Abstract
The SQL Procedure contains powerful options for users to take advantage of. This presentation and poster explores the fully supported _METHOD option as an applications development and tuning tool, and learn how to use this powerful option to understand and control how a query processes.

Introduction
PROC SQL supports a powerful option called _METHOD. Since its implementation, many SAS® SQL users have expressed very favorable comments for the value-added information it provides on the SAS Log. In fact, the _METHOD option is worth exploring simply due to the benefits associated with gaining a better understanding of the processes during specific PROC SQL operations, query evaluation, algorithm selected and used by the optimizer in the processing of a query, or testing and debugging operations.

The _METHOD Option and Code Descriptions

- **_METHOD Option**
  A _METHOD option is specified to show the processing hierarchy in a two-way equi-join. As illustrated, the SQL optimizer selected a hash join algorithm for the join query.

  ```sql
  OPTIONS MSGLEVEL=I;
  PROC SQL _METHOD;
  SELECT M.TITLE, RATING, LENGTH, ACTOR_LEADING
  FROM MOVIES M, ACTORS A
  WHERE M.TITLE = A.TITLE AND RATING = 'PG';
  QUIT;
  ```

  **Log Results**
  INFO: SQL execution methods chosen are:
  `sqxslct`  `sqxjhsh`
  `sqxsr( MOVIES )`
  `sqxsr( ACTORS )`
  INFO: Index Rating selected for WHERE clause optimization.
  QUIT;

- **Join Algorithms**
  The SQL optimizer determines which of four join algorithms to use for performing join query operations. The four algorithms include:

  - **Nested Loop** – Selected by the optimizer when a Sort-Merge, Index and Hash algorithm is eliminated from consideration.
  - **Sort-Merge** – Selected by the optimizer when a Index and Hash algorithm is eliminated from consideration.
  - **Index** – Selected by the optimizer when a user-defined index will improve performance.
  - **Hash** – Selected by the optimizer when the smaller of the tables can fit into available memory.

- **OPTIONS MSGLEVEL=I;**
  ```sql
  OPTIONS MSGLEVEL=I;
  PROC SQL;
  SELECT M.TITLE, RATING, LENGTH, ACTOR_LEADING
  FROM MOVIES M, ACTORS A
  WHERE M.TITLE = A.TITLE AND RATING = 'PG';
  QUIT;
  ```

  **Log Results**
  INFO: Index Rating selected for WHERE clause optimization.
  QUIT;

- ** artwork**
  **Join Algorithms**
  The SQL optimizer determines which of four join algorithms to use for performing join query operations. The four algorithms include:

  - **Nested Loop** – Selected by the optimizer when a Sort-Merge, Index and Hash algorithm is eliminated from consideration.
  - **Sort-Merge** – Selected by the optimizer when a Index and Hash algorithm is eliminated from consideration.
  - **Index** – Selected by the optimizer when a user-defined index will improve performance.
  - **Hash** – Selected by the optimizer when the smaller of the tables can fit into available memory.

  **OPTIONS MSGLEVEL=I;**
  ```sql
  OPTIONS MSGLEVEL=I;
  PROC SQL;
  SELECT M.TITLE, RATING, LENGTH, ACTOR_LEADING
  FROM MOVIES M, ACTORS A
  WHERE M.TITLE = A.TITLE AND RATING = 'PG';
  QUIT;
  ```

  **Log Results**
  INFO: Index Rating selected for WHERE clause optimization.
  QUIT;

- **_METHOD Option**
  A _METHOD option is specified to show the processing hierarchy in a two-way equi-join. As illustrated, the SQL optimizer selected a hash join algorithm for the join query.

  ```sql
  OPTIONS MSGLEVEL=I;
  PROC SQL _METHOD;
  SELECT M.TITLE, RATING, LENGTH, ACTOR_LEADING
  FROM MOVIES M, ACTORS A
  WHERE M.TITLE = A.TITLE AND RATING = 'PG';
  QUIT;
  ```

  **Log Results**
  INFO: SQL execution methods chosen are:
  `sqxslct`
  `sqxjhsh`
  `sqxsr( MOVIES )`
  `sqxsr( ACTORS )`
  INFO: Index Rating selected for WHERE clause optimization.
  QUIT;

Conclusion
The SQL Procedure’s _METHOD option, along with the MSGLEVEL=I system option, provides users with a powerful and effective tool for gaining greater insight into the processes during specific PROC SQL operations, query evaluation, the algorithm selected and used by the optimizer in the processing of a query, testing and debugging operations, and other processes.

Acknowledgements
- SGF Poster and Video Presentations Section Chairs
- SGF Conference Chair
- SGF Executive Committee
- SGF Conference Leaders

Trademark Citations
SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration. Other brand and product names are trademarks of their respective companies.

Authors
Charles Edwin Shipp
CharlieShipp@aol.com
Kirk Paul Lafler
KirkLafler@cs.com