



VAN HELVOIRT AUTOMATISERING

IBM i Access Client Solutions SQL Performance Center 10 June 2020



Rudi van Helvoirt
rvanhelvoirt@vanhelvoirt.nl



VAN HELVOIRT AUTOMATISERING



Sponsors - Donators



In support of our **NHS**



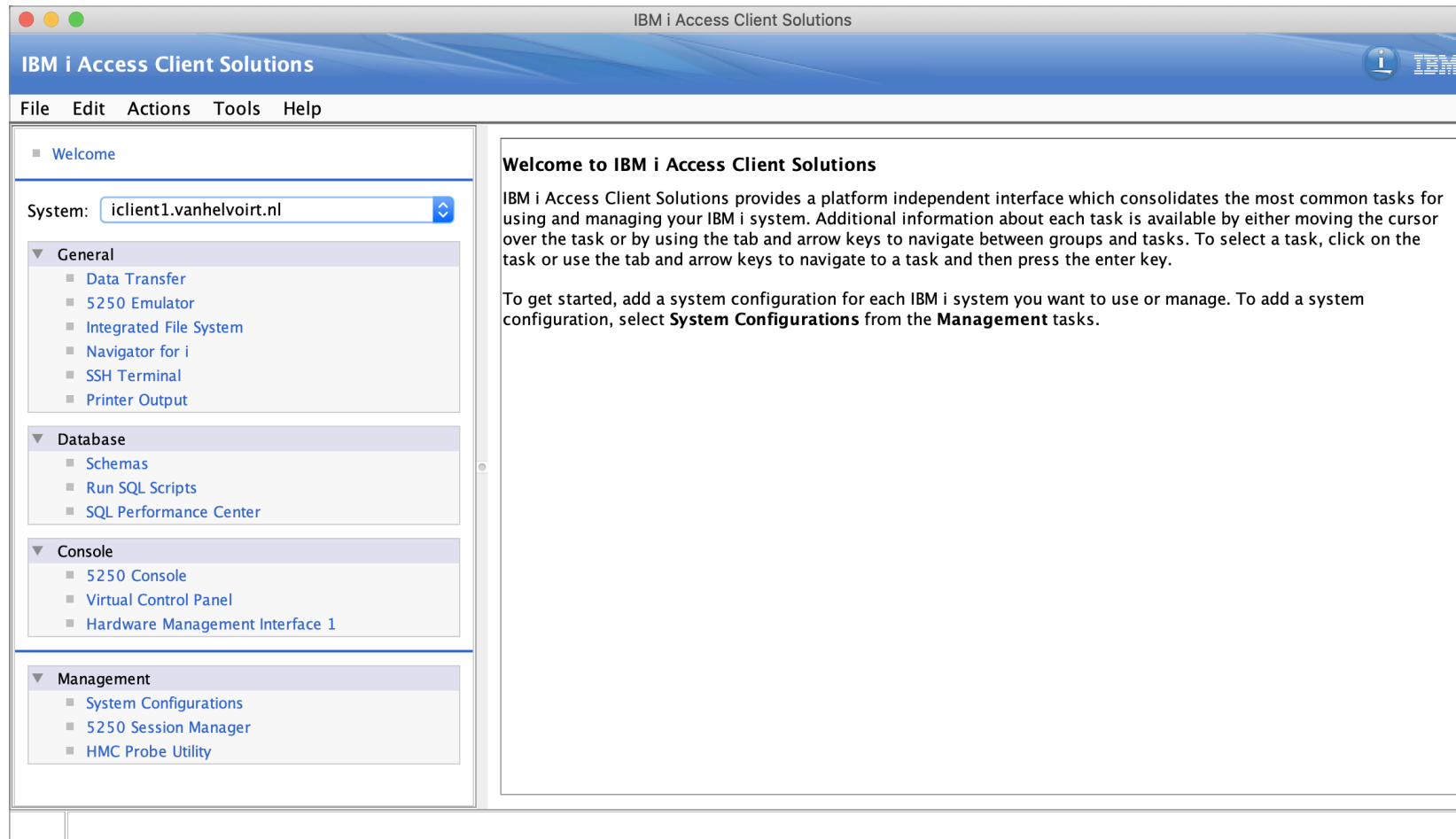
VAN HELVOIRT AUTOMATISERING

Agenda

- IBM i Access Client Solutions
- How to stay current with ACS the easy way
- SQL Performance Center
- Miscellaneous

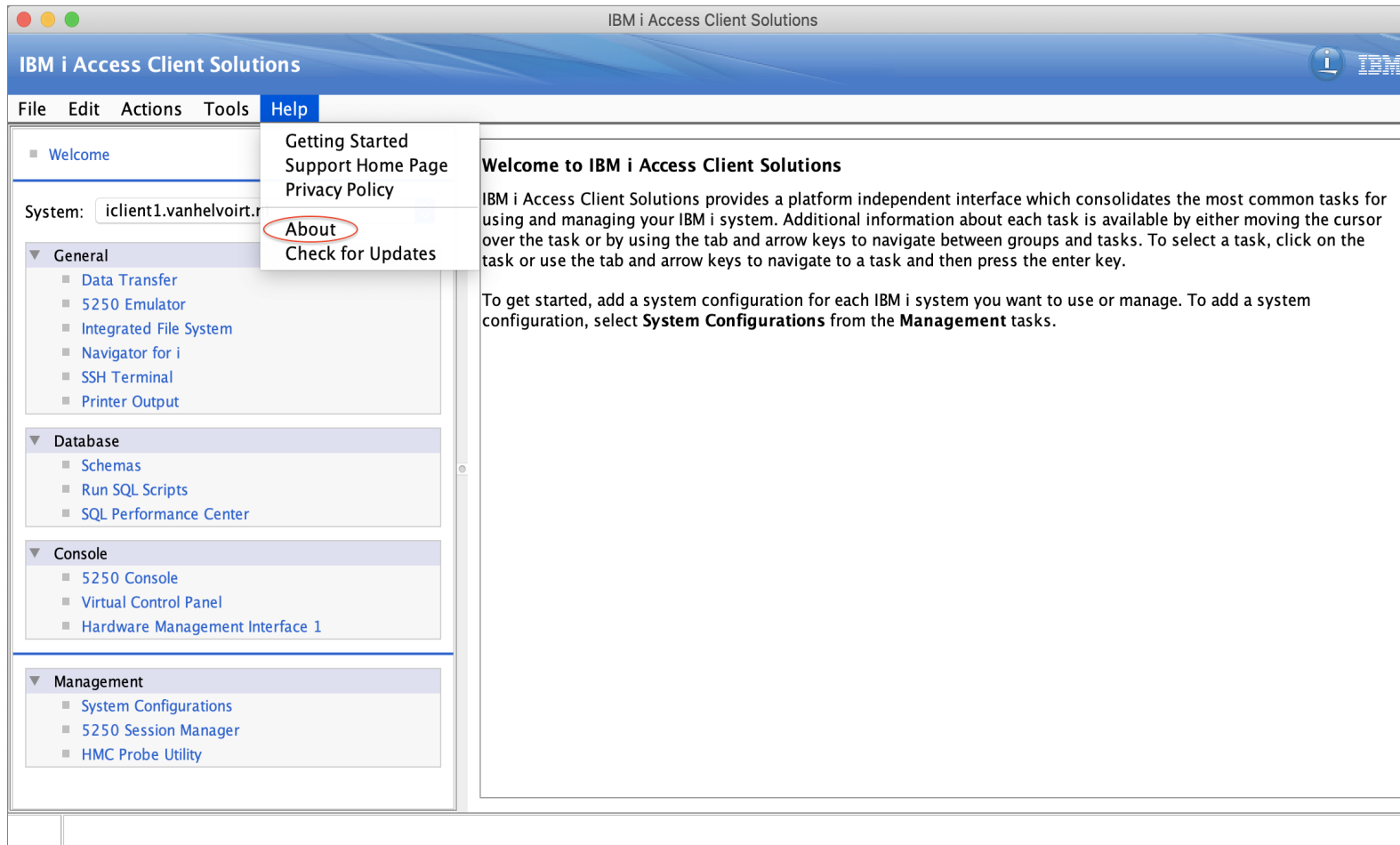


IBM i Access Client Solutions



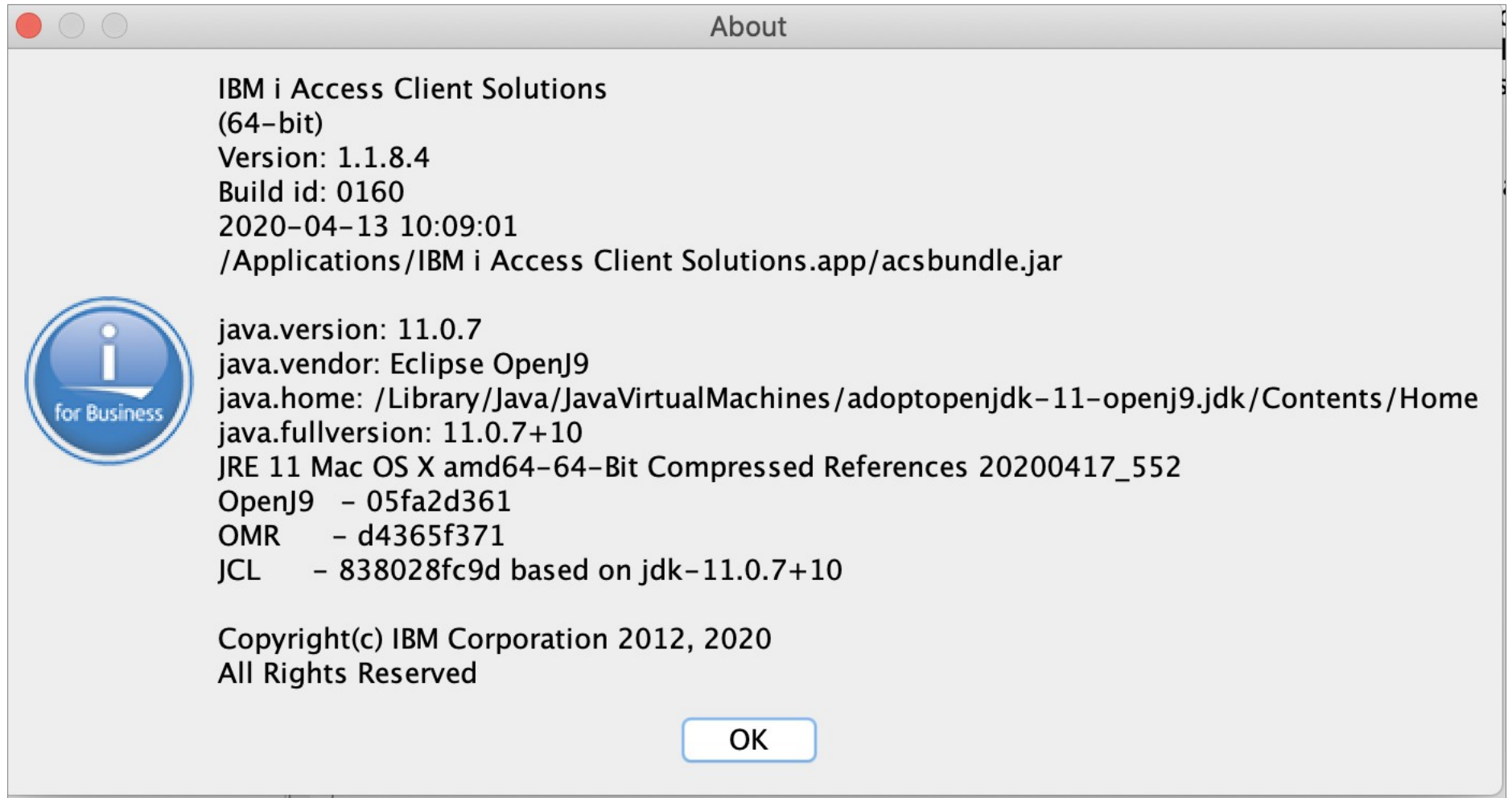


IBM i Access Client Solutions



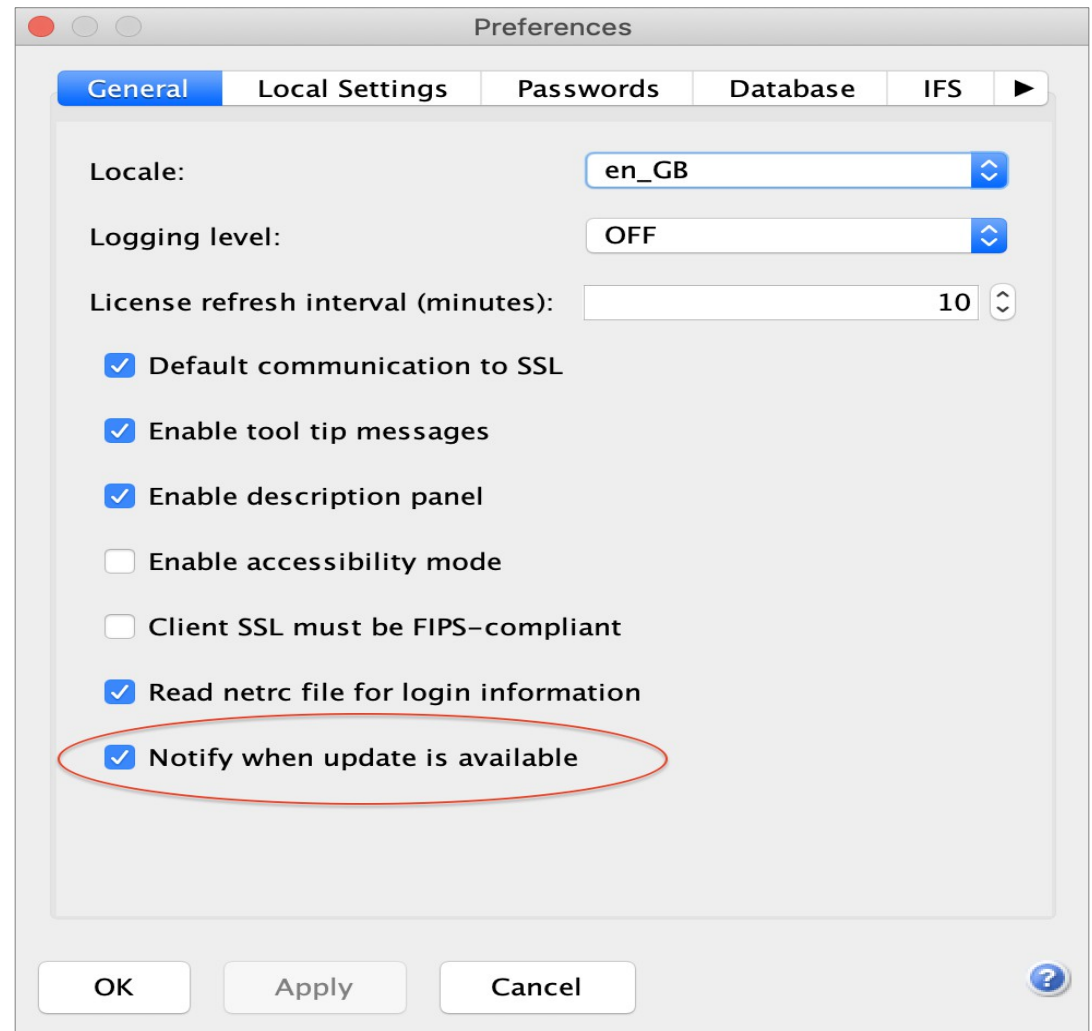
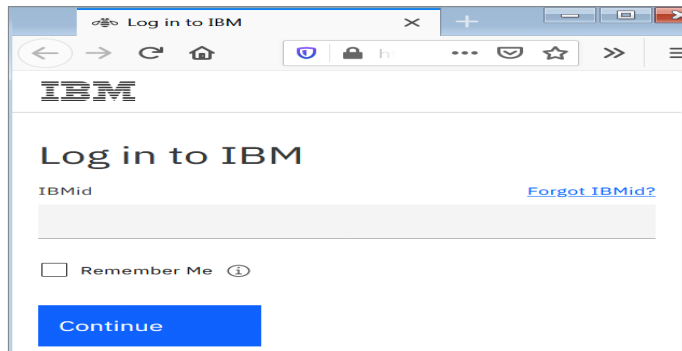
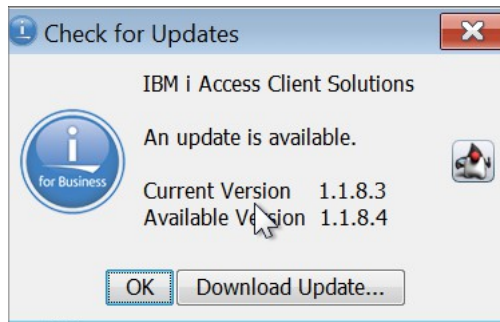
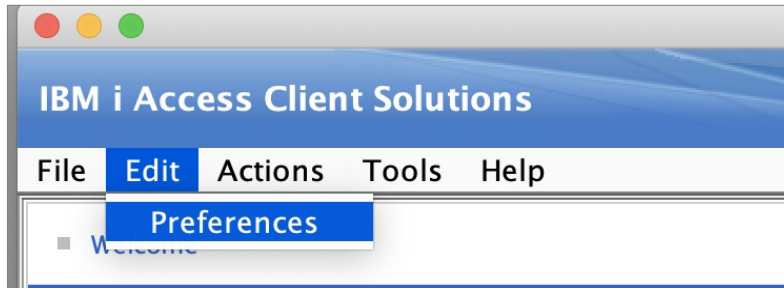


IBM i Access Client Solutions



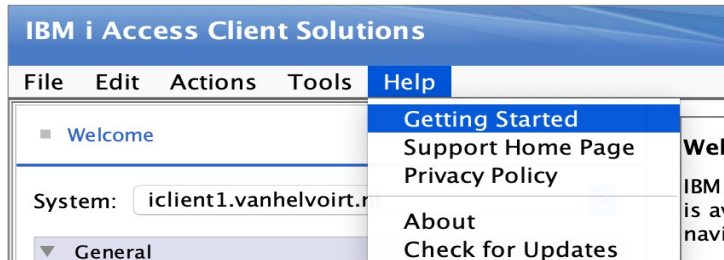


IBM i Access Client Solutions





IBM i Access Client Solutions



5733XJ1 IBM i Access Client Solutions - GettingStarted

The content of this document was last updated on: April 8, 2020

0.5 QuickStartGuide

The [QuickStartGuide](#) contains instructions for deploying the product that will work for most users running single user, or for a multi-user PC, see the [QuickStartGuide](#) in the Documentation folder.

Additional details about the product, other deployment options and customizing the product are included.

Contents:

[0.5 QuickStartGuide](#)

[1.0 Introduction](#)

[2.0 Features](#)

[3.0 Prerequisites](#)

[4.0 Product Contents](#)

[5.0 Installation](#)

[5.1 Updating an Existing Installation](#)

[5.2 Setting up a Configured Update Location](#)

[5.3 Optional IBM i PTFs](#)

[6.0 File Permissions](#)

[6.1 File Permissions \(Linux, Mac, AIX\)](#)

[6.2 File Permissions \(Windows\)](#)

[7.0 Starting the Product](#)



IBM i Access Client Solutions

5.2 Setting up an IBM i Update Location

Administrators can use an IBM i system as their central location for doing installs and applying updates. Regardless of how you initially deploy the product to your users, you can use a central location on an IBM i so that your users can apply an update with a click of a button. Here are the steps:

- Decide what IBM i system will be used as the central location.
- Extract the latest product zip archive (IBMiAccess_v1r1.zip) to any place in the IBM i Integrated File System (IFS).
- Set the following properties in the AcsConfig.properties file:

```
com.ibm.iaccess.CheckUpdateSystem=system_name           (see Note 1 below)
com.ibm.iaccess.CheckUpdatePath=/path_where_zip_was_extracted (see Note 2 below)
```

Setting the `com.ibm.iaccess.CheckUpdateSystem` property causes Help->Check for Updates to behave differently. Instead of checking an external web location for the availability of an updated version, the above IBM i location will be checked for updated product files. An update will be detected when the timestamp of any required product file changes. The timestamp will be displayed on the Help->Check for Updates panel with an option to install the update.

The user will need valid credentials to the system specified for `com.ibm.iaccess.CheckUpdateSystem`. If their credentials have not already been cached from a previous connection to this system, they will be prompted to provide valid credentials. Failing to provide valid credentials will result in updates not being detected.

Users that have an IBM i Update Location configured and have selected the option "Notify when update is available" under Edit->Preferences, will not be prompted to provide credentials. They will only get notified of an available update if they have successfully connected to the `com.ibm.iaccess.CheckUpdateSystem` since the last time they logged into their PC.

Note:

1. This feature is only enabled when using version 1.1.8.3 or higher.
2. If `com.ibm.iaccess.CheckUpdatePath` is not set, the default location is assumed to be:
`/QIBM/ProdData/Access/ACS/Base`
Note: IBM now has release-specific PTFs that extract the contents of the product zip archive (IBMiAccess_v1r1.zip) to this location (see [section 5.3](#)). Administrators may extract IBMiAccess_v1r1.zip to this location themselves as long as they are aware that if the PTF is applied, this location is updated.
3. The `AcsConfig.properties` file along side `acsbundle.jar` gets propagated to the local PC during the initial deployment, but does not get updated during a product update. To leverage this feature, you will need to update `AcsConfig.properties` on the user's PC prior to selecting Help->Check for Updates.

Special note for administrators that maintain a customized AcsConfig.properties file within acsbundle.jar:

This feature downloads the `acsbundle.jar` that exists on the IBM i at the specified location. No special processing is done to maintain a customized version of the `AcsConfig.properties` file during an update. If you have previously customized the `AcsConfig.properties` file inside `acsbundle.jar`, you will need to make sure the new version of `acsbundle.jar` contains your desired customizations before making it available for download.



IBM i Access Client Solutions

5.3 Optional IBM i PTFs

For Administrators that want to maintain a centralized location on an IBM i for their users to install and update the product, release-specific PTFs are available that will provide the extracted contents of IBMiAccess_v1r1.zip at:

/QIBM/ProdData/Access/ACS/Base

The initial PTFs are:

V7R4M0 SI71900
V7R3M0 SI71934
V7R2M0 SI71935

These PTFs will be superseded for each product update and will normally be available within 2 weeks of the availability of the product update.

ACS PTF

Circumvention

PTFs Available

R720 SI73105 1000

R730 SI73104 1000

R740 SI73103 1000

Affected Modules

Modified date:

30 April 2020

Subscribe to this APAR

By subscribing, you receive periodic emails alerting you to the status of the

Contact and feedback



IBM i Access Client Solutions

SF99662 740 IBM HTTP Server for i - level 5

Preventive Service Planning

Abstract

SF99662: SF99662 740 IBM HTTP Server for i

Content

Preventive Service Planning -PSP

SF99662 740 IBM HTTP Server for i

[Release -- R740](#)

SF99662: 740 IBM HTTP Server for i

PTF Group Level: 5

Last Updated: 4/29/20

How to Display: WRKPTFGRP SF99662

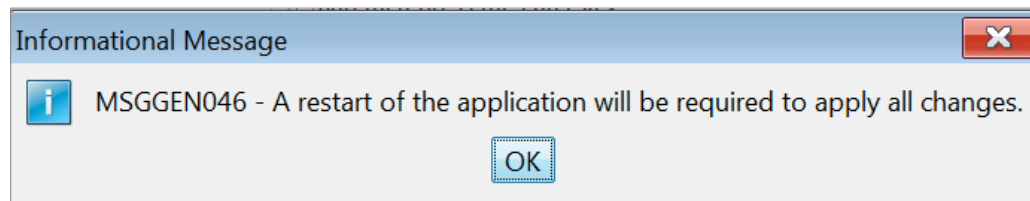
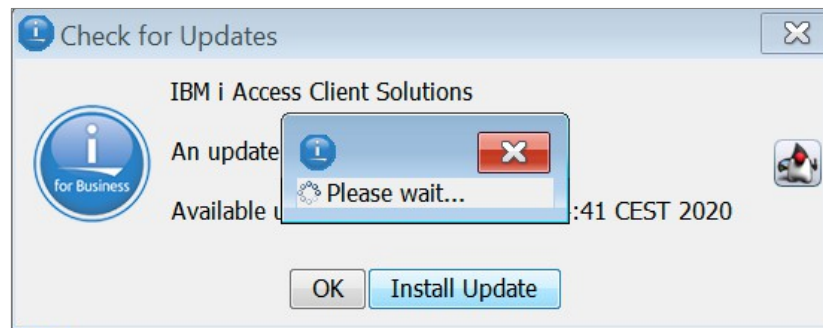
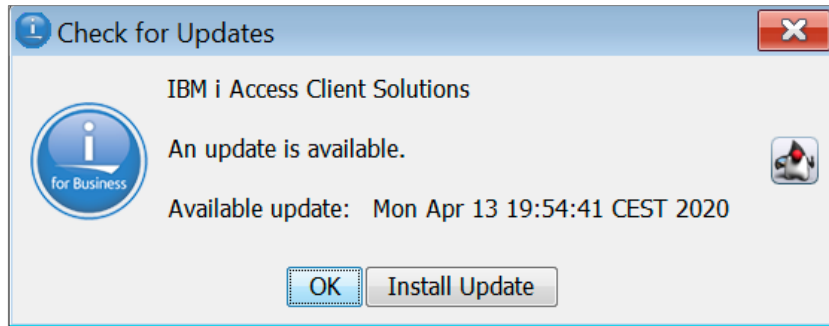
Description: Description: IBM HTTP Server for i 7.4 PTF Group.

PTF NUMBER	DATE ADDED	APAR	LICENSED PROGRAM	CUMUL PACKA

SI70669	04/29/20	SE71837	5770DG1	9304
SI73086	04/29/20	SE73244	5770DG1	1000
SI71936	04/29/20	SE72766	5770SS1	0121
SI72356	04/29/20	SE73103	5770SS1	0121
SI73087	04/29/20	SE73245	5770SS1	1000
SI73103	04/29/20	SE73495	5770SS1	1000
SI72594	04/11/20	SE73240	5770DG1	1000
SI72280	04/11/20	SE72750	5770DG1	1000
SI72301	04/11/20	SE73064	5770DG1	1000
SI71970	04/11/20	SE72790	5770DG1	0121
SI72517	04/11/20	SE73186	5770DG1	1000
SI72017	04/11/20	SE72720	5770SS1	1000
SI72016	04/11/20	SE72845	5770SS1	1000
SI72298	04/11/20	SE73063	5770SS1	1000
SI72070	04/11/20	SE72898	5770SS1	1000
SI72059	04/11/20	SE72885	5770SS1	1000
SI72347	04/11/20	SE73109	5770SS1	1000
SI71619	01/13/20	SE72428	5770DG1	0121
SI71907	01/13/20	SE72632	5770DG1	0121



IBM i Access Client Solutions





VAN HELVOIRT AUTOMATISERING

IBM i Access Client Solutions

When using the IBM i Update Location:

“com.ibm.iaccess.CheckUpdateSystem=system_name”

You need to be signed on when starting IBM i ACS

or

You need to use the option “Check for Updates”
(which will ask you to signon)



SQL Performance Center

IBM i Access Client Solutions

File Edit Actions Tools Help

- Welcome

System: iclient1.vanhelvoirt.nl

- General
 - Data Transfer
 - 5250 Emulator
 - Integrated File System
 - Navigator for i
 - SSH Terminal
 - Printer Output
- Database
 - Schemas
 - Run SQL Scripts
 - SQL Performance Center**
- Console
 - 5250 Console
 - Virtual Control Panel
 - Hardware Management Interface 1
- Management
 - System Configurations
 - 5250 Session Manager
 - HMC Probe Utility

SQL Performance Center - iclient1.vanhelvoirt.nl

File View Actions Tools Help

Database: iclient1

Plan Cache Performance Monitors Plan Cache Snapshots Plan Cache Event Monitors

Show Statements... Change Configuration... SQL Details for Jobs...

Description	Value	Value Unit
Time Of Summary	2020-06-04-16.57.04.689937	
Plan Cache Creation Time	2020-05-26-02.25.16.862089	
Active Query Summary		
Number of Currently Active Queries	34	
Number of Queries Run Since Start	130315	
Number of Query Full Opens Since Start	62784	
Plan Usage Summary		
Current Number of Plans in Cache	1949	
Total Number of Plans Built Since Start	2218	
Total Number of Unique Queries Since Start	1754	
Current Plan Cache Size	291	MB
Current Plan Cache Size Threshold	*AUTO	
Maximum Plan Cache Size For AutoSizing	*DEFAULT (3072)	MB
Current Plan Cache Hit Ratio	96	%
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)	%
Total Number of Plan Cache Autosizing Adjustments	0	
Last Plan Cache Autosizing Adjustment	0000-00-00-00.00.00.000000	
Last Autosizing Limited Due to Temporary Storage	0000-00-00-00.00.00.000000	
Current Number of Job Scoped (QTEMP) Plans	11	
Total Number of Job Scoped (QTEMP) Plans Built Since Start	13	
Total Number of Unique Queries With Job Scoped (QTEMP) References Since Start	3	
Total Times Plans Used from Cache	60566	
Total Plans Removed	269	
Total Plans Pruned	0	
Number of Times Plan Cache Pruned	0	
Time Plan Cache was Last Pruned	0000-00-00-00.00.00.000000	
Current Number of Temporary Runtime Objects Stored in Cache	1835	
Current Total Size of Temporary Runtime Objects stored in Cache	370	MB
Maximum Number of Temporary Runtime Objects Stored Per Plan	*DEFAULT (5)	
Total Number of Temporary Indexes Created	50	
Current Number of Temporary Indexes	17	
Number of Plans Rebuilt due to AQP	0	
Number of Query Mapping Errors Since Start	0	
Plan Cache Configuration		

Done: 45 rows retrieved.



SQL Performance Center

The screenshot displays the SQL Performance Center interface for the database 'Iclient1'. The 'Plan Cache' tab is active, showing a table of properties and their values. The table has three columns: Description, Value, and Value Unit. The data is as follows:

Description	Value	Value Unit
Time Of Summary	2020-06-04-16.57.04.689937	
Plan Cache Creation Time	2020-05-26-02.25.16.862089	
Active Query Summary		
Number of Currently Active Queries	34	
Number of Queries Run Since Start	130315	
Number of Query Full Opens Since Start	62784	
Plan Usage Summary		
Current Number of Plans in Cache	1949	
Total Number of Plans Built Since Start	2218	
Total Number of Unique Queries Since Start	1754	
Current Plan Cache Size	291	MB
Current Plan Cache Size Threshold	*AUTO	
Maximum Plan Cache Size For AutoSizing	*DEFAULT (3072)	MB
Current Plan Cache Hit Ratio	96	%
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)	%
Total Number of Plan Cache Autosizing Adjustments	0	
Last Plan Cache AutoSizing Adjustment	0000-00-00-00.00.00.000000	
Last Autosizing Limited Due to Temporary Storage	0000-00-00-00.00.00.000000	
Current Number of Job Scoped (QTEMP) Plans	11	
Total Number of Job Scoped (QTEMP) Plans Built Since Start	13	
Total Number of Unique Queries With Job Scoped (QTEMP) References Since Start	3	
Total Times Plans Used from Cache	60566	
Total Plans Removed	269	
Total Plans Pruned	0	
Number of Times Plan Cache Pruned	0	
Time Plan Cache was Last Pruned	0000-00-00-00.00.00.000000	
Current Number of Temporary Runtime Objects Stored in Cache	1835	
Current Total Size of Temporary Runtime Objects stored in Cache	370	MB
Maximum Number of Temporary Runtime Objects Stored Per Plan	*DEFAULT (5)	
Total Number of Temporary Indexes Created	50	
Current Number of Temporary Indexes	17	
Number of Plans Rebuilt due to AQP	0	
Number of Query Mapping Errors Since Start	0	
Plan Cache Configuration		

Done: 45 rows retrieved.



Plan Cache – Show Statements...

The screenshot shows a window titled "SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(lclient1)". The interface is divided into a left sidebar for filters and a main content area on the right.

Filters to apply:

- Minimum runtime for the longest execution of the statement:
1 Seconds
- Statements that ran on or after this date and time:
3 June 2020 at 17:17:42
- Top 'n' most frequently run statements:
25
- Top 'n' statements with the largest total accumulated runtime:
25
- Statements the following user has ever run:
RUDI
- Statements that are currently active
- Statements for which indexes have been advised
- Statements for which statistics have been advised
- Include statements initiated by the operating system
- Statements that reference the following objects:
Schema Name
Add Remove
- Statements that contain the following text:
[Empty text area]

Buttons at the bottom: Reset All Filters, Show



Plan Cache – Show Statements...

SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(Iclient1)

Filters to apply:

- Minimum runtime for the longest execution of the statement:
1 Seconds
- Statements that ran on or after this date and time:
3 June 2020 at 17:17:42
- Top 'n' most frequently run statements:
25
- Top 'n' statements with the largest total accumulated runtime:
25
- Statements the following user has ever run:
RUDI
- Statements that are currently active
- Statements for which indexes have been advised
- Statements for which statistics have been advised
- Include statements initiated by the operating system
- Statements that reference the following objects:
Schema Name
Add Remove
- Statements that contain the following text:

Reset All Filters Show

Filters applied:

- Top 25 most frequently run

Shown at 17:22 (1)

Columns... Save Results... Load All Data Refresh



Plan Cache – Show Statements...

SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(liclient1)

Filters to apply:

- Minimum runtime for the longest execution of the statement: 1 Seconds
- Statements that ran on or after this date and time: 3 June 2020 at 17:17:42
- Top 'n' most frequently run statements: 25
- Top 'n' statements with the largest total accumulated runtime: 25
- Statements the following user has ever run: RUDI
- Statements that are currently active
- Statements for which indexes have been advised
- Statements for which statistics have been advised
- Include statements initiated by the operating system
- Statements that reference the following objects:
- Statements that contain the following text:

Filters applied: **Shown at 17:22 (1)**

- Top 25 most frequently run

Last Time Run	Most Expensive Time (sec)	Total Processing Time (sec)	Total Times Run	Average Processing Time (sec)	Statement
2020-06-01 00:01:19.291369	0.2913	1.0840	56	0.0193	DELETE
2020-06-04 17:22:55.518429	0.0114	1.0460	13618	0.0001	DELETE
2020-06-04 17:22:56.049704	0.0150	0.7306	13819	0.0001	INSERT
2020-06-04 17:22:56.049704	0.0118	0.6649	13618	0.0001	SELECT
2020-06-04 17:22:52.886208	0.0269	0.5262	2030	0.0002	Select
2020-06-04 17:22:56.049704	0.0191	0.5193	13618	0.0001	DELETE
2020-05-26 02:35:14.494274	0.0903	0.3806	130	0.0029	SELECT
2020-05-26 02:35:12.185826	0.0496	0.3789	65	0.0058	SELECT
2020-06-04 08:46:09.369697	0.0334	0.3763	1610	0.0002	SELECT
2020-06-04 00:00:49.355726	0.0611	0.3089	72	0.0042	update
2020-06-01 00:02:02.284838	0.0114	0.1601	48	0.0033	INSERT
2020-06-03 00:03:11.953273	0.0182	0.1484	49	0.0030	INSERT
2020-06-04 17:17:47.768662	0.0182	0.1121	900	0.0001	SELECT
2020-06-04 17:22:52.886208	0.0085	0.1085	804	0.0001	Values
2020-06-04 15:56:43.207091	0.0130	0.0798	193	0.0004	SELECT
2020-06-04 17:17:47.768662	0.0188	0.0657	900	0.0001	SELECT
2020-06-03 12:21:40.926221	0.0185	0.0514	201	0.0002	SELECT
2020-06-03 12:21:40.926221	0.0096	0.0474	201	0.0002	DELETE
2020-06-04 00:00:50.465918	0.0084	0.0362	117	0.0003	delete
2020-06-04 15:31:08.673692	0.0091	0.0326	93	0.0003	Values
2020-06-03 12:21:40.926221	0.0090	0.0317	201	0.0001	DELETE
2020-06-04 00:00:50.465918	0.0191	0.0313	54	0.0005	delete
2020-06-04 12:42:05.700357	0.0091	0.0312	50	0.0006	SELECT
2020-06-04 15:31:56.248283	0.0079	0.0206	220	0.0001	SELECT
2020-06-04 12:42:05.700357	0.0018	0.0036	50	0.0001	UPDAT

Done: 25 rows retrieved.

Buttons: Columns... Save Results... Refresh



Plan Cache – Show Statements...

Customize Columns

Column	Width	Visible
Last Time Run	282	<input checked="" type="checkbox"/>
Most Expensive Time (sec)	92	<input checked="" type="checkbox"/>
Total Processing Time (sec)	94	<input checked="" type="checkbox"/>
Total Times Run	92	<input checked="" type="checkbox"/>
Average Processing Time (sec)	94	<input checked="" type="checkbox"/>
Statement	750	<input checked="" type="checkbox"/>
Plan Creation User Name	84	<input checked="" type="checkbox"/>
Job Name	77	<input checked="" type="checkbox"/>
Job User	65	<input checked="" type="checkbox"/>
Job Number	80	<input checked="" type="checkbox"/>
Adjusted Average Processing Time (sec)	94	<input checked="" type="checkbox"/>
Average Result Set Rows	92	<input checked="" type="checkbox"/>
Average Temp StorageUsed (MB)	105	<input checked="" type="checkbox"/>
Plan Score	114	<input checked="" type="checkbox"/>
Plan Identifier	87	<input checked="" type="checkbox"/>
Total Cached ResultsUsed	102	<input checked="" type="checkbox"/>
Optimization Time (sec)	102	<input checked="" type="checkbox"/>
System Name	78	<input checked="" type="checkbox"/>
Relational Database Name	90	<input checked="" type="checkbox"/>
QRO Hash	580	<input checked="" type="checkbox"/>
QQJFLD	75	<input type="checkbox"/>

Move Up
Move Down
Top
Bottom
Default Order
Show
Hide
Width (pixels):
282

OK Apply Cancel



Plan Cache – Show Statements...

SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(Iclient1)

Filters to apply:

- Minimum runtime for the longest execution of the statement: 1 Seconds
- Statements that ran on or after this date and time: 3 June 2020 at 17:17:42
- Top 'n' most frequently run statements: 25
- Top 'n' statements with the largest total accumulated runtime: 25
- Statements the following user executed: RUDI
- Statements that a...
- Statements for wh...
- Statements for wh...
- Include statement...
- Statements that r...

File type: OpenOffice (.ods)

File name: /temp/untitled.ods

Filters applied:

- Top 25 most frequently run

Last Time Run	Most Expensive Time (sec)	Total Processing Time (sec)	Total Times Run	Average Processing Time (sec)	Staten
2020-06-01 00:01:19.291369	0.2913	1.0840	56	0.0193	DELET
2020-06-04 17:22:55.518429	0.0114	1.0460	13618	0.0001	DELET
2020-06-04 17:22:56.049704	0.0150	0.7306	13819	0.0001	INSERT
2020-06-04 17:22:56.049704	0.0118	0.6649	13618	0.0001	SELEC
2020-06-04 17:22:52.886208	0.0269	0.5262	2030	0.0002	Select
2020-06-04 17:22:56.049704	0.0191	0.5193	13618	0.0001	DELET
2020-05-26 02:35:14.494274	0.0903	0.3806	130	0.0029	SELEC
2020-05-26 02:35:12.185826	0.0496	0.3789	65	0.0058	SELEC
					0.0002 SELEC
					0.0042 update
					0.0033 INSERT
					0.0030 INSERT
					0.0001 SELEC
					0.0001 Values
					0.0004 SELEC
					0.0001 SELEC
					0.0002 SELEC
					0.0002 DELET
2020-06-04 00:00:50.465918	0.0084	0.0362	117	0.0003	delete
2020-06-04 15:31:08.673692	0.0091	0.0326	93	0.0003	Values
2020-06-03 12:21:40.926221	0.0090	0.0317	201	0.0001	DELET
2020-06-04 00:00:50.465918	0.0191	0.0313	54	0.0005	delete

Save Results

OK Cancel



Plan Cache – Show Statements...

SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(liclient1)

Filters to apply:

- Minimum runtime for the longest execution of the statement: 1 Seconds
- Statements that ran on or after this date and time: 3 June 2020 at 17:17:42
- Top 'n' most frequently run statements: 25
- Top 'n' statements with the largest total accumulated runtime: 25
- Statements the following user has ever run: RUDI
- Statements that are currently active
- Statements for which indexes have been advised
- Statements for which statistics have been advised
- Include statements initiated by the operating system
- Statements that reference the following objects:
- Statements that contain the following text:

Filters applied: Top 25 most frequently run

Last Time Run	Most Expensive Time (sec)	Total Processing Time (sec)	Total Times Run	Average Processing Time (sec)	Statement
2020-06-01 00:01:19.291369	0.2913	1.0840	56	0.0193	DELETE
2020-06-04 17:22:55.518429	0.0114	1.0460	13618	0.0001	DELETE
2020-06-04 17:22:56.049704	0.0150	0.7306	13819	0.0001	INSERT
2020-06-04 17:22:56.049704	0.0118	0.6649	13618	0.0001	SELECT
2020-06-04 17:22:52.886208	0.0269	0.5262	2030	0.0002	Select
2020-06-04 17:22:56.049704	0.0191	0.5193	13618	0.0001	DELETE
2020-05-26 02:35:14.494274	0.0903	0.3806	130	0.0029	SELECT
2020-05-26 02:35:12.185976	0.0096	0.7789	65	0.0058	SELECT
2020-06-04 08:46:09.185976	0.0334	0.373	1610	0.0002	SELECT
2020-06-04 00:00:49.185976	0.0611	0.309	72	0.0042	update
2020-06-01 00:02:02.185976	0.0114	0.161	48	0.0033	INSERT
2020-06-03 00:03:11.185976	0.0182	0.344	49	0.0030	INSERT
2020-06-04 17:17:47.185976	0.0182	0.111	900	0.0001	SELECT
2020-06-04 17:22:52.185976	0.0885	0.165	804	0.0001	Values
2020-06-04 15:56:43.185976	0.0330	0.078	193	0.0004	SELECT
2020-06-04 17:17:47.185976	0.0330	0.077	900	0.0001	SELECT
2020-06-03 12:21:40.185976	0.0185	0.054	201	0.0002	SELECT
2020-06-03 12:21:40.185976	0.0096	0.054	201	0.0002	DELETE
2020-06-04 00:00:50.185976	0.0001	0.002	117	0.0003	delete
2020-06-04 15:31:08.673692	0.0091	0.0326	93	0.0003	Values
2020-06-03 12:21:40.926221	0.0090	0.0317	201	0.0001	DELETE
2020-06-04 00:00:50.465918	0.0191	0.0313	54	0.0005	delete
2020-06-04 12:42:05.700357	0.0091	0.0312	50	0.0006	SELECT
2020-06-04 15:31:56.248283	0.0079	0.0206	220	0.0001	SELECT
2020-06-04 12:42:05.700357	0.0018	0.0036	50	0.0001	UPDAT

Done: 25 rows retrieved.

Buttons: Columns..., Save Results..., Refresh



Plan Cache – Show Statements...

Visual Explain - iclient1.vanhelvoirt.nl(liclient1)

File View Actions Options Tools Help

Search... Ignore Case

The graph shows a complex query plan with multiple nested loop joins, index probes, table probes, and special logic operations. The estimated number of rows is shown on the arrows between nodes.

Attribute	Value
Query Engine Used	SQE
Time Information	
Timestamp for Creation of Monitor Entry	2020-05-26-02.35.12.1 85826
Statement Start Timestamp	2020-05-26-02.35.12.1 85826
Statement End Timestamp	2020-05-26-02.35.12.1 85826
Total Estimated Run Time (ms)	63.086
Actual Runtime Information	
Optimization Time (ms)	4,419
Longest Key Range Estimate (ms)	0
Key Range Estimate Timed Out	No
Run Time (ms)	5
Statement Open Time (ms)	Not Available
Statement Fetch Time (ms)	5
Statement Close Time (ms)	Not Available
Rows Fetched	0

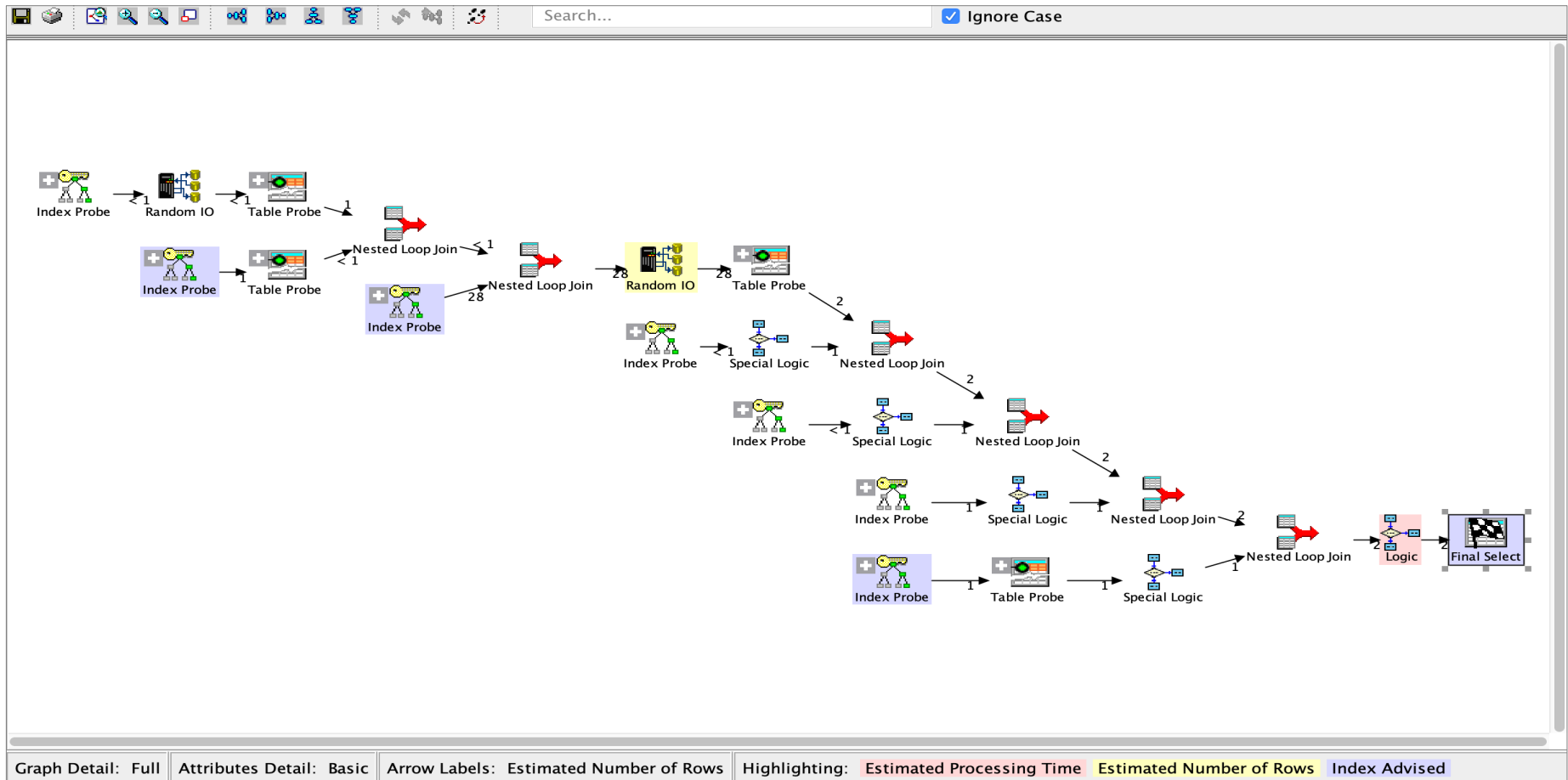
Graph Detail: Full | Attributes Detail: Basic | Arrow Labels: Estimated Number of Rows | Highlighting: Estimated Processing Time | Estimated Number of Rows | Index Advised

```
SELECT COLUMN_NAME
FROM SYSIBM.SQLCOLUMNS
WHERE COLUMN_NAME = ? AND TABLE_SCHEM = ? AND TABLE_NAME = ?
FOR FETCH ONLY
```

Statement Text



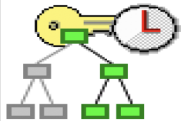
Plan Cache – Show Statements...





Plan Cache – Show Statements...

IBM i 7.4 Database Performance and Query Optimization

Databases Performance and Query Optimization IBM i 7.4.pdf	
	remaining columns required to satisfy the query. Can perform poorly when many rows are selected because of the random I/O associated with the Table Probe.
Likely to be used	<ul style="list-style-type: none">• When the ability to probe the rows required for the query (for example, joins) exists• When the selection columns cannot be matched against the leading key columns of the index• When the overhead cost associated with the creation of the temporary index can be justified against other alternative methods to implement this query
Example SQL statement	<pre>SELECT * FROM Employee XXX, Department YYY WHERE XXX.WorkDept = YYY.DeptNo OPTIMIZE FOR ALL ROWS</pre>
Database Monitor and Plan Cache record indicating use	QQRID 3002 record and QQRID 3001 where QQKP(Index_Probe_Used) = 'Y'.
SMP parallel enabled	Yes
Also referred to as	Index Probe Index Probe, Preload Index Probe, Distinct Index Probe Distinct, Preload Index Probe, Key Selection
Visual Explain icon	



VAN HELVOIRT AUTOMATISERING

Plan Cache – Show Statements...

SMP parallel enabled Yes

License Program:

5770-SS1 DB2 Symmetric MultiProcessing

Introduction to DB2 Symmetric Multiprocessing for IBM i

Process your DB2 for i indexes in parallel



Plan Cache – Show Statements...

SQL Statement Longest Runs - iclient1.vanhelvoirt.nl(Iclient1)

File View Actions

```
SELECT COLUMN_NAME
FROM SYSIBM.SQLCOLUMNS
WHERE COLUMN_NAME = ? AND TABLE_SCHEM = ? AND TABLE_NAME = ?
FOR FETCH ONLY
```

Time Run	Processing Time (sec)	Records Selected	User Name	Job Name	Job User	Job Number	CPU Time (sec)	Synchronous DatabaseReads
2020-05-26 02:35:12.185826	0.0496	0	QDIRSRV	QSQRVR	QUSER	978198	0.0000	
2020-05-26 02:33:14.477483	0.0311	0	QDIRSRV	QSQRVR	QUSER	978198	0.0000	
2020-05-26 02:33:56.653630	0.0296	0	QDIRSRV	QSQRVR	QUSER	978198	0.0000	

Done: 3 rows retrieved.

Columns... Save Results... Refresh



Plan Cache – Show Statements...

Active Jobs - iclient1.vanhelvoirt.nl(Iclient1)

File View Actions

Job Name	Job User	Job Number
----------	----------	------------

Done: 0 rows retrieved.

Columns... Save Results... Refresh



Plan Cache – Show Statements...

Job History - iclient1.vanhelvoirt.nl(Iclient1)

File View Actions

Job Name	Job User	Job Number	First Time Used	Last Time Used
QSQRVR	QUSER	978198	2020-05-26 02:33:01.642031	2020-05-26 02:35:12.185826

Done: 1 rows retrieved.

Columns... Save Results... Refresh



Plan Cache – Show Statements...

User History - iclient1.vanhelvoirt.nl(Iclient1)

File View Actions

User Name	Last Time Run
QSYS	2020-06-05 00:00:04.246713

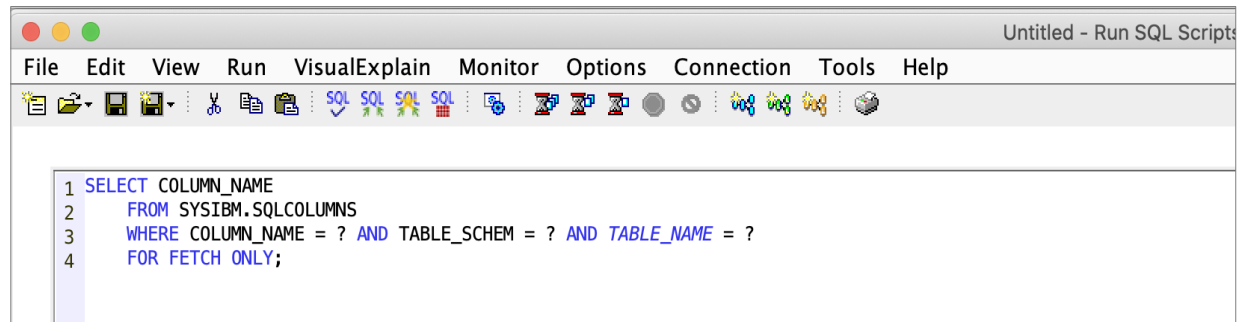
Done: 1 rows retrieved.

Columns... Save Results... Refresh



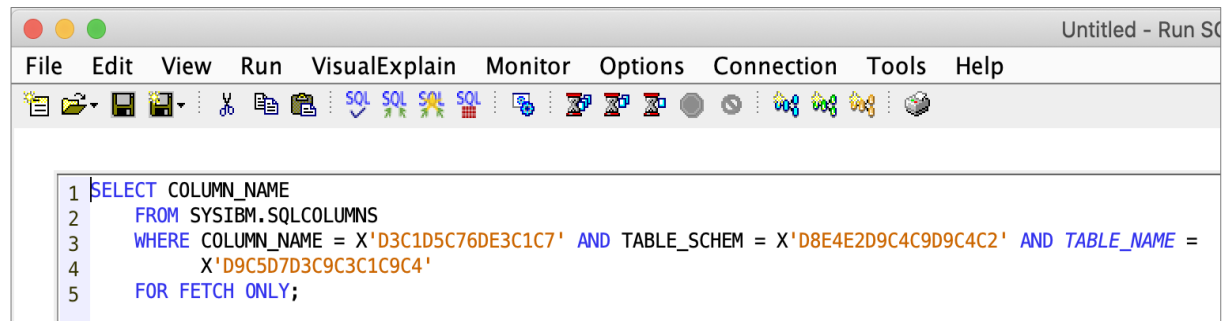
Plan Cache – Show Statements...

Visual Explain	0.0334	0.3
Show Longest Runs	0.0611	0.3
Show Active Jobs	0.0114	0.1
Show Job History	0.0182	0.1
Show User History	0.0182	0.1
Work with SQL Statement		
Work with SQL Statement and Variables		
Save to New...	0.0185	0.0
Plan	0.0096	



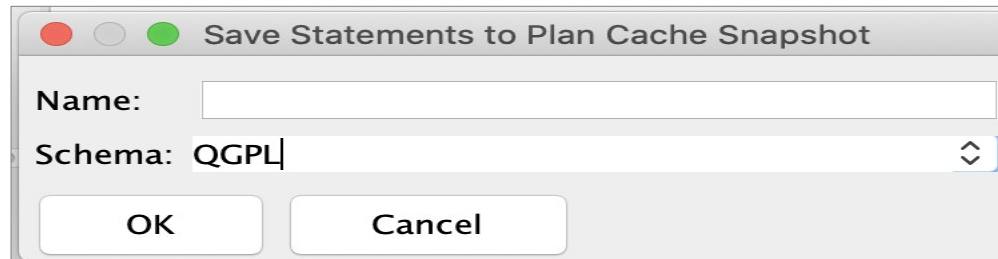
```
1 SELECT COLUMN_NAME
2 FROM SYSIBM.SQLCOLUMNS
3 WHERE COLUMN_NAME = ? AND TABLE_SCHEM = ? AND TABLE_NAME = ?
4 FOR FETCH ONLY;
```

2.185826	Visual Explain	0.371
9.369697	Show Longest Runs	0.301
9.355726	Show Active Jobs	0.161
2.284838	Show Job History	0.141
1.953273	Show User History	0.111
7.768662	Show User History	0.101
2.886208	Work with SQL Statement	0.101
3.207091	Work with SQL Statement and	
7.768662	Save to New...	0.051
0.926221	Plan	0.041
0.926221		



```
1 SELECT COLUMN_NAME
2 FROM SYSIBM.SQLCOLUMNS
3 WHERE COLUMN_NAME = 'D3C1D5C76DE3C1C7' AND TABLE_SCHEM = 'D8E4E2D9C4C9D9C4C2' AND TABLE_NAME =
4 'D9C5D7D3C9C3C1C9C4'
5 FOR FETCH ONLY;
```

Visual Explain	0.0334	0.3
Show Longest Runs	0.0611	0.3
Show Active Jobs	0.0114	0.1
Show Job History	0.0182	0.1
Show User History	0.0182	0.1
Work with SQL Statement	0.0085	0.0
Work with SQL Statement and Variables	0.0130	0.0
Save to New...		
Plan	0.0084	



Save Statements to Plan Cache Snapshot

Name:

Schema: QGPL

OK Cancel



Plan Cache – Show Statements...

Plan	Cost	Execs	Time	SQL
Visual Explain	0.0334	0.03763	1610	0.0002 SELECT *
Show Longest Runs	0.0611	0.03089	72	0.0042 update Q
Show Active Jobs	0.0114	0.01601	48	0.0033 INSERT IN
Show Job History	0.0182	0.01484	49	0.0030 INSERT IN
Show Job History	0.0182	0.01121	900	0.0001 SELECT M
Show User History	0.0085	0.01085	804	0.0001 Values (S
Work with SQL Statement	0.0130	0.00798	193	0.0004 SELECT C
Work with SQL Statement and Variables	0.0130	0.00657	900	0.0001 SELECT M
Save to New...	0.0185	0.00514	201	0.0002 SELECT *
Plan				0.0002 DELETE F
08.673692	0.0091	0.00032	93	0.0003 delete fro
40.926221	0.0090	0.0317	201	0.0001 DELETE F
50.465918	0.0191	0.0313	54	0.0005 delete fro

Change Plan Score...
Delete...

Inquiry Message

Enter the new plan score for the selected plan(s). A larger score value will make the plan less likely to be removed from the plan cache.

Delete

Are you sure you want to delete the selected plan(s) from the system SQL plan cache?

No Yes



Plan Cache – Show Statements...

SQL Plan Cache Statements - iclient1.vanhelvoirt.nl(liclient1)

Filters to apply:

- Minimum runtime for the longest execution of the statement: 1 Seconds
- Statements that ran on or after this date and time: 3 June 2020 at 17:17:42
- Top 'n' most frequently run statements: 25
- Top 'n' statements with the largest total accumulated runtime: 25
- Statements the following user has ever run: RUDI
- Statements that are currently active
- Statements for which indexes have been advised
- Statements for which statistics have been advised
- Include statements initiated by the operating system
- Statements that reference the following objects:

Schema Name Add Remove

Statements that contain the following text: SELECT

Filters applied:

- Top 25 most frequently run
- Statements containing text: SELECT

Statement	Plan Creation User Name	Job Name
0.0001 DELETE FROM QUSRBRM.QA1ANET2 WHERE RMTSYS NOT IN (SELECT R1MSYS FROM QUSRBRM.QA1A1RMT WHERE R1MACT = ...	QBRMS	Q1ACPI
0.0001 INSERT INTO QUSRBRM.QA1A2NET SELECT DISTINCT RMTSYS AS N2RMT , RMRTRNI AS N2RNI , OBJ AS N2OBJ,LIB AS N2LIB FRO...	QBRMS	Q1ACPI
0.0001 SELECT * FROM QUSRBRM.QA1ANET2 WHERE (OBJ = ?) FOR READ ONLY	QBRMS	Q1ACPI
0.0002 Select * from PCSECDTA/TCPIPS2 Where isrvid = ? and iexitf = ? and ? >= ip32f and ? <= ip32t and iusrid = ? and iaorr = ? ...	QSYS	QYUSCM
0.0029 SELECT NAME FROM QSYS2.SYSINDEXES WHERE TABLE_SCHEMA = ? AND NAME = ? FOR FETCH ONLY WITH NC	QDIRSRV	QSQSRV
0.0058 SELECT COLUMN_NAME FROM SYSIBM.SQLCOLUMNS WHERE COLUMN_NAME = ? AND TABLE_SCHEMA = ? AND TABLE...	QDIRSRV	QSQSRV
0.0002 SELECT * FROM QUSRBRM.QA1AHS WHERE BKJNBR = ? AND BKCMDT = ? AND BKPCKGN = ? AND BKHSYS = ? FOR READ O...	BRMSUSER	QRWTSF
0.0033 INSERT INTO QPFRHIST/QAPMHDJOBO SELECT MAX(INTNUM), MAX(DATETIME), MAX(UTCTIME), MAX(INTSEC), MAX(JBTDE), MA...	QSYS	QSQSRV
0.0030 INSERT INTO QPFRHIST/QAPMHDJOBO SELECT MAX(INTNUM), MAX(DATETIME), MAX(UTCTIME), MAX(INTSEC), MAX(JBTDE), MA...	QSYS	QSQSRV
0.0001 Values (Select Count(*) from PCSECDTA/TCPIPS2 Where isrvid = 'TCPACCEPT' and iexitf = 'ACPT0100') into ?	QDIRSRV	QSQSRV
0.0001 SELECT MIN(ID) FROM QUSRDIRDB.REPLOBJECTCLASS10 FOR FETCH ONLY	QDIRSRV	QSQSRV
0.0004 SELECT CURRENT_TIMESTAMP FROM SYSIBM.SYSDUMMY1	QLWISVR	QSQSRV
0.0001 SELECT MIN(ID) FROM QUSRDIRDB.REPLCHG10 FOR FETCH ONLY	QDIRSRV	QSQSRV
0.0002 DELETE FROM QUSRBRM.QA1ANET2 WHERE RMTSYS NOT IN (SELECT R1MSYS FROM QUSRBRM.QA1A1RMT WHERE R1MACT = ...	QBRMS	Q1ACPI
0.0002 SELECT * FROM QUSRBRM.QA1ANET2 WHERE (OBJ = ?) FOR READ ONLY	QBRMS	Q1ACPI
0.0003 Values (Select Count(*) from PCSECDTA/TCPIPS2 Where isrvid = 'TCPCONNECT' and iexitf = 'CONNO100') into ?	QSYS	QYUSCM
0.0006 SELECT * FROM QSRVAGT.QASJINVST5 WHERE INVENTORY_NAME=?	THEO	QSQSRV
0.0001 SELECT * FROM QUSRBRM.QA1ASP ORDER BY SYNAME ASC FOR READ ONLY	BRMSUSER	QRWTSF

Done: 18 rows retrieved.

Columns... Save Results... Refresh



Plan Cache – Autosizing

Description	Value	Value Unit
Time Of Summary	2020-06-04-17.44.43.906932	
Plan Cache Creation Time	2020-03-21-14.51.03.324595	
Active Query Summary		
Number of Currently Active Queries	17294	
Number of Queries Run Since Start	659742527	
Number of Query Full Opens Since Start	9095712	
Plan Usage Summary		
Current Number of Plans in Cache	5984	
Total Number of Plans Built Since Start	708121	
Total Number of Unique Queries Since Start	181490	
Current Plan Cache Size	508	MB
Current Plan Cache Size Threshold	*AUTO	
Maximum Plan Cache Size For AutoSizing	*DEFAULT (9216)	MB
Current Plan Cache Hit Ratio	92	%
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)	%
Total Number of Plan Cache Autosizing Adjustments	0	
Last Plan Cache AutoSizing Adjustment	2020-03-22-21.19.00.118709	
Last Autosizing Limited Due to Temporary Storage	2020-06-04-17.24.11.919093	
Current Number of Job Scoped (QTEMP) Plans	3	
Total Number of Job Scoped (QTEMP) Plans Built Since Start	16895	
Total Number of Unique Queries With Job Scoped (QTEMP) References Since Start	49	
Total Times Plans Used from Cache	8387724	
Total Plans Removed	48744	
Total Plans Pruned	653441	
Number of Times Plan Cache Pruned	2551	
Time Plan Cache was Last Pruned	2020-06-04-17.24.11.919080	
Current Number of Temporary Runtime Objects Stored in Cache	8294	
Current Total Size of Temporary Runtime Objects stored in Cache	282	MB
Maximum Number of Temporary Runtime Objects Stored Per Plan	*DEFAULT (5)	
Total Number of Temporary Indexes Created	1222	
Current Number of Temporary Indexes	79	
Number of Plans Rebuilt due to AQP	15	
Number of Query Mapping Errors Since Start	12	



Plan Cache – Autosizing

Each plan cache entry may also have query runtime objects associated with it. These runtime objects are the real executable objects and temporary storage containers (hash tables, sorts, temporary indexes, and so on) used to run the query. Although these objects are not included in the plan cache size calculation, they may indirectly affect and be affected by the plan cache size. This is because, in addition to honoring the determined plan cache size, the system also seeks to keep the total temporary storage usage for inactive, cached plans within an internally determined threshold. Unlike the plan cache size calculation, this temporary storage calculation considers both the cached plans and the associated runtime objects. If this temporary storage calculation exceeds a system determined percentage of the system auxiliary storage pool (ASP) or if the system storage lower limit (defined by QSTGLOWLMT) is surpassed, the system considers the plan cache to be using excessive temporary storage.

The 7 % rule

```
1 -- category: Systems Management
2 -- description: How close are we to hitting the 7% rule?
3 SELECT
4     dec(
5         DECFLOAT(current_temporary_storage, 34) / (100 - DECFLOAT(system_asp_used, 34)) / DECFLOAT(system_asp_storage, 34) * 10000,
6         3, 1) AS CURRENT_TEMPORARY_PERCENTAGE_USED
7 FROM qsys2.system_status_info;
```

CURRENT_TEMPORARY_PERCENTAGE_USED
15.2



Plan Cache – Change Configuration...

The screenshot shows the SQL Enterprise Manager interface with the Plan Cache configuration window open. The 'Change Configuration...' button is highlighted with a red box and a red arrow pointing to the 'Change Plan Cache Configuration' dialog box. The dialog box is titled 'Change Plan Cache Configuration' and has a close button (X) in the top right corner. It contains a dropdown menu for 'Current Plan Cache Size Threshold' with a downward arrow. Below the dropdown are four radio button options: '*SAME (*AUTO)', '*DEFAULT (*AUTO)', 'Minimum value (50)', and 'Maximum value (51200)'. The 'Specify a value:' option is selected, and a text box next to it contains the value '25,625'. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Description	Value
Time Of Summary	2020-06-04-17.44.43.906932
Plan Cache Creation Time	2020-03-21-14.51.03.324595
Active Query Summary	
Number of Currently Active Queries	17294
Number of Queries Run Since Start	659742527
Number of Query Full Opens Since Start	9095712
Plan Usage Summary	
Current Number of Plans in Cache	5984
Total Number of Plans Built Since Start	708121
Total Number of Unique Queries Since Start	181490
Current Plan Cache Size	508
Current Plan Cache Size Threshold	*AUTO
Maximum Plan Cache Size For AutoSizing	*DEFAULT (9216)
Current Plan Cache Hit Ratio	92
Target Plan Cache AutoSize Hit Ratio	*DEFAULT (90)
Total Number of Plan Cache Autosizing Adjustments	0
Last Plan Cache AutoSizing Adjustment	2020-03-22-21.19.00.118709
Last Autosizing Limited Due to Temporary Storage	2020-06-04-17.24.11.919093
Current Number of Job Scoped (QTEMP) Plans	2
Total Number of Job Scoped (QTEMP) Plans Built Since Start	2
Total Number of Unique Queries With Job Scoped (QTEMP) References Since Start	2
Total Times Plans Used from Cache	2
Total Plans Removed	2
Total Plans Pruned	2
Number of Times Plan Cache Pruned	2
Time Plan Cache was Last Pruned	2
Current Number of Temporary Runtime Objects Stored in Cache	2
Current Total Size of Temporary Runtime Objects stored in Cache	2
Maximum Number of Temporary Runtime Objects Stored Per Plan	2
Total Number of Temporary Indexes Created	2
Current Number of Temporary Indexes	2
Number of Plans Rebuilt due to AQP	15
Number of Query Mapping Errors Since Start	12
Plan Cache Configuration	



Plan Cache – SQL Details for Jobs...

The screenshot shows a window titled "SQL Details for Jobs" with a filter section and a table of jobs. The filter section includes fields for Job name (QZDASOINIT), Job user (QUSER), Job number (All numbers), and Current user (All users). The table below shows a list of jobs, with the second row (Job Number 077923) highlighted. Below the table, the "SQL statement and details" section shows the SQL query and its execution environment details.

Filters

Job name: QZDASOINIT
Job user: QUSER
Job number: All numbers
Current user: All users

Type	User	Number	Detailed Status	Subsystem	Current User	Name
Batch	QUSER	077908	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077923	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077924	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077925	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077926	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077979	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077980	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT
Batch	QUSER	077982	Waiting for time interval	JDEIODBC	JDE	QZDASOINIT

Status: Complete - filtered results

SQL statement and details

```
SELECT CPWOBNM,  
CPWOBNMS,  
CPWOBNML,  
CPOMRBLOB,  
CPWOUSER,  
CPSY  
FROM CODV920.F952410  
WHERE ((CPWOBNM = ?  
AND CPWOUSER <> ?))
```

Detail	Value
Job	077923/Quser/Qzdasoinit
Time when SQL information was retrieved	07:09:42 PM
Environment	
Relational database	
Query options schema	QUSRSYS
Interface type	JDBC
Interface name	IBM Toolbox for Java
Interface version	V6R1M0 PTF 10
Client port	50094
Client host name	
Client IP address (IPv4)	192.168.172.191
Local port	8471



Performance Monitors

Monitoring your queries using the Database Monitor

Start Database Monitor (STRDBMON) command gathers information about a query in real time and stores this information in an output table. This information can help you determine whether your system and your queries are performing well, or whether they need fine-tuning. Database monitors can generate significant CPU and disk storage overhead when in use.

You can gather performance information for a specific query, for every query on the system, or for a group of queries on the system. When a job is monitored by multiple monitors, each monitor is logging rows to a different output table. You can identify rows in the output database table by its unique identification number.

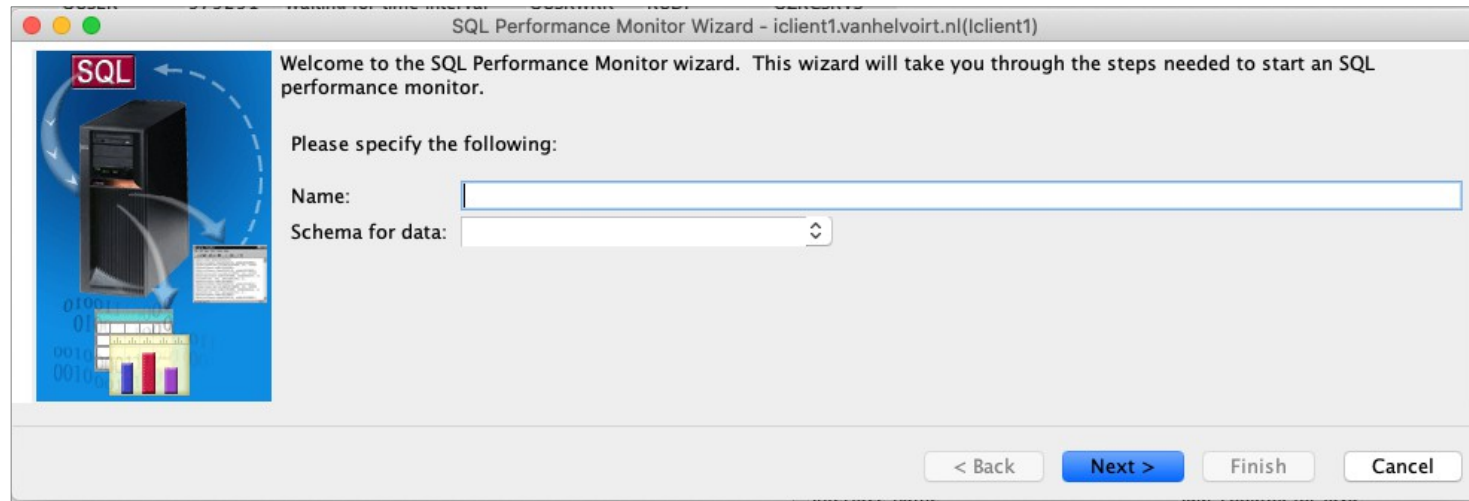
What kinds of statistics you can gather

The database monitor provides the same information that is provided with the query optimizer debug messages (**Start Debug (STRDBG)**) and the **Print SQL information (PRTSQLINF)** command. The following is a sampling of the additional information that is gathered by the database monitors:

- System and job name
- SQL statement and subselect number
- Start and end timestamp
- Estimated processing time
- Total rows in table queried
- Number of rows selected
- Estimated number of rows selected
- Estimated number of joined rows
- Key columns for advised index
- Total optimization time
- Join type and method
- ODP implementation



Performance Monitors





Performance Monitors

SQL Performance Monitor Wizard - iclient1.vanhelvoirt.nl(liclient1)

To limit the amount of data collected, specify which filters to use. When filters are provided, only statements that match the specified filter values will be captured.

If you would like to limit the amount of data collected specify which filters to use:

- Initial number of records: 0
- Minimum estimated query runtime: 0
- Minimum estimated temporary storage: 0
- Job name: QZDASOINIT
- Job user: QUSER
- Current user or group profile: RUDI
- Client location:
- Local port:
- Query Governor limits: Always collect information when exceeded
- Statement result or SQL code: Error or warning
- Host variable values: Condensed

Client registers

- Accounting string:
- Application name:
- Program name:
- Client user:
- Workstation:

Statements that access these objects:

Schema	Name
--------	------

Activity to monitor

- Only collect monitor output for user activity
- Collect monitor output for user and system activity

< Back Next > Finish Cancel



Performance Monitors

SQL Performance Monitor Wizard - iclient1.vanhelvoirt.nl(Iclient1)

Select the jobs you would like to monitor:

All jobs
 Specific jobs

Name	User	Number	Subsystem	Current User
QZDASOINIT	QUSER	979301	QUSRWRK	RUDI

Buttons: Add..., Remove

Navigation: < Back, Next >, Finish, Cancel

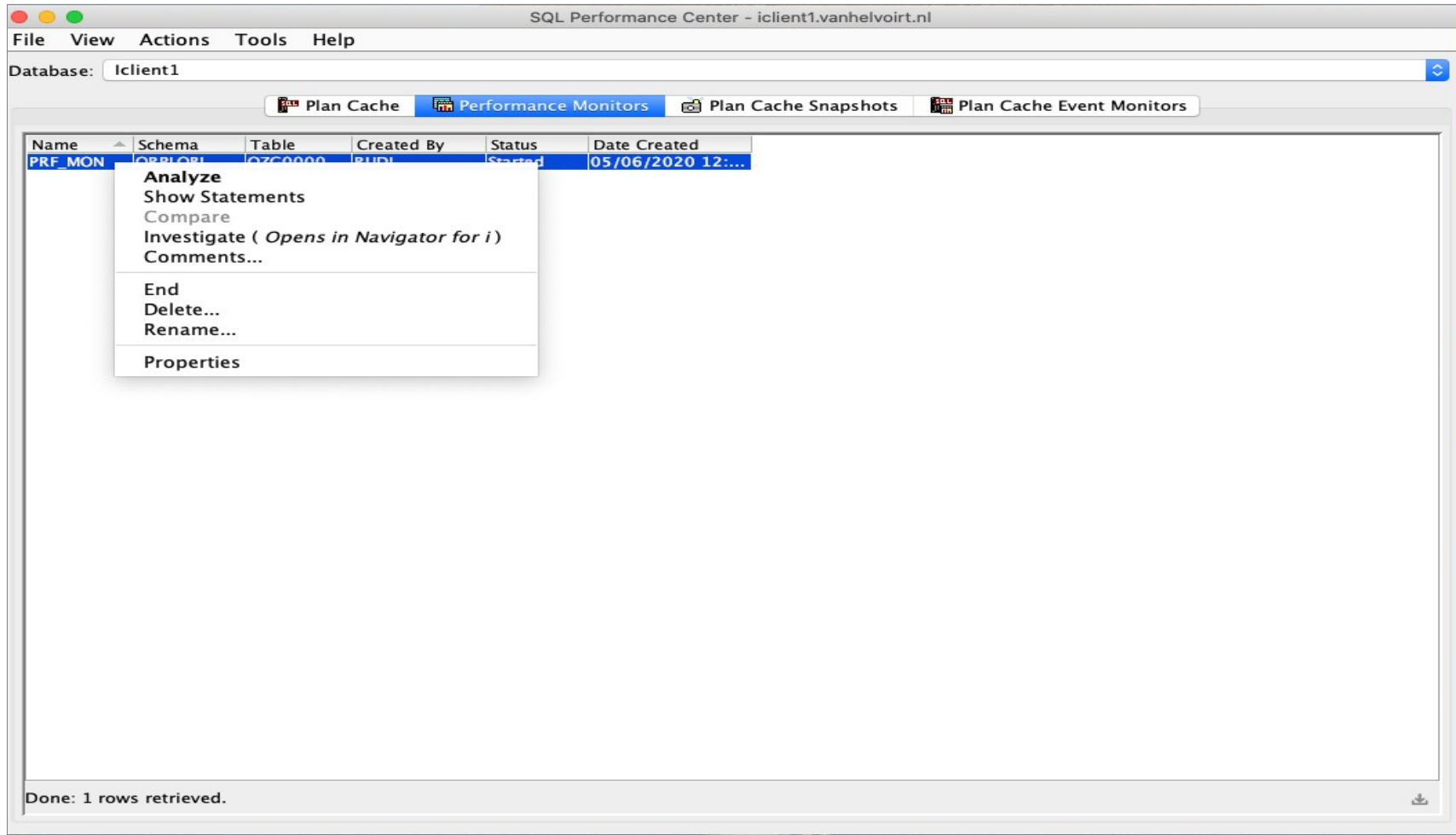


Performance Monitors





Performance Monitors





VAN HELVOIRT AUTOMATISERING

Plan Cache Snapshots & Plan Cache Event Monitors

The SQL plan cache event monitor captures monitor records of plans as they are removed from the plan cache. The event monitor is useful for ensuring that all performance information potentially available in the cache is captured even if plans are removed from the cache. Combining the event monitor output with a plan cache snapshot provides a composite view of the cache from when the event monitor was started until the snapshot is taken.



Plan Cache Snapshots & Plan Cache Event Monitors

The screenshot shows a software application window with a menu bar (File, Edit, View, Run, Visual Explain, Monitor, Options, Connection, Tools, Help) and a toolbar. A search box in the top left contains 'Db2 for i Services'. Below it, a list of search results is displayed, with 'Daily SQL Plan Cache management' selected. A red arrow points from the 'SQL' icon in the toolbar to the search box. The main area of the window displays SQL code for creating a procedure named 'DAILY_PC_MANAGEMENT'. The code includes comments about the purpose of the procedure and the steps it performs. The 'Insert' button at the bottom right of the code window is circled in red.

```
-- category: Db2 for i Services
-- description: Daily SQL Plan Cache management
CL: CRTLIB SNAPSHOTS;
CL: CRTLIB EVENTMONS;
-- Purpose: This procedure captures detail on SQL queries.
-- 1) The 100 most expensive SQL queries are captured into a SQL Plan Cache Snap
-- 2) An SQL Plan Cache Event Monitor is started using a name SNAPSHOTS/EVT<juli
-- 3) For both 1 & 2, only the 14 most recent days are kept online.
-- 4) For both 1 & 2, the new monitor and snap shot are imported into System i N
CREATE OR REPLACE PROCEDURE SNAPSHOTS.DAILY_PC_MANAGEMENT ()
LANGUAGE SQL
BEGIN
DECLARE not_found CONDITION FOR '02000';
DECLARE SNAP_NAME CHAR(10);
DECLARE OLDEST_SNAP_NAME CHAR(10);
DECLARE SNAP_COMMENT VARCHAR(100);
DECLARE EVENT_MONITOR_NAME CHAR(10);
DECLARE YESTERDAY_EVENT_MONITOR_NAME CHAR(10);
DECLARE OLDEST_EVENT_MONITOR_NAME CHAR(10);
DECLARE v_not_found BIGINT DEFAULT 0;

-- A Julian date is the integer value representing a number of days
-- from January 1, 4713 B.C. (the start of the Julian calendar) to
-- the date specified in the argument.
SET SNAP_NAME = 'SNP' CONCAT JULIAN_DAY(current date);
SET OLDEST_SNAP_NAME = 'SNP' CONCAT JULIAN_DAY(current date - 14 days);
SET EVENT_MONITOR_NAME = 'EVT' CONCAT JULIAN_DAY(current date);
SET OLDEST_EVENT_MONITOR_NAME = 'EVT' CONCAT JULIAN_DAY(current date - 14 days);
SET YESTERDAY_EVENT_MONITOR_NAME = 'EVT' CONCAT JULIAN_DAY(current date - 1 day);

-----
-- Process the Top 100 most expensive queries
-----

-- Capture the topN queries and import the snapshot
CALL QSYS2.DUMP_PLAN_CACHE_topN('SNAPSHOTS', SNAP_NAME, 100);
```



Plan Cache Snapshots & Plan Cache Event Monitors

File View Actions Tools Help

Database: Geeltje

Plan Cache Performance Monitors **Plan Cache Snapshots** Plan Cache Event Monitors

Name	Schema	Table	Created By	Date Created
SNAPSHOTS SN202006030603224502	SNAPSHOTS	SN20200603	THEO	03/06/2020 22:45:02
SNAPSHOTS SN202006020602224501	SNAPSHOTS	SN20200602	THEO	02/06/2020 22:45:01
SNAPSHOTS SN202006010601224502	SNAPSHOTS	SN20200601	THEO	01/06/2020 22:45:02
SNAPSHOTS SN202005310531224501	SNAPSHOTS	SN20200531	THEO	31/05/2020 22:45:01
SNAPSHOTS SN202005300530224501	SNAPSHOTS	SN20200530	THEO	30/05/2020 22:45:01
SNAPSHOTS SN202005290529224502	SNAPSHOTS	SN20200529	THEO	29/05/2020 22:45:02
SNAPSHOTS SN202005280528224501	SNAPSHOTS	SN20200528	THEO	28/05/2020 22:45:01
SNAPSHOTS SN202005270527224502	SNAPSHOTS	SN20200527	THEO	27/05/2020 22:45:02
SNAPSHOTS SN202005260526224501	SNAPSHOTS	SN20200526	THEO	26/05/2020 22:45:01
SNAPSHOTS SN202005250525224502	SNAPSHOTS	SN20200525	THEO	25/05/2020 22:45:02
SNAPSHOTS SN202005240524224502	SNAPSHOTS	SN20200524	THEO	24/05/2020 22:45:02
SNAPSHOTS SN202005230523224501	SNAPSHOTS	SN20200523	THEO	23/05/2020 22:45:01
SNAPSHOTS SN202005220522224501	SNAPSHOTS	SN20200522	THEO	22/05/2020 22:45:01
SNAPSHOTS SN202005210521224502	SNAPSHOTS	SN20200521	THEO	21/05/2020 22:45:02
SNAPSHOTS SNP202028 0228102220	SNAPSHOTS	SNP202028	THEO	28/02/2020 10:22:20



Plan Cache Snapshots

Name	Schema	Table	Created By	Date Created
SNAPSHOTS SN202006030603224502	SNAPSHOTS	SN20200603	THEO	03/06/2020 22:45:02
SNAPSHOTS SN2020060206020602	SNAPSHOTS	SN20200602	THEO	02/06/2020 22:45:01
SNAPSHOTS SN2020060106010601	SNAPSHOTS	SN20200601	THEO	01/06/2020 22:45:02
SNAPSHOTS SN2020053105310531	SNAPSHOTS	SN20200531	THEO	31/05/2020 22:45:01
SNAPSHOTS SN2020053005300530	SNAPSHOTS	SN20200530	THEO	30/05/2020 22:45:01
SNAPSHOTS SN2020052905290529	SNAPSHOTS	SN20200529	THEO	29/05/2020 22:45:02
SNAPSHOTS SN2020052805280528	SNAPSHOTS	SN20200528	THEO	28/05/2020 22:45:01
SNAPSHOTS SN2020052705270527	SNAPSHOTS	SN20200527	THEO	27/05/2020 22:45:02
SNAPSHOTS SN2020052605260526	SNAPSHOTS	SN20200526	THEO	26/05/2020 22:45:01
SNAPSHOTS SN2020052505250525	SNAPSHOTS	SN20200525	THEO	25/05/2020 22:45:02
SNAPSHOTS SN2020052405240524	SNAPSHOTS	SN20200524	THEO	24/05/2020 22:45:02
SNAPSHOTS SN2020052305230523	SNAPSHOTS	SN20200523	THEO	23/05/2020 22:45:01
SNAPSHOTS SN202005220522224501	SNAPSHOTS	SN20200522	THEO	22/05/2020 22:45:01
SNAPSHOTS SN202005210521224502	SNAPSHOTS	SN20200521	THEO	21/05/2020 22:45:02
SNAPSHOTS SNP202028 0228102220	SNAPSHOTS	SNP202028	THEO	28/02/2020 10:22:20

- Analyze
- Show Statements
- Compare
- Investigate (Opens in Navigator for i)
- Comments...
- Delete...
- Rename...
- Properties



Plan Cache Snapshots – Analyze

SNAPSHOTS SN2020060

File Actions Options Help

Category: Overview

How much work was requested?

Metric What options were provided to the optimizer?

SQL Statement What implementations did the optimizer use?

Users What types of SQL statements were requested?

Jobs Miscellaneous information

Threads I/O information

Average T			
Average Rows Returned	469.262		
Average Runtime	0.025311		
Average Parallel Degree Used	1.00		
Maximum Parallel Degree	1.00		
SQE	46,955	< Select a report >	⌵
CQE	0		
System Naming	33	< Select a report >	⌵
SQL Naming	53	< Select a report >	⌵
Unique Open Statements	75	< Select a report >	⌵
Full Opens	13,468	< Select a report >	⌵
Pseudo Opens	33,487	< Select a report >	⌵
Table Scans	15,067	< Select a report >	⌵
Average MQTs Used	0.000		
Average Indexes Used	1.298	< Select a report >	⌵
Full Indexes Created	31	< Select a report >	⌵
Sparse Indexes Created	0		
Index From Index Created	6	< Select a report >	⌵
Index Creates Advised	85,911	< Select a report >	⌵
Advised Statistics	2,193	< Select a report >	⌵
Temporary Tables	247	< Select a report >	⌵
Sorts	859	< Select a report >	⌵
Access Plans Rebuilt	100	< Select a report >	⌵
Sort Sequence	0		
Call Statements	0		
Error	0		






Plan Cache Snapshots – Analyze

SNAPSHOTS SN20200

File Actions Options Help

Category:

Metric	Value	Reports
SQL Statements	46,955	< Select a report > 
Users	6	< Select a report > 
Jobs	53	< Select a report > 
Threads	53	
Average Table Rows	11,113.792	
Average Rows Returned	469.262	



Plan Cache Snapshots – Show Statements...

SNAPSHOTS SN202006030603224502 - Statements -

Filters to apply:

- Statements only need to match one filter to be included
- Minimum runtime for the longest execution of the statement: 1 Seconds
- Statements that ran on or after this date and time: 3 June 2020 at 19:59:59
- Top 'n' most frequently run statements: 25
- Top 'n' statements with the largest total accumulated runtime: 25
- Statements that reference the following objects:
- Statements that contain the following text:

Filters applied:

- Top 25 statements with largest accumulated runtime

Start Time	Most Expensive Time	Total Processing Time	Total Times Run	Average Processing Time	Statement
2020-06-03 22:18:06.503615	6.3484	607.5254	185	3.2839	CREATE TABLE QTEMP . VHA_STATUS AS (WITH COLLEC
2020-06-03 12:27:59.106446	34.6177	191.0302	7	27.2900	DELETE FROM QUSRBRM.QA1ALJ2 A WHERE NOT EXISTS
2020-06-03 01:18:06.326893	3.4056	87.9620	27	3.2578	CREATE TABLE QTEMP . VHA_STATUS AS (WITH COLLEC
2020-06-03 09:00:11.326396	5.9816	34.4056	19	1.8108	SELECT 9999 INTO : H FROM QSYS2 . QSQPTABL WHERE
2020-06-02 04:18:12.075836	11.7969	20.8604	2	10.4302	CREATE TABLE QTEMP . VHA_PTFCUR AS (WITH COLLEC
2020-05-27 12:57:43.105431	6.8851	19.5201	3	6.5067	SELECT COUNT(*) FROM (SELECT METRIC, GREEN, YELLO
2020-05-31 12:26:55.158453	19.4132	19.4132	1	19.4132	Non SQL Query QUSRBRM/QA1ALJ2.QA1ALJ2
2020-06-03 12:28:21.554600	3.0832	16.9947	7	2.4278	DELETE FROM QUSRBRM.QA1AMB A WHERE A.MBHSVT I
2020-06-03 22:18:03.333516	0.7803	13.2349	113	0.1171	CREATE TABLE QTEMP . VHA_STG AS (WITH COLLECT J
2020-05-27 17:03:29.240104	6.0612	11.8719	3	3.9573	SELECT METRIC, GREEN, YELLOW, RED FROM (SELECT ?
2020-05-26 02:21:10.945973	7.6547	7.6547	1	7.6547	Non SQL Query QPFRTEMP/QAPMJOB.LQ14600034
2020-06-03 02:18:02.935569	0.9131	6.4470	32	0.2014	CREATE TABLE QTEMP . VHA_STG AS (WITH COLLECT J
2020-05-27 12:57:49.195782	5.9675	5.9675	1	5.9675	SELECT METRIC, GREEN, YELLOW, RED FROM (
2020-06-03 12:28:26.350466	1.2067	5.7734	7	0.8247	INSERT INTO QTEMP.QA1AODTMP SELECT OBRCVASP, C
2020-06-03 12:28:14.079496	4.6676	5.1831	2	2.5915	DELETE FROM QUSRBRM.QA1AOD A WHERE A.OBHSVT I
2020-06-03 09:00:03.973945	3.1849	5.0204	19	0.2642	SELECT INDEX_SCHEMA, INDEX_NAME FROM QSYS2.SYS
2020-06-01 00:03:45.599670	4.7799	4.7799	1	4.7799	DELETE FROM QPFRHIST /QAPMHDJOB.M WHERE DATETI
2020-06-03 01:18:15.834565	0.7263	4.6273	8	0.5784	select count (*) into : H from QWQREPOS . QWQ_ALL_U
2020-05-31 12:31:21.267477	4.4135	4.4135	1	4.4135	Non SQL Query QUSRBRM/QA1AMB.QA1AMB
2020-06-03 01:18:03.147909	1.6286	4.0624	26	0.1562	CREATE TABLE QTEMP . VHA_STG AS (WITH COLLECT J
2020-05-31 00:02:24.173831	3.5868	3.5868	1	3.5868	DELETE FROM QPFRHIST /QAPMHDJOB.M WHERE DATETI
2020-06-01 00:03:32.350360	3.1273	3.1273	1	3.1273	Non SQL Query QPFRTEMP/QAPMJOB.LQ15200034
2020-05-31 00:02:08.663428	2.9973	2.9973	1	2.9973	Non SQL Query QPFRTEMP/QAPMJOB.LQ15100033
2020-05-26 02:21:59.893621	0.5187	2.8986	45	0.0644	INSERT INTO QPFRHIST /QAPMHDJOB.M SELECT MAX(INT
2020-06-03 00:02:18.477096	2.4967	2.4967	1	2.4967	Non SQL Query QPFRTEMP /QAPMJOB.LQ15400037

Done: 25 rows retrieved.

Columns... Save Results... Refresh



Miscellaneous

- Navigator for i – Performance Data Investigator
- IBM i ACS – Schemas
- Run SQL Scripts...
- Index Advisor/Visual Explain



Performance Data Investigator

- [-] Performance
 - [-] Investigate Data
 - [-] Investigate Data Search
 - [-] Health Indicators
 - [-] Monitor
 - [-] Collection Services
 - [-] Database
 - [-] I/O Reads and Writes
 - [-] SQL CPU Utilization Overview
 - [-] Database Locks Overview
 - [-] Database I/O
 - [-] SQL Cursor and Native DB Opens
 - [-] SQL Performance Data
 - [-] Collection Services
 - [-] Query Opens
 - [-] Active Query
 - [-] Plan Cache Searches
 - [-] Plans Detailed
 - [-] Maintained Temporary Indexes (MTIs)
 - [-] Adaptive Query Processing (AQP)
 - [-] SQL Plan Cache Snapshots and Event Monitors
 - [-] SQL Overview
 - [-] SQL Attribute Mix
 - [-] SQL Performance Monitor
 - [-] SQL Overview
 - [-] SQL Attribute Mix

- [-] SQL Plan Cache Snapshots and Event Monitors
 - [-] SQL Overview
 - [-] SQL Attribute Mix

Investigate Data - Performance Data Investigator

Selection

Name
SQL Overview

Description
This perspective gives a comprehensive picture of how queries are running overall.

View List
Query Time Summary
Open Summary
Open Type Summary
Statement Usage Summary
Index Used Summary
Index Create Summary
Index Advised
Statistics Advised
MQT Use
Access Plan Use
Parallel Degree Usage

Locked

New Folder... New Perspective...

Edit Advanced Edit Delete

Move Up Move Down

Collection

Collection Library: SNAPSHOTS

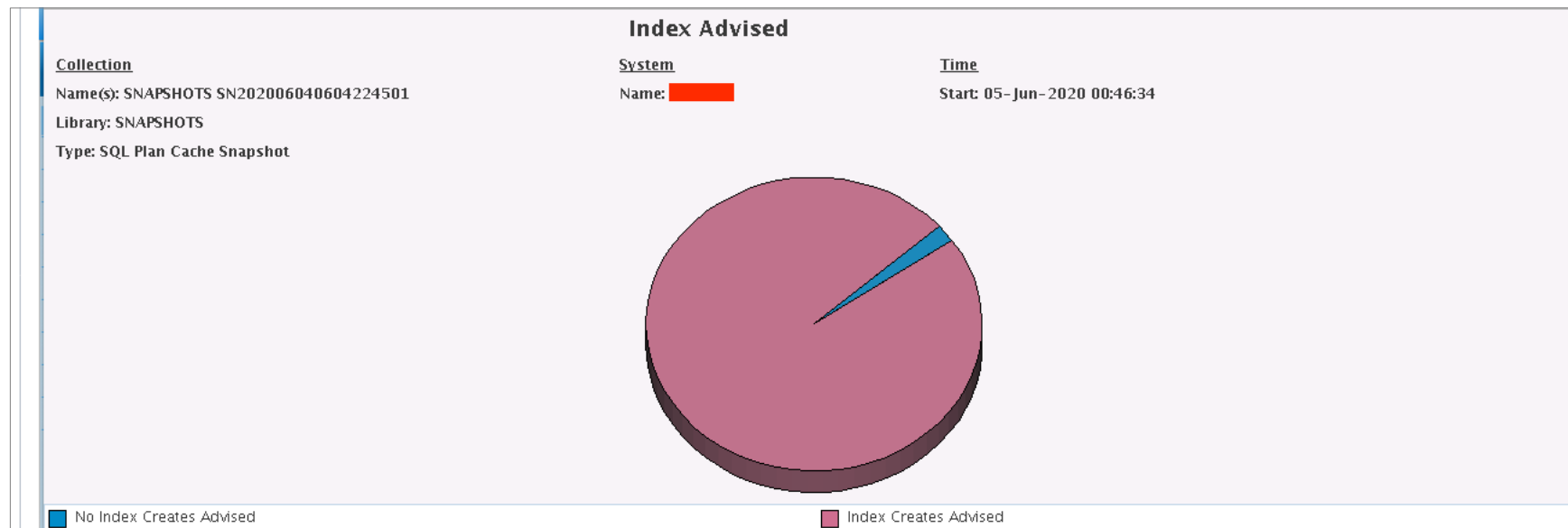
Collection Name: Most Recent

- SNAPSHOTS SN202006040604224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202006030603224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202006020602224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202006010601224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005310531224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005300530224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005290529224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005280528224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005270527224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005260526224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005250525224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005240524224502 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005230523224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SN202005220522224501 (SQL Plan Cache Snapshot)
- SNAPSHOTS SNP202028 0228102220 (SQL Plan Cache Snapshot)



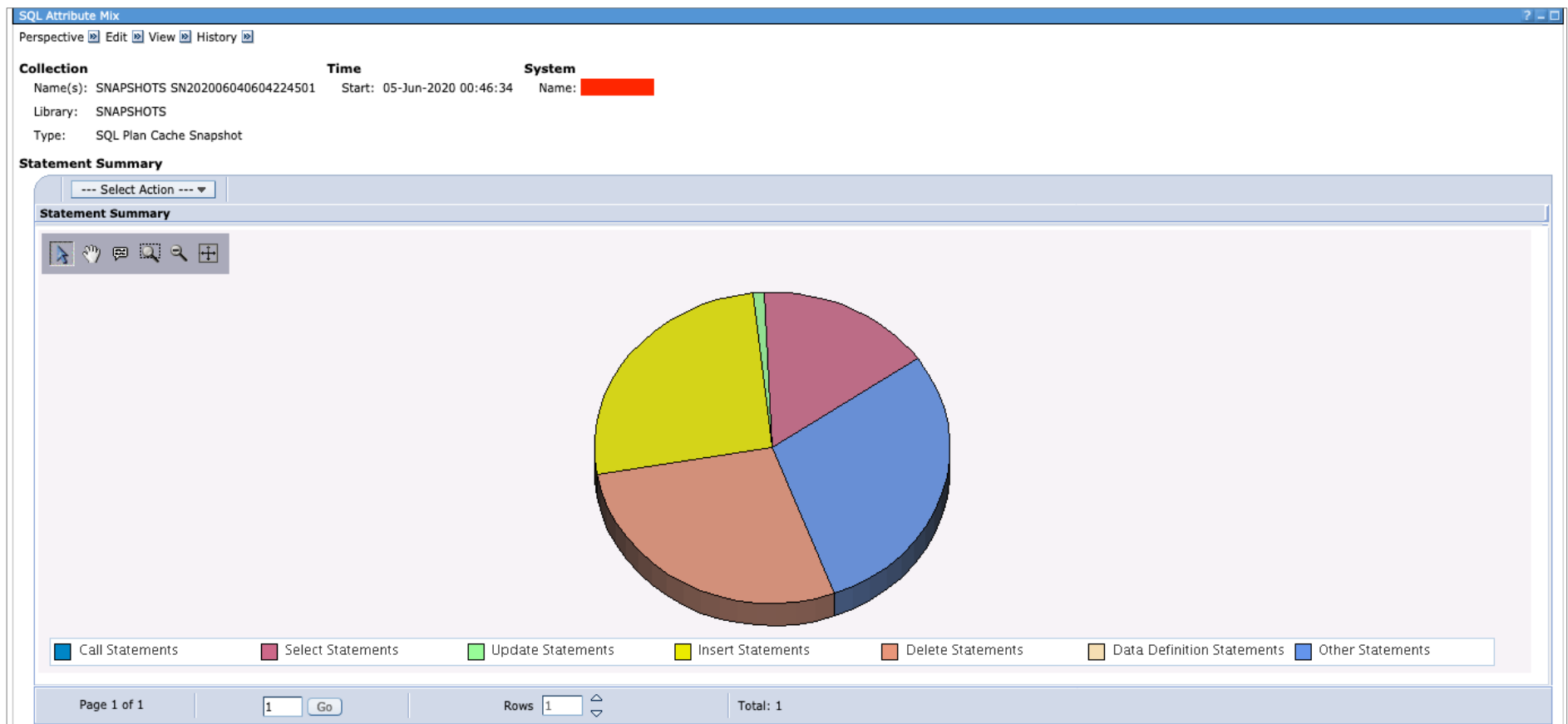
Performance Data Investigator

SQL Overview



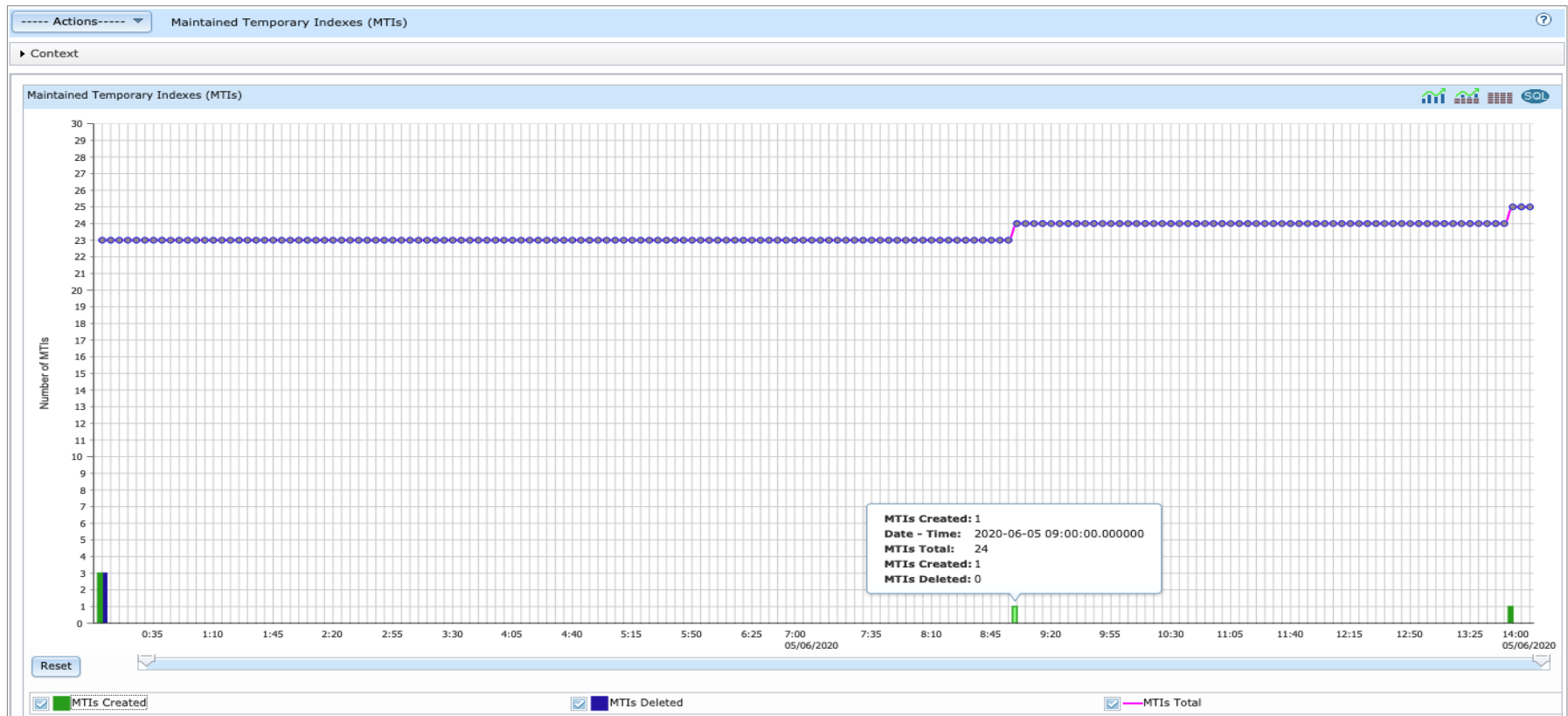


Performance Data Investigator





Performance Data Investigator



Manage your Maintained Temporary Indexes (MTIs)



Schemas

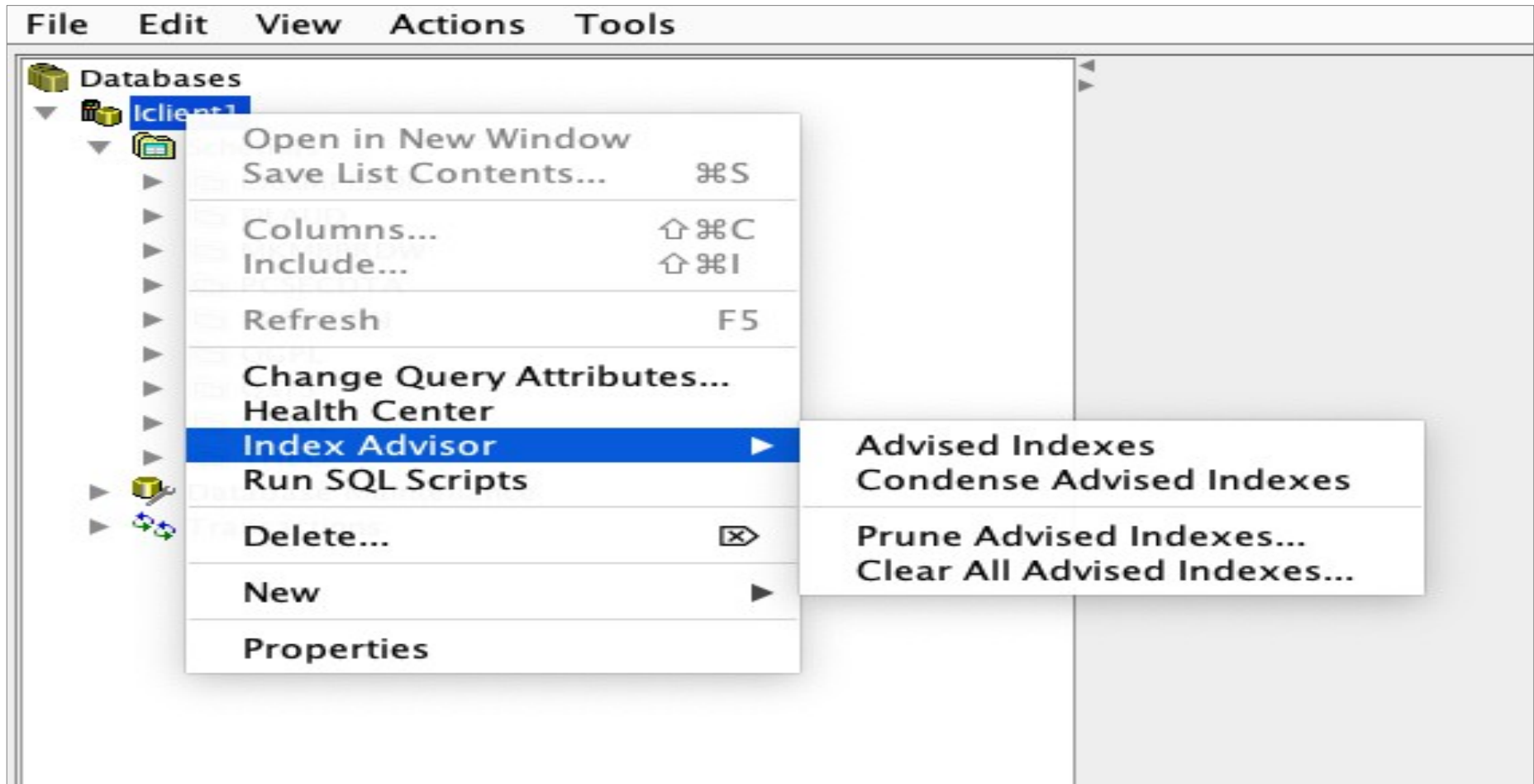
The screenshot shows the IBM i Access Client Solutions interface. The title bar reads "IBM i Access Client Solutions". The menu bar includes "File", "Edit", "Actions", "Tools", and "Help". The main window is titled "Welcome" and displays a system configuration for "iclient1.vanhelvoirt.nl". The left sidebar is organized into four categories: "General", "Database", "Console", and "Management". The "Database" category is expanded, and "Schemas" is selected. The main content area contains the following text:

The interface for managing the Db2 for i databases on your IBM i.

This task requires a system configuration. To add or change a system configuration, select **System Configurations** from the **Management** tasks.



Schemas





Schemas

		Last Advised for Query Use	Times Advised for Query Use	Estimated Index Creation Time	MTI Used	MTI Created	MTI Last Used	L P A
	Binary Radix	05/06/2020 00:04:29	102911 00:00:01		46383	176	05/06/2020 00:03:48	
	Binary Radix	05/06/2020 00:04:19	36633 00:00:01		23095	81	05/06/2020 00:03:48	
	Binary Radix	05/06/2020 00:04:08	17804 00:00:01		8657	80	05/06/2020 00:03:48	
	Binary Radix	05/06/2020 00:04:19	14609 00:00:01		10461	80	05/06/2020 00:01:54	
	Binary Radix	26/05/2020 02:38:32	675 00:00:01		554	68	26/05/2020 02:35:00	
	Binary Radix	05/06/2020 00:04:19	7294 00:00:01		2806	48	05/06/2020 00:03:48	
	Binary Radix	05/06/2020 00:04:08	14575 00:00:01		7330	43	05/06/2020 00:03:28	
	Binary Radix	05/06/2020 08:48:01	1227 00:00:01		831	40	05/06/2020 08:47:01	
	Binary Radix	05/06/2020 00:04:19	7294 00:00:01		2561	40	05/06/2020 00:03:48	
	Binary Radix	26/05/2020 02:35:40	45 00:00:01		39	39	26/05/2020 02:34:15	
	Binary Radix	26/05/2020 02:38:26	45 00:00:01		39	39	26/05/2020 02:34:01	
	Binary Radix	05/06/2020 14:44:14	613555 00:00:01		420318	35	05/06/2020 12:51:55	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1671	32	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1619	31	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1568	27	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1391	27	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1391	25	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:40	7286 00:00:01		1577	21	22/05/2020 00:02:35	
	Binary Radix	05/06/2020 00:04:29	7286 00:00:01		1674	18	05/06/2020 00:03:48	
	Binary Radix	05/06/2020 12:43:23	1535 00:00:01		497	12	16/05/2020 12:42:16	
	Binary Radix	09/04/2020 14:55:59	76 00:00:01		47	10	09/04/2020 14:54:49	
	Binary Radix	05/06/2020 14:45:14	1196358 00:00:01		10019	7	10/04/2020 16:36:13	
	Binary Radix	05/06/2020 00:04:29	5648 00:00:01		5330	7	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		238	6	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		244	6	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		236	5	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		245	5	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:04:50	916 00:00:01		234	5	05/06/2020 00:03:52	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		236	5	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:04:19	7384 00:00:01		5586	5	05/06/2020 00:01:54	
	Binary Radix	05/06/2020 14:45:14	540971 00:00:01		141933	4	05/05/2020 16:50:42	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		232	4	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		231	4	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		237	4	05/06/2020 00:03:51	
	Binary Radix	05/06/2020 00:04:29	9622 00:00:01		9322	4	05/06/2020 00:03:52	
	Binary Radix	05/06/2020 00:04:50	328 00:00:01		78	3	16/05/2020 00:03:37	
	Binary Radix	05/06/2020 00:01:13	90 00:00:01		12	3	15/05/2020 00:00:05	
	Binary Radix	05/06/2020 00:03:38	43710 00:00:01		624	3	25/05/2020 00:02:36	
	Binary Radix	05/06/2020 00:04:19	7306 00:00:01		144	3	28/05/2020 00:02:00	
JOBNUM, ZCGSSVT	Binary Radix	16/03/2020 12:09:05	43 00:00:01		9	2	16/03/2020 12:08:03	
CGSTATUS	Binary Radix	16/03/2020 12:09:05	25 00:00:01		6	2	16/03/2020 12:06:29	
	Binary Radix	05/06/2020 00:05:01	318 00:00:01		191	2	05/05/2020 00:02:44	
	Binary Radix	26/05/2020 02:40:15	603 00:00:01		32	2	28/03/2020 17:19:24	
	Binary Radix	26/05/2020 02:38:32	959 00:00:01		2	2	12/07/2019 17:27:56	
	Binary Radix	05/06/2020 00:05:01	44143 00:00:01		103	1	07/03/2020 00:01:54	
	Binary Radix	05/06/2020 00:03:38	43710 00:00:01		300	1	07/03/2020 00:03:14	
	Binary Radix	05/06/2020 00:05:01	14658 00:00:01		14174	1	28/03/2020 00:01:34	
	Binary Radix	18/07/2019 08:58:34	4 00:00:01		2	1	04/07/2019 15:26:22	
	Binary Radix	09/04/2020 14:48:35	1 00:00:01		1	1	09/04/2020 14:47:33	
	Binary Radix	09/04/2020 14:48:45	1 00:00:01		1	1	09/04/2020 14:47:34	
	Binary Radix	26/05/2020 02:33:44	56 00:00:01		3	1	18/07/2019 09:16:14	
	Binary Radix	01/07/2019 14:32:44	12 00:00:01		0	0		



Schemas

Advised Indexes (Condensed) for lclient1 - lclient1.vanhelvoirt.nl(lclient1)

File Edit View Actions

Advised Indexes (Condensed) for lclient1

Table for Which Index was Advised	System Name	Schema	System Schema	Partition	Keys Advised
PCACGESU	PCACCESU	PCSECDTA	PCSECDTA	For all partitions	AUSER
TRAPO	TRAPOD	PCSECDTA	PCSECDTA	For all partitions	DATA1
QMGT	QMGTFRCD	QGPL	QGPL	For all partitions	RCDID_
QCUST	QCUSTCDT	QIWS	QIWS	For all partitions	CUSNUM
QALWI	QALWIRR	QLWIRADM	QLWIRADM	For all partitions	REQUESTNAME
QAYPS	QAYPSYGRP	QMGTC	QMGTC	For all partitions	OWNER, CHANGEDDATE
QAYPS	QAYPSYGRP	QMGTC	QMGTC	For all partitions	CHANGEDDATE
QAYPSJDS	QAYPSJDS	QMGTC	QMGTC	For all partitions	OWNER, STATUS
QAYPSJDS	QAYPSJDS	QMGTC	QMGTC	For all partitions	OWNER, CHANGEDDATE
QAYPSJDS	QAYPSJDS	QMGTC	QMGTC	For all partitions	STATUS
QAYPSJDS	QAYPSJDS	QMGTC	QMGTC	For all partitions	CHANGEDDATE
QAYPSJDFN	QAYPSJDFN	QMGTC	QMGTC	For all partitions	OWNER, CHANGEDDATE
QAYPSJDFN	QAYPSJDFN	QMGTC	QMGTC	For all partitions	CHANGEDDATE
QAYPSJDT	QAYPSJDT	QMGTC	QMGTC	For all partitions	OWNER, STATUS
QAYPSJDT	QAYPSJDT	QMGTC	QMGTC	For all partitions	OWNER, CHANGEDDATE
QAYPSJDT	QAYPSJDT	QMGTC	QMGTC	For all partitions	STATUS
QAYPSJDT	QAYPSJDT	QMGTC	QMGTC	For all partitions	CHANGEDDATE




Run SQL Scripts...

```
1 SELECT *
2 FROM TRNDTA.F42199
3 WHERE (SLKCO = '42100'
4       AND SLD0C = 24584.000000
5       AND SLDCT = 'PV')
6 ORDER BY SLKCO ASC,
7         SLD0C ASC,
8         SLDCT ASC,
9         SLLNID ASC,
10        SLKCO ASC,
11        SLD0C ASC,
12        SLDCT ASC,
13        SLUPMJ ASC,
14        SLTDAY ASC
```

Connected to relational database ██████████ HA - 110897/QUSER/QZDASOINIT using JDBC configuration 'Default'.

[06/05/2020, 02:58:31 PM] Run Selected...

 SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLD0C = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCO ASC, SLD0C ASC, SLDCT ASC, SLLNID ASC, SLKCO ASC, SLD0C ASC, SLDCT ASC, SLUPMJ ASC, SLTDAY ASC

✓ Statement ran successfully (28,895 ms = 28.895 sec)



Visual Explain

The screenshot shows the Visual Explain tool interface. The main window displays a query plan with three steps: Index Probe, Table Probe, and Final Select. The Index and Statistics Advisor menu is open, showing options like 'Display Query Environment' and 'Request New Plan'. The bottom panel shows the SQL query text.

```
SELECT *
FROM TRNDIA.F42199
WHERE (SLKCO = '42100'
      AND SLDOC = 24584.000000
      AND SLDCT = 'PV')
ORDER BY SLKCO ASC,
         SLDOC ASC,
         SLDCTO ASC,
         SLLNID ASC,
         SLKCO ASC,
         SLDOC ASC,
         SLDCT ASC,
         SLUPMJ ASC,
         SLTDAY ASC
```



Visual Explain

File View Actions Options Tools Help

Search... Ignore Case

Index Scan → Table Probe → Final Select

Attribute	Value
Query Engine Used	SQE
Time Information	
Timestamp for Creation of Monitor Entry	2020-06-05-15.34.49.289824
Statement Start Timestamp	2020-06-05-15.34.49.232371
Statement End Timestamp	2020-06-05-15.34.49.289824
Total Estimated Run Time (ms)	15,181
Actual Runtime Information	
Optimization Time (ms)	17
	0
	No
	Not Available

Graph Detail: Basic | Attributes Detail: Basic | Arrow Labels: Index and Statistics Advisor

```
SELECT *
FROM TRNDTA.F42199
WHERE (SLKCO = '42100'
AND SLD0C = 24584.000000
AND SLDCT = 'PV')
ORDER BY SLKCO ASC,
SLDOCO ASC,
SLDCTO ASC,
SLLNID ASC,
SLKCO ASC,
SLDOC ASC,
SLDCT ASC,
SLUPMJ ASC,
SLTDAY ASC
```

The following indexes were advised:

Create	Table	Schema	Columns	Index Type	Sort Sequence
<input checked="" type="checkbox"/>	F42199	TRNDTA	SLDCT, SLKCO, SLD0C, SLKCOO, SLD0CO, SLDCTO, SLLNID, SLUPMJ, SLTDAY	BINARY RADIX	None (Sort by hexadecimal value)

Show SQL Create...



Schemas

File View Actions Options Tools Help

Search... Ignore Case

Index Scan → 15,181 → Table Probe → 15,181 → Final Select

Attribute	Value
Query Engine Used	SQE
Time Information	
Timestamp for Creation of Monitor Entry	2020-06-05-15.34.49.289824
Statement Start Timestamp	2020-06-05-15.34.49.232371
Statement End Timestamp	2020-06-05-15.34.49.289824
Total Estimated Run Time (ms)	15,181
Actual Runtime Information	
Optimization Time (ms)	17
Longest Key Range Estimate (ms)	0
Key Range Estimate Timed Out	No
Run Time (ms)	Not Available

Graph Detail: Basic Attributes Detail: Basic Arrow Labels: Estimated Processing Time Highlighting: Estimated Processing Time Estimated Number of Rows Actual Number of Rows Index Advised

Message ID	Message Text
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI434A	**** Starting optimizer debug message for query .Cause : The optimizer debug messages that follow provide query optimization information about how the query was implemented. T...
CPI4323	The query access plan has been rebuilt.Cause : The access plan was rebuilt for reason code 4. The reason codes and their meanings follow: 0 - A new access plan was created. 1 - A fi...
CPI432C	All access paths were considered for file F42199.Cause : The query optimizer considered all access paths built over member F42199 of file F42199 in library TRNDTA. The list below sho...
CPI4328	Access path of file F42199_2 was used by query.Cause : Access path for member F42199_2 of file F42199_2 in library TRNDTA was used to access records from member F42199 of fi...
CPI432F	Access path suggestion for file F42199.Cause : To improve performance the query optimizer is suggesting a permanent access path be built with the key fields it is recommending. The ...



Schemas

```
1 /*
2 Creating TRNDTA.F42199_IDX [Index]
3 When creating this index the database connection should have a sort sequence of ^HEX.
4 */
5 CREATE INDEX QRPLOBJ.F42199_IDX
6     ON TRNDTA.F42199 (SLDCT ASC, SLKCO ASC, SLD0C ASC, SLKCOO ASC, SLD0CO ASC, SLDCTO ASC, SLLNID ASC, SLUPMJ ASC, SLTDAY ASC) UNIT
7     ANY KEEP IN MEMORY NO;
8
9 /* Setting label text for TRNDTA.F42199_IDX */
10 LABEL ON INDEX QRPLOBJ.F42199_IDX IS 'Index generated from Index Advisor';
11
12 ;
```



Schemas

```
1 SELECT *
2 FROM TRNDTA.F42199
3 WHERE (SLKCO = '42100'
4       AND SLDLOC = 24584.000000
5       AND SLDCT = 'PV')
6 ORDER BY SLKCOO ASC,
7          SLDOCO ASC,
8          SLDCTO ASC,
9          SLLNID ASC,
10         SLKCO ASC,
11         SLDLOC ASC,
12         SLDCT ASC,
13         SLUPMJ ASC,
14         SLTDAY ASC
```

Connected to relational database ██████████ s HA - 110897/QUSER/QZDASOINIT using JDBC configuration 'Default'.

[06/05/2020, 02:58:31 PM] Run Selected...

SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLDLOC = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCOO ASC, SLDOCO ASC, SLDCTO ASC, SLLNID ASC, S
Statement ran successfully (28,895 ms = 28.895 sec)

[06/05/2020, 02:59:25 PM] Explain...

SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLDLOC = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCOO ASC, SLDOCO ASC, SLDCTO ASC, SLLNID ASC, S

[06/05/2020, 03:06:27 PM] Explain...

SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLDLOC = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCOO ASC, SLDOCO ASC, SLDCTO ASC, SLLNID ASC, S

[06/05/2020, 03:17:21 PM] Run Selected...

SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLDLOC = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCOO ASC, SLDOCO ASC, SLDCTO ASC, SLLNID ASC, S
Statement ran successfully (25,142 ms = 25.142 sec)

[06/05/2020, 03:20:24 PM] Run Selected...

SELECT * FROM TRNDTA.F42199 WHERE (SLKCO = '42100' AND SLDLOC = 24584.000000 AND SLDCT = 'PV') ORDER BY SLKCOO ASC, SLDOCO ASC, SLDCTO ASC, SLLNID ASC, S
Statement ran successfully (152 ms) ←



Visual Explain

File View Actions Options Tools Help

Search... Ignore Case

Graph Detail: Basic | Attributes Detail: Basic | Arrow Labels: Estimated Processing Time | Highlighting: Estimated Processing Time | Estimated Number of Rows | Actual Number of Rows | Index Advised

Attribute	Value
Query Engine Used	SQE
Time Information	
Timestamp for Creation of Monitor Entry	2020-06-05-15.26.49.151608
Statement Start Timestamp	2020-06-05-15.26.49.132266
Statement End Timestamp	2020-06-05-15.26.49.151608
Total Estimated Run Time (ms)	.002
Actual Runtime Information	
Optimization Time (ms)	14
Longest Key Range Estimate (ms)	0
Key Range Estimate Timed Out	No
Run Time (ms)	Not Available

Message ID	Message Text
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI4339	Query options retrieved file QAQQINI in library QTEMP.Recovery . . . : Query options retrieved file QAQQINI in library QTEMP.
CPI434A	**** Starting optimizer debug message for query .Cause : The optimizer debug messages that follow provide query optimization information about how the query was implemented. T...
CPI432C	All access paths were considered for file F42199.Cause : The query optimizer considered all access paths built over member F42199 of file F42199 in library TRNDTA. The list below sh...
CPI432D	Additional access path reason codes were used.Cause : Message CPI432A or CPI432C was issued immediately before this message. Because of message length restrictions, some of t...
CPI4328	Access path of file F42199_IDX was used by query.Cause : Access path for member F42199_IDX of file F42199_IDX in library QRPLOBJ was used to access records from member F421...



VAN HELVOIRT AUTOMATISERING

Questions?



VAN HELVOIRT AUTOMATISERING

Thanks