

Collaborative Product Development

실시간 협업 분산 설계

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 - T³ Design: Collaborative Design Engineering
- 분산 설계의 차이점
- 실시간 협업 / 분산 설계의 예제

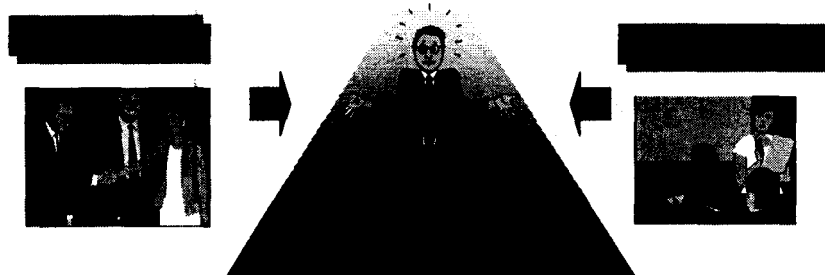
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Market Needs in Product Development

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Challenge in Product Development

TIME



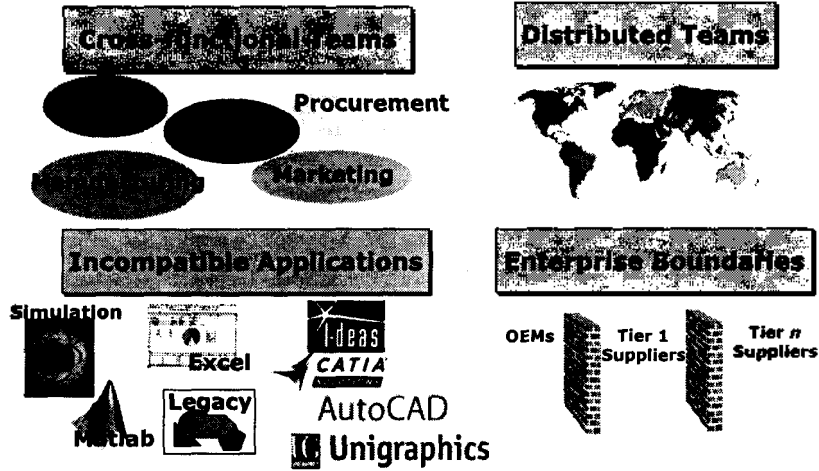
- Rapidly changing customer needs
- Customization often preferred
- Shorter product lifecycles
- Higher expected quality at lower prices

- **Reduce Product Cycle Time**
- **Decrease Costs**
- **Improve Quality**

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Challenge in Product Development

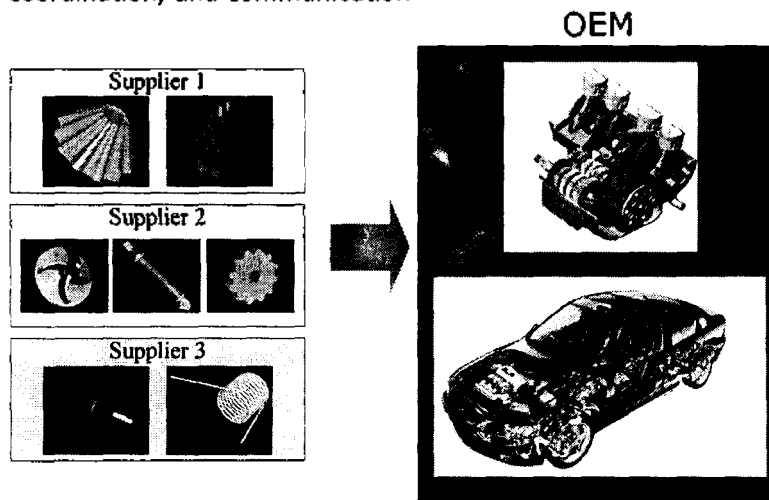
Distributed cross-functional design teams need to integrate their efforts to evaluate various design alternatives



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Market Needs in Collaborative Product Development

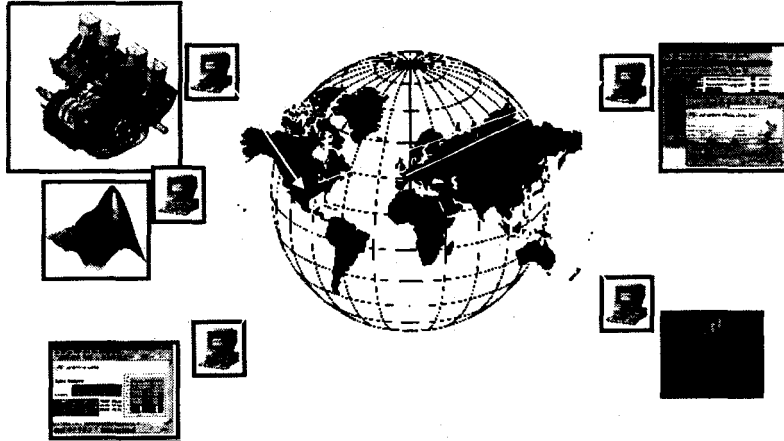
- Involving more parties inherently requires improved integration, coordination, and communication



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Market Needs in Collaborative Product Development

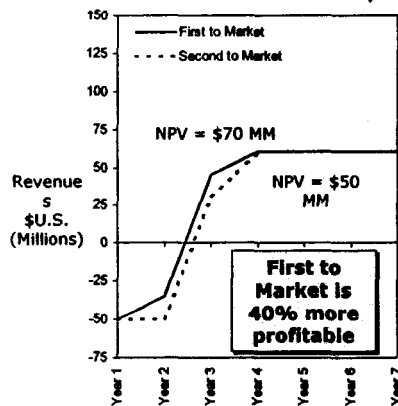
- Coordination is often further complicated by geography
- Use of different software applications



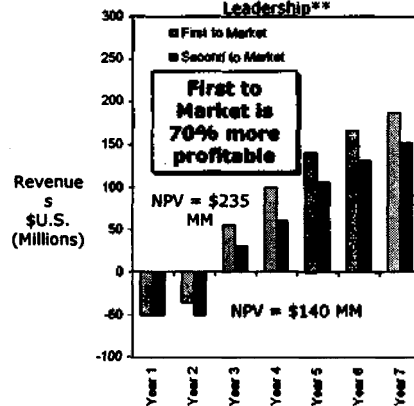
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Time to Market: Winning Formula

Demonstration of Identical Projects Launched 6 Months Apart*



Demonstration of Identical Projects Launched 6 Months Apart with Continuing Market Leadership**



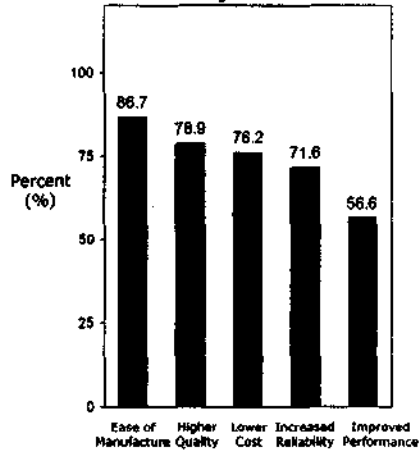
*Assumes both projects cost \$100 million to develop with revenues of \$30 million in first year after launch and \$60 million thereafter; first project launches after 18 months, second after 24 months; expected ROI of 15% for both projects used for NPV

**Same assumptions as above except market continues to grow and first to market maintains market share leadership
Source: Oculus Technologies, Inc.

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Top Objectives in Product Development

Top Five Design Objectives



* Better. Faster. Cheaper.

For many engineers, those three words have served as the doctrine of product design for the 1990s.

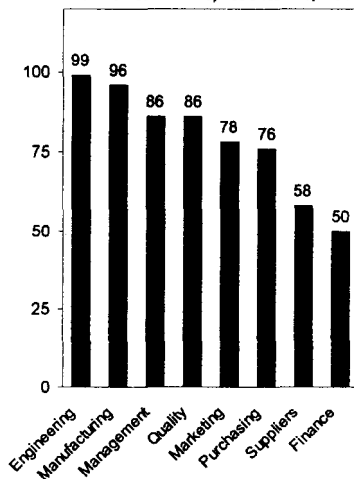
Unlike most fleeting corporate fads, however, this one is here to stay. To hear experts tell it, the 1990s was only a warm-up. The 21st century will bring an even more powerful push toward "better-faster-cheaper."

- Design News

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Collaboration in Product Development

Percentage of Product Design Teams with Functional Representative, 1998



Engineering and Manufacturing requires participation from various outside organizations

"There's a revolution occurring in product design and development. And it's got nothing to do with computer-aided design tools or cutting-edge polymers and alloys. Instead, it involves a radical shift in thinking about exactly what the design process is and who should be involved in it.

Under pressure to shrink design cycles, leverage new technologies, and lower development costs, many manufacturers are transforming product design from a solitary activity handled solely by engineering, to a dynamic process involving the input of multiple company functions as well as key suppliers"

- Design News

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Collaborative Product Design Solutions

- Engineering and Manufacturing Integration



- Improved Supply Chain Management
- Coordination without Consolidation
- Real time product knowledge sharing
- Independent product development process

- Reduce Product Deployment and Manufacturing Cycle Time
- Decreased Costs
 - warranty,
 - Errors & waste
- Improved Efficiency

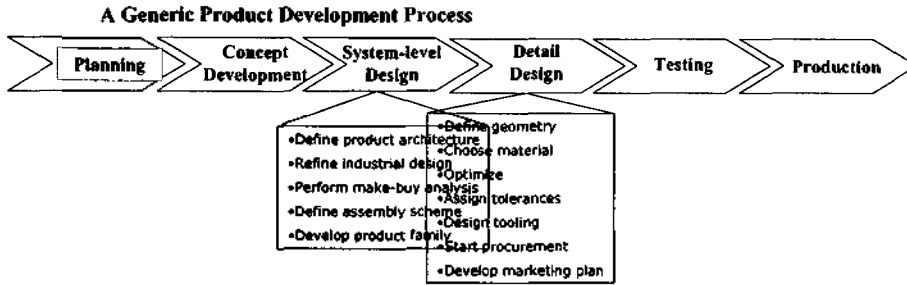
- Accelerated Time-to-Market
- Minimized Product Flaws
- Improved Customer Satisfaction
- Rapid value creation

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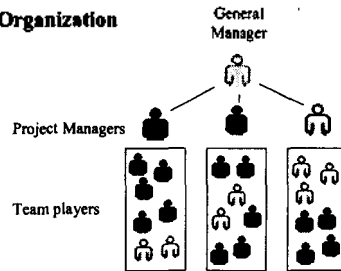
Product Development Current vs. Collaborative Processes

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Product Development Processes and Organizations

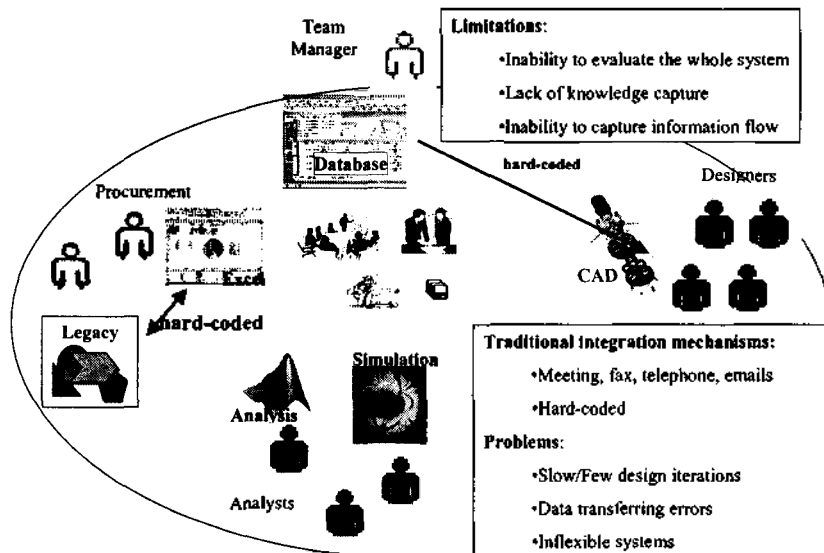


A Typical R&D Organization



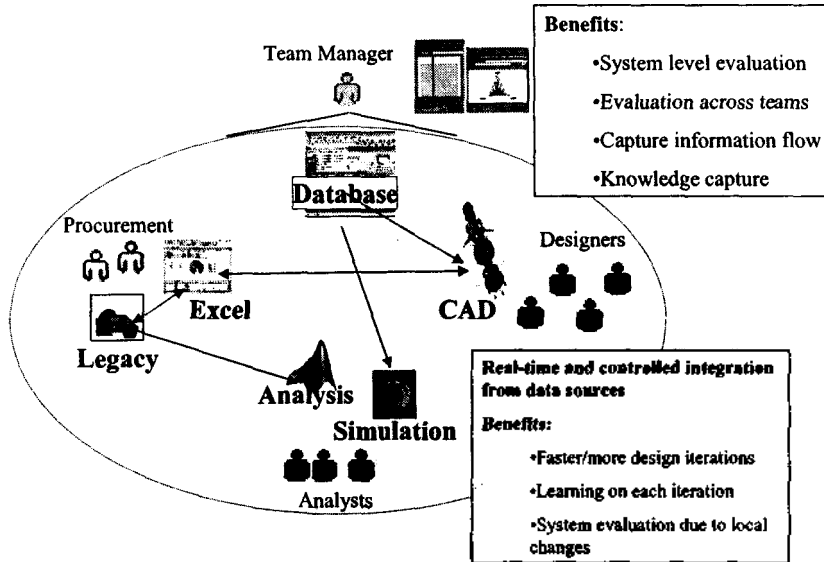
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Current Design Processes



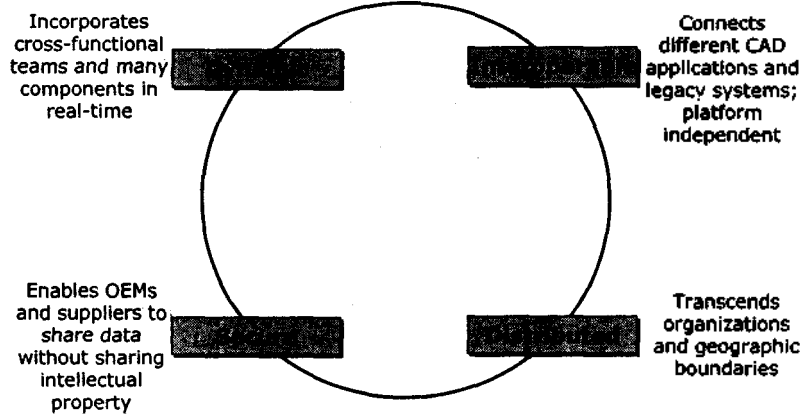
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Collaborative Design Processes



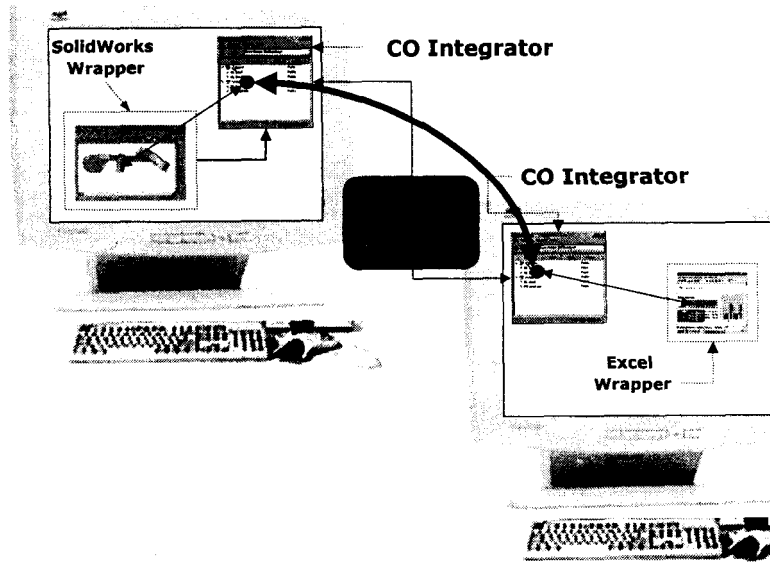
2011 EX

Collaborative Evaluation Environment



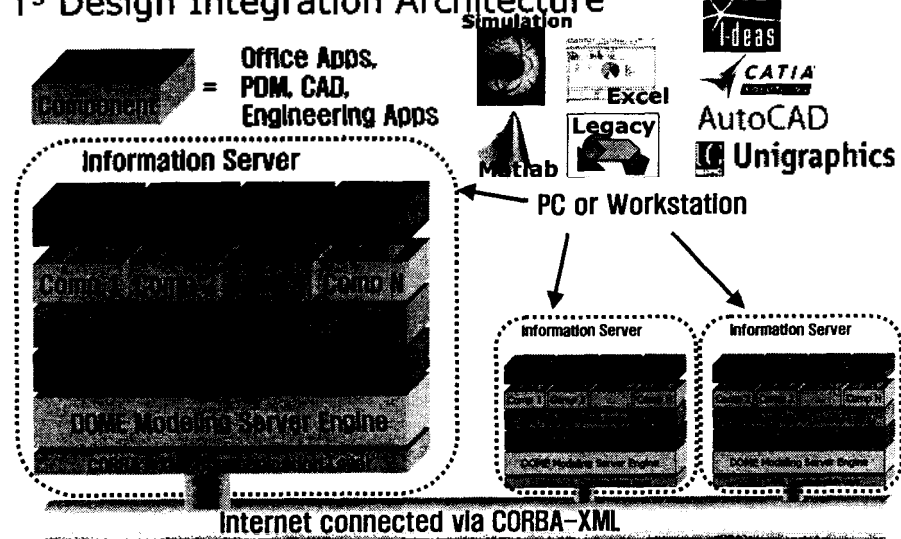
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Collaborative Design Concept



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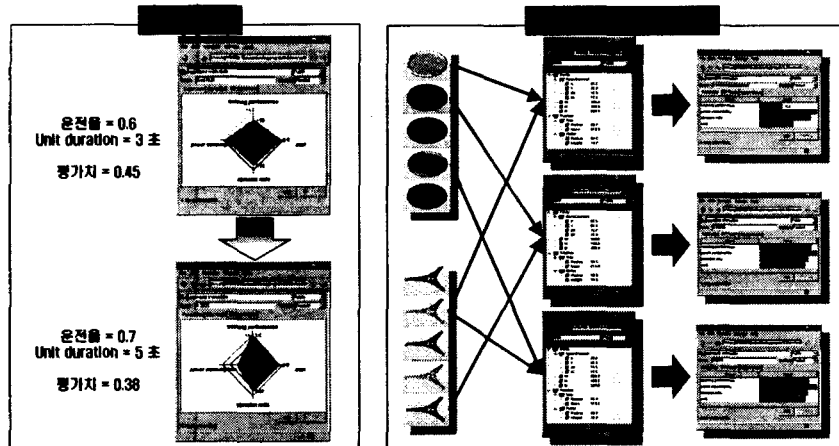
T³ Design Integration Architecture



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Product Design Evaluation

·특정 설계결정이 제품 요구사항에 미치는 종합적인 영향도를 신속하게 평가, 비교함으로써 개발초기에 검토 가능한 다수의 설계대안에 대한 체계적인 비교, 분석이 가능



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Collaborative Engineering Benefits

Team Benefits

- Provides easy and secure access to all data
- Enables distributed access to other users' analyses
- Accesses data directly from sources
- Decreases meetings, phone calls, and emails
- Eliminates data transferring errors

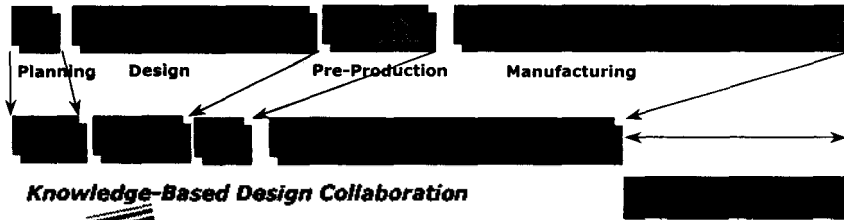
Management Benefits

- Captures business process and information flow
- Provides system level view
- Expands knowledge resources
- Reduces cycle time
- Improves quality of decisions

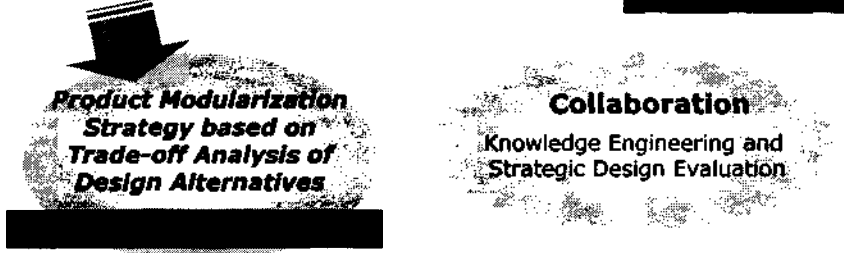
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Rapid Product Development: Cost effective Speed

Traditional Design Methods



Knowledge-Based Design Collaboration



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Examples of Collaborative Product Development

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Collaborative Design Example: Cellular Phone Design

CAD Engineer

- Uses CAD models to define geometry
- Uses PDM spec data to modify engineering drawing in real-time
- Checks physical interferences
- Review actual images.



Electrical Engineer

- Designs cell phone performance
- Evaluates performance in standby time, weight, and cost.
- Calculates cell phone cost with Excel spreadsheet.
- Critical interface with the system depends on the part selection via PDM
- Automatically updates cell phone design with PDM part parameters

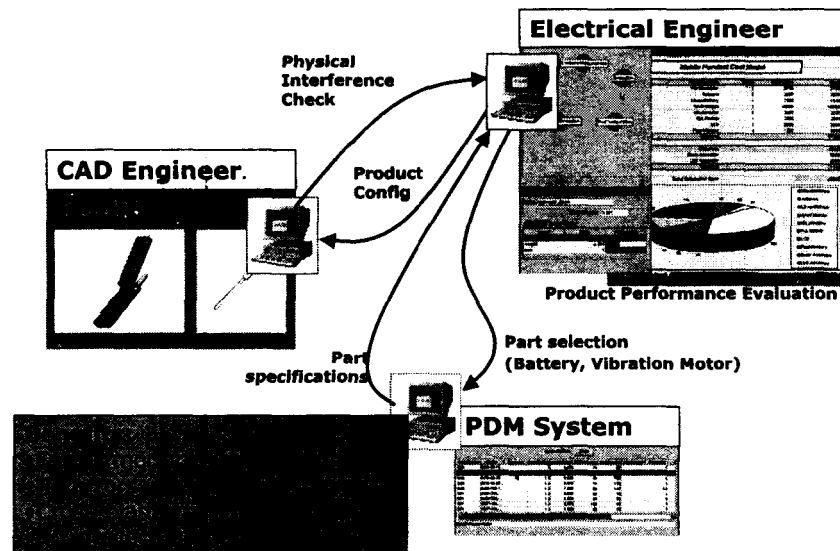
PDM System

- Publish part data specs in real-time.



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Collaborative Design Example



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Example Projects at Ford



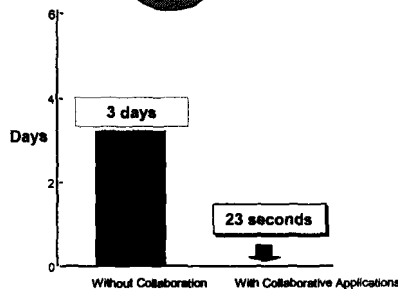
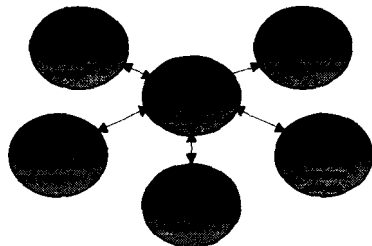
Designing Seal Windows System

- **Reduced (by a factor of at least 10) the time** for evaluating each design alternative
- **Increased quality by 20%** (measured as the number of errors that are caught before they propagate)
- **Found and corrected errors** prior to production with an **estimated \$1 - 2 million in annual savings** in warranty costs
- **Captured the state of a design**, particularly the parameters that were used to make decisions
- **Eliminated geographic and temporal obstacles**
- **Decreased wasted time** caused by slow communication paths

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Example Projects

Improving Fuel Economy



On Business Week (March 26, 2003).

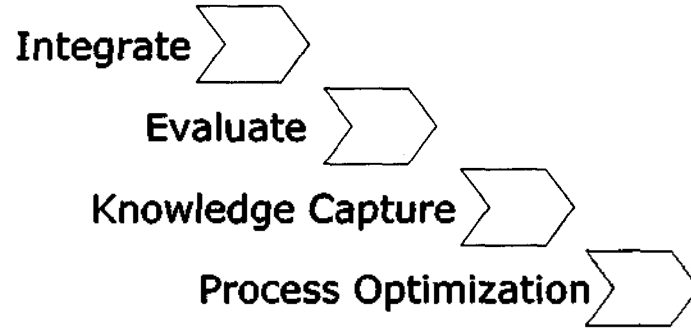
Consider Ford Motor Co. (F) Engineers searching for ways to improve the fuel efficiency of its vehicles are using Web collaboration technology to share design changes and other information with engineers and suppliers scattered around several locations.

That way, they can instantly analyze how a proposed design change would affect a vehicle's fuel economy. Analysis that might have taken three days can now be completed in less than a minute. That's important as Ford races to make good on a promise to boost the fuel economy of its sport-utility vehicles 25% by 2005.

Just as significantly, the technology will shave \$5 million to \$15 million off a vehicle's development costs. While that's small change on a car that costs \$2 billion to develop, the savings would be sizable if it were applied company wide, Ford says.

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Improving the Design Chain



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