



# Speeding Up QUIZ with Suprtool

**A Robelle Tutorial**  
Hans Hendriks, August 1996

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QUIZ from Cognos is a fine report writer. Suprtool is an excellent performance tool. This tutorial aims to teach you how (and when) to integrate these two tools to dramatically decrease the run-time of slow reports.

This tutorial focuses on interfacing Suprtool with QUIZ, and provides only brief explanations of Suprtool examples. If you would like to learn more about Suprtool commands and techniques, please attend our *Suprtool Master Class*.

My name is Hans Hendriks. I've been a technical support consultant at Robelle since 1993. Before joining Robelle, I worked as a Cognos and Robelle distributor for many years, and have been a Suprtool user for 8 years.

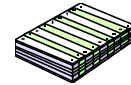
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## For Techies

### References

For further information on topics covered in this tutorial, please consult the *Suprtool User Manual*.



## What's Inside

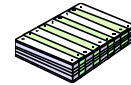
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This tutorial will examine the following topics:

- Why use Suprtool with QUIZ?
- How can Suprtool and QUIZ work together to reduce system load and report times?
- How can you create complex linkages and link files on non-key fields?
- Techniques to create new subfiles and new fields in subfiles
- How can you create subfiles for data that isn't described in your PowerHouse dictionary?
- How can you use Suprtool's powerful Total and Count functions with QUIZ?

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### References



## *Why preselect data with Suprtool?*

- Suprtool features
  - Fast and efficient serial reads of files
  - Powerful and flexible selection features
  - Efficient sort routines
  - Links files on any field with minimum disc I/O
  - Interfaces with many application tools
  
- QUIZ features
  - Powerful, flexible report writer
  - Uses standard data retrieval methods

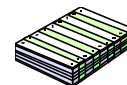
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Suprtool is a pure-bred performance product. It excels at reading files serially, selecting qualified records, and delivering them to application programs as efficiently as possible.

QUIZ is a report writer. It is easy to use, and it provides a rich set of report-formatting features. Unfortunately, in many cases QUIZ spends most of its time reading data that will be discarded because it doesn't meet the selection criteria of a report. You can dramatically improve the run-time performance of reports that select less than 50% of the data by replacing QUIZ data selection with Suprtool's more efficient serial reads.

### **For Techies**

### **References**



## Reading input files

- Suprtool can read
  - IMAGE datasets
  - KSAM files
  - MPE disc files
  - Tape files
  - Other files with fixed-length records
- QUIZ can read
  - QDD or PDL declared files
  - PowerHouse subfiles
- MPE disc files can be declared in the PowerHouse dictionary

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Suprtool can read almost any type of MPE/iX file: IMAGE datasets, KSAM files, MPE disc files, tape files, as well as most files with fixed-length records. It can sort, summarize, link and reformat the data, and direct its output to many different file types.

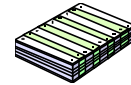
Since QUIZ must know the record structure of a file to report its contents, it can only read two types of files:

1. Files declared in the QDD or PDL dictionary
2. Self-describing files (specifically, PowerHouse subfiles)

Most PowerHouse sites have their regular production data files defined in their PowerHouse dictionary. Typically, this includes some MPE disc files, such as archived data or report data extracted from larger files. If you declare them in the PowerHouse dictionary, the files don't have to be redefined every time they are accessed. You can also use file equations to assign the same logical filename to different physical files at execution time.

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### References



## *A typical QUIZ and Suprtool task*

- Choose an input method for QUIZ; Suprtool cannot create subfiles
  1. Create an empty subfile
  - or
  2. Describe a direct or sequential file in PDL or QDD
- Use Suprtool to populate the file
- Access the output file in QUIZ and link to others

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Integrating Suprtool and QUIZ boils down to using Suprtool to extract the required data and present it to QUIZ in a format it can understand.

For regularly scheduled extracts, it may be easier to describe the output file in your PowerHouse dictionary. Otherwise, you can follow these three steps:

1. Use QUIZ or QTP to create an empty subfile with the required structure
2. Use Suprtool to read the data files, select the required records, sort them if necessary, and write them to the PowerHouse subfile
3. Change the QUIZ report to access the subfile instead of the original data files; remove the selection criteria and the sort commands

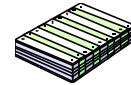
If you use these tools together, each product can do what it does best. Suprtool can read and retrieve the data, and QUIZ can process and format the qualified records.

### **For Techies**

Since QUIZ still needs to read the subfile, you should only use Suprtool if you are selecting less than 50% of the records.

If QUIZ has to do indexed reads on a significant number of records (Choose instead of Select), in many cases it is more efficient to read the whole file serially with Suprtool.

### **References**



## Step 1: Creating subfiles

### ■ QUIZ

```
>access D-SALES
>report summary all
>set subfile name SALESUB keep size 10000
>set report limit 1
>go
```

### ■ QTP

```
>access D-SALES
>subfile SALESUB keep size 10000 include D-SALES
>set input limit 0
>go
```

### ■ Different results if items redefined more than once

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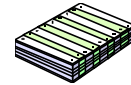
You can use either QUIZ or QTP to create a subfile. QTP has two features that can make it a better choice:

1. The record length of a QUIZ subfile can be greater than the original data records because fields with multiple redefinitions appear more than once. The record length of a QTP subfile is exactly the same as the original data records.
2. QTP's syntax is more flexible. With QTP, it's easier to reference fields from two datasets to create a subfile for Suprlink output. You can also use an alias to include items with the same name.

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You have to specify the size of the subfile, otherwise it defaults to the process limit for the QUIZ or QTP run.

### References



## Step 2: Populate the subfile with Suprtool

```
:run SUPRTOOL.PUB.ROBELLE

>base STORE,5,READER
>get D-SALES
>if PRODUCT="WIDGET"
>sort CUST-ACCOUNT
>output SALESUB,erase
>xeq
IN=20, OUT=6. CPU-Sec=1. Wall-Sec=1.
```

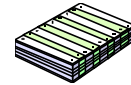
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Once you have created a PowerHouse subfile with the correct structure, you can use Suprtool to select records from the datasets, sort them, and then write them to the subfile.

By default, the Output command creates a new file. You can overwrite the contents of an existing subfile by using the Erase option, which overwrites the data records without affecting the mini-dictionary in the file labels. If you want to add records to the end of a subfile without overwriting the existing records, use the Append option.

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### References



## Step 3: QUIZ can now read the subfile

- Change the QUIZ report from

```
>access D-SALES
>select if PRODUCT="WIDGET"
>sort on CUST-ACCOUNT
>Heading ...
```

to

```
>access *SALESUB
>sorted on CUST-ACCOUNT
>Heading ...
```
- QUIZ TIP: Compiled QUIZ program doesn't require mini-dictionary

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Now you can change the QUIZ report to read the subfile instead of the dataset. First, remove the Select statement from the QUIZ report because the subfile contains only qualified records. Since Suprtool has already sorted the records, you also have to replace the Sort command with Sorted.

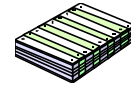
QUIZ TIP: QUIZ doesn't need the mini-dictionary to execute a compiled report. It only checks the record length of the input file which can be an ordinary MPE disc file.

### For Techies

Suprtool has its own set of high-speed sort routines that are generally much faster than the HP sort.

### References





## ***Linking multiple data files***

### Using Suprlink with PowerHouse

- Suprtool reads and selects records from each data file
- Suprtool sorts the qualified records on the link field into flat files
- Suprlink links the files into one record and writes to the subfile
- QUIZ does the final reporting

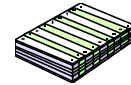
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In the real world, you probably have to collect report data from different input files. Once Suprtool has extracted the data, you can use Suprlink to merge the selected fields into one subfile. Gathering report data from multiple files involves the following steps:

1. Determine which fields are required for the final report; create a subfile for the Suprlink output
2. Use Suprtool to extract records from each of the contributing data files, sort them on the link field, and then write them to self-describing files
3. Use Suprlink to merge the extracted files into one large record; write the Suprlink output to a subfile
4. Report the subfile with QUIZ

### **For Techies**

### **References**



## Linking with QUIZ versus Suprlink

- QUIZ
  - Links on key fields
  - One-to-many links
  - Link field appears twice in subfile
  
- Suprlink
  - Links flat files on any sorted field
  - Each input file record can generate only one output record
  - Link field appears once in output record

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QUIZ and Suprtool use a fundamentally different approach to linking.

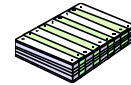
QUIZ relies on indexes to link data. For example, **Access M-CUSTOMER link to D-SALES** performs indexed reads of the sales dataset for each record in m-customer, and then it links each customer record to *all* the qualifying sales records. This linking strategy of one-to-many can result in numerous redundant disc I/Os, especially if the detail records are not stored contiguously and the file has a small blocking factor. QUIZ creates a subfile that contains all the fields selected from both datasets, including two copies of the link field.

Suprlink takes a completely different approach. First, the input and link files must be sorted on the same field. Then Suprlink reads the files concurrently and tries to link each record in the input file with the *first* qualifying record in the link file. As a result, Suprlink only reads each input file once using efficient NOBUF MR reads.

Suprtool can link on non-key fields, but it cannot perform one-to-many links. This prevents the output file from containing more records than the input or “driver” file. Unlike QUIZ, Suprlink does not repeat the link field in the output file.

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### References



## Linking with Suprlink versus QUIZ

M-CUSTOMER File			D-SALES File	
CUST-ACCO	NAME-FIRST	NAME-LAST	PURCH-DATE	CUST-ACCO
10001	Darlene	Hamilton	19931015	10003
10002	Gordon	Lackner	19931015	10003
10003	John	Melander	19931015	10003
10008	Thomas	Serafin	19931020	10010
10009	Gordon	Oxenbury	19931021	10016
10010	Wayne	Humphreys	19931021	10016
10011	William	Kirk	19931001	10020
10012	Percy	Ferguson	19931028	10020
10013	Colin	Andersen		
10019	Rupert	Hillstrom		
10020	Walley	Nisbet		

- QUIZ links 6 records; 14 records if optional link

CUST-ACCOUNT NAME-FIRST NAME-LAST PURCH-DATE CUST-ACCOUNT

- Suprlink links 3 records; 11 records if optional link

CUST-ACCOUNT NAME-FIRST NAME-LAST PURCH-DATE

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In this example, Suprlink reads each customer record in the input file and links it to the *first* matching sales record in the link file. If linkage is optional and there is no match, Suprtool writes the input customer record to the output file and initializes the link record fields to blanks or zeros.

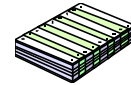
QUIZ reads each record in the Access file and links it to *every* matching record in the link file. If linkage is optional and there is no match, the link record fields are initialized to dictionary defaults.

With Suprlink, you should create many-to-one links instead of one-to-many. By changing the input file, the Suprlink output file would contain the same records as the QUIZ extract, but the sequence of the fields would be different.

Since QUIZ repeats the link field in its output file, the length of the output record is the sum of the lengths of the two data records.

### For Techies

### References



## ***Replacing QUIZ with Suprlink***

- Change one-to-many links to many-to-one; output file cannot contain more records than input file
- Field sequence is different from QUIZ output
- Link field is not repeated in output record; record length of Suprlink output file is smaller than QUIZ
- Optional linkage defaults fields to blanks or zeros

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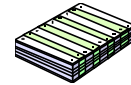
A Suprlink output file cannot have more records than the input file because it contains only one copy of the link field. To replace the "intelligent" but slow QUIZ link with a "dumb" but fast Suprlink, you have to make several changes.

Since Suprlink can only link the first qualifying record, the file with many qualifying records should drive the task. If you change the input file, the new output file would contain the same records as the QUIZ subfile it replaces, but the sequence of the fields would be different.

If linkage is optional and there is no match, Suprlink assigns blanks and zeros to the link record fields in the output file. QUIZ uses the data dictionary to assign item defaults.

### **For Techies**

### **References**



## Debugging tip

- First create a self-describing (SD) file with the LINK option

```
>output SALCUST,LINK
```

- Use FORM command to examine record structure

```
>form salcust
```

```
File: SALCUST.HANS.TECHSUP          (SD Version B.00.00)
```

```
Entry:                               Offset
  CUST-ACCOUNT           Z8           1  <<Sort 1 >>
  DELIV-DATE             I2           9
  PRODUCT-NO             Z8          13
  PRODUCT-PRICE          I2          21
  PURCH-DATE             I2          25
  ...
  POSTAL-CODE            X6          135
```

```
Limit: 108 EOF: 8 Entry Length: 140 Blocking: 29
```

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When programming a Suprtool and Suprlink front-end for a complex QUIZ report, it is critical that the subfile you create *exactly* matches the record structure of the Suprlink output record. This means you need to specify fields in the correct sequence when you create the subfile.

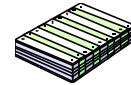
To ensure that your subfile dictionary maps exactly onto the Suprlink output record, it is useful to let Suprlink create a self-describing file by using the Link option instead of Erase.

```
>input salefile
>link custfile
>output salcust,LINK
```

Then you can use the Form command to examine the file's record structure.

### For Techies

### References



## Creating subfiles from multiple datasets

- Indexed link

QUIZ

```
>Access D-SALES link to M-CUSTOMER
>report summary CUST-ACCOUNT NAME-FIRST &
>    NAME-LAST PURCH-DATE
>set subfile name ...
```

QTP

```
>Access D-SALES link to M-CUSTOMER
>subfile SALFILE size 10000 keep &
>    include D-SALES, NAME-FIRST, NAME-LAST
>set input limit 0
>go
```

- Suprlink does not repeat link field in output record

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Because Suprlink does not repeat the link field in the output file, you must take care when creating the subfile for Suprtool output. Note that in this example, we have specified the required fields explicitly.

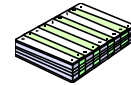
Alternatively, you can change the Suprlink output file so that it resembles the QUIZ result it replaces. You can do this by repeating the link field in the Suprtool task that creates either the link or the input file:

```
>get m-customers
>define custact2,cust-account
>extract city,cust-account,custact2,cust-status
>output ...
```

### For Techies

### References

## Creating complex subfiles without an indexed link



- Suprlink can link files on any field
- QUIZ requires an index to link
- How do you create a QUIZ subfile with the required fields?
- Two steps:
  1. Build a one-record subfile of each data file
  2. Link subfiles on record number to create new subfile
    - >Access \*SALSUB link to record(0) of \*CUSTSUB
    - >report summary CUST-ACCOUNT NAME-FIRST ...
- Subfiles must have correct item definitions; data not important

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Because Suprtool can link files in non-index fields, it is sometimes impossible for QUIZ to perform the same logical linkage to create the subfile. In these cases, the following steps can build a subfile with the correct field sequence and characteristics from any two files that contain the required fields:

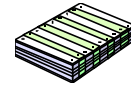
1. Create a one-record subfile of each file
2. Link the subfiles on record number
3. Create a single subfile with the required fields from the two smaller subfiles

It is not important that the two files used to be logically related, only that they contain the fields required to create a mini-dictionary which correctly describes Suprlink's output records.

### For Techies

### References

## Creating subfiles without a PowerHouse dictionary



- Create a one-record subfile with QUIZ

```
>define NAME-FIRST character size 10 = " "  
>define NAME-LAST character size 20 = " "  
>define DELIV-DATE Integer size 4 = 0  
>report summary all  
>set subfile name ...
```
- Ensure data-types match actual data
  - `Integer*4` is not the same as `Integer size 4`
  - Check record length of subfile against data

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If you need to report data that isn't declared in your PowerHouse dictionary, you can use the following technique to create a subfile "from scratch":

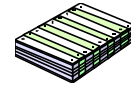
1. Use QUIZ Define commands to assign formats to fields and determine their sequence; initialize character fields to blanks, and numeric fields to zeros
2. Direct output to a subfile; specify the required size
3. Use Suprtool to populate the file with data

### For Techies

Although there is no Access statement, QUIZ still generates one output record.

### References





## Creating new data fields

- Suprtool can summarize at sort breaks  
    `>duplicate none keys total Sales-total`
- Suprtool creates new fields for totals
  - Field names ST-TOTAL-1, ST-TOTAL-2, etc.
  - Appended to record
  - Field format P28 (packed-decimal)
- To create a compatible field in QUIZ:  
    `>define D-Total packed size 14 = 0`

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One case where you need to define new fields involves Suprtool summary functions:

```
>duplicate none keys total sales-amt
```

The totals are created in P28 format and appended to the end of the output record.

You can also use Suprtool to count records at sort breaks:

```
>duplicate none keys count
```

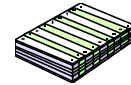
Suprtool creates a new four-byte integer field for the count value, which can be defined in QUIZ as follows:

```
>define numcust integer size 4 = 0
```

When you use the Define command in the process of creating the subfile, QUIZ allocates space for the new field and assigns it a logical name.

### For Techies

### References



## A typical requirement: Summary values

- Create subfile with sort and total fields
- Calculate sort-break totals with Suprtool
 

```
>get d-sales
>sort cust-account
>dup none keys total sales-total
>extract cust-account
>out saltot,erase
```
- Use totals in QUIZ report
 

```
>access *saltot link to d-sales
>define d-pcnt num*3 = &
                                     (sales-total/st-total-1)*100
>report .....
```

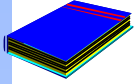
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The most common requirement for multiple-pass reports in QUIZ involves summary values (count, total, average) that have to be calculated in the first pass, so that the result can be used in the second.

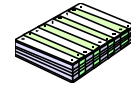
In a sales report, for example, you may wish to show the percentage that each line contributes towards a customer's total amount. This is easily achieved by using Suprtool to prepare a subfile of subtotals, which QUIZ can link back to the original data files. This subfile need only contain the subtotal and the sort field, which is used for linking back to the data file. There is a useful side-effect to having a sorted subfile: when the records are linked back to the data file, the record complexes will be built in sorted order.

### For Techies

### References



## Summary of Speeding Up QUIZ



- Suprtool delivers qualified data to QUIZ
- Data must be in a format QUIZ understands
- Use PowerHouse to create its own data structures
- Create new items with QUIZ Define commands
- Use Suprtool FORM command to examine structure
- Use Show Items in QUIZ to display structure



Carefully examine your requirements  
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In conclusion, the record structure of the Suprtool output file and the QUIZ subfile must be identical when you are integrating these two tools. Carefully examine your report requirements and the subset of records being extracted, before you preselect data with Suprtool and Suprlink.

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### References