The world's most popular transportation modeling suite

Cube is the most widely used and most complete transportation analysis system in the world. With Cube 5, Citilabs integrates the world's standard in GIS software, ArcGIS technologies from ESRI. Cube offers a seamlessly integrated travel forecasting, traffic simulation, and transportation GIS software suite. Cube's broad range of capabilities answers all of your planning and traffic engineering questions. With Cube you can evaluate public transit alternatives, road pricing strategies, land use developments, freight terminal locations, updated signal plans, and alternative geometric designs. Cube generates decision-making information quickly, using powerful modeling and GIS techniques, statistics and comparisons, reports and graphs, high-quality graphics and stunning animations. Cube empowers you to make smarter decisions more quickly by uncovering key indicators for evaluating your planning alternatives helping you to create a better future.

More than 2,000 cities in more than 70 countries use Cube. Cube is backed by over 25 years of research, development, and application.

The Cube software Suite

the Cube software suite offers a set of modules. Each module provides unique functions for unique tasks. You can reduce your costs by only acquiring the modules that you need to complete your tasks. The Cube software suite consists of the following modules and extensions:

**Cube Base**
Cube Base is the system interface. It has three work areas:
- GIS Window: for data editing, analysis, and mapping
- Model Development Window: to design, document, and calibrate models
- Scenario Development Window: to create, run, and manage scenarios.

You can purchase optional extensions to increase the Cube Base feature set:
- Cube Reports — Adds advanced, high-quality reporting and charting
- Cube Cluster — Adds functions that enable model processes to run across multiple computer processors, those in one or multiple personal computers
- Cube Web — Allows users to access their model system through a standard Web browser

**Cube Voyager**
Library of programs for forecasting urban, regional, and long distance passenger travel demand. You can purchase an optional extension for Cube Voyager:
- Cube Avenue - Adds advanced dynamic traffic assignment to Cube Voyager

**Cube Dynasim**
Library of programs for multimodal microsimulation. Cube Dynasim can import data from Cube Voyager and Cube Avenue.

**Cube Cargo**
Library of programs for forecasting regional and long-distance commodity flow and truck demand.

**Cube Analyst**
Library of programs for estimating and optimizing trip tables from traffic counts and other survey data.

**Cube Land**
Library of programs for forecasting land use.

“Citilabs products are by far the most full-featured, flexible, fast and powerful suite of travel forecasting software that we have used”.

C. Purvis, Program Manager Metropolitan Transportation Commission, San Francisco - California

Cube Base provides intuitive tools for editing, analyzing, and mapping all model data and for designing, building, and calibrating models and simulations.
Data editing, analysis and mapping

Cube Base's capabilities in data manipulation, analysis, and mapping are unmatched. You can store and use all network data directly in ESRI compatible geodatabase formats or in other standard data formats. In Cube Base, you can manipulate data directly with intuitive tools that let you select, query, and update data. Other tools let you analyze and compare data and create charts, reports, and maps. With these tools, you can effectively and efficiently compare scenarios and highlight key differences.

Building and documenting the models

Cube Base uses a flow-chart system for designing, coding, documenting, and applying models. You create one file, the model catalog, which holds the model applications. Simply drop functions from the Cube library into the catalog to build a model. Calibrate the model from the menu interface or with the Cube scripting language. And run the model directly from the interface. With Cube, you can easily present and document a model. You can organize the model using drag-and-drop, enter data names and descriptions, add custom graphics, change font color and size, and print the application in a suitable format.

Creating and comparing scenarios

Cube Base makes forecasting easier than ever. After you open a model, Cube prompts you for each scenario’s model parameters and input data. Simply highlight the model’s parameters and data that will change between scenarios. Cube automatically locates these values and creates menu prompts to enter new values. You can easily run selected or all scenarios with no additional entries. Cube Base is designed explicitly for developing and applying models built using any Cube module or Citilabs’ legacy products, TP+, TRIPS, and Tranplan.
Cube Voyager offers a comprehensive library that lets you model and analyze passenger transport systems containing any transportation mode. Cube Voyager uses a modular, script-based structure enabling you to use any modeling methodology, including standard four-step models, discrete-choice models, and activity-based models. You can also incorporate advanced methods, like junction-based capacity restraint for highway assignment and discrete-choice pathbuilding for multiroute transit assignment. Cube Voyager includes highly flexible network and matrix calculators to calculate travel demand and to compare scenarios in detail.

**Cube Voyager meets today's modeling requirements**

Complex traveler choices — Represent choices like locations of activities, travel frequencies, automobile ownership and licensing, destinations, transport modes and sub-modes, routes, and departure times.

Choice aggregation — Combine the effects of individual choices for destination choice, time of day, cost, and parking.

Useful outputs — Collect information useful for subsequent analyses of land use, system performance, air quality, financial feasibility, and other issues.

**Models built with Cube Voyager can be of many forms**

Four-step models — Develop generation, distribution, mode-choice, and assignment structures with easy-to-use templates.

Modified four-step with feedback — Overcome the weaknesses of pure four-step models with a hybrid approach. Include modifications, like car-ownership models, combined mode- and destination-choice models, or an iterative feedback loop to reach model equilibrium.

Activity-based demand — Incorporate specifically designed modules that support analysis and estimation of activity patterns.

Combined equilibrium models — Implement equilibrium feedback into your models with Cube Voyager’s scripting language.
Cube Cargo forecasts commodity demand and vehicle flows using a commodity-based approach. Cube Cargo can test a wide variety of policies and infrastructure improvements, such as alternative pricing strategies or freight-specific facilities.

Cube Cargo operates seamlessly with other Cube components. With Cube Cargo, you can leverage your existing passenger data and existing models to add freight forecasting. With Cube Cargo, you can forecast:

- Tons of goods by commodity type and by transport mode, which you can use to analyze flow of goods
- Number of trucks by truck type, which you can use to analyze truck vehicle flows.

**Cube Cargo models three distinct segments of freight traffic**

Long-haul bulk cargo — segments moving from logistic node to logistic node, such as factories, warehouses, or packaging centers

Short-haul freight — segments for the distribution and collection of goods

Urban freight — segments moving small amounts of goods, or workers, delivering services within a town or city.

**Cube Cargo consists of seven models**

- Generation: Estimates the tons of goods produced and consumed by commodity class and by zone
- Distribution: Estimates matrices of the tons of goods by commodity class, segmented by short-haul and long-haul
- Modal Choice: Estimates matrices of the tons of long-haul goods by mode and by commodity class
- Transport Logistics Nodes: Partitions the long-haul goods by mode and commodity class, and by direct transport and transport chain tours
- Fine Distribution Model: Distributes coarse zone information to the finer level zone system
- Vehicle Model: Estimates the number of vehicle tours per day by vehicle type
- Urban Goods Model: Estimates matrices of local truck travel for local delivery and services
Using mathematical models, Cube Land forecasts land use by simulating the real estate market under different economic conditions. For a user-defined scenario, Cube Land forecasts the supply and the demand for different types of properties, and estimates the location of households and non-residential activities. Cube Land evaluates the impacts of:

- Economic growth
- Changes in population, employment, and wealth
- Urban management policies
- Specific real estate projects
- Transportation projects
- Changes in consumer behavior

Using a rigorous microeconomic approach, Cube Land finds an economic equilibrium between land supply and demand. The process also considers perceptions of the real estate market, market restrictions, and regulations.

**Cube Land concepts**

Cube Land uses a “bid function” for each consumer. The bid function estimates property values in the market and defines rents and the location patterns for activities. The bid function considers consumer preferences, perceptions of parcel attributes, and budget restrictions.

Cube Land locates the highest-bidding consumers either households or economic activities on each land parcel. In this way, Cube Land auctions real estate.

Cube Land uses variables to represent the characteristics of consumers, properties, and neighborhoods. Such variables might include indices that represent accessibility to the transportation system, environmental quality, and location.

Cube Land simulates how regulations and restrictions influence the real estate market. Regulations can vary by zone and by consumer type. These include:

- Maximum area of land available for development
- Minimum property sizes
- Maximum land utilization
- Maximum building height
- Type of land use
- Limits for residential density and population (min and max)

Cube Land also captures location subsidies and tax policies.
Cube Analyst estimates and updates the matrix containing base-year automobile, truck, and public transit trips. The matrix representing existing travel is one of the most valuable pieces of data in travel-demand forecasting. This matrix supports forecasting and almost all important comparative analyses. Cube Analyst enables planners to manipulate the extensive data set used to develop and update this matrix. Indeed, planners have successfully used Cube Analyst in various studies around the world.

**Excellent results with limited data**

Cube Analyst uses mathematical techniques to find trip matrices consistent with observed transport demand and count data. Cube Analyst reproduces hand-based methods more accurately and more efficiently. To use Cube Analyst, you supply observed travel-demand data like trip-end data collected in a shopping-center survey, traffic-count data organized into screen- and cutlines, or movement or path data identifying travelers’ routes from origins to destinations. Cube Analyst can use a wide range of low-cost, readily available data.

You supplement this travel-demand data with quality weights. Quality weights provide tolerance bands for the data observations. Cube Analyst uses maximum likelihood statistical techniques to estimate matrix values—the values that best fit the observations and their quality weights.

Based on the inputs, Cube Analyst estimates the matrix with a computationally intensive process. In a set of iterative calculations, Cube Analyst automatically determines the statistically most likely matrix for the set of input data values.

You can analyze the quality of the estimated matrix. Cube Analyst tools can characterize the extent of changes and help you find areas of significant change between input and estimated information.

**Integrazione with Cube Software Suite**

Cube Analyst is compatible with all Cube modules, including Cube Voyager and Cube Base. For example, you can use Cube Voyager tools to prepare origin-destination data and to manipulate and modify cost matrices.
Cube Avenue is an extension to Cube Voyager providing dynamic traffic assignment. Cube Avenue enhances Cube Voyager’s traffic assignment model by explicitly modeling time. With Cube Avenue, analysts can study problems for which traditional models do not provide enough data and for which microscopic models provide too much data.

Cube Avenue is an innovative tool for analyzing traffic. Cube Avenue offers the ideal environment for many studies, such as comparing policies for alleviating peak-period congestion or examining the effectiveness of emergency evacuation plans. Indeed, pioneering transportation professionals can use Cube Avenue to meld planning with real-time operations, examining likely impacts of operational responses before implementation.
**Cube Base Extensions**

**Cube Reports** is an extension to Cube Base. Cube Reports can easily create tables, charts, and cross tabulations of input and output data from models and simulations. Cube Reports simplifies data analysis.

A powerful tool, Cube Reports can help planners and engineers understand their data, compare and contrast scenarios, and deliver this information inside and outside of their organizations. Cube Reports works seamlessly through Cube Base, supporting models from Cube Voyager, Cube Cargo, Cube Avenue, Cube Analyst, and Cube Compact. Cube Reports can be used on any size of project, for any type of agency or company.

**Cube Cluster** is an extension to Cube Base. Cube Cluster can dramatically cut model run times by distributing run processes across multiple computer processors, those in one or in multiple PCs.

Cube Cluster requires a primary instance and one or more node instances of the processing Cube module, such as Cube Voyager. The primary instance initiates and monitors model runs. Each node instance simply completes assigned processes. With appropriate configuration, Cube Cluster enables you to run model processes simultaneously, optimizing the use of your computer resources and reducing your overall run times.

**Cube Web** is an extension to Cube Base. With Cube Web, you can access your model system through a standard Web browser. The Web interface provides remote access to models and reduces the learning curve for those applying models.

In fact, Cube Web helps you better define the roles of those developing and those applying models, resulting in better work flows and improved model management. In addition, Cube Web can help organizations use their computer resources more efficiently.