Paper 175-25

Security on the Web using SAS/IntrNet™ Software and HTML

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Abstract

The increase in **INTERNET** usage from both companies and from the general public has caused security to become a growing concern and in turn a whole industry is being created. Each day more and more companies bring their business closer to individuals for home, personal and business usage. Business transactions are increasing daily as we approach the paperless trail society.

One way to safe guard the company proprietary information from hackers and competitors is by installing security on the web. Security can limit access to the company sensitive data areas, by granting different level of access on a need to know basis. There are many ways to provide security on the web, one of the more effective ways is through the usage of **SAS/IntrNet™** in conjunction with **SAS/htmSQL™** and **HTML**.

Introduction

The application in discussion is a system in which the "**Application Administrator**" administers each departments application(s) independent of the IT department. The security application does not require anyone with an in-depth knowledge of both the hardware and software used by the application. The only required skill set an individual need is to be able to use a web browser. The Application Administrator is a point and click application with minimal typing required by the user. The only option that requires extensive input during the initial phase of implementation is the "Add" option, where the user (Administrator) is required to input information to the application. However, this initial massive inputting of information, primarily User Ids, Passwords and Level of Access, can be avoided by providing a list of potential users to the developer. The developer can then pre-load the information to the User Id / Password file. Having a protected application allows the department Application Administrator to track privileges as to how many users are using the application and its usage like number of records updated.

With the User Id, Password and Level of Access setup, a user is able to sign-on to the application via the regular sign-on screen and not the Application Administrator sign-on screen. Once the user has successfully signed onto the application, based on the setup of the user at the security application, a list of parameters will be passed to the application menu program. Depending on the level of access a different set of screen options will be presented to the user; thus eliminating administrative nightmares of having to code security protocols within specific programs used by the general audience. Being able to pass the User Id and Password from a **HTML** / **htmSQL™** page from one application menu to another, presents a list of authorized options based on the user level of access granted, each time the application menu program is invoked.

The application menu program is coded in **Base SAS®** using '**PROC SQL**' to query the User Id / Password file and extracting user information. The program then processes the information obtained from the file, and if the user has been defined in the User Id / Password file, a list of authorized options will be displayed. However, if the user id is not found on the User Id / Password file an error message will be displayed, asking him / her to contact the Application Administrator for access.

The security application is primarily written in **htmSQL™** unlike that of the application menu described above. The speed in which results are being retrieved from a **htmSQL™** page, compared to invoking programs through the **INTERNET** broker, is faster. This is because the queries are done directly from the web page rather than by passing the query parameters through the broker, and then back from the broker to the web page for display.

Another tool used to prevent unauthorized access to a secure application is to use the option in **HTML**, **METHOD='POST'** in the **<FORM>** tag. This prevents the user from **BOOKMARKING** the application with the **METHOD='POST'** option, information like User Id, Password and other required information for the execution of an option presented in the menu, will not be shown.

There are many ways to pass parameters, like one's User Id and Password mentioned above, from one **HTML** page to another including using **JAVA**, **JavaScript**, **VBScript**, **C++**, etc. However, all of these "**program**" / **HTML** pages have the file extension of "**.html**" or "**.htm**" and managing them can prove to be cumbersome since it requires the user to have knowledge of other languages other than **SAS™**. These obstacles can be avoided while achieving the common goal is by using **SAS/htmSQL™**. A **SAS/htmSQL™** file bears close resemblance to the **HTML** page / file. The main difference is that file extension is ".hsql" instead of ".html" or ".htm". The **SAS/htmSQL™** uses SAS "**PROC SQL**" syntax and many of the formatting functions that **Base SAS®** offers, as well as some of the customized functions native only to **SAS/htmSQL™** (refer to documentation on **SAS/htmSQL™ Version 1.2**).

Using **Base SAS®**, **SAS/IntrNet™**, **SAS/htmSQL™** and **HTML** effectively can prove to be a viable tool to combat hackers and competitors that desire inside competitive information of their competition.

Components of the Security Application (one can customize to their needs)

Listed with this document are the components of the Security Application and the skeleton of the Application

Menu Program. The two need to work hand in hand to provide the necessary infrastructure for a security application.

First of all, a file containing the following fields need to be created:

- i. User Name
- ii. User Id
- iii. Password
- iv. Access Level - All, Update, Inquiry
- v. Location
- vi. Date Created
- vii. Date Updated

Next a record need to be created in a master file separate from the one above, which will contain the following fields:

- i. User Id
- ii. Project Name
- iii. Password
- iv. Date Created
- v. Date Updated

Once the above files have been created, both files need to be indexed by User Id. This is to ensure that no duplicate User Ids are created.

The application is comprised of a series of screens:

- i. User Sign-on
- ii. Main Menu
- iii. Add
- iv. Edit
- v. Delete
- vi. Inquiry

To use the security application, the user (administrator) needs to enter the User Id and Password found in the master file created earlier onto the User Sign-on screen. Only then, the administrator will be able to grant, change or revoked access to user of the application that he or she manages.

The Application Menu Program listed here translates the user access level that has been granted and displays the appropriate menu options, which is activated through the **SAS®** broker.

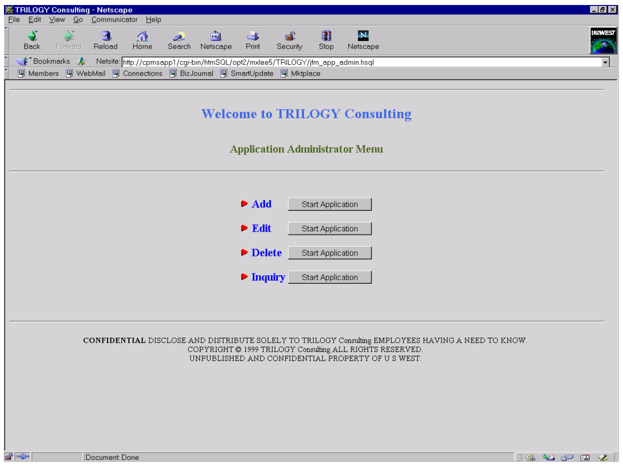
Application Menu Program

```
PROC DATASETS LIB=WORK KILL;
RUN;

* ------------------------------------------- *;
*                                             *;
*  PROGRAM NAME  : ASSIGN_MENU.SAS            *;
*                                             *;
*  FUNCTION      : DISPLAY APPRORIATE MENU BY *;
*                  LEVEL OF ACCESS            *;
*                                             *;
*                                             *;
*  MODIFIED BY      :                         *;
*  DATE MODIFIED    :                         *;
*                                             *;
*  MODIFICATION     :                         *;
*                                             *;
* ------------------------------------------- *;

OPTIONS MSGLEVEL=I SYMBOLGEN MACROGEN
MAUTOSOURCE MPRINT MLOGIC MTRACE ERROR=2
MISSING=' ' PAGENO=1;

LIBNAME TEST   "/DATA/TEST" SERVER=SHR1;

%GLOBAL SQLOBS SQLRC OBSX USERID PASSWORD
LOCATION;

%MACRO ACC_ALL; /* Display All Options available
in the Application */

DATA _NULL_;
   FILE _WEBOUT;

        ← SAS Codes / HTML →
        ← Access to ALL Options →

RUN;

%MEND ACC_ALL;

%MACRO NOT_ALL; /* Display Only Options relevant
to Update */

DATA _NULL_;
   FILE _WEBOUT;

        ← SAS Codes / HTML →
        ← Access to Update Options →

RUN;

%MEND NOT_ALL;

%MACRO INQUIRE; /* Display Only Inquiry and
Reporting Options */

DATA _NULL_;
   FILE _WEBOUT;

        ← SAS Codes / HTML →
        ← Access to Inquiry Options →

RUN;

%MEND INQUIRE;

%MACRO EXECIT;

DATA _NULL_;
   SET ACC END=EOF;
   FILE _WEBOUT;

   IF ((&SQLOBS = 1) AND
       (&SQLRC  = 0)) THEN DO;
      IF UPCASE(PASSWORD) = UPCASE("&PASSWORD")
THEN DO;
         SELECT (ACCESS);
            WHEN ("ALL") DO;
               CALL SYMPUT('CHOICE','%ACC_ALL');
            END;
            WHEN ("UPDATE") DO;
               CALL SYMPUT('CHOICE','%NOT_ALL');
            END;
            WHEN ("INQUIRE") DO;
               CALL SYMPUT('CHOICE','%INQUIRE');
            END;
            OTHERWISE DO;
               LINK INVOPT;
            END;
         END;
      END;
      ELSE DO;
         LINK BADPWD;
      END;
   END;

RETURN;

BADPWD:

        ← SAS Codes / HTML →
        ← ERROR Message for Invalid or Bad
password →

RETURN;

INVOPT:

        ← SAS Codes / HTML →
        ← ERROR Message for Invalid Access Level
Assigned →

RETURN;

RUN;

&CHOICE; /* Execute selection */

%MEND EXECIT;

%MACRO EXECERR;

DATA _NULL_;
   FILE _WEBOUT;

        ← SAS Codes / HTML →
        ← ERROR Message for Invalid User Id →

RUN;

%MEND EXECERR;

* ------------------------------------------ *;
*                                            *;
* Verify user id and password - Start of the *;
* Application Menu Program                   *;
*                                            *;
* ------------------------------------------ *;

PROC SQL;

   CREATE TABLE ACC AS
   SELECT *
   FROM TEST.TESTPWD
   WHERE UPCASE(USERID) = UPCASE("&USERID")
         ;

QUIT;

%PUT "*** SQLOBS : " &SQLOBS;
%PUT "*** SQLRC  : " &SQLRC;

PROC CONTENTS DATA=ACC OUT=XXX(KEEP=NOBS)
              NOPRINT;
RUN;

DATA _NULL_;
   SET XXX END=EOF;

   IF EOF THEN DO;
      CALL SYMPUT('OBSX', NOBS);
   END;

RUN;

%PUT "***** OBSX : " &OBSX;
```

```
DATA _NULL_;
   SET ACC END=EOF;
   WHERE USERID = UPCASE("&USERID");

   IF EOF THEN DO;
      CALL SYMPUT('LOCATION',LOCATION);
   END;

RUN;

DATA _NULL_;
   SET XXX END=EOF;

   IF _N_ = 1 THEN DO;
      IF &OBSX = 0 THEN DO;
         CALL SYMPUT('DECISION','%EXECERR');
      END;
      ELSE DO;
         CALL SYMPUT('DECISION','%EXECIT');
      END;
   END;

RUN;

&DECISION; /* Execute Program */

QUIT;
```

Excerpts of SAS/htmSQL™ and its Associating Screens

```
* ------------------------------------------ *;
* Main Menu Options                          *;
* ------------------------------------------ *;
```


TRILOGY Consulting - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Stop Netscape
Bookmarks Netsite:
Members WebMail Connections BizJournal SmartUpdate Mktplace
Document: Done

http://cpmsapp1/cgi-bin/htmSQL/opt2/mxlee5/TRILOGY/jfm_app_admin.hsql

Welcome to TRILOGY Consulting

Application Administrator Menu

- Add [Start Application]
- Edit [Start Application]
- Delete [Start Application]
- Inquiry [Start Application]

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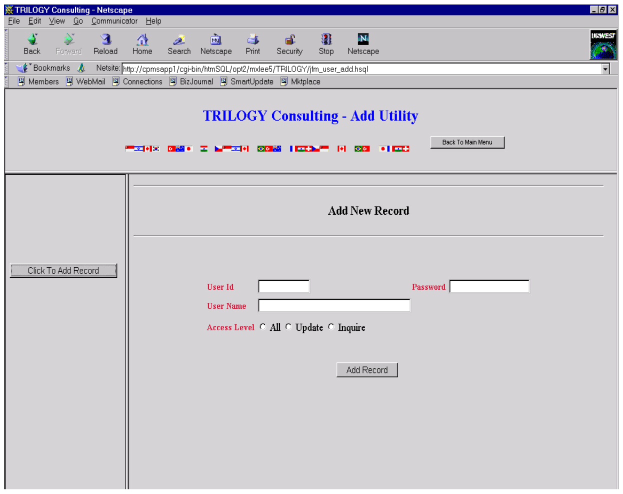
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File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Stop Netscape
Bookmarks Netsite:
Members WebMail Connections BizJournal SmartUpdate Mktplace
Back To Main Menu
Click To Add Record
Add Record

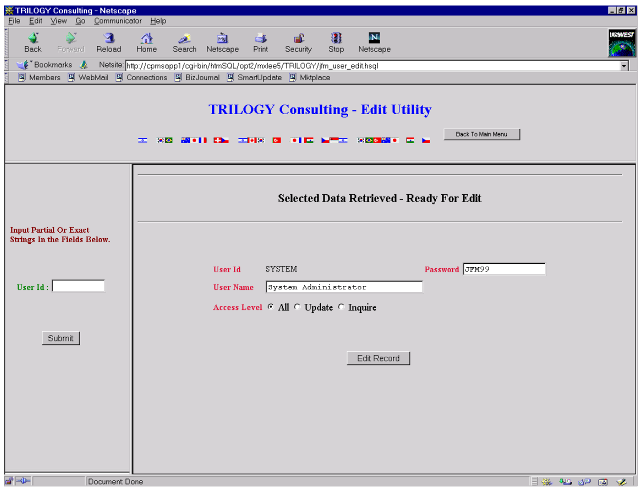
http://cpmsapp1/cgi-bin/htmSQL/opt2/mxlee5/TRILOGY/jfm_user_add.hsql

TRILOGY Consulting - Add Utility

Add New Record

User Id ____ Password ____
User Name ____
Access Level ○ All ○ Update ○ Inquire

```
* ------------------------------------------- *;
* Add new User                                *;
* ------------------------------------------- *;
{sql}
   insert into <libref>.testpwd
      set userid   = upcase("{&userid}"),
          username = "{&username}",
          password = upcase("{&password}"),
          access   = "{&access}",
          crtedate = today(),
          chngdate = today(),
          location = "{&location}",
          all      = case when "{&access}" =
"ALL     " then "CHECKED" else "       " end,
          upd      = case when "{&access}" =
"UPDATE " then "CHECKED" else "       " end,
          ing      = case when "{&access}" =
"INQUIRE" then "CHECKED" else "       " end
          ;
{/sql}
```


TRILOGY Consulting - Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Stop Netscape
Bookmarks Netsite: http://cpmsapp1/cgi-bin/htmSQL/opt2/mxlee5/TRILOGY/jfm_user_edit.hsql
Members WebMail Connections BizJournal SmartUpdate Mktplace
Back To Main Menu
Submit
Edit Record
Document: Done

TRILOGY Consulting - Edit Utility

Input Partial Or Exact Strings In the Fields Below.

User Id :

Selected Data Retrieved - Ready For Edit

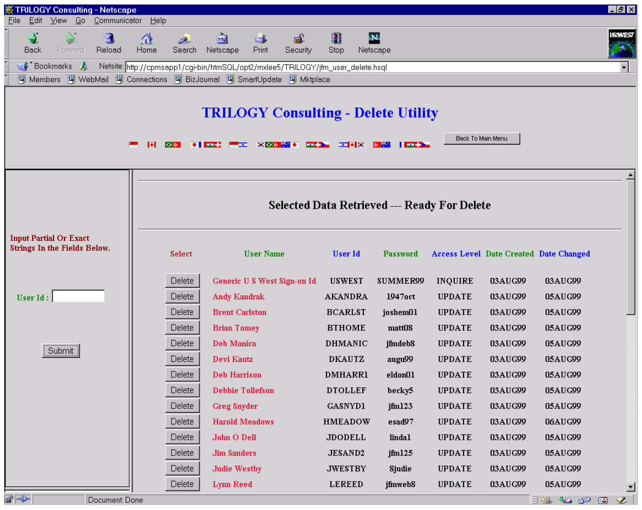
User Id SYSTEM   Password JFM99

User Name System Administrator

Access Level [✓ All] Update Inquire

```
* ------------------------------------------- *;
* Edit User                                   *;
* ------------------------------------------- *;
{sql}
   update <libref>.testpwd
      set username = "{&username}",
          password = upcase("{&password}"),
          access   = "{&access}",
          crtedate = today(),
          chngdate = today(),
          location = "{&location}",
          all      = case when "{&access}" =
"ALL     " then "CHECKED" else "       " end,
          upd      = case when "{&access}" =
"UPDATE " then "CHECKED" else "       " end,
          ing      = case when "{&access}" =
"INQUIRE" then "CHECKED" else "       " end

   where userid = "{&userid}";
{/sql}
```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Bookmarks Netsite: http://cpmsapp1/cgi-bin/htmSQL/opt2/mxlee5/TRILOGY/jfm_user_delete.hsql
Members WebMail Connections BizJournal SmartUpdate Mktplace
Back To Main Menu
Submit
Document: Done

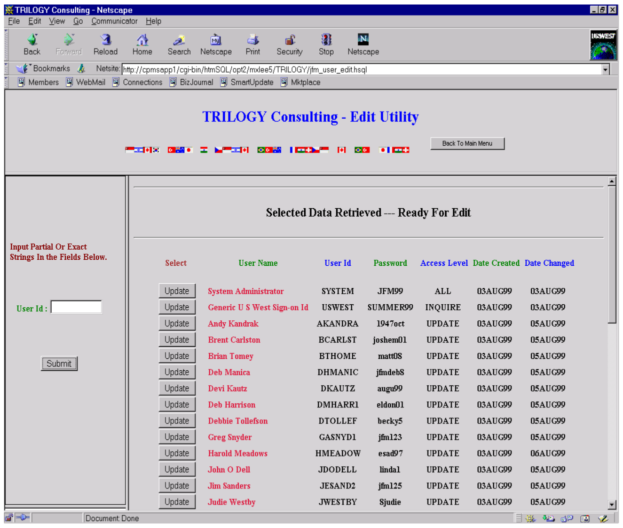
TRILOGY Consulting - Delete Utility

Input Partial Or Exact Strings In the Fields Below.

User Id :

Selected Data Retrieved --- Ready For Delete

Select	User Name	User Id	Password	Access Level	Date Created	Date Changed
Delete	Generic U S West Sign-on Id	USWEST	SUMMER99	INQUIRE	03AUG99	03AUG99
Delete	Andy Kandrak	AKANDRA	1947oct	UPDATE	03AUG99	05AUG99
Delete	Brent Carlston	BCARLST	joshem01	UPDATE	03AUG99	05AUG99
Delete	Brian Tomey	BTHOME	matt08	UPDATE	03AUG99	05AUG99
Delete	Deb Manica	DHMANIC	jfmdeb8	UPDATE	03AUG99	05AUG99
Delete	Devi Kautz	DKAUTZ	augu99	UPDATE	03AUG99	05AUG99
Delete	Deb Harrison	DMHARR1	eldon01	UPDATE	03AUG99	05AUG99
Delete	Debbie Tollefson	DTOLLEF	becky5	UPDATE	03AUG99	05AUG99
Delete	Greg Snyder	GASNYD1	jfm123	UPDATE	03AUG99	05AUG99
Delete	Harold Meadows	HMEADOW	esad97	UPDATE	03AUG99	06AUG99
Delete	John O Dell	JDODELL	linda1	UPDATE	03AUG99	05AUG99
Delete	Jim Sanders	JESAND2	jfm125	UPDATE	03AUG99	05AUG99
Delete	Judie Westby	JWESTBY	8judie	UPDATE	03AUG99	05AUG99
Delete	Lynn Reed	LEREED	jfmweb8	UPDATE	03AUG99	05AUG99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Bookmarks Netsite: http://cpmsapp1/cgi-bin/htmSQL/opt2/mxlee5/TRILOGY/jfm_user_edit.hsql
Members WebMail Connections BizJournal SmartUpdate Mktplace
Back To Main Menu
Submit
Document: Done

TRILOGY Consulting - Edit Utility

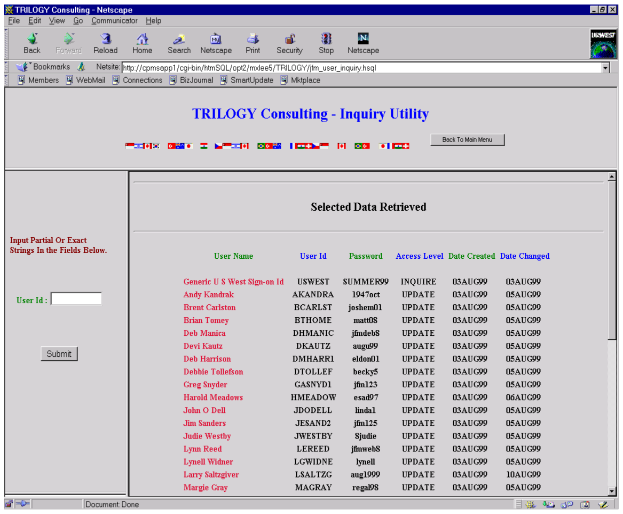
Input Partial Or Exact Strings In the Fields Below.

User Id :

Selected Data Retrieved --- Ready For Edit

Select	User Name	User Id	Password	Access Level	Date Created	Date Changed
Update	System Administrator	SYSTEM	JFM99	ALL	03AUG99	03AUG99
Update	Generic U S West Sign-on Id	USWEST	SUMMER99	INQUIRE	03AUG99	03AUG99
Update	Andy Kandrak	AKANDRA	1947oct	UPDATE	03AUG99	05AUG99
Update	Brent Carlston	BCARLST	joshem01	UPDATE	03AUG99	05AUG99
Update	Brian Tomey	BTHOME	matt08	UPDATE	03AUG99	05AUG99
Update	Deb Manica	DHMANIC	jfmdeb8	UPDATE	03AUG99	05AUG99
Update	Devi Kautz	DKAUTZ	augu99	UPDATE	03AUG99	05AUG99
Update	Deb Harrison	DMHARR1	eldon01	UPDATE	03AUG99	05AUG99
Update	Debbie Tollefson	DTOLLEF	becky5	UPDATE	03AUG99	05AUG99
Update	Greg Snyder	GASNYD1	jfm123	UPDATE	03AUG99	05AUG99
Update	Harold Meadows	HMEADOW	esad97	UPDATE	03AUG99	06AUG99
Update	John O Dell	JDODELL	linda1	UPDATE	03AUG99	05AUG99
Update	Jim Sanders	JESAND2	jfm125	UPDATE	03AUG99	05AUG99
Update	Judie Westby	JWESTBY	8judie	UPDATE	03AUG99	05AUG99

```
* ------------------------------------------- *;
* Delete User                                 *;
* ------------------------------------------- *;
{sql}
   delete from <ibref>.testpwd
      where userid = "{&userid}"
      ;
{/sql}
```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Members WebMail Connections BizJournal SmartUpdate Mktplace
Back To Main Menu
Submit
Document: Done

TRILOGY Consulting - Inquiry Utility

Input Partial Or Exact Strings In the Fields Below.

User Id :

Selected Data Retrieved

User Name	User Id	Password	Access Level	Date Created	Date Changed
Generic U S West Sign-on Id	USWEST	SUMMER99	INQUIRE	03AUG99	03AUG99
Andy Kandrak	AKANDRA	1947oct	UPDATE	03AUG99	05AUG99
Brent Carlston	BCARLST	joshem01	UPDATE	03AUG99	05AUG99
Brian Tomey	BTHOME	matt08	UPDATE	03AUG99	05AUG99
Deb Manica	DHMANIC	jfmdeb8	UPDATE	03AUG99	05AUG99
Devi Kautz	DKAUTZ	augu99	UPDATE	03AUG99	05AUG99
Deb Harrison	DMHARR1	eldon01	UPDATE	03AUG99	05AUG99
Debbie Tollefson	DTOLLEF	becky5	UPDATE	03AUG99	05AUG99
Greg Snyder	GASNYD1	jfm123	UPDATE	03AUG99	05AUG99
Harold Meadows	HMEADOW	esad97	UPDATE	03AUG99	06AUG99
John O Dell	JDODELL	linda1	UPDATE	03AUG99	05AUG99
Jim Sanders	JESAND2	jfm125	UPDATE	03AUG99	05AUG99
Judie Westby	JWESTBY	8judie	UPDATE	03AUG99	05AUG99
Lynn Reed	LEREED	jfmweb8	UPDATE	03AUG99	05AUG99
Lynell Widner	LGWIDNE	lynell	UPDATE	03AUG99	05AUG99
Larry Saltzgiver	LSALTZG	aug1999	UPDATE	03AUG99	10AUG99
Margie Gray	MAGRAY	regal98	UPDATE	03AUG99	05AUG99

```
* ------------------------------------------- *;
* Inquire User(s)                             *;
* ------------------------------------------- *;
{sql}
   select *,
          put(count(userid),comma10.) as reccnt
   from <libref>.testpwd
   where userid like
compress(upcase("{&userid)") || '%')
   ;

{/sql}
```

Conclusion

The **SAS/IntrNet™** software provides a quick solution to setup security on the web as well as the ease of maintaining it.

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