

Securely transfer IFS extracts using native IBM i tools!

sftp over SSH
Client

Soft-coding IFS
Objects and CLP

DB2 Application
Files, Defining
and Populating

Positive Pay
Application

Using Exception
Join to Detect
New Trx(s)

IFS Security

Featuring sftp over SSH and cross-platform extracts

Speaker: Rex Smith
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OMNI User Group
November 2010 Meeting



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Speaker Bio – Rex Smith

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- Rex is an expert in several types of cross-platform extracts, having spent a good percentage of his time on this and other types of integration projects for clients, first starting around 1991. Rex has completed integration, interface, conversion or extract projects in the areas of payroll, collections, inventory control, cost accounting, medical records, DSS and data warehousing.
- Rex has an undergraduate degree in Computer Science from Indiana University. He does application development services projects for clients and has also worked in package development for ISVs (Independent Software Vendor) Information Consultants, Inc. and Professional Computer Resources, Inc. Rex continues to be driven to create modern applications efficiently and achieve high levels of client satisfaction.

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Securely transfer IFS extracts using native IBM i tools!

Presentation Take-Away

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- Familiarity with setting up sftp over SSH
- Understanding of how to transmit data securely using sftp over SSH, using soft-coded parameters
- New knowledge potential
 - IFS and cross-platform extracts in general
 - interesting tips and techniques for creating and using stream files on the IFS
 - Interaction between DB2 on i, CLP, OPNQRYF, IFS
 - Positive Pay application
 - ideas you can use for your Positive Pay or cross-platform extract project
 - Early warning on few potential gotchas that might impact your Positive Pay application

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Presentation Overview

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- The sftp over SSH client functions are now available as a no-charge part of IBM i OS. There are several excellent reasons for using this new client instead of FTP, among them better security and error monitoring.
- This presentation will touch upon aspects of a package-quality Positive Pay solution that creates files on the IFS, and includes an automated and secure internet transmission method using the sftp over SSH client.
 - Only a small amount of the presentation will be devoted to conceptual accounting application facets or accounting application programming.
- The rest of the time will be spent on technical tips and techniques that I hope you will find interesting, such as my favorites for interaction between DB2, the IFS, CL Programming and SQL (or equivalents).

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And now a word from my sponsor

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Securely transfer IFS extracts using native IBM i tools! sftp over SSH versus FTP

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- Advantages
 - Password is not stored in clear text in the script
 - Error status detection without custom programming
 - Easier to run without 3rd party tools
 - 1) “secure FTP” (SFTP) (different from sftp over SSH) relies on a dynamic port assignment step that appears to be problematic over internet
 - 2) You can get around the SFTP problem by licensing a product from Linoma or nuBridges
- Comparisons
 - Both methods are a file transfer protocol, a method for sending files from one TCP/IP address to another
 - sftp reads input script stored in IFS stream file
 - FTP reads input script stored in standard source file
 - sftp over SSH executes in i5/OS PASE AIX runtime
 - we’ll be seeing that the written description above is harder to comprehend than the code

sftp over SSH Client Setup

sftp over SSH Client

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- Setup

- SystemNetwork articles provide a lot of good info
 - One is the SSH, SCP, and SFTP Tools from OpenSSH <http://systeminetwork.com/article/ssh-scp-and-sftp-tools-openssh>
written by Scott Klement
 - Scott indicates OS components are standard as of V5R4!
 - We are going to configure just the client
More setup is required for the OpenSSH server
- Other good articles
 - New SSH Options Make Their Way to iSeries – IT Jungle <http://www.itjungle.com/fhs/fhs022205-story02.html>
 - Using sftp on iSeries – SystemiNetwork Forums <http://forums.systeminetwork.com/isnetforums/showthread.php?t=52419>

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- Basically, our configuration examples takes 2 steps
 - Key pair gen
 - Indicate trust of remote server

- Deciding upon the password exchange method
 - Scott Klement talks about installing the expect utility, which I did, which should enable you to run an sftp over SSH script manually, and enter passwords

However, there may be sftp server based settings that indicate that an encrypted password is required, I don't know for sure. I could not get this to work.
 - I found that the easiest way was to do the private / public key gen and exchange process right off the bat, and then write and run the full script. When I did that, the password change was transparent and I didn't have to do anything within the script at all.

sftp over SSH Client – Setup Password/Key Gen

sftp over SSH Client

- Setup (*continued) – Password/Key Gen & Exchange

- An important detail of the transparent password/key pair exchange that occurs at run time
 - the process looks in the .ssh subfolder of the user profile's home directory
 - somehow get to the keys and passwords necessary
- Scott explains a process in the article – I will paraphrase
 - 1) Log on to a 5250 session with the profile who will be running the SSH client programs
 - 2) Make sure the user's home directory exists (change the value or create it)
 - Use DSPUSRPRF to see the home directory name
 - Use the WRKLNK command to see if it exists
 - Use the CRTDIR command to create it if it doesn't exist
 - 3) Type the following to get an interactive PASE command shell:
CALL QP2TERM
 - 4) Create the public/private key pair:
Type in ssh-keygen -t rsa -N ""
Press ENTER to create within user's home directory

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sftp over SSH Client – Setup Password/Key Gen

sftp over SSH Client

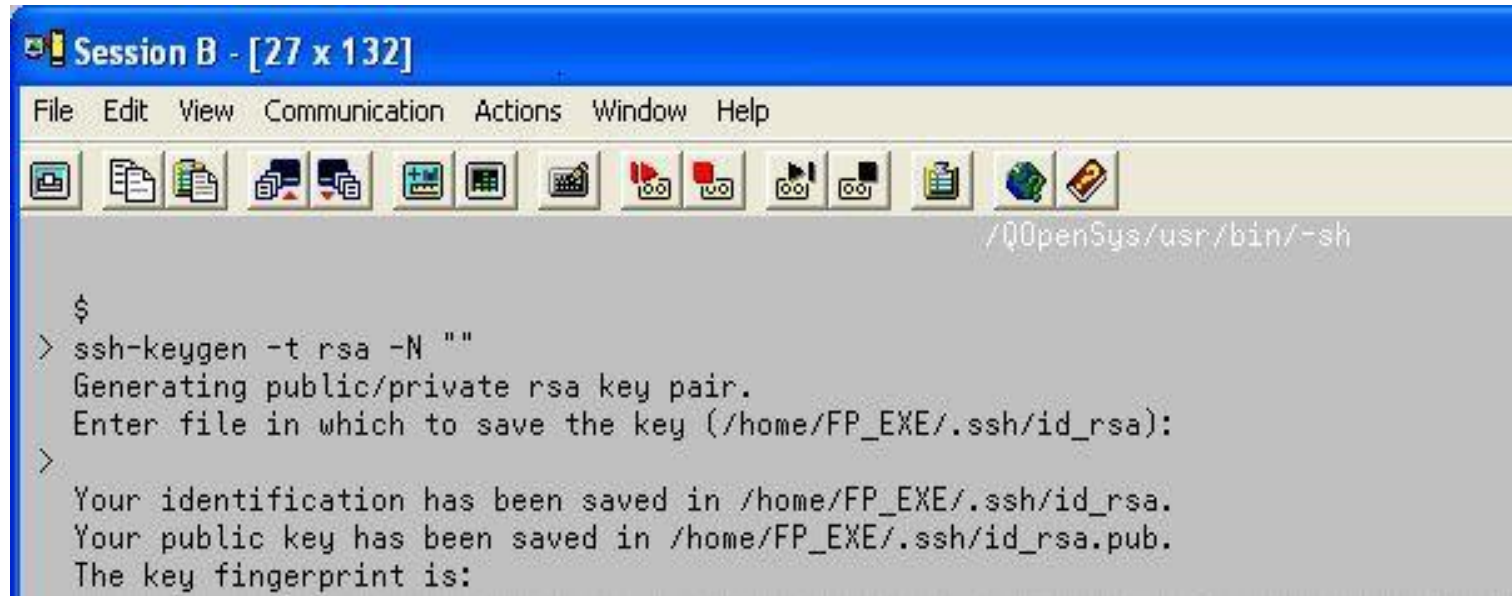
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```
Session B - [27 x 132]
File Edit View Communication Actions Window Help
/QOpenSys/usr/bin/-sh
$
> ssh-keygen -t rsa -N ""
Generating public/private rsa key pair.
Enter file in which to save the key (/home/FP_EXE/.ssh/id_rsa):
>
Your identification has been saved in /home/FP_EXE/.ssh/id_rsa.
Your public key has been saved in /home/FP_EXE/.ssh/id_rsa.pub.
The key fingerprint is:
```

- Setup (*continued) – Password/Key Gen & Exchange
 - 5) The id_rsa.pub file created needs to be transferred to an admin person at the destination SSH server location in order to finish enabling it

sftp over SSH Client – Setup – Password/Key Gen

Where are those key pairs things again?

sftp over SSH Client

- Setup (*continued) – Password/Key Gen & Exchange
 - Use WRKLNK command to navigate IFS root

```
Session A - [24 x 80]
File Edit View Communication Actions Window Help
Work with Object Links

Directory . . . . : /home/fp_exe

Type options, press Enter.
 2=Edit  3=Copy  4=Remove  5=Display  7=Rename  8=Display attributes
11=Change current directory ...

Opt  Object link          Type  Attribute  Text

      (Cannot find object to match specified name.)

Bottom

Parameters or command
==> wrklnk '/home/fp_exe/*'

F3=Exit  F4=Prompt  F5=Refresh  F9=Retrieve  F12=Cancel  F17=Position to
F22=Display entire field  F23=More options

21/007
1902 - Session successfully started
HP LaserJet 2200 Series PCL 6 on HPLaserJet2200
```

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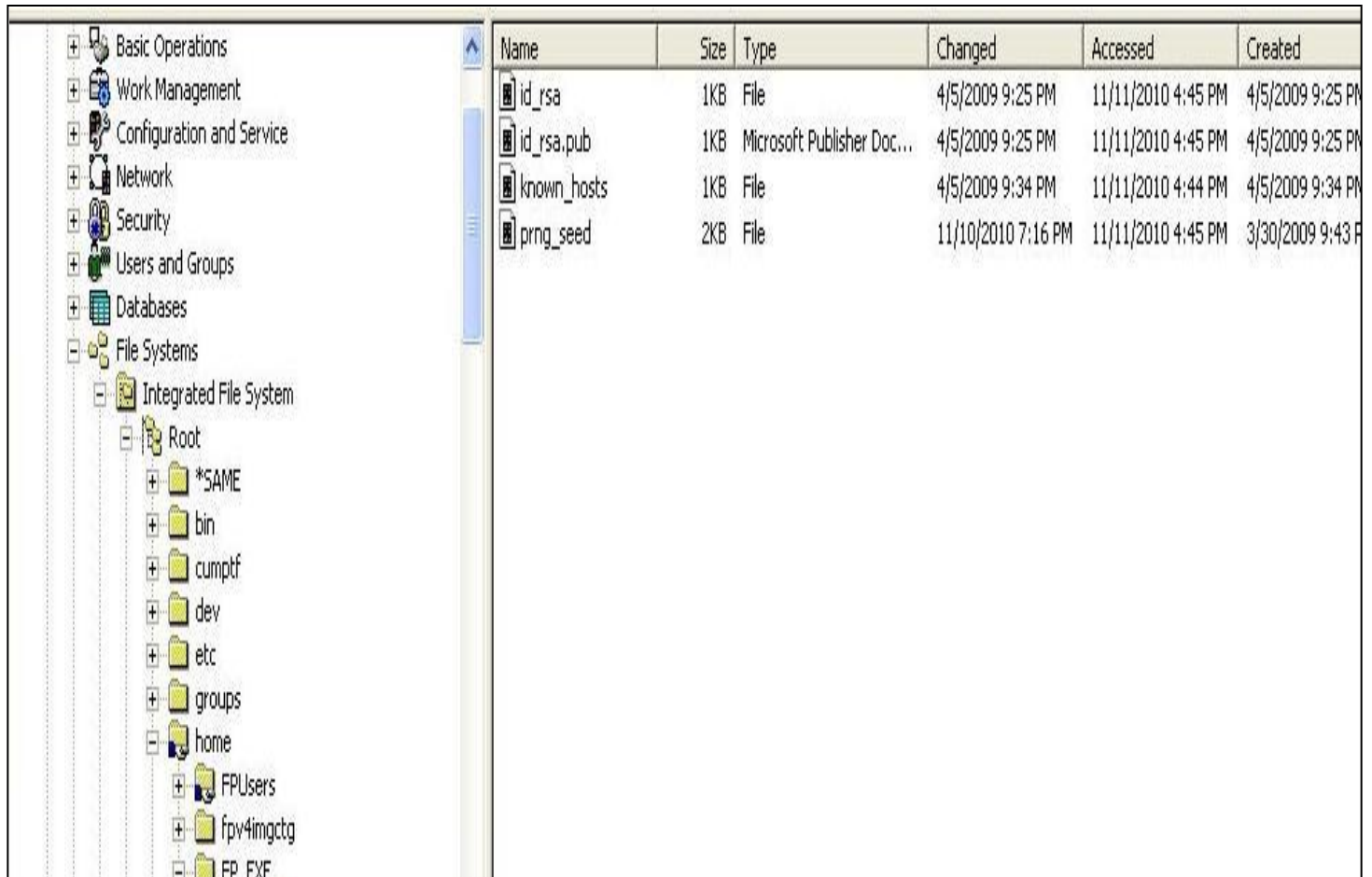
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sftp over SSH Client – Setup – Password/Key Gen

Where are those key pair files?

sftp over SSH Client

- Setup (*continued) – Password/Key Gen & Exchange
 - Ok, the files are visible using Navigator, in expected spot



The screenshot shows a file navigator interface. On the left, a tree view displays the file system structure under 'File Systems' > 'Integrated File System' > 'Root'. The tree includes folders for '*SAME', 'bin', 'cumptf', 'dev', 'etc', 'groups', 'home', 'FPUsers', 'fpv4imgctg', and 'FP_EXE'. On the right, a table lists files with columns for Name, Size, Type, Changed, Accessed, and Created.

Name	Size	Type	Changed	Accessed	Created
id_rsa	1KB	File	4/5/2009 9:25 PM	11/11/2010 4:45 PM	4/5/2009 9:25 PM
id_rsa.pub	1KB	Microsoft Publisher Doc...	4/5/2009 9:25 PM	11/11/2010 4:45 PM	4/5/2009 9:25 PM
known_hosts	1KB	File	4/5/2009 9:34 PM	11/11/2010 4:44 PM	4/5/2009 9:34 PM
prng_seed	2KB	File	11/10/2010 7:16 PM	11/11/2010 4:45 PM	3/30/2009 9:43 PM

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sftp over SSH Client – Setup – Password/Key Gen

Where are those keys pair files?

sftp over SSH Client

- Setup (*continued) – Password/Key Gen & Exchange
 - Files can also be seen within mapped drive
 - The files show Archive in Windows, however
 - IFS files in root are modeled more after Unix than Windows, thus I would speculate there are a number of internal attribute/property differences
 - Thus Archive is not all that is at play here

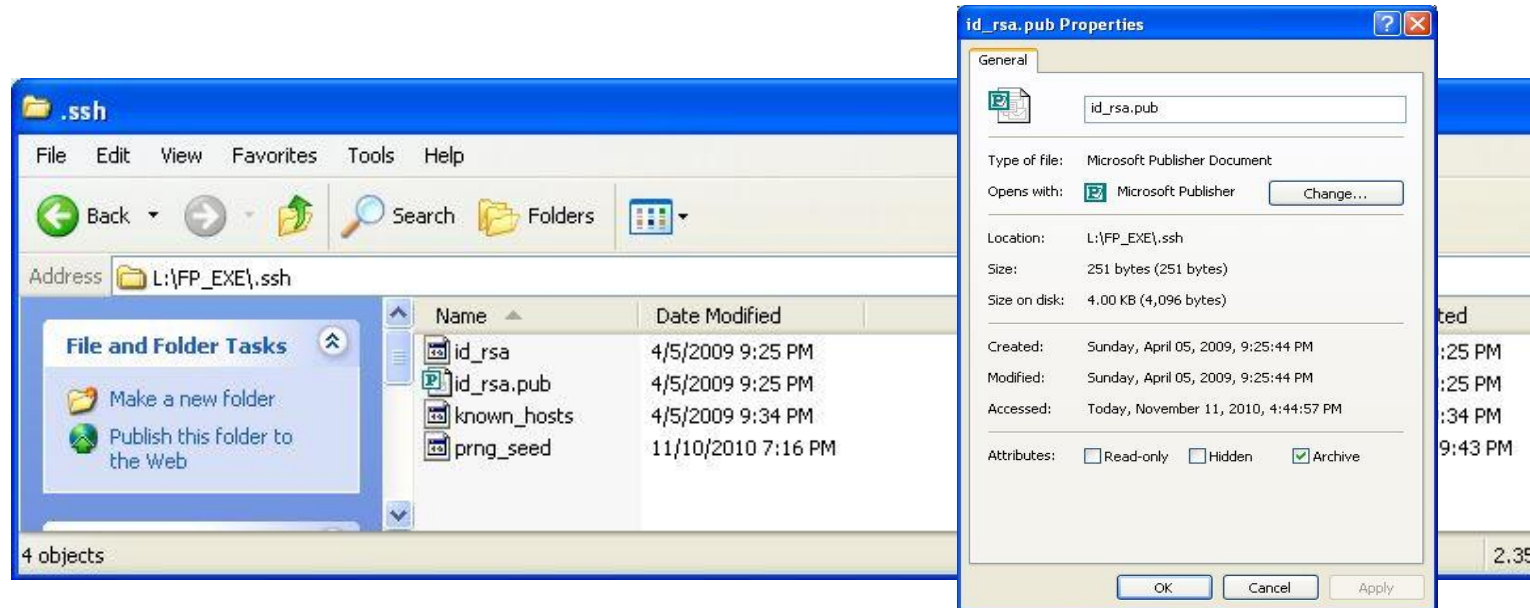
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