Simio Supplemental Product Information

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Simio LLC Company Background

Simio LLC is a private company headquartered just outside Pittsburgh Pennsylvania dedicated to delivering leading edge solutions for the design, analysis, and scheduling of complex systems. Our company mission is to:

> *Lead the industry with a truly innovative family of simulation-based design and scheduling products to improve the productivity of our customers.*

Simio was founded by a highly experienced team. C. Dennis Pegden, Ph.D., Founder and CEO of Simio LLC, has over 30 years of experience in simulation and scheduling and has been widely recognized as an industry leader. He led in the development of SLAM (marketed by Pritsker and Associates) and then founded Systems Modeling Corporation, now part of Rockwell Automation. Dr. Pegden led the creation of the market-leading simulation products SIMAN® and Arena®, as well as the finite capacity scheduling product Tempo (later renamed RS Scheduler).

Many of the same team members who brought you Arena and a long line of industry breakthroughs have now focused their efforts on creating the next generation of simulation tools. This very talented team is bringing to bear an additional 125+ years of combined simulation experience to provide you with the best possible suite of simulation and scheduling tools.

Simio has an experienced management team to provide leadership in the day-to-day management of the company. Simio also has an Advisory Board of experienced executives to provide strategic input to long term planning.

Simio also has a worldwide network of over 25 very experienced partner companies who supply local sales, training, technical support, and consulting services.

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Description of Licensing Activation Modes

Simio LLC uses software activation to enable advanced Simio software capabilities. A customer and product-specific activation code is supplied based on the products and number of seats purchased. During application of the activation, a one-time automatic (or optionally manual) contact between the customer computer and a Simio license server validates installation of the product on a specific machine and replaces the customer-specific activation code with a machine-specific activation code. While this final activation code is not intended to move between computers, when necessary Simio can assist customers under current support with making such a move.

Node-locked Licensing (restricted to one computer)

For node-locked activation, Simio LLC uses software from the Infralution company. Node-locked activation is locked to a single user computer. While it is intended for a single user, it can also be shared by several people who alternately share one computer. Simio software must be installed on the machine with the activation.

Server Licensing (shared via a central server)

For server-based activation, Simio LLC uses software from the Reprise company (by the same people who invented the popular FlexLM software). Server-based activation is locked one or more servers, but those servers can in turn manage the sharing of activations across an unlimited number of clients who have access to the servers via an internal, external, or VPN network. This provides a very convenient mechanism for sharing a small number of licenses across a larger number of users. For example a 5-seat server license could be shared by 20 or more users as long as only a maximum of 5 concurrent users are sharing licenses at one time.

In addition, Reprise allows users to "borrow" a license to their machine for use while off network (e.g., while traveling), or for dedicated use for an extended period of time (e.g., to implement an important project). Both the duration and availability of borrowing is under administrative control.

Reprise does require a server that is available to all potential users. But Reprise puts only very small demands on the server for both disk space and processor load. Simio simulation software need not be installed or run on a server, only on the client machines.

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Simio Installation Notes

Delivery and Installation

Standard delivery of Simio software and activation is via electronic download from a link provided by Simio LLC. Delivery of the software on media is optionally available for an extra fee.

Installation is implemented by the customer. Email and line on-line support, phone support, and the Simio User Forums are available to assist in resolving any installation related problems.

Description of Runtime Capability

Runtime is the ability for people to execute a Simio model without investing in that design-time version of Simio. Simio imposes no limits to the number of models you can distribute or the number of people you distribute to. You are free to distribute outside of your organization if you choose. There is no charge for any such distribution Two runtime modes are available:

Interactive Runtime

Uses Simio Personal Edition, which is available free to anyone and may be used without activation. It provides the ability to load a model, run it interactively to view the animation, and even change the model at will. Model changes cannot be saved nor is the capability provided to run experiments or execute custom user-written steps and elements. Only Simio Team Edition and above are capable of creating models that will run in Interactive Runtime.

Full Runtime

Uses Simio Express Edition which provides the ability to load and run models, run experiments, and execute custom user-written steps and elements. Users can also make changes (that are supported by the functionality available in Simio Express Edition) and save these changes. Commercial Design, Team, and Enterprise Editions can create models for use with Full Runtime.

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Simio System Requirements

Software Requirements

▶ Microsoft® Windows 7 with Service Pack 1 or later, Windows 8.1 or later, or Windows 10 Anniversary Update or later.
▶ Both 32 and 64 bit operating systems are fully supported
▶ If installing on Windows 8.1, the April 2014 update (KB2919355) must be installed first (see https://support.microsoft.com/en-us/kb/2919355). Update 2919442 is also required (see https://support.microsoft.com/en-us/kb/2919442)
▶ Simio requires .NET Framework Version 4.6.2, which is part of the default installation.

Minimum Hardware Requirements

▶ Pentium class or faster processor
▶ A 32 bit OS with 2 GB of RAM
▶ Available hard drive space of 500 MB minimum for installation
▶ 1,024x768 display
▶ A 16-bit graphics card with 128 MB compatible with DirectX ver. 9

Recommended Hardware Requirements for Large Project Support

▶ Core i5 class or faster multi-threaded quad core processor - Simio takes full advantage of multiple processors
▶ A 64 bit OS with 8 to 16 GB or more RAM to support very large models
▶ 1 TB hard drive
▶ 23" or larger WUXGA (1920x1200) display - Consider multiple displays since Simio takes full advantage of higher resolution and multiple monitors
▶ A 64-bit graphics card with 1 GB compatible with DirectX ver. 9

Oculus Rift 3d Headsets' Requirements for Integration

▶ Graphics Card (GPU) - NVIDIA GTX 970 or AMD 290 equivalent or greater
▶ Processor (CPU) - Intel i5-4590 equivalent or greater
▶ Memory (RAM) - 8GB+ RAM
▶ Video Output - HDMI 1.3 video output
▶ USB ports - 3 x USB ports (2 of them must be USB 3.0 ports)
▶ Operating System - Windows 7 64-bit (Service Pack 1) or newer

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Support and Service Level Agreement

Simio® Design Edition, Team Edition, & Enterprise Edition Maintenance

Technical Support

A dedicated e-mail address (support@simio.com) is monitored by a team of support engineers – this is often the best way to obtain support because the models and any necessary files and screen shots can be shared for the most effective support. Simio maintains a toll-free telephone support line for technical assistance twenty-four hours a day, seven days a week (24x7). The support line is available for live communication during normal working hours and is backed up by a voice mail system that will record requests for assistance.

A user forum is also continuously available and very active. This is monitored by many users as well as Simio engineering and development staff. This forum can be used in many ways:

1) You can search the forum for previously posted solutions to obtain an instant answer to your problems.
2) You can report a problem and let the world-wide user community respond – often with creative solutions.
3) You can exchange utilities and libraries with others in a dedicated item-sharing forum.
4) You can post ideas and suggestions or add your votes to the posts of others. This is a big factor in determining future development work.

On-line logging of suggestions and support issues includes support for user attachments and screen shots that are often useful in resolving problems. In addition, Simio includes features to support optional automatic reporting of certain issues to streamline the issue reporting and problem resolution process.

Simio strives to respond to every request within one business day – most within hours. SIMIO provides new releases as frequently as every third week to make new features and any required bug fixes available as expeditiously as possible. In addition, for critical issues, interim releases or work-arounds may be made available when appropriate.

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Software Updates

Simio allows updates to any software released within the paid up annual fee maintenance period. For example, annual maintenance agreements expiring August 30, 2018, customers can download and run software that is compiled on or before that date. Attempts to use software compiled on September 1, 2018 or later will receive a message that the activation will not support running that software and they will be put into Personal Edition. The customer may uninstall that version, and reinstall the previous version, and can continue running that version indefinitely.

Aside from the above, activation is not effected by new releases. Customers do not need to make any changes to their activation to update to a new release, even a major release.

Technical Support and Technical Services

Simio Technical Support is appropriate for help with installation, problem resolution, understanding a feature, the use of the tools, and discussing proposed software improvements. Please take advantage of Simio Technical Services for formal product training, system or model analysis, or model-building help.

Supplemental Product Information

Training Classes and Learning Simio

Introduction to Simio (Level 1 Certification)

This one day course provides a fast start to using Simio to effectively solve real problems. It starts with a brief overview of simulation technology and appropriate use, and the Simio modeling framework. Then the Simio Standard Library is used to solve a variety of problems exploring the fixed and dynamic objects, and the various ways entities move through the model and interact with other objects. It then overviews innovative features to work with model data and ends with interpretation of simulation results.

This course is appropriate for all audiences and is recommended for those who may use simulation infrequently, or who desire a lighter command of simulation technology. In particular the early sessions of the course are appropriate for those who manage or work with simulationists.

Simio Standard Training (Level 2 Certification)

This four-day training session starts with similar material covered in the Introduction to Simio course. Significant time will be spent on extending model logic with add-on processes and building object definitions. It will add extra depth to the previously covered topics of working with model data and interpreting simulation results. It will end with a discussion of how to ensure the success of your simulation projects. This course is often supplemented with topics of special interest to the attendees and/or project jump-start advice.

This course is recommended for anyone who is interested in doing large or frequent simulation projects.

Accelerated Simio Training (Level 2 Certification)

This three-day course is similar to the Simio Standard Training, but will focus on the Simio product itself, and will not cover general simulation topics like appropriate use of simulation, simulation benefits, statistical analysis, and project success skills. It covers all of the Simio-specific topics at a slightly faster pace and in greater detail. This course is often supplemented with topics of special interest to the attendees and/or project jump-start advice.

This course is appropriate only for technical people with previous simulation background.

General Information

All of the above courses are typically customized to the audience. Individual course topics may be covered in greater or lesser detail as determined by the allotted time and the needs of the audience.

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Training Classes and Learning Simio

On-line Video Training

The Support Ribbon of the Simio software makes available a wide array of videos (and e-books) to help people get started with Simio. These range from a series of 5 to 10 minute videos discussing basic simulation concepts and over a hundred YouTube videos up to a full 8 hour class with accompanying 130 page e-book and a 13 unit, 24 hour lab series with multiple videos in each. This is all available at no cost.

SimBits

A SimBit is a small, fully documented model that explains a particular concept or procedure. There are over 160 SimBits included with Simio as well as a custom search engine to help find the concept you want. These provide a great way to learn Simio – like a friend who is always there to explain things.

User Guide

Simio contains a comprehensive users guide of over 1000 pages. While it is available to be printed, most people prefer to use the interactive, searchable, on-line help version of the user guide.

Supplemental Product Information

Simio Simulation Products

Simio is a Simulation Modeling framework based on Intelligent Objects. This may be a bit different than other simulation packages that you may be familiar with, even those that market themselves as object oriented. Simio is designed from the ground up to support the object modeling paradigm; however, it also supports the seamless use of multiple modeling paradigms including a process orientation and event orientation. It also fully supports both discrete and continuous systems, along with large scale applications based on agent-based modeling. These modeling paradigms can be freely mixed within a single model.

The intelligent objects are built by modelers and then may be reused in multiple modeling projects. Objects can be stored in libraries and easily shared. A beginning modeler may prefer to use pre-built objects from libraries; however the system is designed to make it easy for even beginning modelers to build their own intelligent objects for use in building hierarchical models. An object might be a machine, robot, airplane, customer, doctor, tank, bus, ship, or any other thing that you might encounter in your system. A model is built by combining objects that represent the physical components of the system. A Simio model looks like the real system. The model logic and animation is built as a single step. An object may be animated to reflect the changing state of the object.

Simio is a family of products that includes the Personal, Design, Team, and Enterprise Editions. Models built with all four Editions are fully compatible both up and down the product family. All four products provide the same powerful 3D object-based modeling environment.

Many simulation packages are built on outdated 2D technology that limits your ability to visualize your process or capture 3D spatial relationships in your system. Some of these older products limit you to 2D only models, while others offer expensive/complex 3D add-ons that require you to build a separate 3D visualization of your system, and then tie these two separate components together. These extra steps add unnecessary work and time to your project, and make your model and animation difficult to edit and maintain.

In contrast, Simio provides a true object-based 3D modeling environment which lets you construct your 3D model in a single step from a top-down 2D view, and then instantly switch to a 3D view of your system. You simply drag and place your 3D objects from an Object Library into your facility view of the model.

All Simio model-building products directly integrate with Google Warehouse to allow you to quickly download from a massive library of freely available 3D symbols to easily and quickly add realism to your models.

Supplemental Product Information

Detailed Production Scheduling

Simio's Detailed Production Scheduling extends traditional Advanced Planning and Scheduling (APS) to fully account for the variation that is present in nearly any production system, and provides the necessary information to the scheduler to allow the upfront mitigation of risk and uncertainty. Simio provides a family of products that let you leverage your existing investment in planning systems, such as SAP's APO, to finally close the gap between master planning and detailed production scheduling, thereby driving more revenues and greater customer satisfaction at reduced cost with existing assets.

No matter how powerful the scheduling engine, ignoring variation will typically produce large discrepancies between predicted schedules and actual performance. It is common that what starts off as a feasible schedule turns infeasible over time as variation and unplanned events degrade performance. With traditional APS we are forced to work with an overly optimistic schedule that promises more than we can deliver in terms of meeting critical customer requirements. As a result the scheduler is forced to buffer the expected degradation with some combination of extra time, inventory, or capacity; all adding inefficiency and cost to the operation. The challenge is to know what combination of these buffers is necessary to produce a robust schedule at minimal cost.

Simio's family of Detailed Production Scheduling products (patent pending) allows for flexible scheduling strategies to support your key production objectives and lets you quickly reschedule in response to unplanned events. You can accurately model your complex production processes to capture all critical constraints so that the resulting schedules reflect the reality of your systems. You can display schedules in a wide range of outputs, including interactive Gantt charts that display individual waiting times at critical resources as well the root causes for non-value added time in the system. Simio products also integrate a 3D animation of your planned schedule to provide a unique and insightful preview of your facility operations. Simio's Detailed Production Scheduling solution is built on the popular and widely used Simio simulation engine and can be flexibly applied across a wide range of industries.

Detailed Production Scheduling

In traditional APS the tool itself often limits the constraints that can be included in the schedule. Many optimization-based tools are further limited by their need to keep the model formulation small and simple so that the solver can generate a solution in a reasonable time. However when constraints are ignored these tools produce schedules that initially appear to be feasible, but are unrealistic in the real system.

An example of a critical constraint that is typically ignored is material handling devices such as AGV's or forklift trucks that are used for moving material between workstations. If considered at all, these constraints are approximated in the schedule as an "average" and constant move time independent of the congestion in system. However in cases where we are employing transfer lot sizes to reduce WIP, the timely availability and movements of material handling devices can be a critical constraint.

Simio Enterprise Edition featuring Detailed Production Scheduling uses a simulation-based approach to scheduling that is built around a purpose built Simio model of the system. The key advantage of this is that you have the full modeling power of the Simio simulation software available to fully capture the constraints in your system. You can model your system using the Simio Standard Library of objects, or if needed you can create your own custom objects for modeling complex systems. You can include moving material devices such as forklift trucks or AGV's (along with the congestion that occurs on their travel paths) as well as complex material handling devices such as cranes and conveyors. You can also accurately model complex workstations such as ovens and machining centers with tool changers.

Simio Enterprise imposes no restrictions on the type and number of constraints included in the model. With Simio Enterprise you no longer have to assume away critical constraints in your production system. You can generate both the deterministic plan and associated risk analysis using a model that fully captures the realities of your complex production and supply chain.