

Accelerate your product innovation

HCL's Computer-Aided Engineering (CAE) solutions

You need to improve product quality and keep development costs down. We understand your needs. In today's business scenarios organizations like yours are striving for time savings, productivity gains and strategic benefits. What you need is a radical new way to product development.

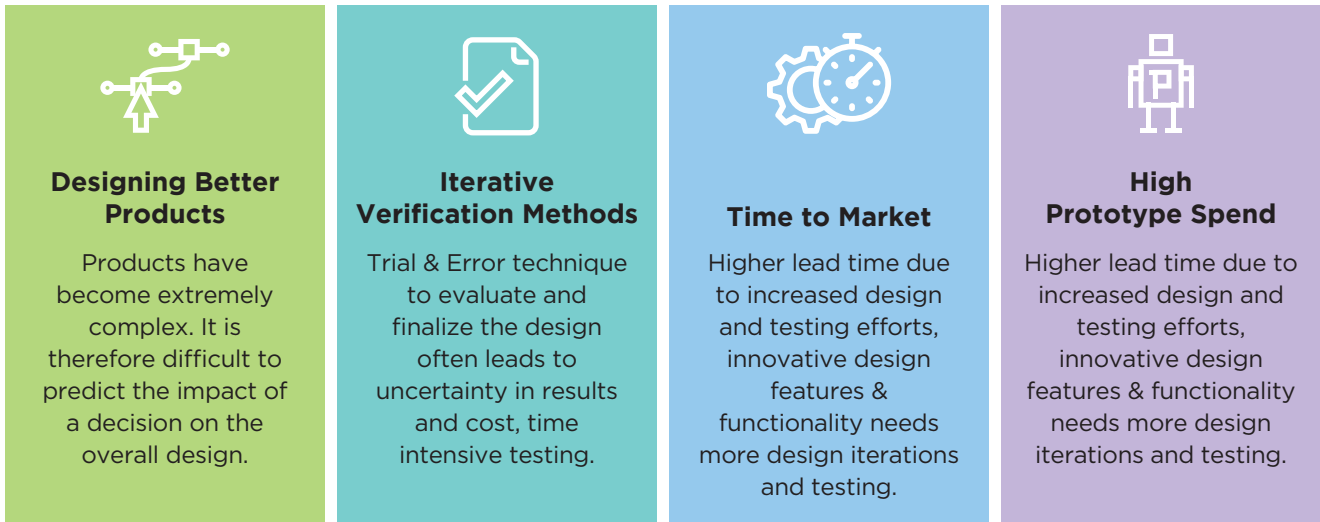
With the right Computer Aided Engineering solution, you can enhance your product's performance and quality and enjoy the strategic benefits that result from effective CAE implementation.



HCL's CAE solutions offers organizations solutions to complex engineering problems at different stages in a product life cycle from concept evaluation & design to manufacturing as per industry standards, to root cause analysis for field failure issues, and resolutions.

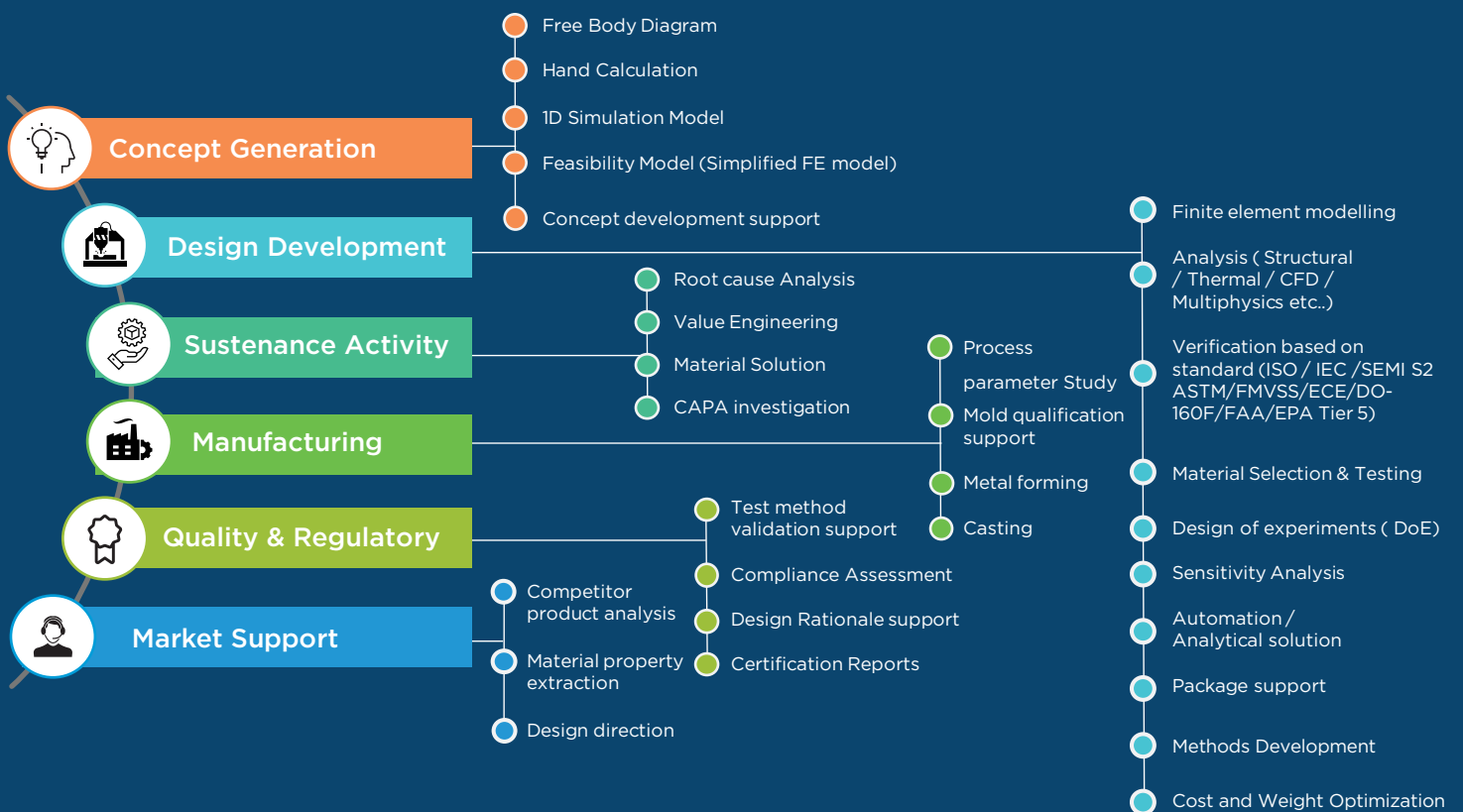
Business Challenges

Product development is a complex, dynamic, and time-consuming process. The market is always in need of new products that offer greater functionality and a fresh user experience. Manufacturers and service providers are under duress to simplify and expedite their processes to result in high-value product development engineering that reduces time & cost and simplifies design. Some of the biggest challenges in product design are:



CAE Solutions all through product lifecycle for Superior Products

HCL has acquired expertise in successfully implementing CAE solutions at each stage of product development. Expertise in end to end solution purveying has been our core forte to come over design challenges

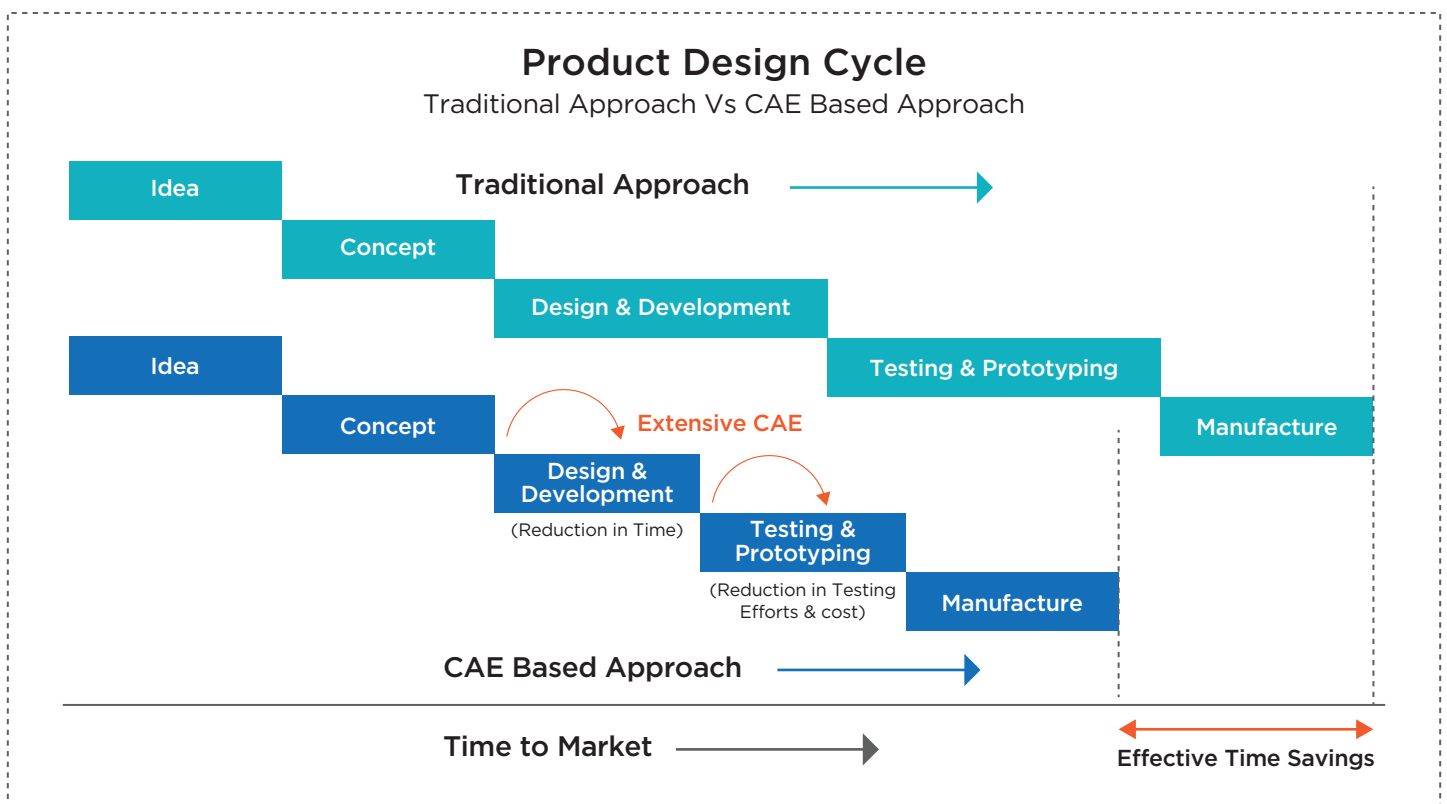


HCL's CAE-driven Design Solutions


HCL's CAE solutions help customers make the right design decisions for building robust and optimized products. Our CAE solutions help simulate performance to improve product designs and assist in resolving engineering problems for a wide range of industries.

HCL's CAE solutions help customers simulate, verify, and optimize products, processes and tools. This allows our customers to save development costs, reduce time to market while helping them build their product portfolio with varied ranges and functionalities.


HCL's CAE solutions address product design and development activities in Aerospace, Automotive, Industrial, Medical, Hi-tech, Consumer electronics, Semiconductors, and Consumer Appliances for leading OEMs and Tier 1 & 2 suppliers across the globe.





Our customers realize the following business advantages through CAE driven solutions:


 Reduced Time to Market


 Continuous Design Improvement


 Robust & optimized Design

 Improve customer satisfaction

 Improve Accuracy & Failure Predictability

 Reduced Physical testing / Prototyping

 Resolving Field Failures

 High compatibility with Emerging Technologies like Digital Twin and AI/ML

HCL's CAE Service Offerings to Achieve Product Excellence

HCL's CAE solution are an indispensable part of our customers' product development teams. We help customers launch world-class products by successfully applying the following CAE solutions.



New Product Development Support

Our customers would expect their product to be more reliable, safe and cost effective. Designers would like to understand products performance at all possible usage conditions before building the product.

We at HCL, perform various CAE simulations such as Structural analysis, CFD analysis, Multi physics simulations and Kinematic studies to predict and improve

- ▶ Strength of Product
- ▶ Cost and Weight
- ▶ Life Enhancement
- ▶ Flow, Thermal Performance and Efficiency
- ▶ Mechanics of Machine
- ▶ Co-Simulations



Emerging Technologies

Our customers are under increasing pressure to reduce costs, early to market and real time data acquisition of physical product for improvisation of products, while increasing flexibility, improving quality and product traceability. To meet these demands, customers are approaching HCL for newer and more innovative solutions. We support their needs through services such as

- ▶ Digital twins
- ▶ Artificial Intelligence / Machine Learning
- ▶ Electric & Autonomous Vehicles
- ▶ Additive Manufacturing
- ▶ 3D-to-1D System Modeling
- ▶ Cloud Computing



CAE Automation

The latest and most sophisticated Computer Aided Engineering (CAE) software enables the most tedious manual design functions in engineering to be carried out automatically and instantaneously. Through HCL's automation solutions, customers benefit increased productivity, reduced project turnaround times, improved product quality and safety.

HCL CAE's solution in this space are:

- ▶ In-house Automation tools
- ▶ TCL/TK, Python, Visual Studio Based APIs
- ▶ Ansys APDL and ACT programming

Why choose HCL CAE?

With Engineering and R&D in our DNA, cross-industry best practices, and a talent pool comprising of leading Subject Matter Experts (SMEs), we help customers enhance and accelerate their product development.

Service Offerings

- End to End product support – One stop solution
- Structural, Thermal, CFD, Multiphysics and CAE Automation
- Agile, Flexible business model options
 - » Time and Material model
 - » Fixed price model
- Quick ramp-up & down model for effective demand management

Skills and Experience

Expertise:

- 500+ CAE Engineer along with Industry experts, SME and PhD scholars
- ~20 years of simulation heritage across different domain
- Involved in several complex mission-critical products developed from concept to Manufacturing across different industry domain spread

Ecosystem

- Strong Partnerships:
 - » Collaboration with world known Institutions in developing new technologies
 - » Manufacturing support: CAE enabled tools development
 - » High Performance On-premise and Cloud Computing
- In-house Product Engineering, Product Test Labs, Reliability Engineering and VAVE

Automation in Company's DNA

- CAE Process Accelerators
 - » Preprocessing to Report generation
 - » Automation tools customized to suit customer process and products
 - » Reusable model and Reduced rework & hand offs

Engineering Maturity

- Cross Pollination of Practices
 - » Adoption of Best Practices from across the industry domains
- Standardization:
 - » Process
 - » Simulation Tool
 - » CAE Libraries
 - » Knowledge Base

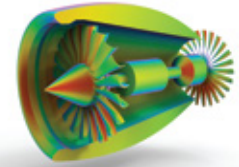


Customer Success Stories

Aero

A large US-based Tier-1 Aerospace supplier was supposed to pay penalty to the Aircraft OEM for the over weighing design of Nacelle structure.

HCL CAE team took a herculean task of understanding the functionalities, interfacing components, manufacturing limitations in a quick time and were able to come up with optimized Nacelle design to meet the targeted weight. HCL's CAE team helped our customer to save huge penalty amount by performing simulation based Topology optimization and Engineering judgement.



Auto

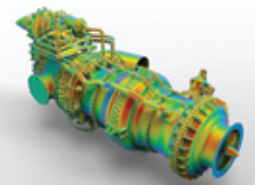


A leading US based automotive OEM company had a need and vision to establish an engineering center in India as a hub to support various design programs across the globe.

HCL CAE group helped them to realize their vision by closely coordinating with OEM management in working out strategies for various divisions in terms of skillset matrix, hiring and training process. By cross leveraging various best practices, HCL CAE team helped the OEM customer to set up their facility with the right skilled engineers (close to 200+ CAE Engineer) to support various programs in a very short time.

Industrial

A global leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives has a strong strategic partnership with HCL for over a decade. HCL's CAE team provides support to address many field failure issues to minimize warranty costs and reduce machine downtime. HCL also takes part in finalizing design concepts through CAE solutions to optimize the designs and minimize overall cycle time to market



Medical



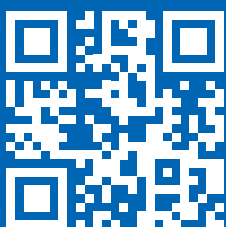
A U.S based global leader in the science of diagnosing and treating heart rhythm disorders wanted to enhance the medical devices RnD with CAE solutions. HCL's CAE group helped them by providing the design directions at different stages of the product development cycle. The simulation helped the customer in understanding the various modes of design failure, optimizing the design parameters and reducing the design cycle time.

HCL

HCL Technologies (HCL) empowers global enterprises with technology for the next decade today. HCL's Mode 1-2-3 strategy, through its deep-domain industry expertise, customer-centricity and entrepreneurial culture of ideapreneurship™ enables businesses to transform into next-gen enterprises.

HCL offers its services and products through three lines of business - IT and Business Services (ITBS), Engineering and R&D Services (ERS), and Products & Platforms (P&P). ITBS enables global enterprises to transform their businesses through offerings in areas of Applications, Infrastructure, Digital Process Operations, and next generation digital transformation solutions. ERS offers engineering services and solutions in all aspects of product development and platform engineering while under P&P. HCL provides modernized software products to global clients for their technology and industry specific requirements. Through its cutting-edge co-innovation labs, global delivery capabilities, and broad global network, HCL delivers holistic services in various industry verticals, categorized under Financial Services, Manufacturing, Technology & Services, Telecom & Media, Retail & CPG, Life Sciences, and Healthcare and Public Services.

As a leading global technology company, HCL takes pride in its diversity, social responsibility, sustainability, and education initiatives. As of 12 months ending on December 31, 2021, HCL has a consolidated revenue of US\$ 11.2 billion and its 198,000 ideapreneurs operate out of 52 countries. For more information, visit www.hcltech.com



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