

# Teradata Statistical Library Add-in Powered by IMSL

Data Warehousing > Tools and Utilities

The Teradata® Statistical Library Add-in, Powered by IMSL™, provides users with a wide range of embedded statistical functions for in-database analysis. These functions fall into these general categories:

- > **Probability Distribution Functions and Inverses**, including cumulative distribution functions such as beta, binomial, bivariate, chi-squared, F, gamma, binomial, hypergeometric, and Poisson.
- > **Random Number Generation**, including generators for numbers from many distributions, including normal, gamma, Poisson, and beta.

The Teradata Statistical Library Add-in consists of statistical functions provided as embedded user defined functions (UDFs) accessible through Teradata Warehouse Miner or standard SQL Queries. Teradata Warehouse Miner's UDF capabilities work like an index from which users can select prepackaged functions that are linked to the detailed data. In a Windows® desktop environment, business users can now click, drag, and drop the needed analytic function from a list of UDFs and run it against the appropriate detailed data in the warehouse without wasting time by manually coding the function or moving data between systems. One of the key benefits of these UDFs is that they reside in-database, sharable across all users, and leverage the scalability and performance of the industry-leading Teradata platform.

Combined with other analytic functions in Teradata Warehouse Miner, these Statistical Library functions can be used in a variety of applications.

## Sample Applications

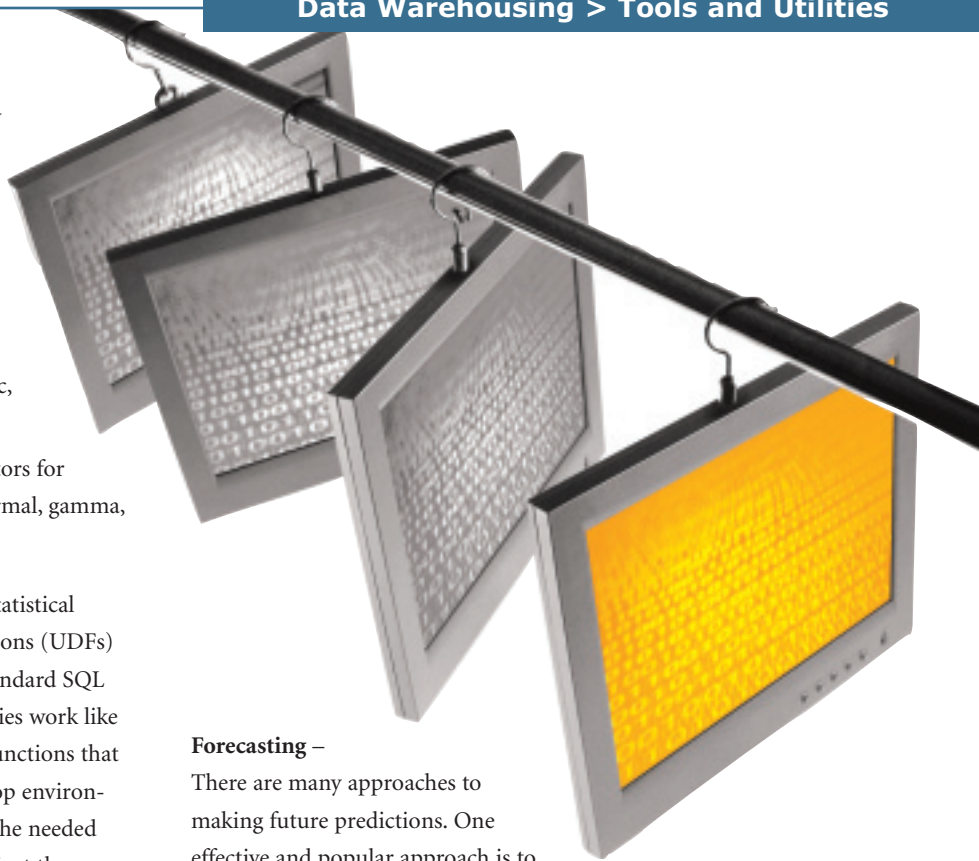
**Classification** – In many applications, it is useful to identify whether new data fits expected patterns based on historical data. For example, a manufacturer might want to identify when the number of defects is higher than expected. Basic cumulative distribution functions such as chi-squared, student-t, and F distributions are useful in these applications.

## Forecasting –

There are many approaches to making future predictions. One effective and popular approach is to use simulations based on theory, models, or historical data. For example, to forecast financial risks based on an historical model or data, you would generate 1000s of observations randomly using the assumed model or data, and then base forecasts for risk estimates based on the empirical risks calculated from these simulations. These techniques are enabled by the many proven and reliable random number distributions provided in the Teradata Statistical Library.

## Improved Data Mining Performance

New functions in the Teradata Statistical Library Add-in can also improve the performance of many data mining problems. In forecasting problems for example, it is often not necessary to run an entire data set through a forecasting model. Instead, Teradata users can select a random sample and still get extremely accurate results. The random number generation functions in the Teradata Statistical Library enable users to easily and accurately create the necessary random sample.



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## Available Functions

Version one of the Teradata Statistical Library contains the following IMSL functions.

Probability Distribution Functions and Inverses		Random Number Generation	
beta_cdf	Beta probability distribution function	random_beta	Beta distribution
beta_inverse_cdf	Inverse of the beta distribution function	random_binomial	Binomial distribution
binomial_cdf	Binomial distribution function	random_cauchy	Cauchy distribution
binomial_pdf	Binomial probability function	random_chi_squared	Chi-squared distribution
bivariate_normal_cdf	Bivariate normal distribution function	random_exponential	Standard exponential distribution
chi_squared_cdf	Chi-squared distribution function	random_exponential_mix	Standard exponential distribution (mixed numbers)
chi_squared_inverse_cdf	Inverse of the chi-squared distribution function	random_gamma	Standard gamma distribution
F_cdf	F distribution function	random_geometric	Geometric distribution
F_inverse_cdf	Inverse of the F distribution function	random_hypergeometric	Hypergeometric distribution
gamma_cdf	Gamma distribution function	random_logarithmic	Logarithmic distribution
gamma_inverse_cdf	Inverse of the gamma distribution function	random_lognormal	Lognormal distribution
hypergeometric_cdf	Hypergeometric distribution function	random_neg_binomial	Negative binomial distribution
hypergeometric_pdf	Hypergeometric probability function	random_normal	Standard normal distribution
non_central_chi_sq	Noncentral chi-squared distribution function	random_poisson	Poisson distribution
non_central_chi_sq_inv	Inverse of the noncentral chi-squared function	random_stable	Stable distribution
normal_cdf	Standard normal (Gaussian) distribution function	random_student_t	Student's t distribution
normal_inverse_cdf	Inverse of the standard normal (Gaussian) distribution function	random_triangular	Triangular distribution
non_central_t_cdf	Noncentral Student's t distribution function	random_uniform	Uniform (0, 1) distribution
non_central_t_inv_cdf	Inverse of the noncentral Student's t distribution function	random_uniform_discrete	Discrete uniform distribution
poisson_cdf	Poisson distribution function	random_von_mises	von Mises distribution
poisson_pdf	Poisson probability function	random_weibull	Weibull distribution

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