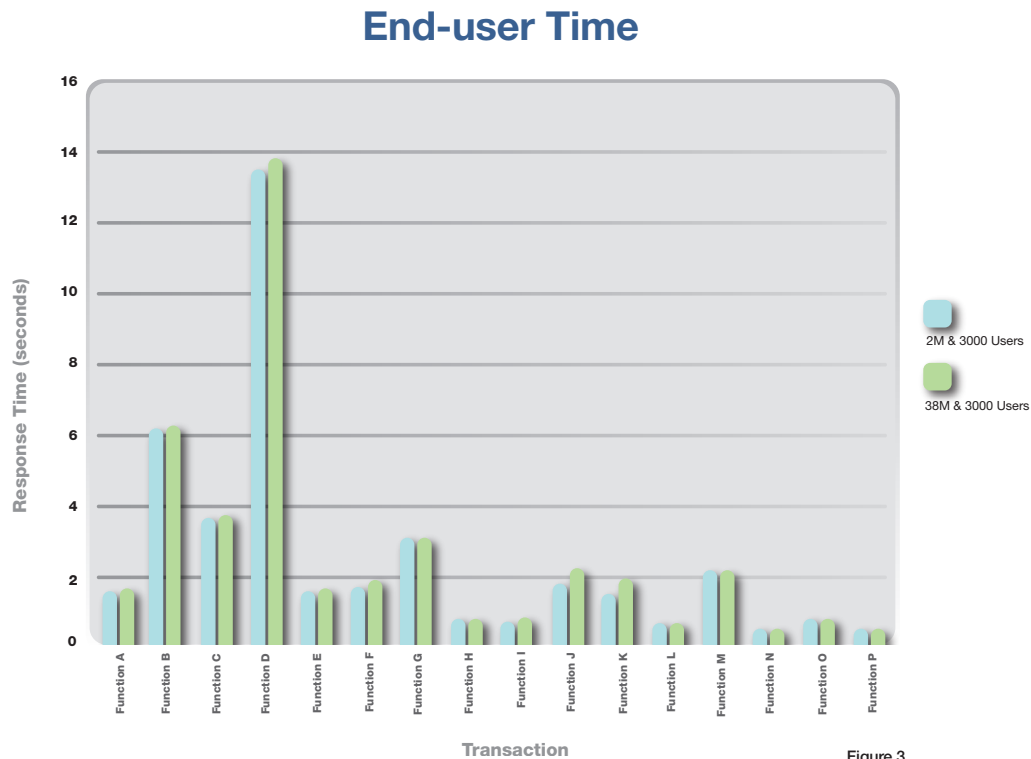


Figure 3

Scalability Overview

In collaboration with IDSICC, DS ran Scalability tests on a representative database using two million instances in the first drop. The first simulation included 1,500 users for the scalability test on a single server (see Figure 4).

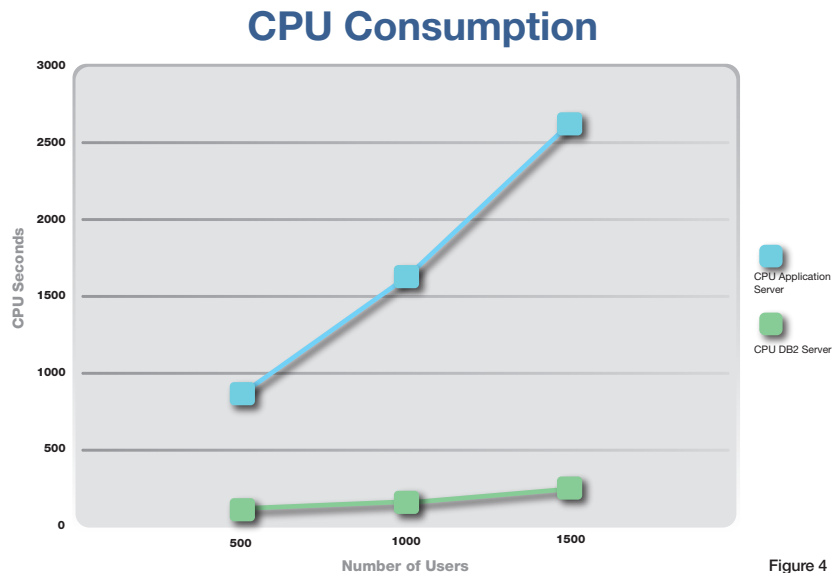


Figure 4

The V6 Values

Global Collaborative Innovation

PLM joins Requirements, Functional, Logical, and Physical (RFLP) product definitions.

Online Creation and Collaboration

V6 enables real time, concurrent work, across multiple locations via a simple Web connection. This is critical for companies implementing global engineering and manufacturing strategies.

Single PLM Platform for Intellectual Property (IP) Management

V6 supports modeling applications spanning all engineering disciplines and collaborative business Processes including end user experiences through the product lifecycle.

Lifelike Experience

The V6 interface is intuitive. Any user can find and search information easily, communicate, collaborate, and experience products in 3D online, mimicking what would happen in the real world.

Ready-to-use PLM Business Processes

V6 unifies engineering and enterprise processes including program and compliance program and sourcing. It provides industry specific PLM best practices solutions that speed deployment and cut time to ROI (return on investment).

Lower Cost of Ownership

Quicker ramp up time via a single server and database for all applications dramatically reduces cost of ownership, spurring efficient collaboration. SOA standards compliance allows easy integration with existing systems and modeling of business processes with no programming skills, supporting an adaptable business model.

About ENOVIA

ENOVIA is a recognized leader in delivering collaborative PLM solutions. We enable companies from a broad range of industries to dramatically accelerate innovation, time-to-market and revenue generation by collaboratively developing, building and managing products. Our solutions facilitate the sharing of concepts, content and context across product lifecycles and throughout value chains of employees, customers, suppliers and partners.

ENOVIA collaborative PLM solutions help global enterprises bring together people, processes, content and systems to achieve a compelling competitive advantage. Our interoperable solutions unify and streamline processes across the product lifecycle, enabling companies to easily and cost-effectively work on projects within and outside of their enterprises. Our adaptable, scalable technology is built to accommodate the ever-changing marketplace.

About Dassault Systèmes

As world leader in 3D and Product Lifecycle Management (PLM) solutions, the Dassault Systèmes group brings value to more than 90,000 customers in 80 countries. A pioneer in the 3D software market since 1981, Dassault Systèmes develops and markets PLM application software and services that support industrial processes and provide a 3D vision of the entire life cycle of products from conception to maintenance. Our offering includes integrated PLM solutions for product development (CATIA®, DELMIA®, ENOVIA®, SMARTEAM®), mainstream product 3D design tools (SolidWorks®), 3D components (Spatial/ACIS®) and SIMULIA®, DS' open scientific platform for realistic simulation. Dassault Systèmes is listed on the Nasdaq (DASTY) and Euronext Paris (#13065, DSY.PA) stock exchanges. For more information, visit 3ds.com.

