R&R Report Writer *Technical Bulletin*

Multi-Scans in SQL

Product:	ARPEGGIO™	**Oper Sys:**	Windows®
Version:	2.0		

Summary

R&R Report Writer allows you to create reports in which there are essentially multiple detail areas. While the "multi-scan" feature is not explicitly available in ARPEGGIO, the end result can be achieved using the technique explained in this document.

Example Multi-Scan Report

We'll consider a simple example that shows the basics of the procedure. It can be used as the basis of the solution to a more complex case.

We have a master table, JOBS with these fields:

JOBS

> JOBNO character job id
> CUSTNO numeric customer id

Say we have two tables, SERVICES and MATERIALS, with the following fields:

SERVICES

> JOBNO character job id
> SCODE character service id code
> CATEGORY numeric service category
> HOURS numeric hours spent providing service

MATERIALS

> JOBNO character job id
> MCODE character materials code
> QTY numeric units of material

In R&R, one would set one scan from JOBS to SERVICES, and a second from JOBS to MATERIALS to set up the multi-scan. Composite records returned would show first, say, all

the MATERIALS records for the first JOBS record along with empty values for the fields from the SERVICES table. Next, the composites returned would show all the SERVICES records for that first JOBS record along with empty values for the fields from the MATERIALS table. After this, composites would be returned for the next JOBS record, and so on. Note the key point that for composites with data in the MATERIALS fields, the SERVICES fields are empty, and vice versa.

In ARPEGGIO, if you set a join from JOBS to SERVICES and then one from JOBS to MATERIALS, a very different set of composites would be returned. For each JOB record, each matching MATERIALS record would be returned with data from every one of the matching SERVICES records. So, far more composites could be returned for each JOB and each SERVICE or MATERIAL could be returned multiple times rather than simply once.

Simulating a Multi-Scan Report in ARPEGGIO

In ARPEGGIO a multi-scan report must be simulated with a fairly complex user SQL report. It is done by doing the SQL UNION of two SELECT statements. The first SELECT return all the MATERIALS records for each JOB along with empty values for the SERVICES fields. The second SELECT returns all the SERVICES records for each JOB along with empty values for the MATERIALS fields. In addition, each SELECT returns a constant value that indicates which of the two SELECTS returned a given composite. The UNION of these two SELECT will return all the records from the first SELECT and all the records from the second SELECT. We call for the returned records to be sorted so that the records for a given JOB are grouped together, and within that grouping, all MATERIALS records are grouped together and then all SERVICES records. That's what the user SQL does in English. Here's how to say it in SQL:

> select J.JOBNO, J.CUSTNO, M.MCODE, M.QTY, "", 0, 0, 1 from JOBS J, MATERIALS M where J.JOBNO = M.JOBNO
>
> union
>
> select J.JOBNO, J.CUSTNO, "", 0, S.SCODE, S.CATEGORY, S.HOURS, 2 from JOBS J, SERVICES S, where J.JOBNO = S.JOBNO
>
> order by 1, 8

The ORDER BY clause refers to the J.JOBNO field of each of the two SELECTs by its position in the column list, i.e. position 1. The second ORDER BY field is in position 8 and is the constant value 1 for the first SELECT and 2 for the second. This is the value the R&R report can test to decide which related table's data is being returned in any given composite

record. Note that this numeric field can be used by report calculations in the same way the R&R SCANING() function's value can be used.

Note that for SELECTs to be combined this way with a UNION, the columns of the SELECTs must be consistent in data type and each select must return the same number of columns. Also, some databases allow for the keyword NULL to be used in place of the empty values we list explicitly in each of the SELECTs. If your database allows this use of NULL, that is the best choice for specifying an empty value.

There is one more step needed to finish the user SQL simulation of multi-scan. R&R requires that every field of the composite in a user SQL report have a unique name. To do this, we make use of the ARPEGGIO DEFINE REPORTVIEW construction, as follows:

```
define reportview JOBJOIN (JOBNO, CUSTNO, MCODE, QTY, SCODE,
CATEGORY, HOURS, SOURCE) as

select J.JOBNO, J.CUSTNO, M.MCODE, M.QTY, "", 0, 0, 1 from JOBS J,
MATERIALS M where J.JOBNO  = M.JOBNO

union

select J.JOBNO, J.CUSTNO, "", 0, S.SCODE, S.CATEGORY, S.HOURS, 2 from
JOBS J, SERVICES S, where J.JOBNO = S.JOBNO

order by 1, 8
```

This supplies the names listed in parenthesis to R&R for the eight fields returned by the UNION. Note that the 8th field, used to identify the source of each composite, is named SOURCE in this example.