Mirabilis Design *is a Silicon Valley company, providing software solutions to identify and eliminate risk in the electronic product specification; accurately predict the human and time resources required to develop the product; improve communication between engineering teams; and ensure software quality.*

VisualSim Architect Features

VisualSim Architect is the graphical modeling and simulation software for system design and validation of network of systems, electronics, semiconductors and timing critical software. This simulation-based solution is used for the rapid exploration of architectures, to optimize the product specification, and conduct software validation. The output results provide the designer feedback on safety, reliability, functionality, energy and performance.

VisualSim Architect provides a large library of modeling components, application–specific templates, and a graphical entry for software code. Using these VisualSim capabilities, engineers can assemble models of their proposed system in a graphical editor. Users can execute a large number of simulations by varying the parameters to view the operation for different architectures, traffic scenarios and fault conditions.

The generated reports, performance plots and power statistics provide insight into the operation and enable the designers to finalize the system specification to meet service latency, bandwith, power and cost.

VisualSim Architect eliminates the two major system modeling challenges of *"where do I start"* and *"it takes too much time".* This type of architecture modeling is used prior to any algorithm implementation or software development. After the software has been debugged, the same platform model in VisualSim is used for software validation. Power modeling studies the power efficiency of the system and the impact of complex power management schemes.

The finalized and fully validated models can be embedded in the specification document for simulating within a Web Browser. This can be used to communicate the specification across partners and customer.

VisualSim Simulation Output

Core Features

- Graphical and hierarchical model construction for rapid system definition and component reuse
- Models can be exchanged seamlessly across all major OS– Windows, Linux, Mac OS X and Solaris
- Training material, documentation and tutorials integrated into the graphical environment
- Multiple models of simulation integrated into one simulation engine including, discrete–event cycle–based, continuous, and finite state machine
- Virtual environment to execute C/C++/Java software
- Graphical debugging components for rapid model validation and testing

Applications

- Performance trade-offs using bandwidth utilization, application response time and queue depth metrics applied to system sizing, flow management and traffic analysis
- Power measurement reports for device consumption of application tasks, battery usage, and average/peak power, to design energy conservation
- Functional analysis generates trace reports and timing diagrams to evaluate arbitration algorithms correctness, task sequence and scheduling, and hardware–software task assignment.
- Software validation for functional correctness, timing and power consumption for different hardware configurations, and faults
- Reliability anaylsis using real–life scenarios such as fault injections; incorrect data values; timing jitters; loss of devices such as links; battery capacity and processor board; and traffic overloading

Application Templates

- Starting point for model construction with pre-configured sub–components and analysis tools
- Templates available for applications in Networked Systems, Electronic Systems, Semiconductors, Time-Critical Software, Satellite, Avionics, Automotive, Computing, Network, Wireless, Multimedia and Radar
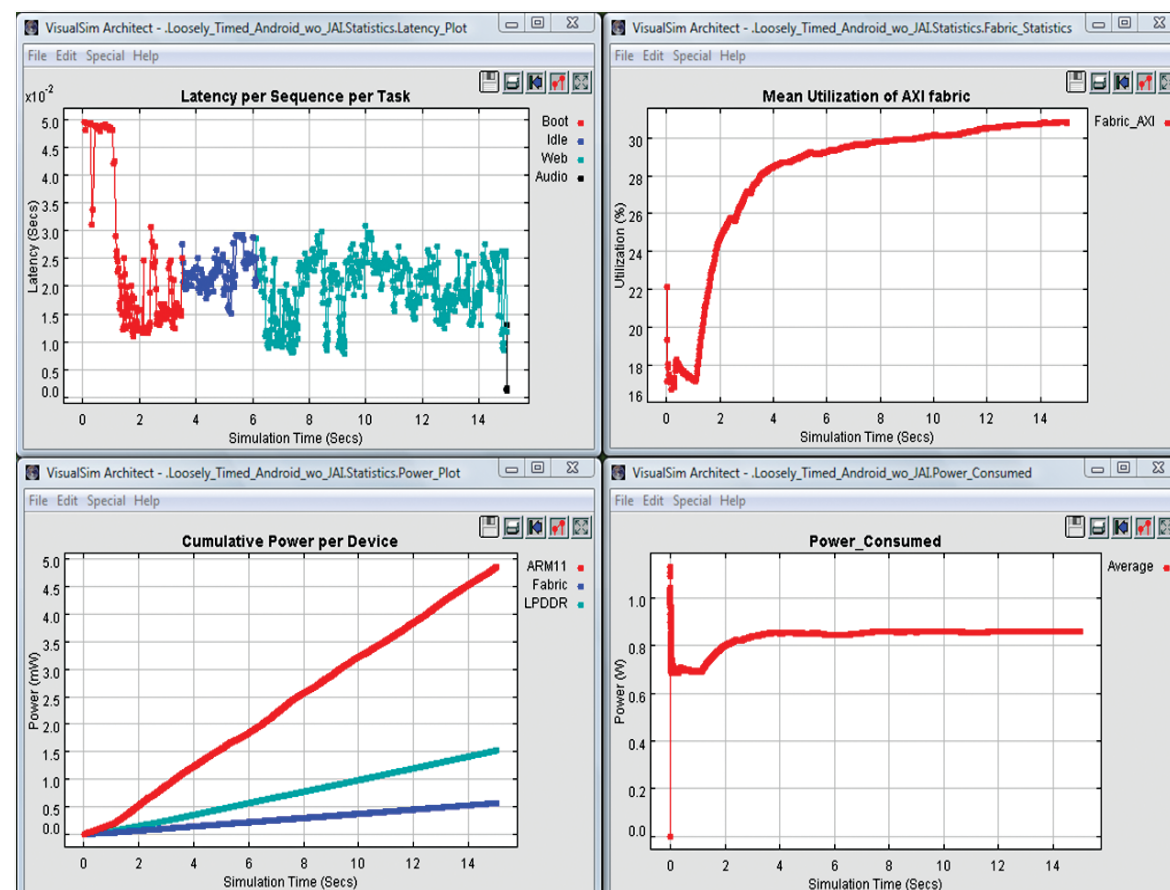
Modeling Libraries
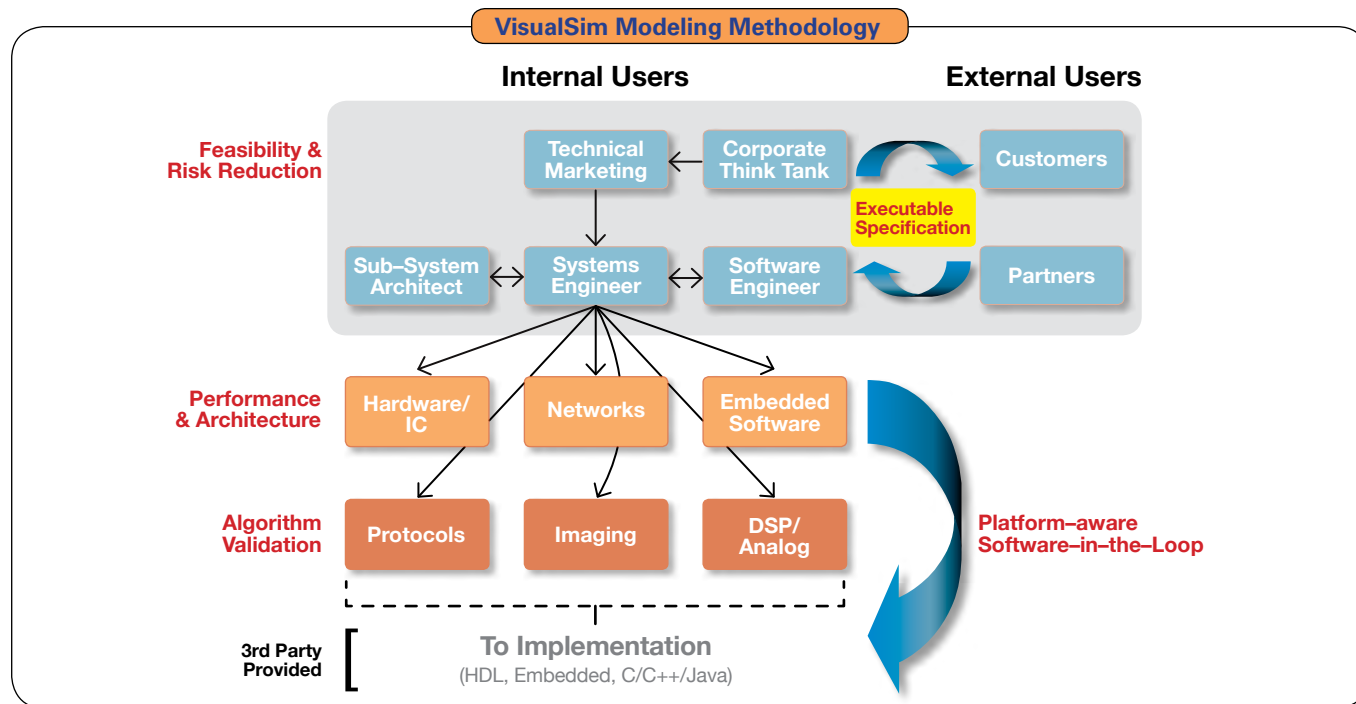
- Parameterized library of components containing timing, power and functionality
- Construct new components by changing parameters, assembling hierarchical blocks with multiple components and using code–based blocks
- Pre-built probes, plotters and output displays for capturing statistics, and doing real–time debugging
- Over 600 RegEx functions for data evaluation accelerators, analysis output, dynamic queuing, power management and scheduling operators
- C-like script language to accelerate development of protocols, arbitrations and automate tasks
- Over 20 interface blocks for reuse of simulation models, algorithm code and traffic files
- Algorithmic library of signal processing, communication, imaging, control systems, network protocols, and wireless sensors
- Auto–generators for vendor–specific processors, buses, switches, memories, cache, storage devices, RTOS and software tasks
- Technology-specific network protocols, interfaces, buses and memory devices

Documentation and Sharing

- Export to HTML provides early documentation output from model
- Generate Java Applet from the model for simulating from within a Web Browser
- Advanced graphical debuggers include flow trace, interactive viewers, probes, syntactical debuggers, automatic logical and syntactical error detection with recommendation messages
- Preset statistics include Latency, Throughput, Utilization, Avg and Peak power and Deadline checker, Task Trace, Hit-Ratio, Stall Time, Bandwidth and Battery Discharge
- Template documentation provides detailed explanation on model assembly, usage and technology training

MIRABILIS design | VisualSim™ Architect

VisualSim Modeling Methodology

Internal Users — **External Users**

Feasibility & Risk Reduction
- Technical Marketing
- Corporate Think Tank
- Customers
- Executable Specification
- Sub–System Architect
- Systems Engineer
- Software Engineer
- Partners

Performance & Architecture
- Hardware/IC
- Networks
- Embedded Software

Algorithm Validation
- Protocols
- Imaging
- DSP/Analog

Platform–aware Software–in–the–Loop

3rd Party Provided — To Implementation (HDL, Embedded, C/C++/Java)

Industry Requirements

Early architecture trade–off is especially important for systems with high throughput and fidelity requirements. Architects must make the system scalable and operate with a mix of traffic conditions. The time window between product generations is shrinking and new architectures need to be designed prior to standards being finalized. Emerging products have a mixture of algorithms, digital, software, analog, protocols and controls that must all be integrated in hardware and software, evaluated for algorithm quality and tested for system performance. VisualSim satisfies these requirements.

Companies need a unified specification environment to define leading–edge electronic products, leverage distributed design teams and collaborate with the customer and partners. Because hardware, software and integration teams use different methodologies, system architects need to easily describe the systems definition, operating environment and functional partitioning of the application tasks across the system.

VisualSim Benefits

VisualSim enables systems designers to make recommendations on architecture decisions. Simulation with VisualSim has demonstrated a number of non–intuitive results to quantify the risk vs. reward. The high–level of accuracy and the rapid simulation performance provides high confidence in the specification. The results provide a wider view of the system operation, plan future enhancements, debug system irregularities, and provide a platform for intensive software testing and validation.

VisualSim Architect formalizes the system specification process by providing a methodical and quantitative solution. You can start the analysis for a specific sub-system and then extend for the full system. Multi–disciplinary systems such as aircraft, satellites, automobiles, can be defined in VisualSim to encompass electrical, mechanical, electronics, and software. The graphical models, embedded in the documents, makes the communication across teams and suppliers uniform.

VisualSim Products

VisualSim Architect–Desktop graphical modeling software

VisualSim Explorer–Documentation generator and Web Server to execute models within Web Browser

VisualSim Post Processor–Combine and display plots from multiple simulations of same and different models

VisualSim Batch–Mode Simulator–Run–time license for non–graphical simulation execution

VisualSim Libraries–Custom technology and application libraries, utilities and interfaces
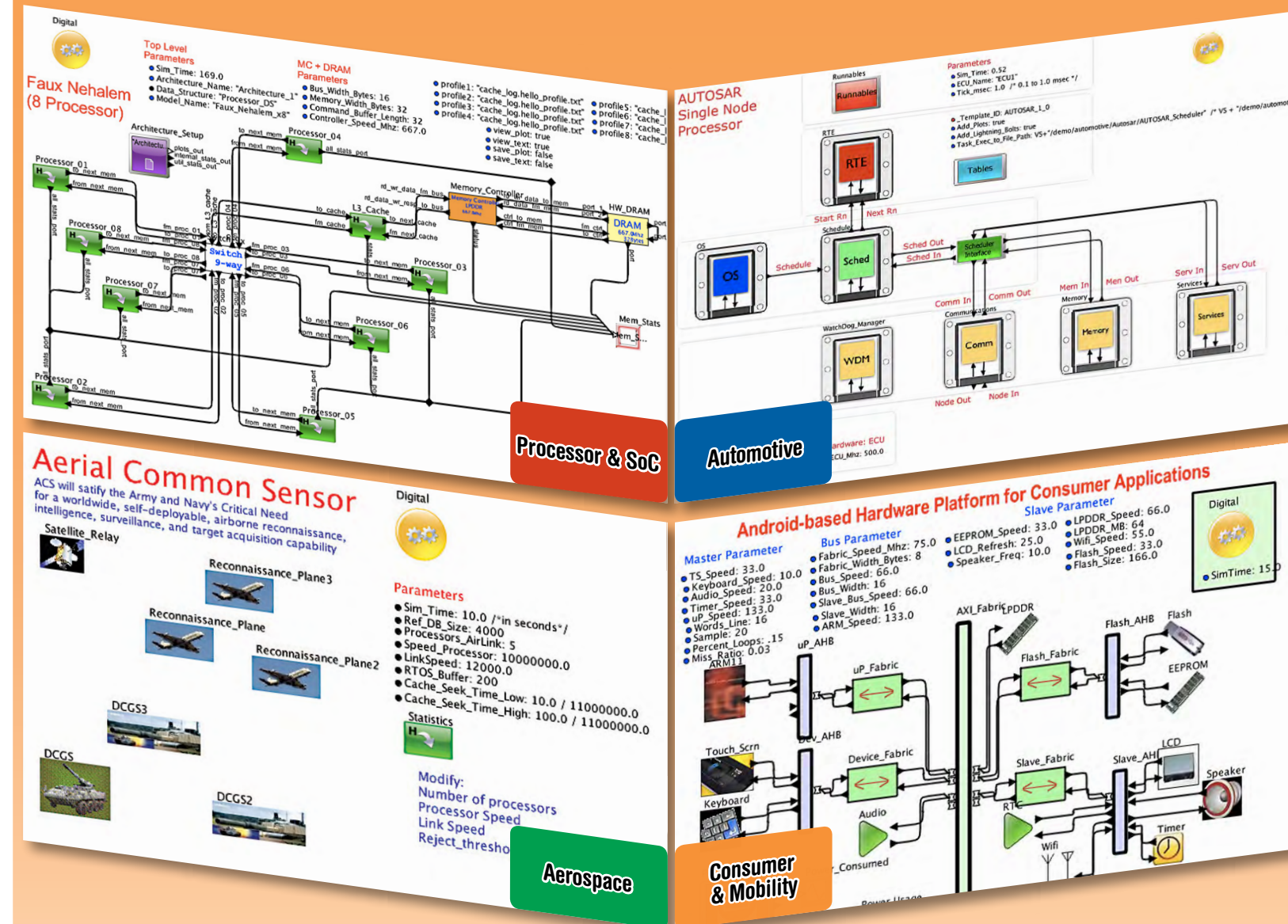
VisualSim Training & Services–Product, application and modeling training, development and analysis

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Faux Nehalem (8 Processor) — Processor & SoC

AUTOSAR Single Node Processor — Automotive

Aerial Common Sensor — ACS will satisfy the Army and Navy's Critical Need for a worldwide, self–deployable, airborne reconnaissance, intelligence, surveillance, and target acquisition capability — Aerospace

Android-based Hardware Platform for Consumer Applications — Consumer & Mobility

Applications

- Performance Analysis
- Power Measurement
- Fault Analysis
- Software Validation
- Protocol Design

Uniqueness

- Reuse models for many applications
- Consolidate modeling requirements
- Execute models in Web Browser
- Refine model using parameter
- Application modeling templates

Benefits

- Focused start reduces initial investment
- Quick results with fast, flexible models
- Short learning time with templates
- Rapid model development with libraries
- Fast time-to-results with pre-built analysis