

Version 3.0, User's Guide



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Introduction

Introduction

kLink is a Customizable Online Server for the IBM i. It can be configured to do many things including; online registration, secure document delivery, and it can receive Interactive PDF Forms data. kLink includes programmable buttons for performing other custom business processes.

kLink uses two HTTP Servers to distribute and receive documents to and from any browser or mobile device, including iPads, iPhones, and Android devices. One kLink server is used by your employees (those with User-IDs) and the other kLink server is used by your customers/agents (those without User-IDs).

Security

kLink uses several different methods to secure the sessions, to prevent hacking, and to quickly deliver sensitive content to the appropriate authorized end user.

SSL:

Either server may use Secure Sockets Layer to encrypt User Accounts and Passwords from being intercepted.

Resource Security:

Both servers adhere to the standard IBM resource security that has been set for the IFS. Only *Public directories, or directories that have been authorized to the users may be accessed by the Servers.

kLink Security:

kLink uses its own built in security to deliver content only to those user's that have been given specific access (or Links) to private directories. You define a list of Public Directories that can be found within the IFS Path for Customers, in the kLink System Setup. All directories not found in the Public list can only be accessed by a User Account that has been given a specific Link to that directory.

Activity Logs:

User activity is automatically logged so that you can track exactly what user's are doing with the system.

Online Registration

To simplify and speed the registration process for the Customer Server, you can set up kLink to allow online registration. Users are led through a series of validation and security questions so that they can be automatically authenticated. With online registration, users can add directory links to their accounts only after the server's validation program verifies their answers against your own master file data. The kLink accounts can also be manually maintained internally.

Guessing Passwords:

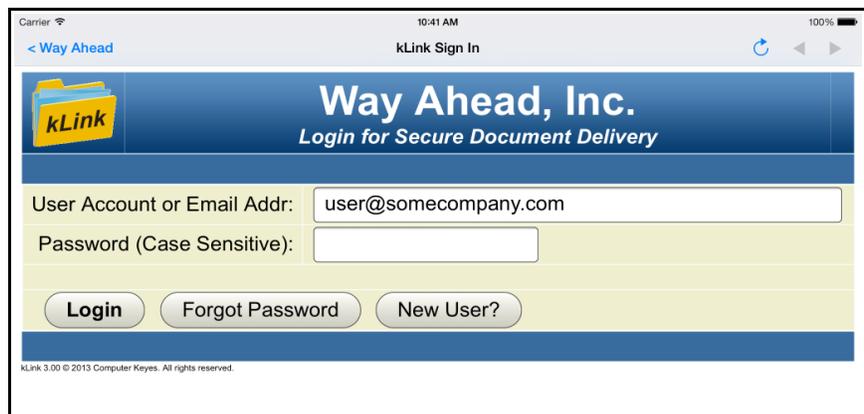
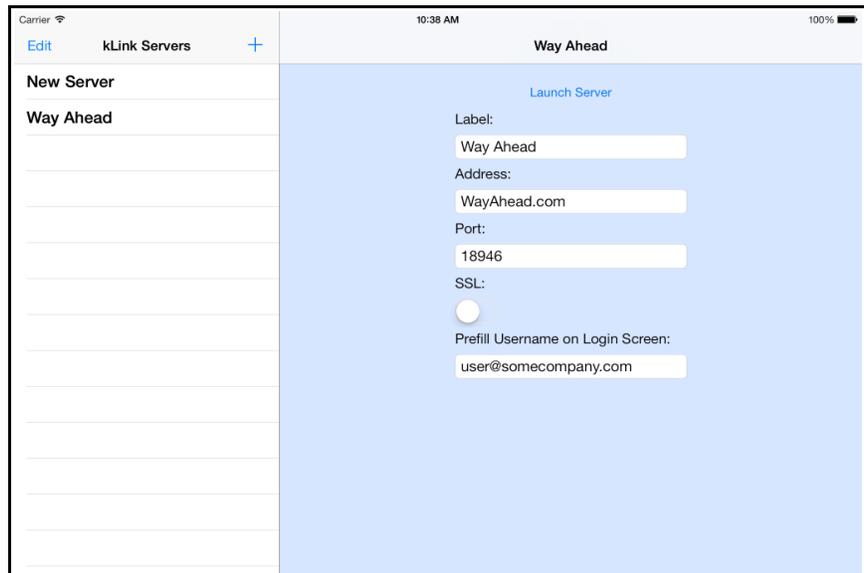
kLink will not allow users to try to guess at their passwords more than 5 times in a row. Their accounts will be automatically disabled for an hour and an email is sent to the user's address (that is on file) to notify them that their account was disabled due to multiple invalid Log In attempts.

Lost Passwords:

kLink automates the reset process for lost or forgotten passwords. The users are asked a security question to verify their identity. If verified, their password is reset to a random value and emailed to the address that is on file for that user.

Free Mobile App

kLink comes with a free Mobile App for both Apple and Android products. The free App can be downloaded by your users to allow quick connection to your kLink servers. Other devices, including PC's, Macs and laptops, can access your kLink servers using any browser.



Installation Instructions

Sign on as a Security Officer

The following installation procedure will require that you have *ALLOBJ authority, when you restore the library.

Copying kLink Programs to a Library

You may place the **kLink** programs into any library that you wish. We recommend that you install these programs in its own library called **KLLIB**. Please be aware that the HTTP Servers have been configured to only use programs out of the KLLIB library.

Restoring Instructions:

1. Follow the instructions found in the **Readme.txt** file that you download from our website (www.ckeyes.com). It will use FTP to transfer Save File data to your IBM i.

2. *If this is a New Installation:*

```
Enter: RSTLIB SAVLIB(KL03LIB) DEV(*SAVF)
       SAVF(QGPL/KL03SVF) MBROPT(*ALL)
       RSTLIB(KLLIB)
```

If you are Updating an Existing System:

```
Enter: DLTLIB LIB(KLUPD)
```

Ignore any "Library not found" message.

```
Enter: RSTLIB SAVLIB(KL03LIB) DEV(*SAVF)
       SAVF(QGPL/KL03SVF) MBROPT(*ALL)
       RSTLIB(KLUPD)
```

Updating an Existing System

This program will update or add the kLink programs to an existing program library (usually called KLLIB). Choose the desired library name to be updated and code it in the first parameter, below.

1. Prompt the kLink Update program.
Enter: KLUPDATE then press F4 (Prompt)
2. Fill in the appropriate library names and press Enter:
kLink Program library. . . kllib
kLink Update library. . . . klupd
3. Follow the instructions to *Create the kLink Subsystem Objects and Install the kLink Files*, found on the following pages, to update the objects in your library.
4. If this was a change to a new version number of kLink, you may have to install a new license number, as described on the following page.

Enter your kLink License number

The kLink programs will not function until they are activated with a license number. The license number is based on your IBM i (AS/400) serial number and Logical Partition.

You must contact Computer Keyes to get a valid license number. You may call, fax or e-mail your request. Be sure to specify your name, company, and other contact information along with the serial number and logical partition of your IBM i (AS/400).

Note: The KLLICENSE command described below will tell you what the serial number is and the logical partition.

Recording the kLink License Number:

1. Switch your current library to where your kLink programs were installed. This is usually KLLIB.

Enter: CHGCURLIB *kllib*

2. Start up the program that will record your kLink License.

Enter: KLLICENSE

3. Key your kLink License number in the field provided, then press Enter.

kLink License Number:

Permanent: _____ S# _____ - _____

Temporary: _____

Create the kLink Subsystem Objects

You will need to run this if you are installing a new system or if you are updating kLink to a newer Version number.

The kLink HTTP server programs run in the QHTTPSVR subsystem, with the configuration files located in the IFS. The configuration objects will be restored to the IFS and all of the remaining server objects needed will be created in the kLink library (KLLIB).

1. Be sure that the kLink Program library is on your library list.
2. Create the kLink Subsystem Objects.

Enter: CRTKLSBS

Install the kLink Files

You will need to run this if you are installing a new system or if you are updating kLink to a new Version number.

The kLink HTTP server programs use physical and logical files to monitor the activity of the kLink users. This step will create or update the needed files in the kLink Program library.

1. Be sure that the kLink Program library is on your library list.
2. Install the kLink Files.

Enter: KLINSTALL

Customize Two Programs

If this is a new installation, you will want to customize two programs. One is an email program called KLWEMAIL located in QCLSRC. The other is a validation program called KLWVALID located in QRPGRSRC. You can find information about those programs in the Appendix.

kLink Menu

The kLink system uses a menu (KLMENU) for creating and monitoring users. It is also used for configuring, starting and stopping the servers.

Displaying the Menu:

1. Be sure that the kLink Program library is on your library list. The library is usually called KLLIB.

Enter: ADDLIBLE kllib

2. Display the kLink Menu.

Enter: GO KLMENU

```
Display-S105P5DM.ws
File Edit View Communication Actions Window Help
KLMENU kLink Menu 11/14/13
JOHN 10:58:42

Select one of the following:

Current Activity:
  1. Employee File Maintenance
    and View Logs
  2. User Account Maintenance
    and View Logs
  5. Display KLMSGQ messages

Administration:
  31. kLink System Setup
  32. Employee Extensions
  33. Customer Extensions

Servers:
  21. Start Employee Server
  22. End Employee Server
  23. Start Customer Server
  24. End Customer Server

Maintenance:
  41. Purge Employee Logs
  42. Purge Customer Logs
  43. Purge Inactive Users
  90. Sign Off

Selection or command
==>

F3=Exit F4=Prompt F9=Retrieve F12=Cancel
F13=Information Assistant F16=AS/400 main menu
MA a MW 20/007
```

Configuring new Employees for kLink

By default any employee that has a User Profile can sign in to use kLink. They will be given access to the directory in the IFS that is configured in the kLink System Setup parameter called **Employee Server: Root IFS Dir.**

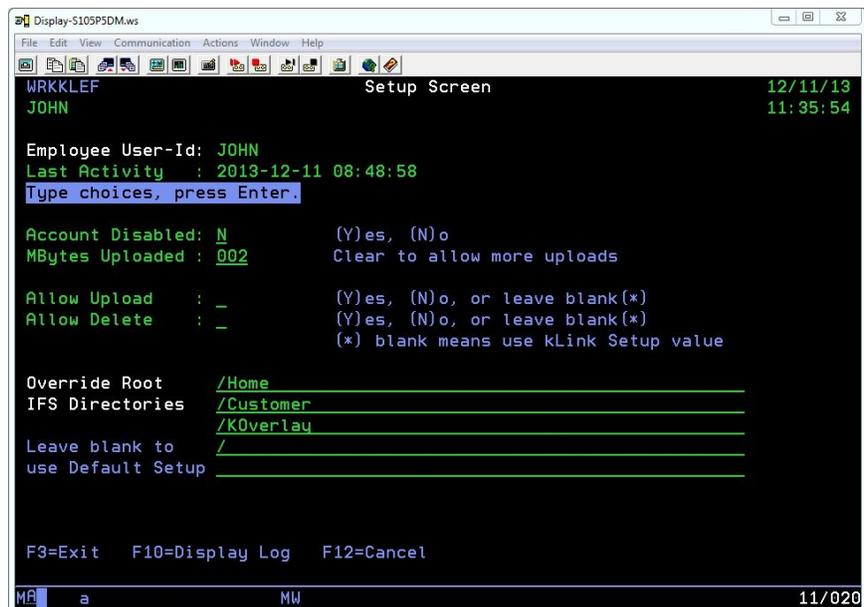
If you leave the **Employee Server: Root IFS Dir** parameter blank, in the kLink System Setup, this will prevent all employees from signing onto the kLink Employee Server – except for those employees that you give **Override Root IFS Directories** to, as shown below.

Employee entries are created using an employee's User-Id. New records will be automatically added, as employees use the server. You can override the **Root IFS Directories** that are accessible for each employee.

Work with kLink Employee Records

A new employee record with default values will automatically be created for each user if/when they use the kLink server.

A kLink administrator can manually add/change/disable employee records, using item 1 from KLMENU (Employee File Maintenance and View Logs). Override Root IFS Directories can be added for each user and Logs can be viewed.



Account Disabled:

Code a (Y) to disable an employee. The employee will not be able to use the kLink server. Code an (N) to re-enable the employee.

MBytes Uploaded:

The total number of Mbytes of data that has been uploaded recently is recorded for each employee. It is reset each time the employee signs on after a 10 hour time period of no activity. You can manually clear this value to allow an

employee to upload more files.

Allow Upload:

Use this field to override the default value recorded in the kLink System Setup for Employees. Leave it blank to use the Setup value. Coding a **Y** will allow this Employee to upload files into the IFS Directories that they have been given access to. The IBM Resource Security must also allow a file to be created.

Allow Delete:

Use this field to override the default value recorded in the kLink System Setup for Employees. Leave it blank to use the Setup value. Coding a **Y** will allow this Employee to delete files from the IFS Directories that they have been given access to. The IBM Resource Security must also allow a file to be deleted.

Override Root IFS Directories:

You may add up to 5 different Root IFS Directories for each employee.

These directories will replace the default Root IFS directory that is coded in the kLink Setup Parameter. The employee will not be able to access any directories above or outside of the ones listed here.

Leave these fields blank to use the default Root IFS Directory that is coded in the kLink Setup parameter.

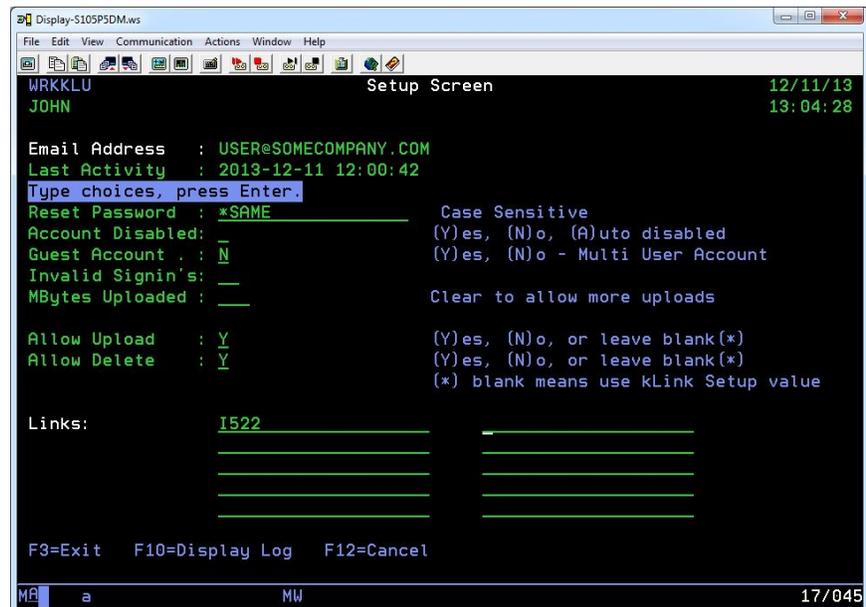
You can give access to the Root Directory by coding a single slash (/).

Registering new Users for kLink

There are two different ways that new users (without User-Ids) can be registered to use the kLink system to securely access the appropriate content within your IBM i's IFS (Integrated File System):

Manually

A kLink administrator can manually add/delete/disable users in the kLink User file. New links can be added or removed using item 2 from KLMENU (User Account Maintenance and View Logs).



Email Address:

User Account entries are typically created using an email address for that user. However, Multi-User or Guest Accounts will typically not use an email address.

Last Activity:

This lists the last date and time that this account was created or accessed the kLink server.

Reset Password:

Leave the value as *SAME to NOT change this user's password. If you want to change the password be aware that it is case-sensitive.

Account Disabled:

Code a (Y) to disable a user account. The user will not be able to use the kLink server. Code an (N) to re-enable the user account. An (A) means that the kLink server has automatically disabled the account because of too many invalid sign in attempts.

Guest Account:

A (**Y**) will make a Guest or Multi-User type account. This type of account will not allow any account maintenance done by the user. It must be maintained manually by an administrator. An (**N**) will be a normal user account which will typically be their email address.

A Guest or Multi-User account by default cannot Upload or Delete files, unless you specifically code a **Y** in the **Allow Upload** and **Allow Delete** fields defined below, respectively.

Invalid Signin's:

This field keeps track of the number of Invalid Sign in Attempts. If the number exceeds 5, within one hour, the account will be Auto Disabled by the kLink server.

If an account is Auto Disabled the user will not be able to sign on using this account, until the account is re-enabled.

An account can be re-enabled by an administrator or by the user. The user can wait an hour and sign on with the correct password, or they can have their password reset by kLink using the **Forgot Password** button.

MBytes Uploaded:

The total number of Mbytes of data that has been uploaded recently is recorded for each employee. It is reset each time the employee signs on after a 10 hour time period of no activity. You can manually clear this value to allow an employee to upload more files.

Allow Upload:

Use this field to override the default value recorded in the kLink System Setup for Customers. Leave it blank to use the Setup value. Coding a **Y** will allow this Customer to upload files into the private Directories that they have access to. The IBM Resource Security must also allow a file to be created. The Customer will not be able to upload files into any Public Directory, as defined in the kLink System Setup. Guest accounts cannot upload files unless you code a **Y** in this field.

Allow Delete:

Use this field to override the default value recorded in the kLink System Setup for Customers. Leave it blank to use the Setup value. Coding a **Y** will allow this Customer to delete files from the private Directories that they have access to. The IBM Resource Security must also allow a file to be deleted. The Customer will not be able to delete any files from a Public Directory, as defined in the kLink System Setup. Guest accounts cannot delete files unless you code a **Y** in this field.

Links:

You may add up to 10 different Links to each user account.

A *Link* is the name of a non-Public directory in the IFS that contains a user's private content. Links are typically named after a customer number or account number that can be uniquely assigned to your users.

Online Registration

You may set the “Allow Online Registration” parameter to *YES in the kLink System Setup (option 31 from KLMENU). This will allow new users to register themselves online so that an administrator does not have to manually register every user.

Automatic Validation:

A validation program (called KLWVALID) is used to validate the users as they register online. It will check the user's answers to validation questions that are configured in the kLink System Setup. The validation program will determine if the new user's record will be added or not. And, it will determine if the Links (that a user requests) will be added to that user's record. The validation program will access the appropriate master files necessary to allow the validation process to proceed without requiring any manual administrator's intervention.

Validation Program:

A sample validation program called KLWVALID has been written for you. It is an RPG program with the source located in KLLIB in the source file called QRPGRSRC. If you set the “Allow Online Registration” parameter to *YES, you will need to alter this program for your use and compile it into KLLIB to do the appropriate validation for new users.

Starting and Stopping the Servers

You can start and stop each of the kLink HTTP servers using options 21 – 24 of KLMENU. The HTTP servers run in the QHTTPSVR subsystem under the QTMHHTTP user profile.

Employee Server:

The Employee server is used by employees of your company. The server can be accessed using a free mobile application or by setting any browser to access “http://your_ibm_i:18944/” or “https://your_ibm_i:18944/” if you have activated SSL. Employees will sign onto the server using their normal IBM i User Profile and Password.

The server will be able to access all of the IFS directories starting from the “Employee Server: Root IFS directory” that you code in the kLink System Setup. If you set the Root IFS directory to the actual Root directory “/” the employees will have access to the entire IFS. If you leave the Root IFS directory setup parameter as “blank”, this will prevent all employees from using the kLink Server – except for any employees that you have given any Override Root IFS directories to in their Employee Record. Standard IBM resource security will be used to control what the employees can or cannot view from the IFS.

Customer Server:

The Customer server is used by customers of your company. The server can be accessed using a free mobile application or by setting any browser to access “http://your_ibm_i:18946/” or “https://your_ibm_i:18946/” if you have activated SSL for this server. Users will sign onto the server using their own Account and Password. User accounts must be registered (either by an administrator or by the users themselves using online registration). A user account will allow a user to see all of the Public directories within the “Customer Server: Root IFS directory” that you code in the kLink System Setup. Links can be added to a user account either manually or using online registration. Links allow a user to access their private directories.

kLink System Setup

The kLink servers are controlled by the values that are entered in the System Setup. If you change any setup parameter values, you will need to end the server and restart it for the new values to take effect.

Server Company Name

Enter up to 30 characters for your Company Name. This value will appear at the top of kLink's browser screens.

Employee Server: Root IFS directory

Enter up to 50 characters for a Root IFS directory for Employees. The employees will be able to access all of the folders and data in the IFS that are within this starting path. They may not view anything above or outside this directory. An employee will only be able to view folders and documents that the IBM Resource Security has given their user profile Read authority to. You may code a slash '/' to indicate that the employees can access the entire IFS.

You may override this Root IFS Directory by coding up to 5 replacement Root IFS Directories within the kLink Employee file.

You may code `¬U` within the path as a substitution value. This will be replaced with the User-ID of the employee that signs onto the kLink Employee Server. For example, if you coded `"/Home/¬U"` for the starting path - kLink will start the employee in their own directory within the Home directory, and will not allow them above this directory.

You may code `¬H` for the path as a substitution value. This will be replaced with the User's Home Directory as recorded in their User Profile. For example, if you coded `"/¬H"` for the starting path - kLink will start the employee in their own Home Directory, and will not allow them above this directory.

Default Directory: Employees

Enter up to 50 characters for the default directory. This directory must be within the "Root IFS directory" that was named in the previous parameter for the employees. You can leave this parameter blank or code '/' to indicate that the Root IFS directory is the first directory shown to employees.

The Default Directory value is not used if the employee record contains any Override Root IFS Directories.

You may code `¬U` within the default as a substitution value. This will be replaced with the User-ID of the employee that signs onto the kLink Employee Server. For example, if you coded `"/¬U"` for the default directory - kLink will start the employee in their own directory within the Root directory for the Employees.

You may code `¬H` within the default as a substitution value. This will be replaced with the User's Home Directory as recorded in their User Profile. For example, if you coded `"/¬H"` for the default directory - kLink will start the employee in their own Home directory within the Root directory for the Employees.

Enable SSL: Employee Server

Enter either *YES or *NO to indicate whether or not you want this server to use SSL (Secure Sockets Layer). If all your connections will be internal to your network, you won't need SSL. If your users connect to your network via VPN (Virtual Private Network), you will not need to activate SSL.

Before you activate SSL for the server, you will need to do 2 things:

- 1) Create an SSL Application for kLink.
- 2) Add a Certificate for kLink.

Note: We recommend that you follow the instructions found on our website titled “*How to create an SSL Application for kLink*” and “*How to add a Certificate for kLink*” to complete these tasks.

Max Uploads in Time Period: Employee

For the Employee Server, enter the maximum Megabytes of data that one employee can upload in any given time period. The default is 50 Mbytes. The total amount that an employee has uploaded for a time period is reset to 0 (Zero) when the employee signs ON after 10 hours of not using the server. This is intended to help prevent a rogue employee or hacker from over filling your IFS.

Allow Upload Files: Employee

Code a **Y** if you want employees to be able to upload files into the directories that they have access to. The IBM Resource Security will still function normally for each User Profile.

You may override this Upload capability by coding a different value within the kLink Employee Record for each User Profile.

Processing an Uploaded File

Each file that is uploaded will trigger a CL program called KLUPLOAD to be processed. This program can be used to record the Path and File into a Data Queue for later processing. You may want to Log the uploaded file or you may want to start another program to process the data right away. It is recommended that you do not do anything in this CL program that might cause an error. Instead, you should submit another program to do any processing of the data – so that the kLink Server will never get stuck with a CPF error message.

Allow Uploads to Replace: Employee

Code a **Y** if you want employees to be able to replace existing files with the same name during an upload. Code an **N** to force the employee to use a different name for existing files in the IFS.

Allow Delete Files: Employee

Code a **Y** if you want employees to be able to delete files from the directories that they have access to. The IBM Resource Security will still function normally

for each User Profile.

You may override this Delete capability by coding a different value within the kLink Employee Record for each User Profile.

Logging Code: Employee

You may code (N,F, or U) in this parameter to control the type of entries that are recorded in the Employee Log file:

None Code an “N” to turn OFF logging.

Files Code an “F” to log all files that are viewed, uploaded, or deleted.

Upload Code a “U” to log all files that are uploaded or deleted.

Customer Server: Root IFS directory

Enter up to 50 characters for a Root IFS directory for your Customers. The customers will only be able to access directories that are within this starting path. Customers may only view the content that is stored in public directories and the private directories that they have a Link to. Customers may not navigate to anything above or outside this starting directory. Public directories for customers must be declared in the appropriate System Setup parameter. Other private Links must be added to each user account individually.

Default Directory: Customers

Enter up to 50 characters for the default directory. This directory must be within the “Root IFS directory” that was named in the previous parameter for the customers. You can leave this parameter blank or code '/' to indicate that the Root IFS directory for the Customers is the first directory shown to the users.

Enable SSL: Customer Server

Enter either *YES or *NO to indicate whether or not you want this server to use SSL (Secure Sockets Layer). If all your connections will be internal to your network, you won't need SSL. If your users connect to your network via VPN (Virtual Private Network), you will not need to activate SSL.

Before you activate SSL for the server, you will need to do 2 things:

- 1) Create an SSL Application for kLink.
- 2) Add a Certificate for kLink.

Note: We recommend that you follow the instructions found on our website titled “*How to create an SSL Application for kLink*” and “*How to add a Certificate for kLink*” to complete these tasks.

Max Uploads in Time Period: Customer

For the Customer Server only, enter the maximum Megabytes of data that one user can upload in any given time period. The default is 50 Mbytes. The total

amount that a user has uploaded for a time period is reset to 0 (Zero) when the user signs ON after 10 hours of not using the server. This is intended to help prevent a rogue user or hacker from over filling your IFS.

Allow Upload Files: Customer

Code a **Y** if you want customers to be able to upload files into the Private Directories that they have access to. The server will not allow a user to upload any files into Public Directories, as defined in the kLink System Setup.

You may override this Upload capability by coding a different value within the kLink User Record for each User Account. Guest accounts may not upload files unless you specifically code a **Y** in their account record for **Allow Upload**.

Processing an Uploaded File

Each file that is uploaded will trigger a CL program called KLUPLOAD to be processed. This program can be used to record the Path and File into a Data Queue for later processing. You may want to Log the uploaded file or you may want to start another program to process the data right away. It is recommended that you do not do anything in this CL program that might cause an error. Instead, you should submit another program to do any processing of the data – so that the kLink Server will never get stuck with a CPF error message.

Allow Uploads to Replace: Customer

Code a **Y** if you want users to be able to replace existing files with the same name during an upload. Code an **N** to force the user to use a different name for existing files in the User's Private Directories.

Allow Delete Files: Customer

Code a **Y** if you want users to be able to delete files from the Private Directories that they have access to. The Server will not allow a user to delete any files from Public Directories, as defined in the kLink System Setup.

You may override this Delete capability by coding a different value within the kLink User Record for each User Account. Guest accounts may not delete files unless you specifically code a **Y** in their account record for **Allow Delete**.

Logging Code: Customer

You may code (N,I,A, or F) in this parameter to control the type of entries that are recorded in the User Log file:

None Code an “N” to turn OFF logging.

Invalid Code an “I” to log all Invalid Sign On attempts.

All Code an “A” to log all Sign On and Account Maintenance events.

Files Code an “F” to include all files that are viewed, as well as all Sign On's and Account Maintenance events.

File Uploads and file Deletes are always logged unless you code an “N” for Logging.

Session Timeout value

Code a value between 10 and 45 minutes, the default is 15. This value controls how long a browser session can remain inactive before the user is automatically logged off of the session. Once a session times out a user must sign back on with their account name and password before they can navigate the customer directories or view a document.

Maximum Submitted PDFs per day

Code a value between 0000 and 9999, the default is 0500. This value controls the maximum number of Interactive PDF's that will be accepted by kLink in a single day. Choose a value that is more than needed. This is intended to prevent an abuser from overloading your system with unwanted Submitted PDF data. If this count is reached in a day, kLink will stop accepting Submitted data. The count is reset each day.

Public Directories: Customers

You may code up to 20 characters each for up to 10 different public directories. Any directories with these names that are found within the Customer's Root IFS directory will be considered public. Directories are not shown to a user unless it is either defined as a public directory or it is added as a private Link within the user's account.

Allow Online Registration

Code either ***YES** or ***NO** in this parameter to code whether or not online registration is allowed. If ***YES** is coded, you must prepare and compile the validation program (KLWVALID), described later in this manual. The validation program is used by the Customer server to verify the answers to the Validation questions, described below. If ***NO** is coded, all account maintenance must be handled by an administrator within your company and online account maintenance will not be offered to the Users.

Link to Description

Code up to a 20 character description for the Links that will be used by the Customer server. This can be Customer Number, Dealer Number, Account Number, Card Number, or some other description of a value that is unique to your Users. Content for a user that is not public is placed within a directory named after a value described by this entry.

Note: A *Link* is the name of a private directory in the IFS that contains a user's private content. Links are typically named after a customer number or account number that is uniquely assigned to each user.

Validation Questions

Up to 3 different 80 character long validation questions may be asked of a user before they can register a new account or add a new Link to their existing account. You will ask one or more questions that will most likely not be known to anyone other than the intended users, and the answer is embedded somewhere in your system files. Try not to ask questions that can be figured out by a hacker searching social media. Your validation program (KLWVALID) will access your master files to validate the answers. If the answers are verified by the validation program the new account or the new Link to their account is added.

Security Questions

One of these questions, up to 80 characters long, or one that your users make up will be used to assist the users in identifying themselves. The answer to this question will be up to 10 characters long and is for the user's benefit – not yours. If a user forgets their own password, they can answer this security question online to get their password automatically reset by the system. If answered correctly, a new random password will be generated and emailed to the address that is on file for that user. You may offer up to 5 different security questions that the user may select from. The user may choose one of these questions or write their own security question if they choose to. This question and its encoded answer will be stored in their file.

Note: Try to choose questions that cannot be figured out by hackers searching social media.

Employee Server

The Employee server is accessed using the kLink mobile application or using any browser. The user will set their application or browser to access the following URL:

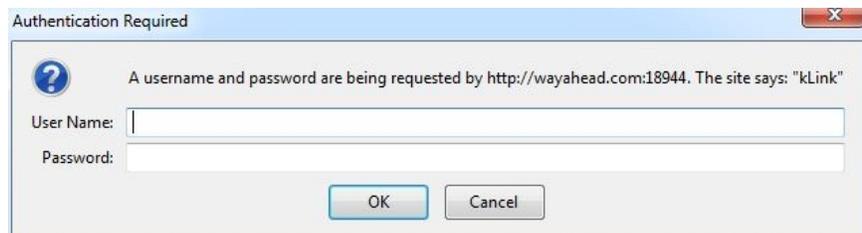
http://your_ibm_i:18944/

-or- if SSL is activated use the following URL:

https://your_ibm_i:18944/

Signing In

A Sign In screen, asking for a User Name and Password, as shown below, should appear:

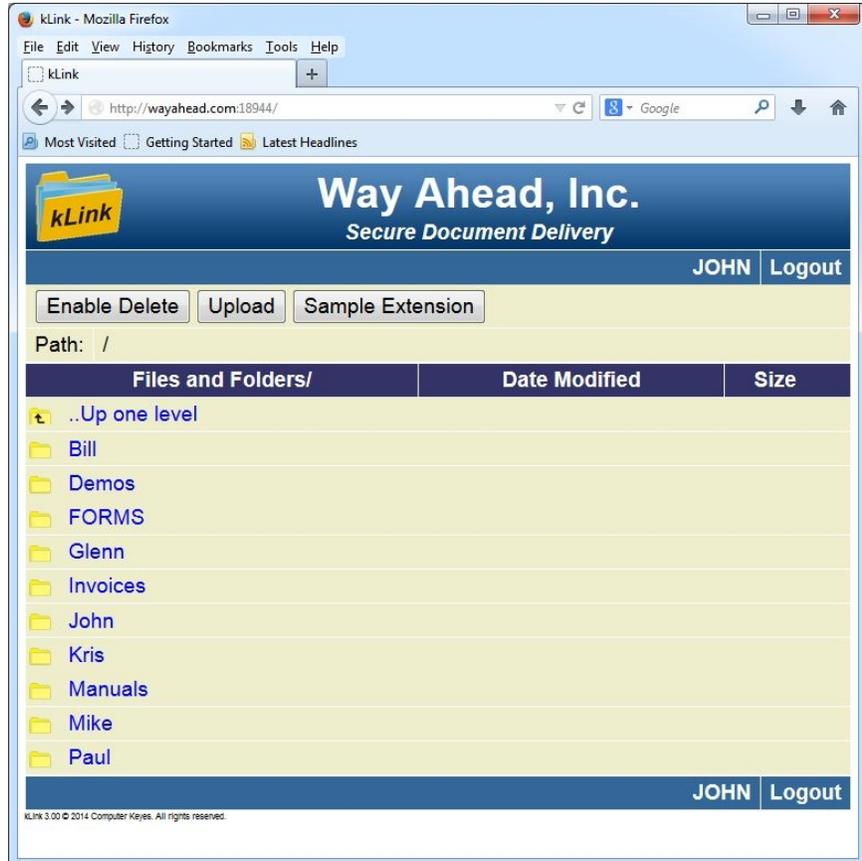


The employee will sign in using their normal User Profile and Password for the IBM i. kLink Employee Records will automatically be created with default settings as each employee uses the server.

Browsing the IFS

After signing in, the employee will be shown the Default Directory for Employees, as entered in the kLink System Setup. This directory must be located within the Root IFS directory for Employees.

If the Employee Record has been configured with any Override Root IFS Directories, the employee will be given access to those directories only. They will not have access to the Root IFS directory as coded in the kLink System Setup. If you give the user access to the Root “/” directory, the entire IFS may be available for the user.



The employee may browse the directories and display any file that the resource security allows, by clicking or tapping the item. For security, the employee will not be able to navigate above or outside of the Root IFS directories, as defined in the kLink System Setup or the Override Root IFS directories entered into their Employee Record.

In this example, a kLink Extension is offered to the employee called “Sample Extension”.

Also in this example, the Employee is allowed to Delete files from and to Upload files into the Directories that they have access to.

Customer Server

The Customer server is accessed using the kLink smart device application or using any browser. The user will set their application or browser to access the following URL:

http://your_ibm_i:18946/

-or- if SSL is activated use the following URL:

https://your_ibm_i:18946/

Signing In

The Sign In screen, shown below, should appear:



If the User already has an account, they can sign in.

New Users

If “Allow Online Registration” is allowed, the Sign In screen will include a “New User?” button. When this button is pressed, the following screen will be presented to the user:

The screenshot shows a web browser window titled "kLink Register New Account - Mozilla Firefox" with the URL "http://WayAhead.com:18946". The page header features the "kLink" logo and the text "Way Ahead, Inc. Register New Account". The form contains the following fields:

| | | |
|-----------------------|----------------------|-----------|
| Email Address: | user@somecompany.com | 3-45 char |
| Verify Email Address: | user@somecompany.com | 3-45 char |
| Password: | •••••••• | 6-18 char |
| Verify Password: | •••••••• | 6-18 char |

Below the password fields is a section titled "Select or create a single Security Question for your safety" with the following options:

- What is your favorite cats name?
- What is your Maternal Grandmother's first name?
- What is your Father's middle name?
- In what City did you go to Kindergarden?
- Where were you on September 11th, 2001?

The "Security Answer:" field contains "Punkin" and is labeled "1-10 char".

Next is the "Create a Link" section with the following fields:

| | | |
|---|-------|-----------|
| Customer Number | 1522 | 1-20 char |
| What is the last 5 digits of your IBM i Serial Number | 5RX9N | 1-10 char |

At the bottom of the form are "Cancel" and "Submit" buttons. A footer note reads "kLink 3.00 © 2014 Computer Keyes. All rights reserved."

A new user may fill out the screen to register their new account. The Validation program will either accept or reject the new account.

Security Question:

The security question is one of their choice and is for their benefit. They may choose one of the stock questions or ask one that they make for themselves. The security question is used for resetting a forgotten password.

Create a Link:

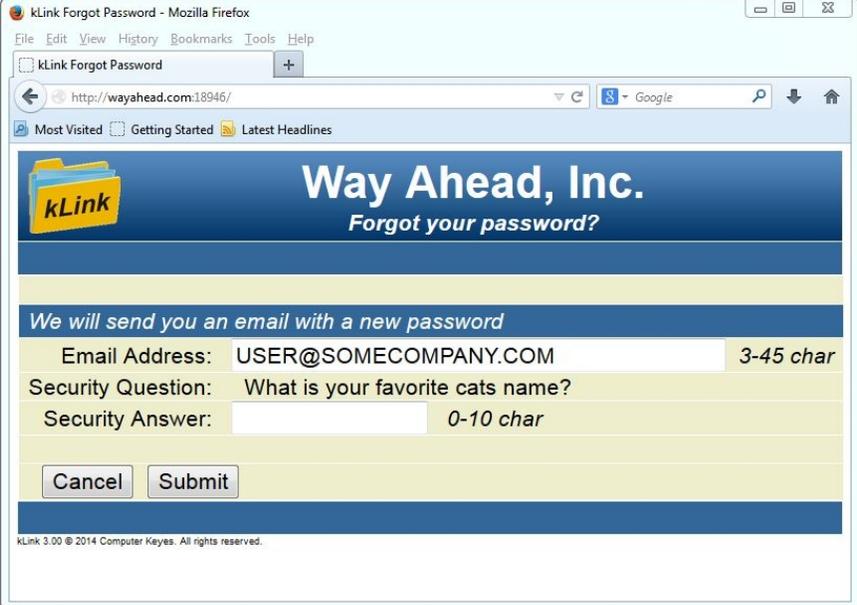
To Create a Link, the user must fill out the requested Link name (such as a Customer or Account Number) and answer one or more Validation questions that the server will ask them. This information will be sent to the Validation

program to verify their answers. If successful, the server will create the new account and add the Link.

Forgot Password

If a user knows their account (email address), but has forgotten their password, they can press the **Forgot Password** button.

The following screen will appear:



The screenshot shows a web browser window titled "kLink Forgot Password - Mozilla Firefox". The address bar displays "http://wayahead.com:18946/". The page content includes a header with the "kLink" logo and the text "Way Ahead, Inc. Forgot your password?". Below the header, a message states "We will send you an email with a new password". The form contains three input fields: "Email Address:" with the value "USER@SOMECOMPANY.COM" and a character count of "3-45 char"; "Security Question:" with the value "What is your favorite cats name?"; and "Security Answer:" with a character count of "0-10 char". At the bottom of the form are "Cancel" and "Submit" buttons. A footer at the very bottom reads "kLink 3.00 © 2014 Computer Keyes. All rights reserved."

If the user answers their Security Question correctly, the server will reset their password to a random value and email the new password to the address for that user.

Account Maintenance

While browsing the IFS, an **Account Maintenance** button will be available for all users except those that are marked as a Guest or Multi-user account.

If pressed, the following screen will appear:

The screenshot shows a web browser window titled "kLink User Account Maintenance - Mozilla Firefox" with the URL "http://wayahead.com:18946/". The page header features the "kLink" logo and "Way Ahead, Inc. User Account Maintenance". The form includes the following sections:

- Current Account Information:** Email Address: USER@SOMECOMPANY.COM; Password: [masked] *Required.
- Change Information:** A section titled "Leave blank for no change" with fields for Change Email Address (changed@domain.com, 3-45 char), Verify New Address (changed@domain.com, 3-45 char), Change Password (6-18 char), and Verify New Password (6-18 char).
- Security Question:** A section titled "Select or create a single Security Question for your safety" with radio buttons for: "What is your favorite cats name?" (selected), "What is your Maternal Grandmother's first name?", "What is your Father's middle name?", "In what City did you go to Kindergarden?", and "Where were you on September 11th, 2001?". A Security Answer field (0-10 char) is also present.
- Add a Link:** Fields for Customer Number (1-20 char) and "What is the last 5 digits of your IBM i Serial Number" (1-10 char).
- Remove Links:** Checkboxes for "I522" and "JUNK" (checked).
- Buttons:** "Cancel" and "Submit".

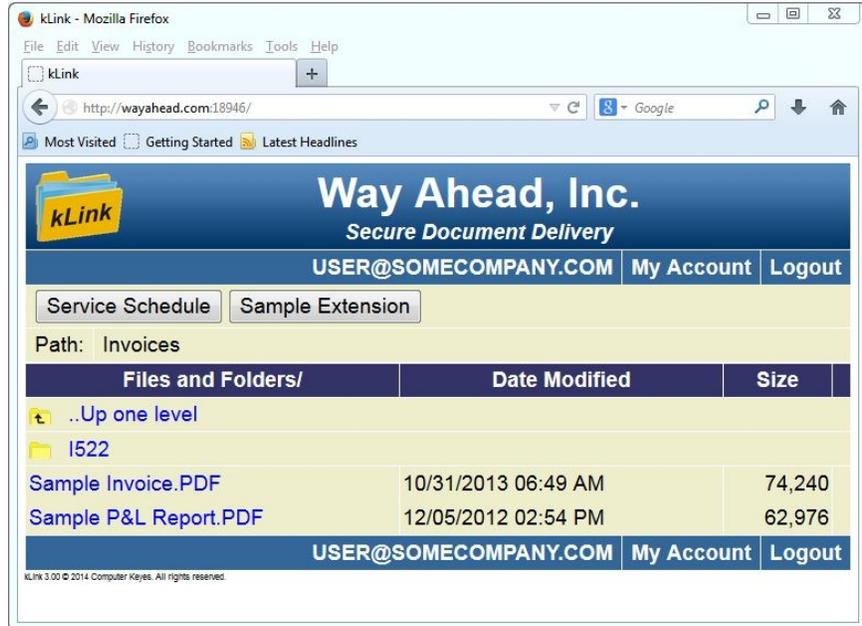
kLink 3.00 © 2014 Computer Keyes. All rights reserved.

This screen will allow a user to change their email address, their password, and their security question. They will be able to see their current Links and allow them to add or remove a Link, as needed. Any new Link requests will be sent to the Validation program (KLWVALID) to verify their answers before adding.

Browsing the IFS

After signing in, the user will be shown the Default Directory for Customers, as defined in the kLink System Setup. This directory must be located within the Root IFS directory for Customers.

All of the Public Directories and any private directories that they have a Link to will be shown to the user, as shown below:



The user may browse the directories and display any file within any directory that is shown to them, by clicking or tapping the item. For security, the user will not be able to navigate above or outside of the Root IFS directory for Customers, as defined in the kLink System Setup.

In this example, there are many private directories that exist within the Public Directory called *Invoices*. This customer only has one Link (**I522**) added to their account. Therefore, the *I522* directory is the only private directory that is shown to the user along with the *Sample Invoice* that was placed in the Public Directory.

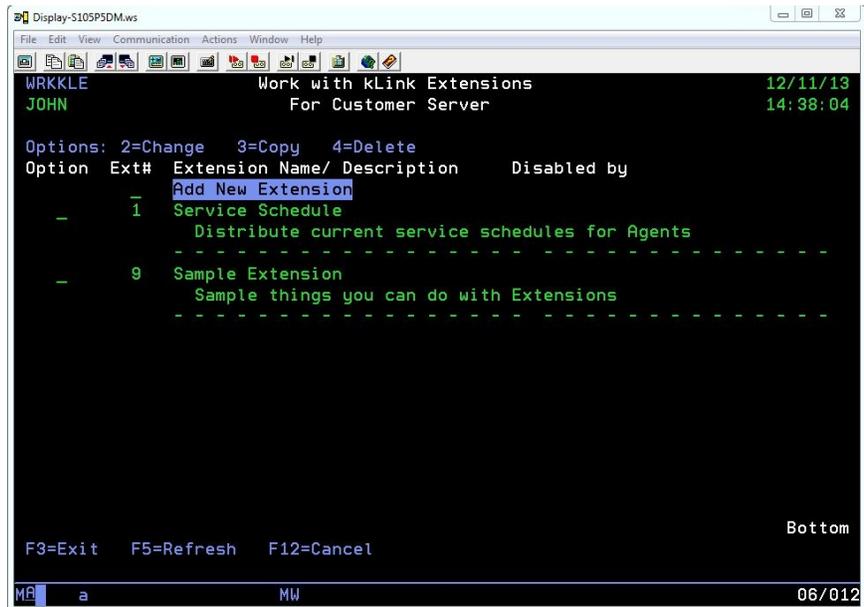
In this example, there are two kLink Extensions offered to the customer; "Service Schedule" and "Sample Extension".

Also, in this example, the user does not have the "Enable Delete" button nor the "Upload" button offered – because they are not within any of their own Private Directories (I522) yet.

kLink Extensions

kLink Extensions provide automated mobile communication between a Company and its users (employees, customers, agents, etc.). A button will be added to the top of the kLink Browser screen for each Extension that is defined.

An administrator or programmer may configure an Extension using item 32 or 33 from KLMENU. The initial screen will display any Extensions that have been configured and allow new Extensions to be added, changed, copied or deleted. Extension definitions are stored in a file called KLWEXTN.



Options

Option 2=Change

This can be used to change the configuration for an Extension.

Option 3=Copy

This can be used to copy an existing Extension to another Extension number or to copy an existing Extension to the other Server (Employee or Customer).

Option 4=Delete

This can be used to Delete an Extension that is no longer wanted.

Configuring an Extension

An Extension can be configured by defining from 1 to 30 objects to appear on the user's screen. Each object is defined on one line of the setup screen and can be continued for as long as necessary using the (+) Continuation column.

```

Display-S105PSDM.ws
File Edit View Communication Actions Window Help
MRKKLE      Setup Screen Objects 1-10      12/11/13
JOHN        For Employee Server                    14:47:18

Extension # : 9
Name on Button: Sample Extension      Disabled by:
Description : This is a Sample Extension used for training and testing

Define Input & Output Objects for the Extension screen:
T Len (H/T) HTML Data, (I/P/B) Lead:Dft;Trail, (R/L) Val1;Val2;Val3. (+)
H   <H2><I>kLink Extensions provide automated communications between +
T   Code Text lines using a "T" Object Type.<br> Any object can be +
I 15 Ask for Input Data<br>From 1 to 1000 chars long;Default value; +
P 15 Ask for Passwords;;;Password input is kept hidden -
R   Radio buttons can be defined;Option 2;Option 3;Etc... -
L   List selection can be defined;Option 2;Option 3 +
B   ;Checked;Check Boxes can be defined -
H   &nbsp; -
T   <H2>Let's try entering some data and getting a response</H2> +
R   I do not want a response;I want a response;I want an error response; +
Len: Use for Input & Passwords only (Use "+" to enter additional Text) <
Types: H=Heading, T=Text, I=Input, P=Password, B=CheckBox, R=Radio, L=List
or: use "+" to Insert objects, "D" to Delete, or "C" to Copy objects
F3=Exit F12=Cancel

MW a MW 05/018
  
```

Name on Button:

This will be the title on the button that will be placed on the top of kLink's browser screen. When pressed, the server will send the selected Extension to the user's screen.

Disabled by:

Code your own User-ID in this field when you are defining or testing a new Extension. This will disable the Extension to everyone except for you. The button will not be offered to anyone except you while it is disabled. When you finish your testing, clear the field and the Extension will be offered to everyone.

Description:

Code a brief description of the Extension in this field.

Object Types:

There are 8 different types of objects that you may define on the Extension screen: H=Headings, T=Text fields, I=Input fields, P=Password fields, B=CheckBoxes, R=Radio buttons, and L=List selections.

Object Lengths:

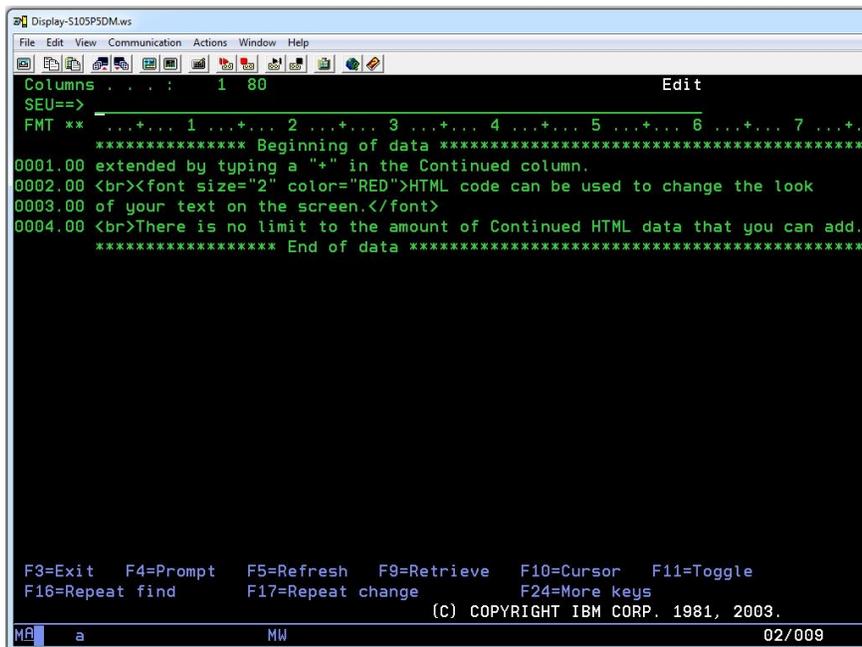
A length value must be supplied for both Input and Password fields. The value may be between 1 and 999 characters long. You may not enter a length for any other type of field. Passwords are limited to a maximum of 80 characters long.

Object Text:

The Object's Text field is used differently for the different types of objects that you place on the screen. See *Object Types* below for a description of what to key in the Object Text field for each type.

(+) Continued

When you type a plus in the Continued column you will be sent to a Source File (called KLWEXTC) where you can enter as much data as you need for each object. This uses IBM's Source Entry Utility (SEU) for text entry.

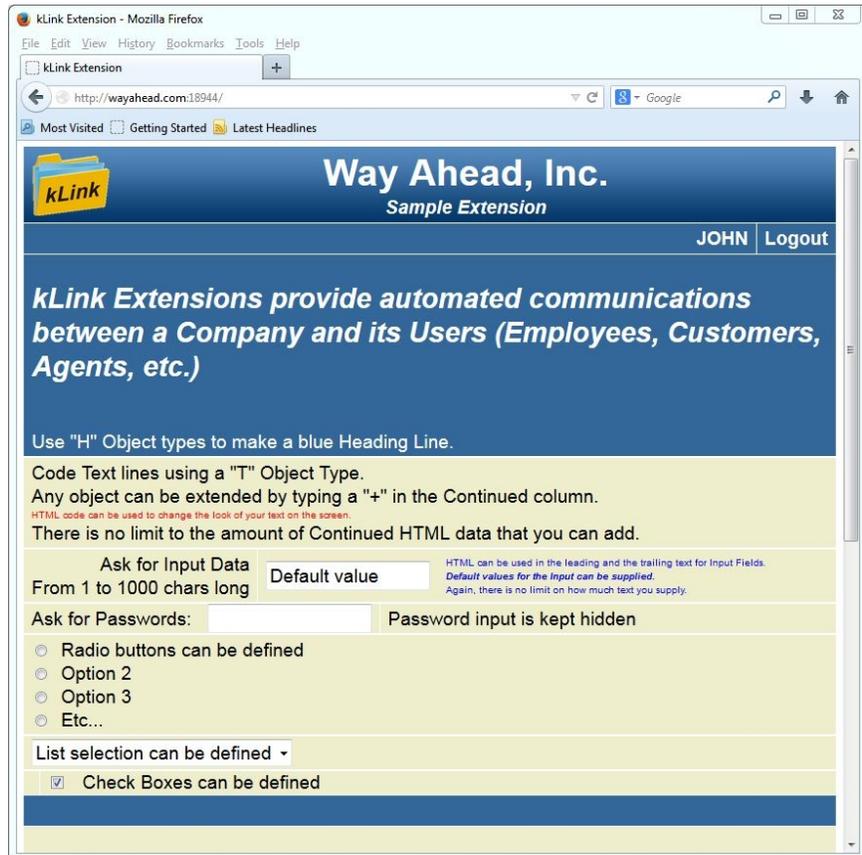


Inserting, Deleting and Copying Objects:

You may also use a "+" in the Type field to insert a new object, use a "D" to delete an empty object line, or use a "C" to copy an object to the first empty object line. Type the character (+,D, or C) and press the Enter key to Insert, Delete, or Copy the object.

Extension Screen

The resulting Extension screen will appear on the Browser exactly how it is configured in the setup. Configuration of objects is dynamic. Therefore, making changes to objects in the setup can immediately be seen by pressing the Refresh button on a Browser that is viewing that Extension screen.



Object Types

H or T Type:

Used for Heading and Text objects. These are used for sending data to the Extension screen. Headings default to White text on a Blue background. Key the text string including any HTML that you want to use for that Object. You may use HTML Tags to make the text appear exactly how you want it on the user's screen.

I, P, or B Type:

For Input, Password, or CheckBox objects you may key up to 3 different values on the screen separated by semi-colons (;). The first value will be used as Leading Text. The second value is used as a default value for the input field. The third value will be used as Trailing Text. The Leading and Trailing Text strings may contain HTML. For CheckBoxes the default text must either be the word (Checked) or it must be left blank.

You may code `¬U` or `¬L` in the default value portion for an Input field. It will be replaced with the current User that is signed on or the user's first valid Link, respectively. The first Link substitution (`¬L`) can only be used for the Customer server.

Examples: Leading text;default value;Trailing text
 Leading text;Checked;Trailing text
 Leading text;;Trailing text
 ;;Trailing text
 User-Id;¬U

R or L Type:

For both Radio buttons and List selection objects, key each of the selectable values separated by semi-colons (;). The individual values are limited to 80 characters, each. A new line in the Continuation text will start a new Value with or without a semi-colon. Blank values are not allowed.

Example: Value 1;Value 2;Value 3;Value 4 +
 Value 5
 Value 6; Value 7;etc...

HTML Examples:

Heading, Text, Leading, and Trailing text may use HTML Tags.
This text will be red
This text will be white
Font sizes range from 1 to 5
<H2>Heading sizes range from H1 (large) to H5 (small)</H2>
<I>Italics</I> Bold <U>Underline</U>
New paragraph
This will be script

Extension Exit Programs

Each of the Extensions that you configure will require an Exit program to process the input data that is entered by the user. The Exit program can validate and save the input data, it can trigger any external processes desired, and can return back information in the form of Alert or Error messages to the user's screen.

The names of the Exit programs are fixed. They are called EXTKC01-09 or EXTKE01-09, for the two servers. EXTKCxx are used for the Customer server and EXTKExx are used for the Employee server Extensions.

We have provided skeleton programs for you to make your Exit programs from. They are located in QRPGLSRC file located in KLLIB. Make a copy of the EXTKC00 or EXTKE00 source members to the appropriate Extension number to make your Exit programs for each of the Extensions that you configure.

Input Files

At the top of the Exit Program for Extensions you may define input files, if desired. Simply change the sample file definition line that is titled “**Your_File**”. Be sure to also change the two subroutines titled “OpenFiles” and “CloseFiles” to specify your input file and the library that it can be found in. You may then use your file for validation, storage, or for supplying responses to the user's screen.

Input Fields

Up to 30 objects can be configured for each Extension. Each of the input field types (Input, Password, Radio Buttons, List Selection, Upload, or CheckBoxes) will send data to the Exit Program. You will use the following fields or arrays to process the user's input.

- 1) **Object** – This is an array containing the 30 potential object input fields that you can configure for each Extension.
- 2) **Value** – This is an array containing the 30 potential object input fields converted to a numeric value. If the input field contains nothing but the following list of characters (digits 0-9, comma, period, plus, minus, \$, %) it will be automatically converted to a value for you.
- 3) **User** – This is the current user that is signed on to the kLink server. It is 45 characters long. If this is for the Employee Server, use the field called **UserId** that is a subset of the User field, that is 10 characters long.
- 4) **Path** – This is a 120 character long field that will contain the Path of the Folder that the user had been viewing before they pressed the Extension button on the server.
- 5) **Link** – This is an array containing up to 10 of the current user's valid Links, for the Customer Server only.

Output Fields

The following fields can be filled by your Exit program. They will be sent back to the kLink Server program and displayed on the user's screen.

- 1) **AlertMsg** – This is a 200 character long field that you can use to tell the user any information that you want. It is typically used for a positive response.
- 2) **ErrorMsg** – This is a 200 character long field that you can use to tell the user that an error occurred. You would use this if you need more information or if their data was rejected for any reason. The user will be able to use the back button on their Browser to correct their data and resubmit it.
- 3) **Explain** – This is a 200 character long field that you can pass additional information back to a user if you have set anything into the **ErrorMsg** field. It is typically used to further explain why the error occurred or what they can do about it.

Process Subroutine

At the bottom of the Exit program is a routine called **Process**. This is where you will put your Exit program's code. It is RPGLE. Use option 14 (if you are using PDM) or any other method to compile the Exit program when completed.

If you want a text string that was input from the Extension use **Object(nn)** where **nn** is the Object number. For example, you could say:

```
IF      Object(5) = 'This is text'
EVAL   AlertMsg = 'Your text was accepted.'
ENDIF
```

```
or MOVEL Object(10)  MyField      15
IF      MyField = 'This is text'
EVAL   AlertMsg = 'Your text was recorded.'
ENDIF
```

```
or EVAL MyField = Object(2)
CALL   'MyProgram'
PARM   MyField      20
```

If you want a numeric value from the Extension use **Value(nn)**. For example, you could say:

```
IF      Value(12) >= 250.25
```

If you want to send a message back to the user, put it into the variable called **AlertMsg**. For example, you could say:

```
EVAL   AlertMsg = 'Your input was accepted'
```

If you want to send an error message back to the user because you want them to make a change to their input data, you would put it into **ErrorMsg**. For example, you could say:

```
IF      Object(3) = *Blanks
EVAL   ErrorMsg = 'Invalid input – please try again'
```

If you want to further explain why an error has occurred or how to correct the error, you would put it into **Explain**. For example, you could say:

```
EVAL   Explain = 'Your address is a required'
        + ' field. Please enter it in the box'
        + ' provided.'
```

kLink Extensions

You may call other programs from the Exit program to perform any process needed. When finished simply jump to **EndProcess** to leave the **Process** subroutine and the Exit program will return your output message to the user's screen.

Appendix

There are two programs located in the kLink library that you will want to customize for your use. One is used by the Customer Server to validate a new user or for adding private Links to an existing user account. The other is used by the Customer Server to send e-mail messages to the user's. E-mails are sent to a user to help them reset a forgotten password, or to notify a user when someone has attempted to Log On to their account more than 5 times using an invalid password.

Emailing Program (KLWEMAIL)

The source code for a CL program called KLWEMAIL is located in the source file QCLSRC in the kLink Library (usually called KLLIB). This program may have to be customized and compiled, if you do not have KeyesMail software running on your system.

When a user forgets their password or if the kLink Customer Server disables a user account because of too many guesses at a password, the kLink Server will attempt to send an email to that user's address. Assuming that the user account was made with a valid email address and assuming that you have KeyesMail installed on your system, no changes will be needed to this program.

If you do not have KeyesMail or if your user accounts are not made with valid email addresses – you may want to customize KLWEMAIL. You can call any other mail client that you have available on your system to send the appropriate message that KLWEMAIL creates for the user. You may also change the message, as you see fit.

Validation Program (KLWVALID)

The source code for an RPG program called KLWVALID is located in the source file QRPGRSRC in the kLink Library (usually KLLIB). This program must be customized and compiled before *Allow Online Registration* is activated in the kLink System Setup.

When a customer attempts to register a new account or to add a Private Link to their account, this program is used to validate or reject their request. The Server program will create a new User Account record when requested by a user and then it will call this validation program. If accepted, this validation program will set new Links into the User Account record to designate what private directories this user may access. The program will return a message to the user. It will either be a Welcome message or a Rejection message. If the validation program sets the OK parameter to “Y”, the new User Account record will remain. If it sets the OK parameter to “N”, the new User Account record will be deleted by the Server program.

Files:

The sample validation program uses two files:

- 1) **KLWUSER** - this is the kLink User Account file that will be updated.
- 2) **CUSMST** - this is where the validation questions are checked. You must change this file to access one or more of your own files that you need to validate new User Accounts and Link requests.

Input Parameters:

The following parameters will be sent from the Server program to the validation program:

- 1) **USER** – This is the email address of the user that wants to create a new User Account or add a Link to their existing Account. For new User Accounts, the Server program will already have added the new record to the KLWUSER file.
- 2) **LINK** – This is a Link that the user wishes to add to their User Account record. If approved this validation program must add this Link to their record.
- 3) **ANS1** – This is the answer to validation question #1.
- 4) **ANS2** – This is the answer to validation question #2.
- 5) **ANS3** – This is the answer to validation question #3.
- 6) **MSG** – This will be the message that the validation program returns to the user that is requesting the new Account or new Link. It may either be a welcome or a rejection message, of your choice.
- 7) **OK** – The validation program should change this parameter to either a “Y” or an “N” before it returns. If you code an “N” in this parameter – the user will not be allowed to register a new account. If it was a new account – the Server program will delete the new record that it created for the user. You may code a “Y” to allow the user to register their new account even if you reject the Link that they request.

Program Logic:

The sample program rejects a new account request if the user does not request a Link. This was done because we have not asked any questions to validate a new User Account other than for new Links. If you ask a validation question that has nothing to do with Links, you could allow the account to be created even without a Link by setting the OK parameter to “Y”.

The sample program checks to make sure that answers were given to the questions. It also makes sure that the answers are at least 5 characters long. This was done so that we could scan the customer file for the answer. Short answers could falsely match random data in a scanned field.

The sample program chains to the customer master file using the Link that was requested. If the Link was not a valid customer number, the request is rejected.

The sample program capitalizes the answer to the validation question, so that it is not case sensitive. Then the program scans the customer record to see if the string is found in either of two comment fields.

If the answers were correct, the Link Request is approved. The Link is added to the User's Account record and an appropriate message is sent back to the Server program for the User.

Messages Returned to the Customer:

The following messages have been set up by the sample program. You may change or add to these messages for your customized version.

- 1) Welcome to kLink: Your Link has been approved.
- 2) Welcome to kLink: Your request has been approved.
- 3) The requested Link does not exist.
- 4) You did not provide a Link. Registration not allowed.
- 5) Your answers were not correct. Registration not allowed.
- 6) Could not open Link file. Registration canceled.

Purge Old IFS Customer Files (PURGEIFSC)

This Purge is run by a crawler program that will crawl through an IFS directory removing old files. It will read down three levels of directories from the Path that you name. It will delete files that are older than the Number of Months that you specify. It will skip over Public directories in the specified Directory to Purge, as defined in the kLink System Setup. It will only remove old files from Private directories that are within the specified Directory to Purge.

Be sure to specify a Public directory to purge. Private directories within that Public directory will be the target of the purge. Private directories that are purged to empty will be removed.

Note: You must have the special authority of ***SECADM** or have ***JOBCTL** or ***SPLCTL** special authorities in your User Profile to be able to run this program.

Directory to Purge (IFSPATH)

Enter the Path of the Directory that you wish to Purge - up to 100 characters long. The Directory that you name must be within the Root IFS Directory for Customers, as defined in the kLink System Setup, and should be a Public directory.

For example, you could specify **'/Customer/Invoices'** for the Directory to Purge. This will purge old files out of that Private directories that are found within the **Invoices** directory.

Number of Months Old (NRMONTHS)

Choose the number of Months that you want to leave files in the Purge Directory. All files that are older than the number of months that you enter will be deleted. You must enter a value greater than 1 Month.

Submit to Batch or Interactive (SUBMITJOB)

The default value of ***BATCH** will cause the program to be submitted to your default batch job queue. If you specify ***INTER** the system will run the purge interactively.

Purge Old IFS Employee Files (PURGEIFSE)

This Purge is run by a crawler program that will crawl through an IFS directory removing old files. It will read down three levels of directories from the Path that you name. It will delete files that are older than the Number of Months that you specify. It will also remove old files from all of the directories that are within the specified Directory to Purge. Directories that are purged to empty will be removed.

Note: You must have the special authority of *SECADM in your User Profile to be able to run this program.

This is a dangerous program that can delete thousands of files from the IFS. For this reason, it can only be run by a Security Administrator. Please be sure to specify a proper Directory to Purge.

Directory to Purge (IFSPATH)

Enter the Path of the Directory that you wish to Purge - up to 100 characters long. The Directory that you name must be within the Root IFS Directory for Employees, as defined in the kLink System Setup.

For example, you could specify '**Home/Reports**' for the Directory to Purge. This will purge old files and empty folders out of that Path - as well as from all of the Directories that are found within the **Reports** directory.

Number of Months Old (NRMONTHS)

Choose the number of Months that you want to leave files in the Purge Directory. All files that are older than the number of months that you enter will be deleted. You must enter a value greater than 1 Month.

Submit to Batch or Interactive (SUBMITJOB)

The default value of *BATCH will cause the program to be submitted to your default batch job queue. If you specify *INTER the system will run the purge interactively.

Interactive PDF Forms

kLink can be used to receive submitted Interactive PDF form data from the Internet. When generating an Interactive PDF, you can specify your kLink server as the target for a Submit button. The target URL will look like this:

<http://your-ibm-i:18946/cgi-bin/klwbrwcus>

Submitted data will be gathered by kLink and stored in two places on the IBM i:

- 1) The field names and the corresponding values are parsed, translated and placed in a Source file called KLWPDFDTA located in KLLIB. The member name will be Pmmddhhmms with Month, Day, Hour, Minute and a unique Sequence number. You can write programs that use this data to update your files.
- 2) The submitted form data with the same member name is saved as a .FDF file in the IFS. The path will be the following:

/kLink/Submitted PDFs/member-name.FDF

Note: If you place a copy of the original blank Interactive PDF in the same directory, you can open the .FDF file, select the original blank PDF and you will get the filled out PDF form - just as it was submitted to the system. Please be aware that it will not include the Digital Signature - if it had been signed – even though the Signature is in the .FDF file.

Exit Program for Editing PDF Data:

Source Code for an RPGLE Exit Program called EXTPDF has been included in the kLink library, in QRPGLSRC. You can alter this program to perform a live edit of the submitted PDF data. You can send back a response up to 2000 characters long to the user that submitted the data. Your response will be shown to the user on the PDF that they just submitted, making the process Interactive.

You can Accept the submitted data or Reject it, from that Exit Program. If you Reject the submitted data, the data will not be saved. The user will have to correct the data and resubmit the form again.

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