Creating and Exploiting Information Maps and Filters on Clinical Data

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ABSTRACT

Utilizing Information Maps with the SAS 9 Business Intelligence platform is vital in taking advantage of the software you have purchased. It is also a new concept in SAS development. This paper will focus on the creation of maps and filters as well as how to leverage these from SAS Enterprise Guide, SAS Add-in for Microsoft Office, Web Report Studio and SAS Web Report Studio on SAS data sets, OLAP cubes, and the information maps engine. Setting up information maps in an effective way can give information consumers an easy way to create reports and analyze data. In the clinical arena, this can give more power to non-programming statisticians, data managers, medical personal and management.

INTRODUCTION

Information maps and filters are a critical component in the SAS Business Intelligence packages. Information maps are a clear communication bridge between the data modelers and information consumers. Having Information maps in place can allow data architects to focus on providing clean and well organized data without having to spend time responding to requests for simple reports. Using filters along with information maps adds nice functionality to reports that can be leveraged by non-coding information consumers.

CONCEPTS

First we will review the concepts and types of problems addressed in this paper. The two main tools used in this paper are Information Maps and Prompts/Filters. These tools will be explained from the aspect of how to create them as well as how to leverage them.

1. INFORMATION MAPS:

What is an Information Map?
SAS Information Maps are business data about your physical data. Information Maps contain data items and filters. The information map allows other SAS BI applications to display the business information to users while they are querying the data so information consumers do not need to know all of the technical details about the physical data.

Why use an Information Map?
Information maps provide a business metadata layer that enables business users to ask questions and get answers themselves. This frees IT resources from one-time reporting requests and reduces the need to provide training in programming and database structures.

Information maps enable business users to easily access enterprise-wide data by providing the following benefits:

- Users are shielded from the complexities of the physical data.

- Data storage is transparent to the users, regardless of whether the data is relational or multidimensional or whether the data is in a SAS data set or in a third-party database system.

- Business formulas and calculations are predefined, which makes them usable on a consistent basis.

- Users can easily query data for answers to business questions without having to know query languages.

How to Create an Information Map?
There are essentially two ways to create information maps.
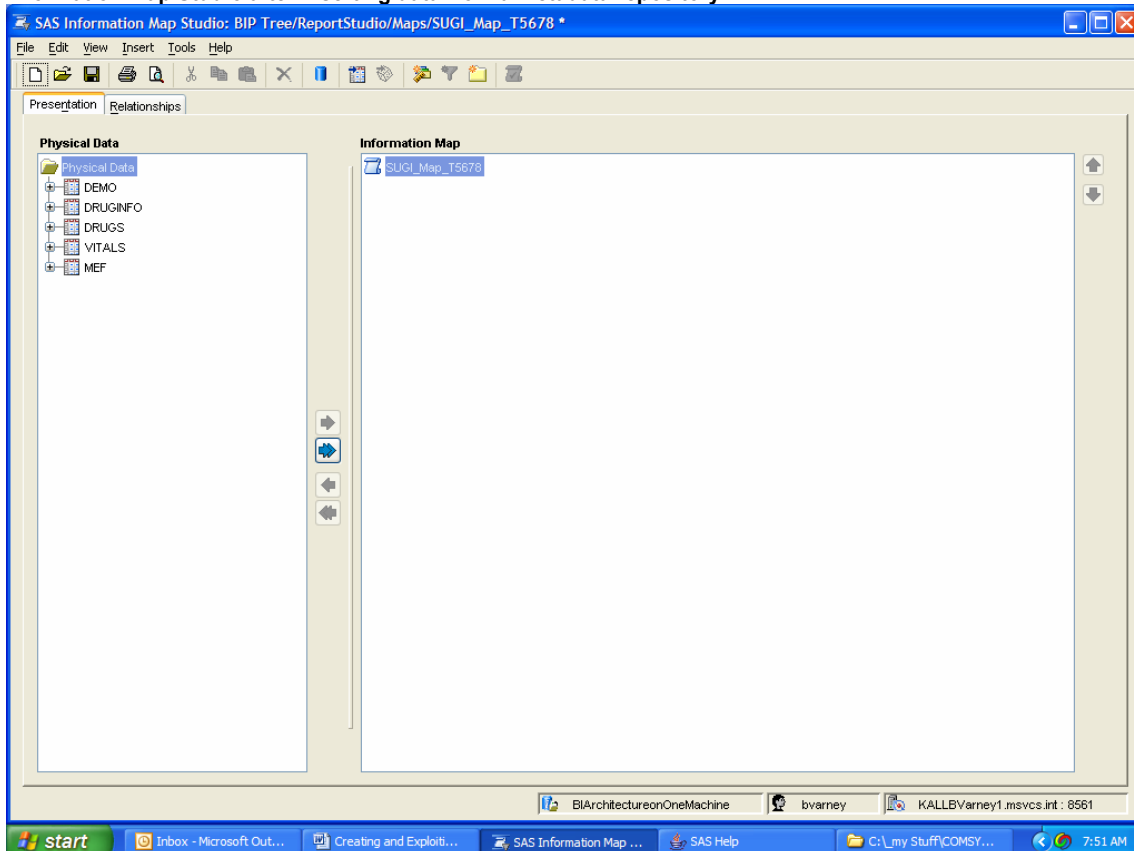
- Information Map Studio
- PROC INFOMAP

The most common method used to create an information map is using Information Map Studio. Information Map Studio is a graphical user interface used to create, edit, and view information maps (see screen shot below this paragraph). There are just a few activities involved to define an information map.

- Insert Data (from Metadata Repository)
- Create data items
    - Map from physical data field
    - Create an expression
- Define Relationships (if more than one table)
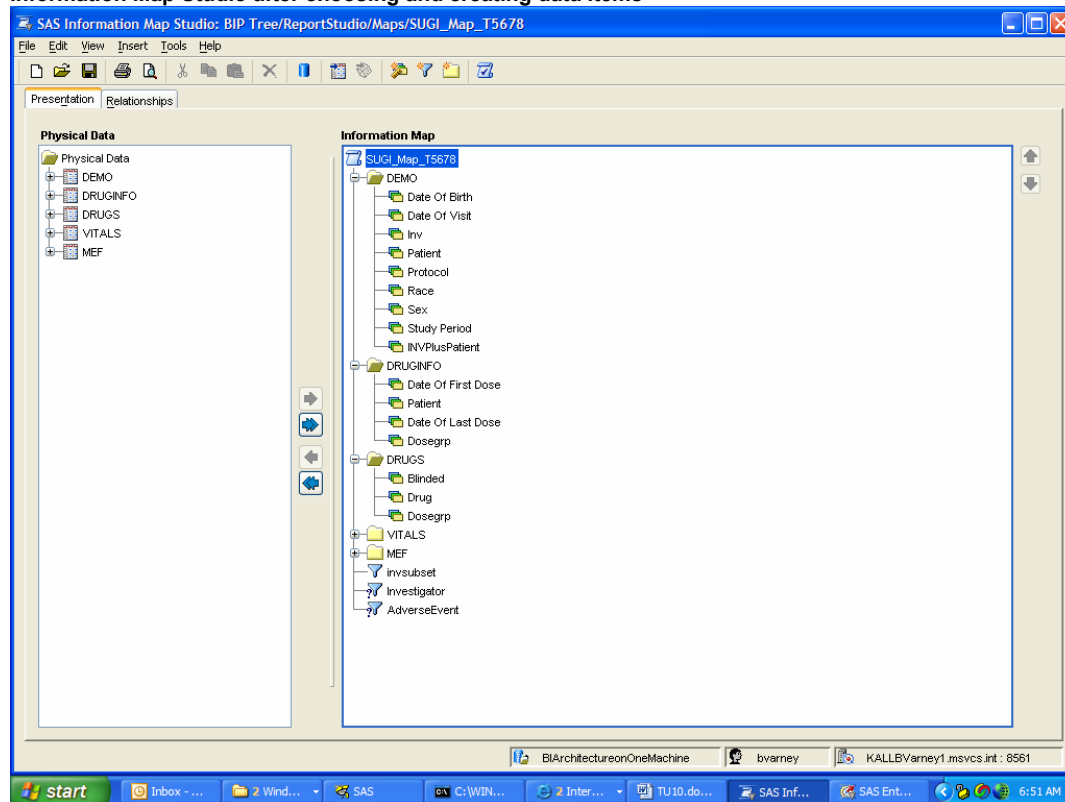- Define Prompts and/or Filters (optional)
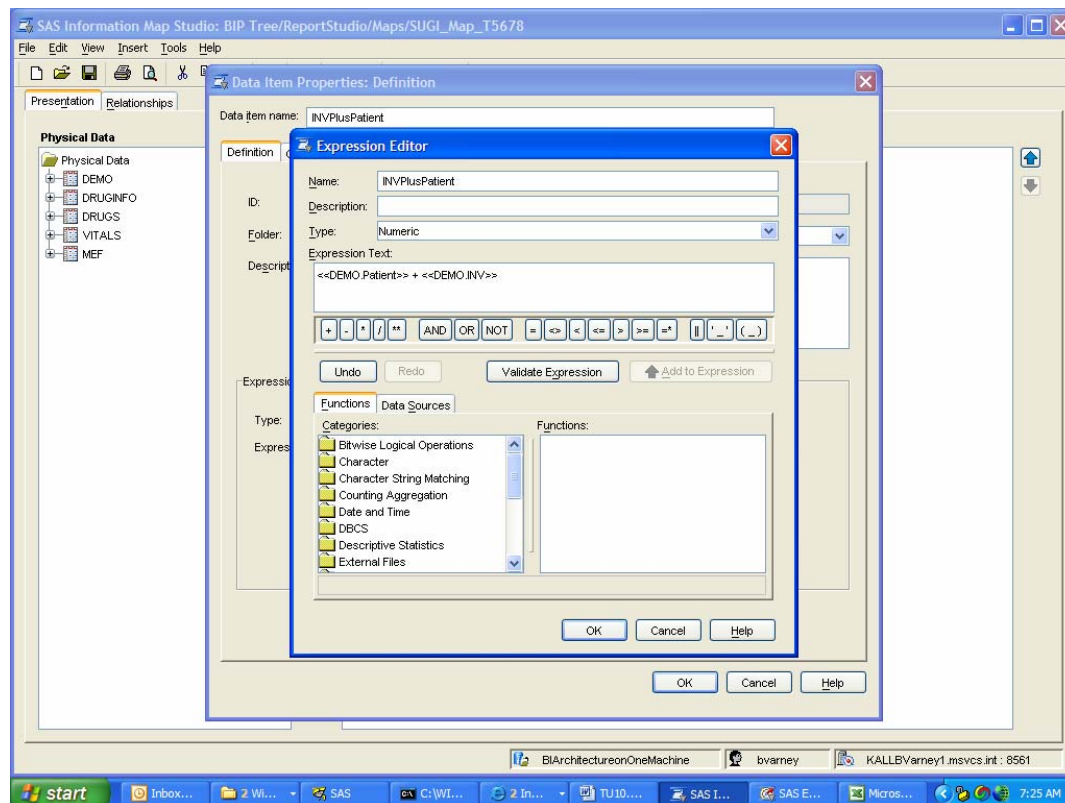
Information Map Studio Initial Window
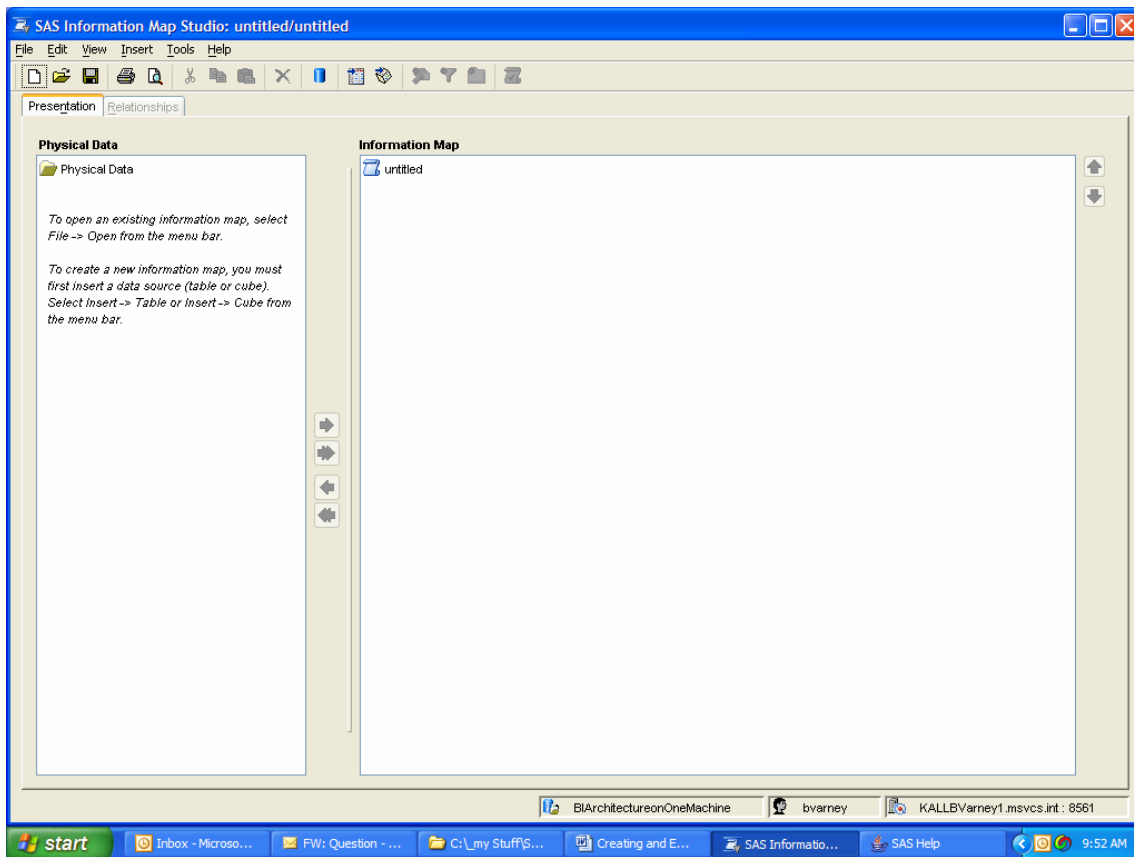
Information Map Studio after Inserting data from a metadata repository
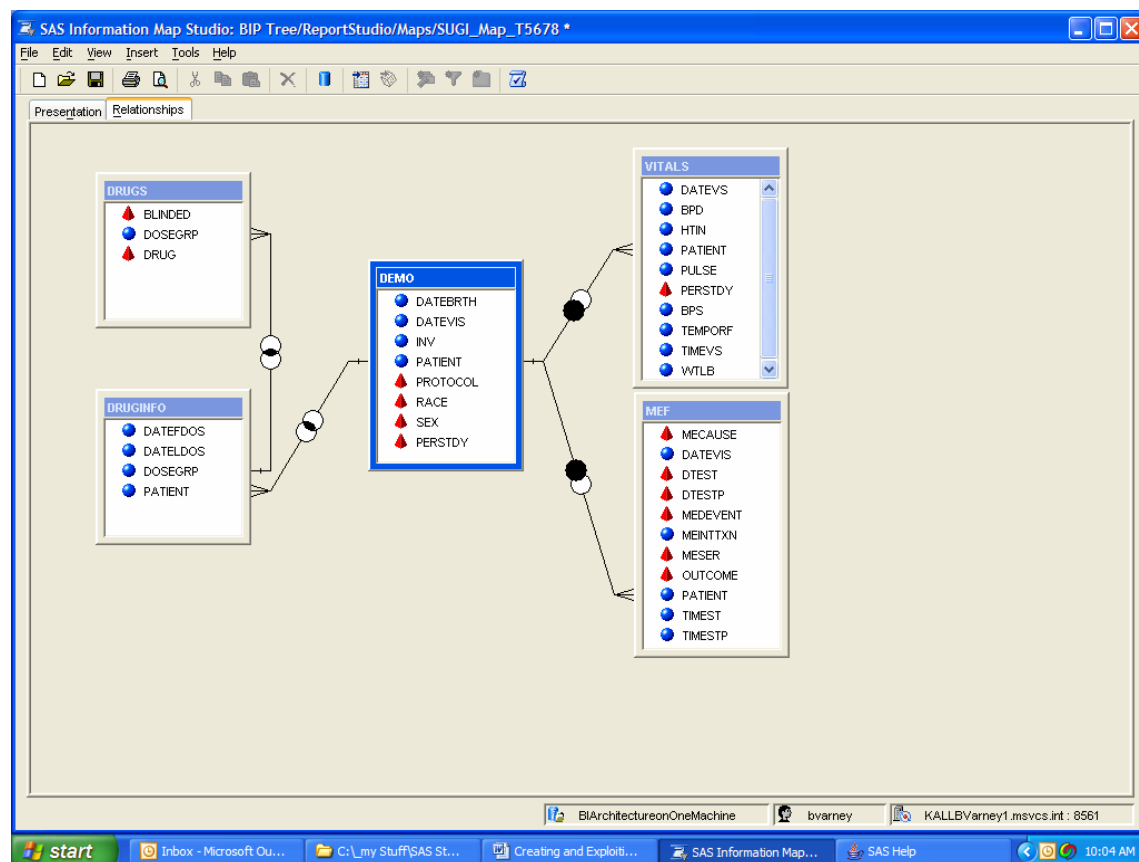
Information Map Studio after choosing and creating data items

Data items are chosen from the left pane and are displayed in the right pane. New data items can be created by creating an expression using the expression editor.

Information Map Studio after defining relationships on clinical data

Icons and Notations in the Relationships Tab

Icon	Description
🔵	Numeric column
🔺	Character column
🔑	Primary key
🗝	Foreign key
🗝	Unique key
◑	Inner join
◐	Left outer join
◑	Right outer join
⬤	Full outer join
—+—	Cardinality of one
—<	Cardinality of many

Another method used to create an information map is using PROC INFOMAP.

PROC INFOMAPS
METAPASS="*password*"
METAPORT=*port-number*
METAREPOSITORY="*repository-name*"
METASERVER="*address*"
METAUSER="*user-ID*"
<MAPPATH="*repository-path*">;

DELETE INFOMAP *information-map-name*
<MAPPATH="*repository-path*">;

EXPORT <INFOMAP *information-map-name*>
<FILE=*fileref* |"*physical-path*">
<MAPPATH="*repository-path*">;

IMPORT FILE=*fileref* |"*physical-path*";

INSERT DATAITEM
COLUMN=*datasource-ID.column-name* | EXPRESSION="*expression-text*"
<AGGREGATION=*aggregate-function*>
<AGGREGATIONS_DROP_LIST=(*aggregate-function-list*)>
<CLASSIFICATION=CATEGORY | MEASURE>
<DESCRIPTION="*descriptive-text*">
<FOLDER=*folder-name* | "*folder-path*">
<FORMAT="*format-name*">
<ID="*dataitem-ID*">
<NAME="*name*">
<TYPE=NUMERIC | CHARACTER | DATE | TIME | TIMESTAMP>;

INSERT DATASOURCE
SASSERVER | SERVER=*server-name*
TABLE=*library.table* <COLUMNS=(*column-1 column-2 ... column-n*) | _ALL_ >
<ID=*datasource-ID*>;

INSERT DATASOURCE
SASSERVER | SERVER=*server-name*
CUBE=<*schema.*>*cube* <_ALL_>
<ID=*datasource-ID*>;

INSERT FILTER *filter-name*
CONDITION="*conditional-expression*"
<DESCRIPTION="*descriptive-text*">
<FOLDER=*folder-name*| "*folder-path*">;

INSERT FOLDER *folder-name*
<PARENT=*parent-folder-name*>
<DESCRIPTION="*descriptive-text*">;

INSERT RELATIONSHIP *left-table* **INNER | LEFT | RIGHT | FULL**
JOIN *right-table* **ON** "*conditional-expression*";

LIST <DATAITEMS | DATASOURCES | FILTERS | _ALL_> ;

OPEN INFOMAP *information-map-name*
<CREATE_TARGET_FOLDER=YES | NO>
<INIT_CAP=YES | NO>
<MAPPATH="*repository-path*">
<REPLACE_UNDERSCORES=YES | NO>
<USE_LABELS=YES | NO>;

SAVE <INFOMAP *information-map-name*>
<MAPPATH="*repository-path*">;

How to Leverage Information Maps from:
- Information Maps Engine
- Enterprise Guide 4.1
- SAS Add-in for Microsoft Office
- Web Report Studio
- Information Delivery Portal

Information Maps Engine

The information maps engine is how SAS reads data from an information map. Below is an excerpt from a log from an EG 4.1 session which utilizes an information map.

```
libname _egmle sasioime
          user="bvarney"
          pw=XXXXXXXXXXXXXXXXXXXXX
NOTE: Libref _EGMLE was successfully assigned as follows:
      Engine:        SASIOIME
      Physical Name: /BIP Tree/ReportStudio/Maps
          metaserver="kallbvarney1"
          metaport=8561
          metarepository="Foundation"
          mappath="/BIP Tree/ReportStudio/Maps"
          PRESERVE_TAB_NAMES=YES;

      data WORK.SUGI_Map_T5678 (label='Selected Data from SUGI_Map_T5678');
        length
            Patient 8
            Race $ 20
            Sex $ 6
            Date_Of_Birth 8
            ;
      set _egmle."SUGI_Map_T5678"n (keep=Patient Race Sex Date_Of_Birth   );
      run;
```

Note: Using the information maps engine gives one read-only access to the map and data.

**Advantages of Using the Information Map Engine**
- Users are shielded from physical data complexities and relationships
- Data storage details are transparent to users
- Calculated variables are already included in data
- Users do not need to know a query language to use the data

DIsadvantages of Using the Information Map Engine
- Performance is not optimal

Leveraging Information Maps from Enterprise Guide 4.1

One of the new features of EG 4.1 is the ability to leverage information maps. The following two screen shots show an example of leveraging an information map in an EG project.
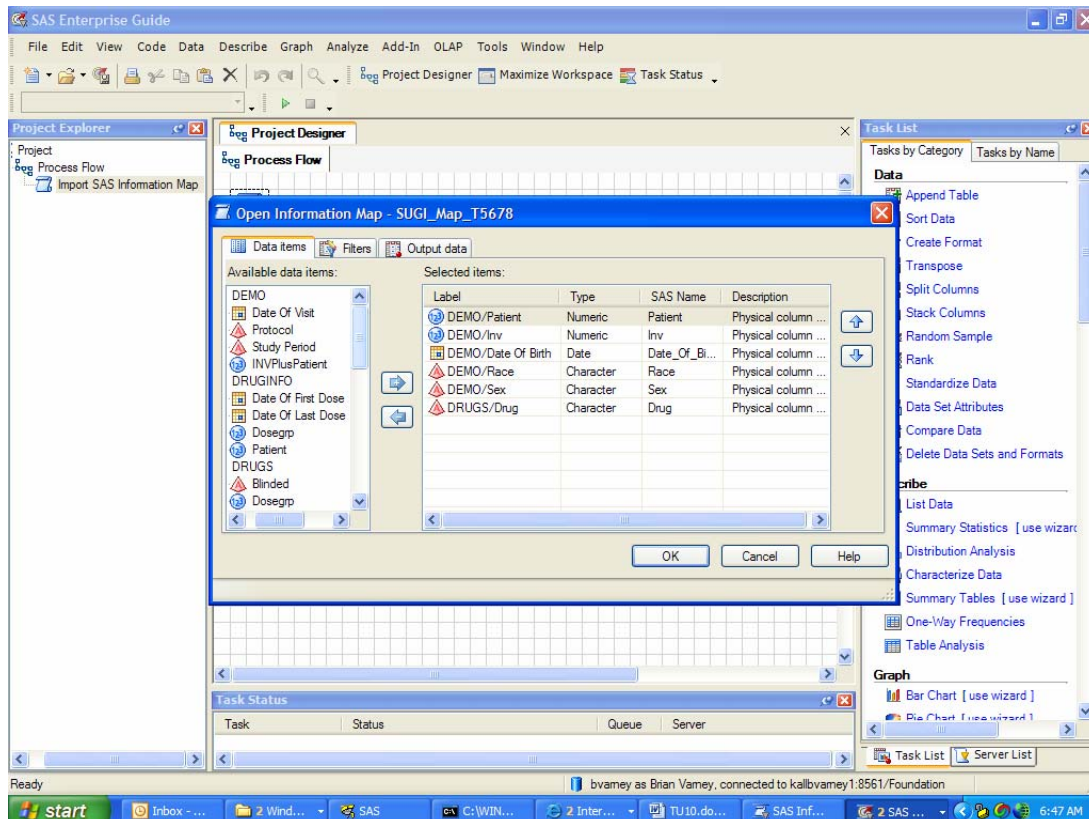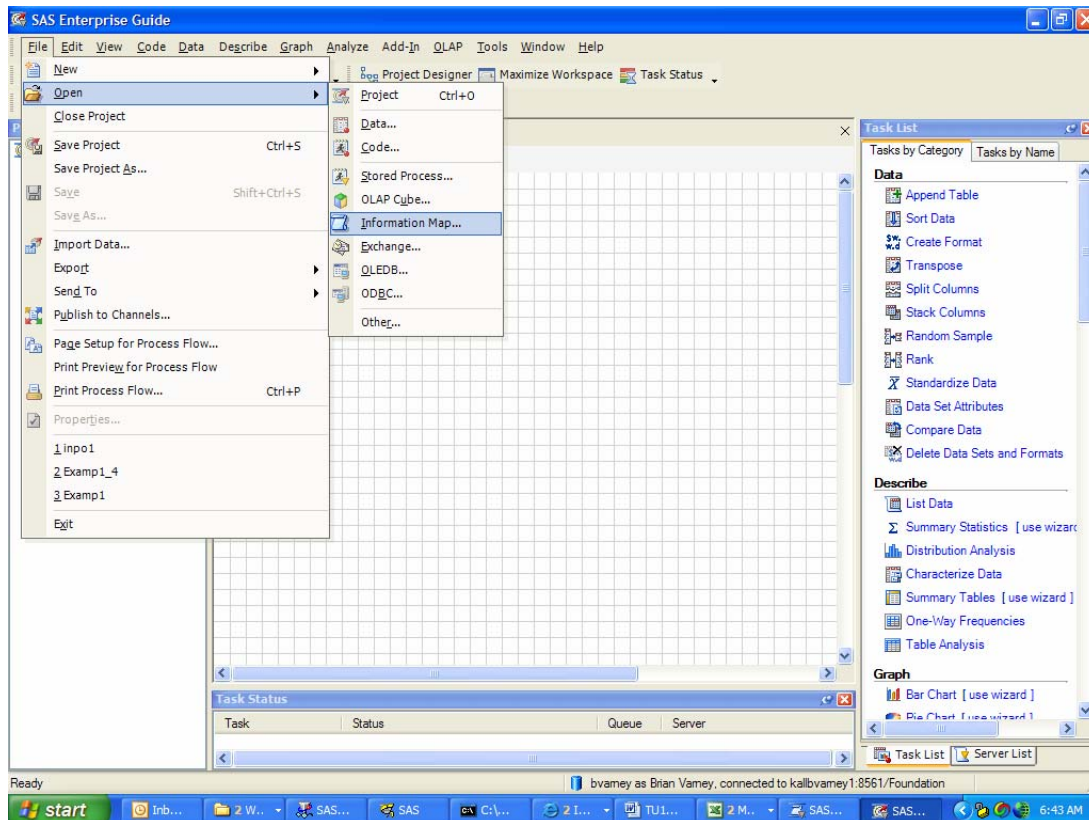
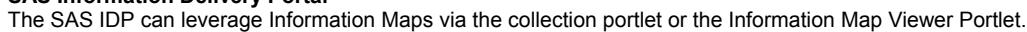**SAS Add-in for Microsoft Office (AMO)**
One of the new features of SAS AMO 2.1 is the ability to leverage information maps. The following screen shot shows an example of utilizing an information map from Excel via the SAS Add-in for Microsoft Office.
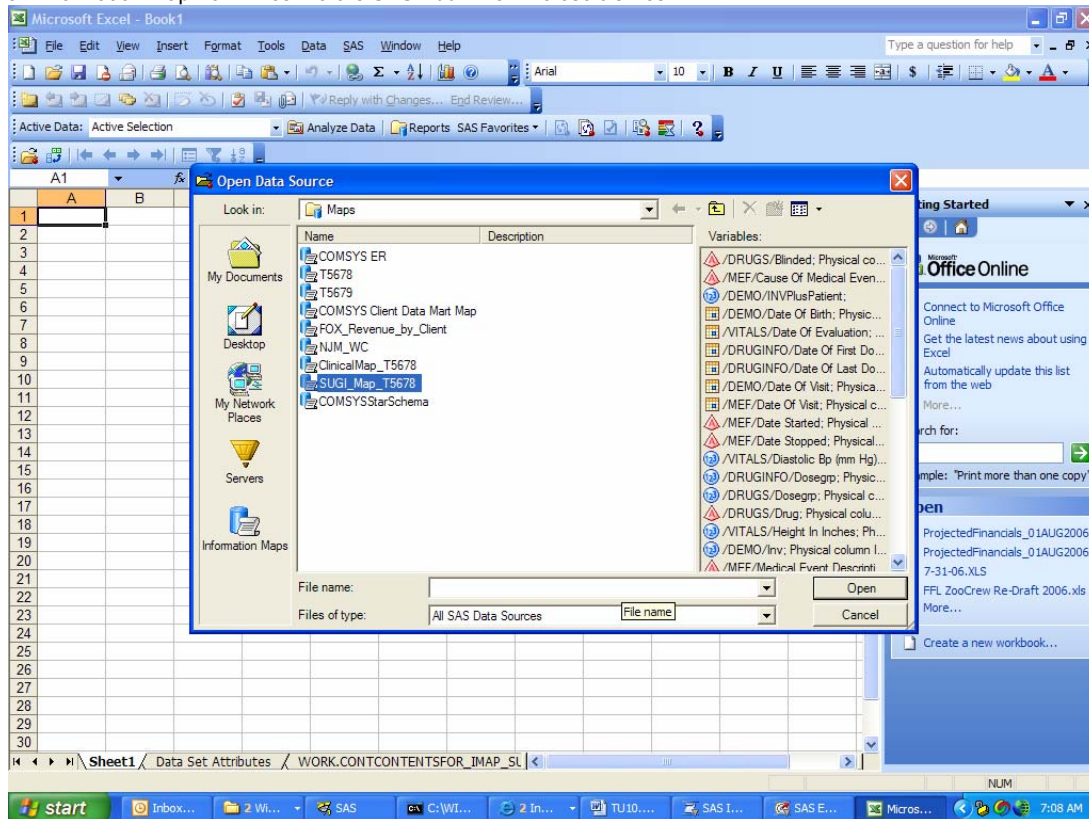
Once an information map has been chosen in SAS AMO, one can use it in the pre-defined analysis tasks off of the SAS menu item in as shown below. The analysis tasks are available off of the SAS menu in AMO.
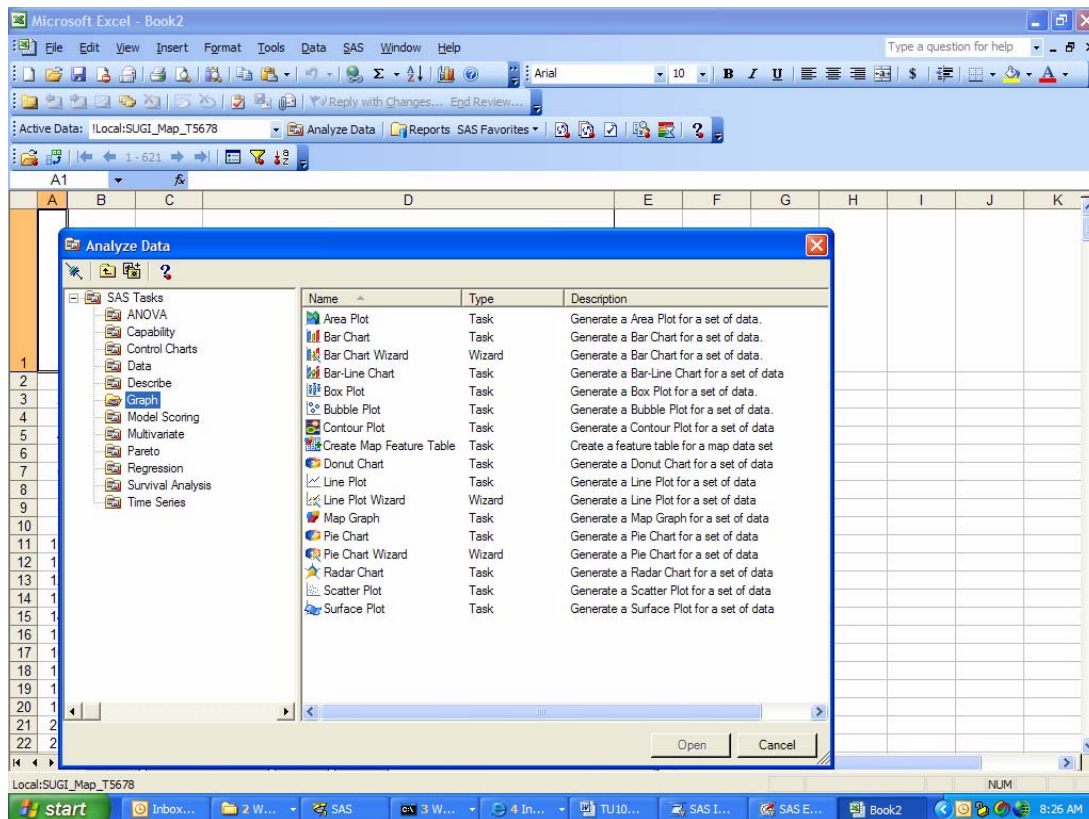
SAS Web Report Studio
Information Maps are the bridge between Web Report Studio and the physical data. When creating a web report, the first thing a user must do is choose an Information Map to work from as a data source.


SAS Information Delivery Portal
The SAS IDP can leverage Information Maps via the collection portlet or the Information Map Viewer Portlet.

2. PROMPTS AND FILTERS:

What is a prompt?
A prompt stops and asks the information consumer for input or to make a choice. Prompts can be created and managed from the "Manage Prompts" menu item off of the tools menu in Information Map Studio.
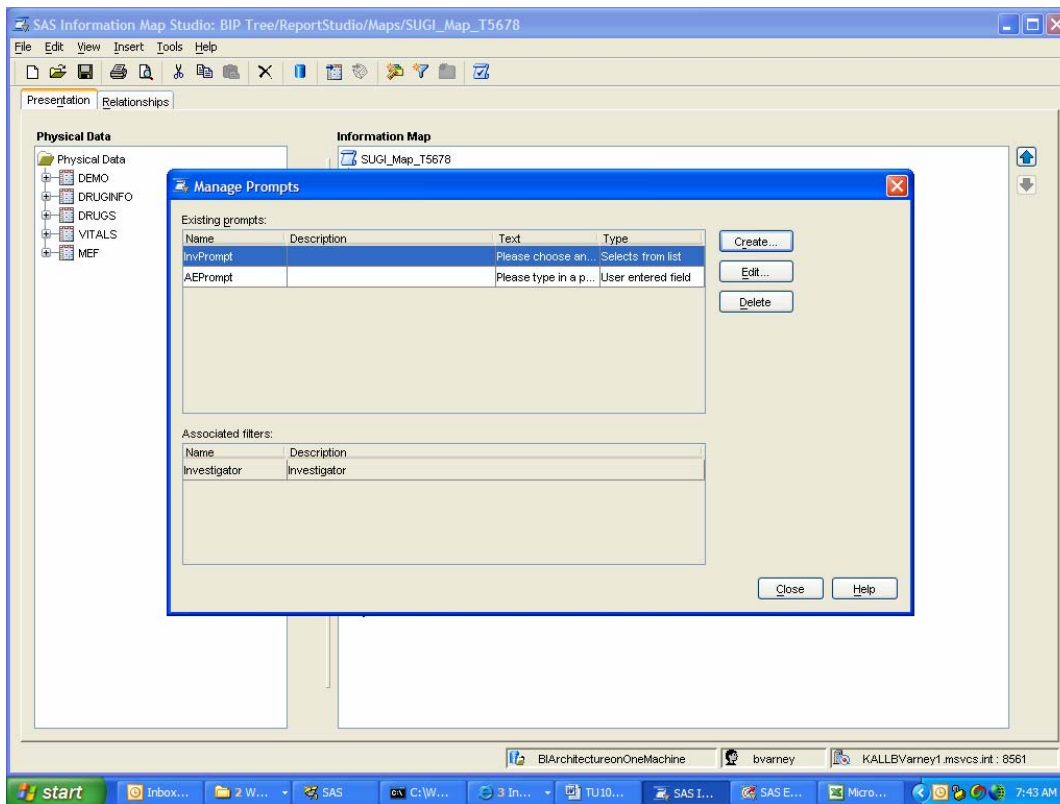
Prompts can be constructed to allow users to type in input or to choose from a pick-list of values.

What is a filter?
A filter is a rule used to subset data. A filter is created by choosing "filter" from the insert menu item or by clicking on the filter button in Information Map Studio. Below is an example of an initial filter creation screen on the variable date of birth.
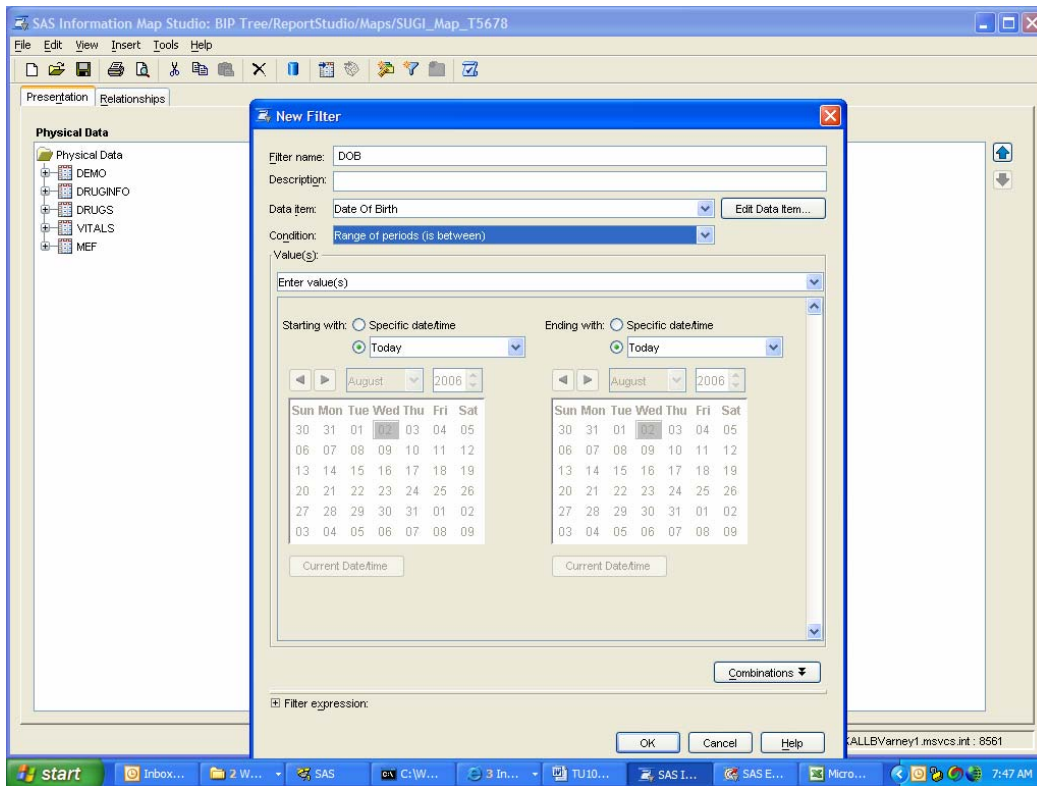
When a prompt and filter are used together, it is called a prompted filter.

Examples of using prompts and filters from:
- Web Report Studio
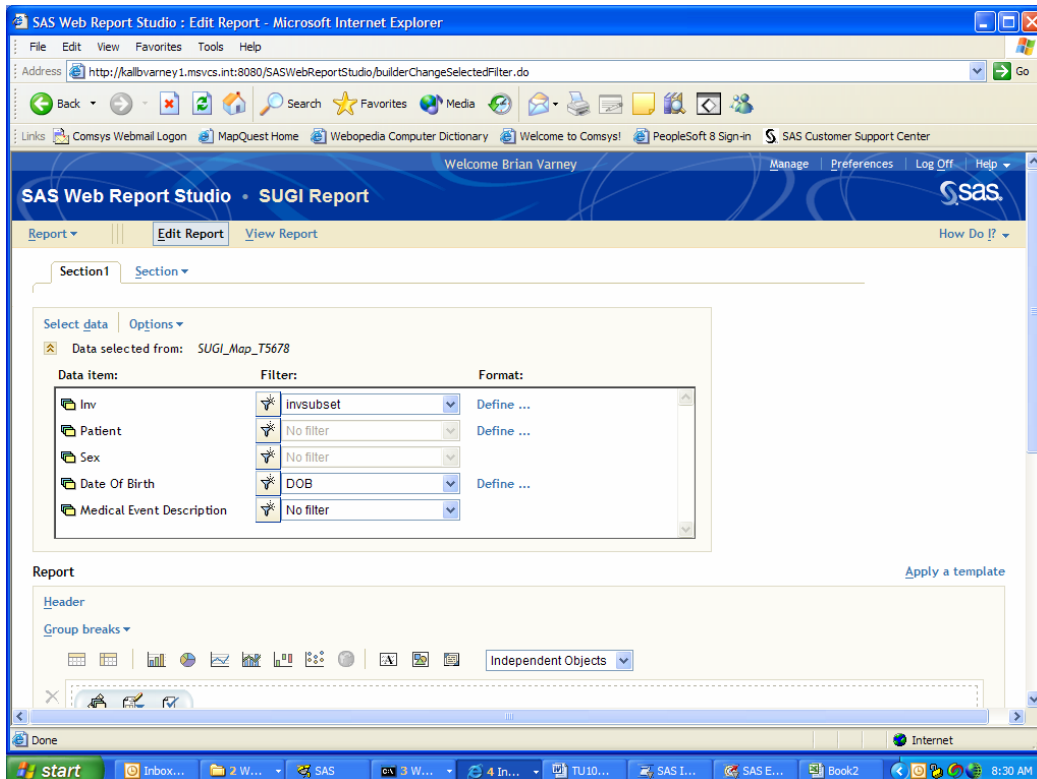
Notice in the above screen shot, the variables from the information map with filters associated with them have the pick-list highlighted. One can also define a filter within the report but it would only be available within the report.

Prompts and filters in action in Web Report Studio
When a report is run, variables in the report that have prompted filters enabled will prompt the user with a screen. Notice that prompts can be pick list or an input field.

CONCLUSION
The SAS Business Intelligence products are a very powerful suite of tools. To not understand and utilize information maps, prompts, and filters would cause users to miss out on some very useful features that are available out of the box.

If information maps are defined against the physical data for each study, anyone in the organization can perform simple reporting and analysis from Enterprise Guide, Microsoft Office or a web browser without having to ask a programmer to produce the report. The user is shielded from details such as table join criteria and physical data location.

REFERENCES
SAS Information Studio 3.1 Online Help

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CONTACT INFORMATION
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