The PLM Platform Behind the World's Data

What happens when a storage leader reinvents its core and turns complexity into strategic advantage.

Seagate Technology Holdings plc is a global leader in mass capacity data storage, powering the world's largest cloud providers and enterprises with advanced Hard Disk Drive (HDD), Solid State Drive (SSD) and Storage Systems technologies. Operating for more than 45 years with a global workforce of 30,000 employees, the company runs seven manufacturing facilities and four R&D centers across the US, Europe and Asia. Its products serve a wide span of industries, including hyperscale cloud providers, enterprise data centers, consumer electronics, gaming, edge computing and emerging AI-driven workloads. Seagate ships more than 550 exabytes of storage annually, making it a foundational data storage supplier to the world's largest cloud and technology companies.

With the introduction of its next generation hard drive technology, Heat-Assisted Magnetic (HAMR) drives and a rapidly expanding global footprint, Seagate's product development environment must support extreme precision, high-volume production and increasingly rapid innovation cycles.

The Challenge: Hidden Friction of Multiple PDM Systems Slowing a 550 Exabyte Enterprise

Before its digital transformation in 2020, Seagate's product data management environment was fragmented across multiple legacy PDM systems inherited through decades of growth and acquisitions. Different business units relied on different PDM/PLM tools, each with its own data model, change process and integration footprint.

This fragmentation created several critical challenges for Seagate, including the absence of a unified part master and classification, BOM management, and change process across HDD, SSD, Systems and equipment engineering, which made coordination difficult and inconsistent.

Teams also struggled to reuse components effectively, leading to unnecessary cost, duplicated time and effort and added product complexity. Maintaining multiple interfaces to ERP, manufacturing engineering and supply chain systems increased integration overhead and operational risk, while quality investigations required slow, manual cross system tracing to understand where components were used. Together, these issues made it increasingly difficult for Seagate to scale its engineering and operations to support global manufacturing demands and future product architectures.

"We had multiple PDM systems for different business segments. We couldn't achieve component reuse across the board, we didn't have a unified change process, and some quality issues required detective work and drilling across multiple systems. It was slowing us down, wasting time and costing us money, and on top of that, fragmented tools meant fragmented decisions, and that's the opposite of what a global manufacturer needs," said John Zhang, Engineering IT Senior Director for Seagate.

"Our products power the world's data economy, so our engineering backbone, the PLM system, has to be just as advanced as the technology we ship. And when you're shipping hundreds of exabytes a year, precision and speed aren't optional - they're survival."

The company needed a single, enterprise-wide PLM platform capable of supporting its digital transformation strategy and enabling a seamless digital thread across the business.

The Solution: A Modern PLM Foundation for Precision at Scale

To support its next era of innovation, in 2018 Seagate set out to modernize its product data backbone and establish a true enterprise digital thread.

Following a rigorous RFP and a 12-month proof of concept evaluation involving seven major PDM/PLM vendors, Seagate selected PTC Windchill because it aligned closely with the company's existing data model and engineering practices, offered strong support for supply chain centric product structures, and demonstrated powerful integration capabilities with ERP, manufacturing, supply chain and enterprise data warehouse systems.

Windchill PLM platform's robust part classification, mass BOM change functions and change control features were also key differentiators, along with its ability to scale seamlessly across Seagate's global engineering and manufacturing operations.

"Our products and key components go through countless iterations. Some components reach double-digit revisions. Without a strong digital foundation, it would be impossible to manage that complexity or keep engineering, manufacturing and supply chain aligned," said Zhang. "When our key users saw the final proof of concept demo of Windchill, they said, 'This is how we've always wanted to work.' Functionally and architecturally, it was the best fit for our business."

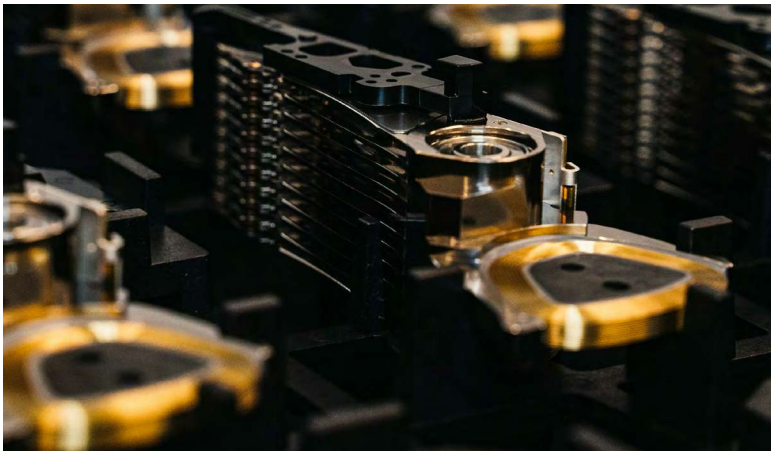
Seagate launched a multiyear initiative to consolidate all product data, engineering processes and integrations into the Windchill platform. Windchill has now become the backbone of Seagate's digital thread, unifying product definition across HDD, SSD, Storage Systems, equipment and tooling, spanning more than 35 upstream and downstream business processes and applications.

"Choosing Windchill as our unified system wasn't just an IT decision. It was a strategic move to future proof our entire product lifecycle," added Zhang.

Results: One Source of Truth. Thirty Thousand Employees. Zero Guesswork.

The shift to the unified Windchill platform has delivered measurable and strategic benefits across Seagate's global operations. By establishing an enterprise-wide digital thread, the company now connects engineering, manufacturing, supply chain planning, quality, sustainability, finance and service teams through a single source of truth.

"Even our legal department accesses Windchill's documents and product data. It is supporting every area of our business," added Zhang. "Without a system like this, product development would stop almost immediately. It's the DNA of our product definition."



One of the most significant gains has been in component reuse and cost efficiency. Seagate eliminated redundant part creation and now manages more than one million unique part numbers through structured classification. This has helped the company avoid duplicate part creation, reduce supplier sourcing and qualification costs and improve BOM accuracy and maintainability.

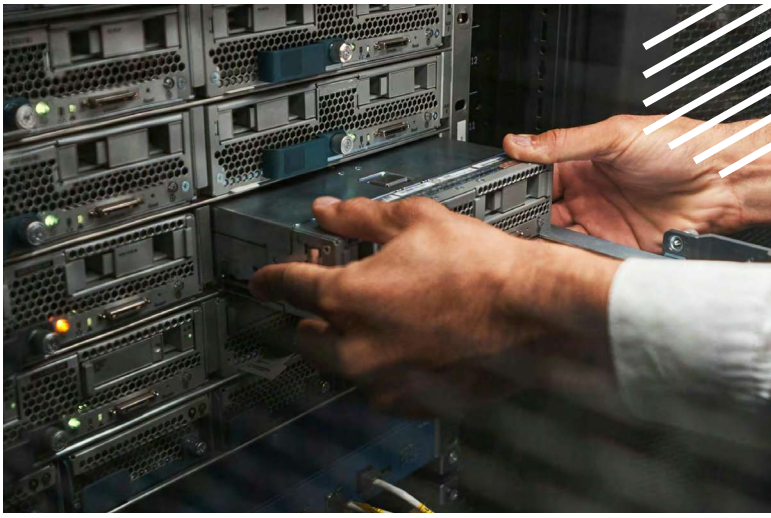
Engineering changes have also become faster and more accurate. A unified Engineering Change Notice workflow, combined with Where-used Mass BOM Change capabilities, ensures that updates propagate across the enterprise, spanning multiple products and SKUs within minutes or hours rather than days.

"Any change must be visible across the company almost immediately," Zhang noted. "That's what our integration with downstream systems now achieves. And reuse saves a huge amount of cost, while classification is helping us avoid redundancy and optimize sourcing."

Cross functional collaboration has strengthened as well. Windchill now sits at the center of Seagate's engineering ecosystem, integrating MCAD/ECAD, requirements management, portfolio management, Manufacturing enterprise systems, ERP and supplier collaboration. More than 30 teams and business processes now consume data from the system and Windchill is the foundation for how the company designs, builds and supports its products.

Finally, the platform enables innovation at scale. While PLM doesn't create innovation on its own, it supports the iteration cycles required to reach breakthroughs such as Seagate's next-generation HAMR technology, delivering an industry-leading combination of mass capacity and energy efficiency that powers the world's largest AI infrastructure providers.

> **"Our products power the world's AI infrastructure and data economy, so our engineering backbone — the PLM system — must be as advanced as the technology we deliver."**
>
> **John Zhang, Engineering IT Senior Director for Seagate**



"The value is in enabling engineering to keep iterating," Zhang explained. "It took more than a decade of engineering investment to reach HAMR volume shipment with strong yields. Windchill helps make that possible. Innovation doesn't happen in a vacuum. It happens through iteration and key component reuse. Our digital thread, rooted in the Windchill PLM system, enables that iteration and sustained innovation."

Looking Ahead: A Smarter, Faster, More Agile Future

Seagate is continuing to expand its digital thread capabilities with initiatives such as AI assisted change processes, configurable platforms and options/variants for new product introduction, Bills of Process for manufacturing agility, ALM/PLM integration for unified hardware-firmware change management, and exploration of VR/AR for smart manufacturing.

"The next phase is an opportunity to push even further," Zhang concluded. "We're looking for ways to make the platform smarter with even more automation, more intelligence and more agility. Windchill is the long-term foundation supporting our ongoing innovation."

Customer Overview | Seagate

Industry	High-tech
Employees	30,000
Revenue	$11.01 billion
Website	seagate.com
PTC Products	Windchill

Benefits

- **Enterprise-wide digital thread** - Single, authoritative product definition across all business units with global scalability.
- **Unified Product Data Model** - Replaced fragmented legacy PLM/PDM systems and ensures consistent definitions across HDDs, SSDs, systems, equipment and tooling.
- **Improved Part Reuse and Cost Efficiency** - Structured classification and management of 1m+ part numbers, eliminating duplicates, reducing sourcing and qualification effort.
- **Accurate, Scalable BOM Management** - Supports complex, high-volume, globally distributed manufacturing environments.
- **Faster, More Reliable Engineering Changes** - Unified ECN workflows propagate updates across the enterprise within minutes or hours.
- **Strong Cross-functional and Supplier collaboration** - 30+ integrated business processes. Secure, compliant sharing of assemblies and drawings to external partners.
- **Reduced Integration Complexity and Operational Risk** - Consolidated interfaces with ERP, MES, supply chain and enterprise data platforms.
- **Enhanced Quality Investigations** - Centralized data, full traceability and elimination of manual cross-system searches.
- **Supply-Chain-Centric Product Structures** – Essential for Seagate's vertically integrated, globally distributed manufacturing model.
- **Accelerated Product Configuration and SKU Creation** - Rapid market response and customer-specific variants enablement of long-term innovation cycles and foundation for future digital transformation.