



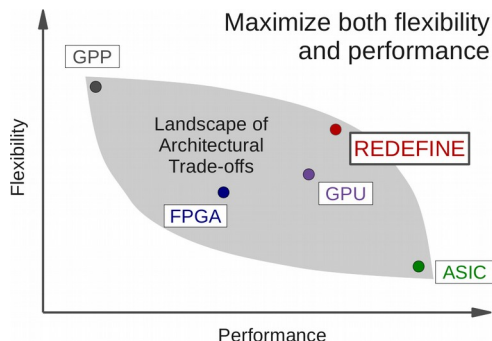
Company Profile

About Morphing Machines

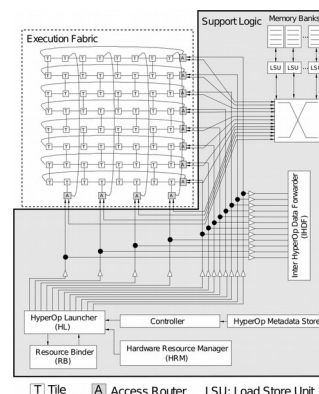
- **Morphing Machines Pvt Ltd** – a closely held fab-less semiconductor company launched from the Technology Entrepreneurship initiative of the **Indian Institute of Science** at Bangalore – has recently emerged as one of India's most exciting silicon-centric technology start-up companies
- **Morphing Machines** licenses its patent-pending **REDEFINE** reconfigurable silicon core technology and other unique semiconductor and software IPs to key customers in India and elsewhere
- **Morphing Machines** featured as one of the four global semiconductor start-up companies in the **Cool Vendors 2011** report of **Gartner Research**
- **Morphing Machines** was founded by a distinguished group of IIT and IISc alumni with decades of rich experience in cutting-edge technology product research and development at leading global computer technology corporations
- With a best-in-class technical staff – all graduates, postgraduates, and PhDs from IISc, IITs, and other leading institutions in India and abroad – **Morphing Machines** has created an invigorating environment for research and development in advanced silicon solutions and core systems software in India
- Aiming to emerge as one of the foremost global IP providers for high-performance reconfigurable silicon cores, **Morphing Machines** collaborates closely with research groups at the **Indian Institute of Science**

About REDEFINE technology

- **REDEFINE** – a path-breaking new processor technology from **Morphing Machines** – provides an architecture and a silicon platform for building *polymorphic ASICs* and SoCs that implement *application specific runtime reconfigurable heterogeneous multi-core and massively parallel processors*
- **REDEFINE** reconfigurable silicon cores offer hardware acceleration for entire classes of applications – enabling ASIC-like performance at an affordable NRE cost for a much wider range of compute-intensive applications than has ever been possible before
- The powerful **REDEFINE Meta Compiler Framework** enables re-targeting existing application sources to a new **REDEFINE** application core through concurrency analysis and automatic generation of hardware reconfiguration meta-data for the **REDEFINE** compute fabric and the **REDEFINE XNOC** network-on-chip
- Fast cycle-accurate **REDEFINE Simulators** enable full functional verification, extensive pre-synthesis design validation, and application performance benchmarking much before any hardware realizations are available
- **REDEFINE** technology has enabled breakthrough multi-protocol reconfigurable silicon solutions in cryptography, video processing, and other domains. Exciting research and development are in progress in avionics, software defined radio, pattern recognition, artificial neural networks, secure embedded systems, and other application domains of interest



Relative advantages of **REDEFINE** reconfigurable silicon cores



High level architecture of the **REDEFINE** massively parallel runtime reconfigurable application specific processor core

Information on **Morphing Machines** IPs, products, solutions, and services is overleaf. More information is available at <http://morphing.in>



What Morphing Machines Offers

Morphing Machines IPs and offerings

- **REDEFINE Reconfigurable Silicon Core** – Breakthrough **Massively Parallel Processor** and **Heterogeneous Multi-Core** SoC platform for rapid realization of domain-specific high-performance hardware acceleration solutions
- **REDEFINE Meta Compiler Framework** – Enabler for optimal application performance on **REDEFINE** MPP and HMC processors
- **REDEFINE MPP Simulator** – Cycle-accurate simulation platform for **REDEFINE MPP** processors for application software development
- **REDEFINE XNOC** – Ready-to-use reconfigurable and scalable **Network-on-Chip** silicon IPs with high-throughput, deadlock-free routing, multiple topologies, and customizable interfaces for rapid integration of complex multi-core and many-core SoCs
- **REDEFINE Crypto Core** – High-throughput silicon IP for a dynamically reconfigurable multi-protocol silicon cryptography engine
- **MM REMoSS** – Programmable embedded monitor platform for secure FPGA based embedded system and MPSoC applications systems and solutions
- **MM-FPUX** – High-performance customizable silicon IP for partially IEEE 754 compliant floating-point units supporting double and extended precision arithmetic and custom special functions
- **REDEFINE XFloat** – High-throughput silicon engine for floating-point and linear algebra computations
- **MM RAES** – High-performance reconfigurable silicon IPs for AES encryption/decryption supporting up to 256-bit keys and all AES modes in standard and custom configurations
- **MM RECC** – Programmable high-performance silicon IPs for finite field arithmetic with ready-to-use Elliptic Curve Cryptography support
- **MM SHARC** – Optimized silicon IPs for very fast **SHA-2** and **SHA-3** secure hash function units
- All **Morphing Machines** silicon IPs are functionally verified, FPGA validated, performance and area optimized, and customizable – ready for back-end design and integration into ASIC or SoC

Key Morphing Machines competencies

- Mathematical modeling, problem analysis, algorithm identification, characterization, and optimization, for hardware acceleration of compute-intensive problems
- Rapid prototyping or golden reference implementations of target algorithms or complete applications in C/C++ and other programming languages
- **Compiler development** for targeting application-specific custom processors and hardware accelerators
- **High-level design and synthesis** using advanced functional hardware description languages
- Design, realization, verification, and optimization of application or domain specific special purpose **custom functional unit** silicon IPs
- RTL design, simulation, synthesis, verification, and optimization using Verilog HDL
- **Rapid FPGA prototyping of ASIC and SoC** designs using multi-FPGA high-capacity COTS and custom FPGA boards
- **Current application domains:** Cryptography and cryptanalysis, numerical computation, matrix and linear algebra computations, high-definition video processing, signal processing, pattern recognition, artificial neural networks, software defined radio, reference monitors for secure embedded systems and MPSoCs, and other high-performance computing application domains
- End-to-end know-how, processes, and partners to take a custom silicon solution from concept stage all the way through back-end design and verification, and ASIC or SoC fabrication using reputed multi-project shared wafer services or commercial foundries

Custom solution development

- **Morphing Machines** offers custom advanced silicon-centric solution development services (mainly to support adoption of **REDEFINE** and other **Morphing Machines** IPs) to select customers – from high-level algorithm to hardware accelerated solution realization on FPGA or ASIC/SoC platforms
- Development of application oriented systems and solutions and technology consulting and training are provided in association with our selected partners

More information on **Morphing Machines** and **REDEFINE** technology is overleaf. Further information is available at <http://morphing.in>