

# Linguistic Tools:

**S**emantha is an interactive UNIX application that allows you to write rules that control the translation of words in specified contexts. When translating sentences, the Logos system refers to thousands of internal rules to determine semantic and syntactic contexts of the words. But you may want to add rules or override existing rules to reflect individual translation needs or stylistic preferences. By enabling you to write your own rules, Semantha gives you greater control over translation output.

## Semantha Gives Power Over Translation

Word groups - as opposed to single words - may form semantic units. Idiomatic phrases, which cannot be translated word-for-word, are an example of this. Semantha enables you to enter rules containing idiomatically correct translations for these groups in the semantic database. These rules are linked to the Logos dictionary during the automatic translation process. The tremendous flexibility of this system is one of the strongest and most unique features of the Logos Intelligent Translation System.

## How does Semantha work?

Words often take on new meanings in different contexts. For example, the verb "file" has entirely different meanings in each of the following: *File letters; file complaints; file nails*. The presence of words that affect the meaning of other words is often called co-occurrences. Usually co-occurrences like this are not suited for handling in the dictionary. For example, the particle "on" in the phrase "to put a jumper on" is

too remote to be captured in a dictionary entry. This is where Semantha comes in. Semantha allows the user to define co-occurrences of words when the co-occurrence affects the meaning of one or both of the words.

In effect, with Semantha, you can override the standard dictionary translation in specific contexts. Semantha rules can be written for verbs, prepositions and adjectives. Semantha rules can also be written for nouns.

## Understanding Semantic Rules

Rules created by Semantha are so-called "deep structure" rules. This means a single rule can be applied to a great variety of "surface" structures, including variations in parts of speech. In effect, Semantha allows you to communicate with the Logos system

conceptually, much as an instructor would communicate to a student. The system takes your instruction and applies it in all possible ways, without your having to specify those ways.

## An Example to Illustrate Context

Semantha rules are extremely simple to create. Let us suppose that the verb "run" in your dictionary has the French translation "opérer" but you want the translation "exécuter" when the object of the verb "run" is a piece of software. Using Semantha, you would communicate your wish in a rule that looks like this:

Run N(software,etc) —> exécuter N(software,etc)

Your rule informs the system that you want "run" to be translated in French as "exécuter" whenever its object is a word that belongs to the class of words denoted "software." Such objects would include program, routine, subroutine, application, etc.

## Linguistic Tools:

Your rule now guides the Logos system in the handling of the concept "run" whenever it occurs in the context of subroutines, etc. The following example illustrates the variety of ways in which the system will make use of your rule:

He ran the program-> *Il a exécuté le programme*

The running of the program-> *Lexécution du programme*

The programs run by the operator-> *Les programmes exécutés par l'opérateur*

### Semantha Understands Subtlety

Semantha can distinguish between subtle variations in meaning of the same word. Imagine translating the following sentence:

"The young mother **raised** an important question: how should she **raise** her child? She especially wanted to know whether the child suffers trauma when a mother **raises** her voice whenever she admonishes her child."

Notice the different uses of the word "to raise." There are only subtle contextual differences between each instance. Semantha rules consider these subtleties.

In German the translation comes out as the following:

"Die junge Mutter **warf** eine wichtige frage **auf**: Wie sollte sie ihr Kind **aufziehen**? Sie wollte besonders wissen, ob das Kind Trauma erleidet, wenn eine Mutter **lauter spricht**, wenn sie ihr Kind ermahnt."

Even if you do not speak German, it is obvious that the translation for each instance of "to raise" is an entirely different word. Try this on any other machine translation system and the translation will often be incomprehensible.

### Semantha Assists in Problem Solving

The rules within the semantic table (Semtab) of the Logos system identify contexts in which the standard translations from the dictionary database are awkward or inappropriate. These rules then replace the improper dictionary transfers with constructions that accurately convey the intended meaning, in accordance with the stylistic conventions of the target language. Eight rule templates are presently available in English; seven are available in German.

The user can review the translation, searching for terms which were translated incorrectly in a special context. These terms can be entered in the semantic database using Semantha.

#### Structure and Size of the Semantha Rulebase:

- Unlimited expansion
- Rules are labeled with the same three-letter Company code specified for user dictionaries.
- A maximum of five Company Dictionaries can be selected hierarchically.
- Semantha offers eight rule templates for English source language and seven rule templates for German source language.

### Number of Semantic Rules

English source language: over 11,000

German source language: over 20,000

Hardware & Software Requirements

Semantha is a UNIX application that requires the Logos Server. Please see the Logos Server data sheet for hardware and software specifications.

#### The Logos Family of Translation Products:

Logos Server™

LogosClient™ for LAN

LogosClient Remote

Alex™

Semantha™

Alex™ for Windows