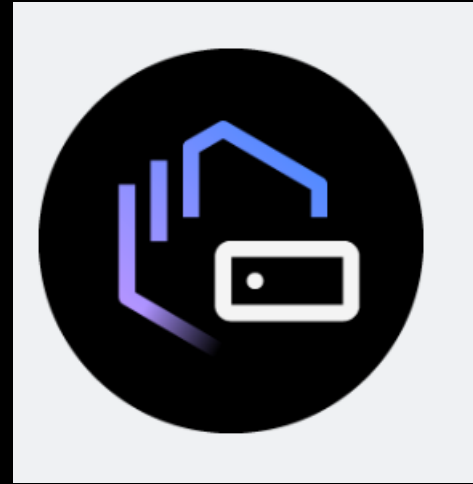


# Db2 for z/OS Developer Extension v1.3

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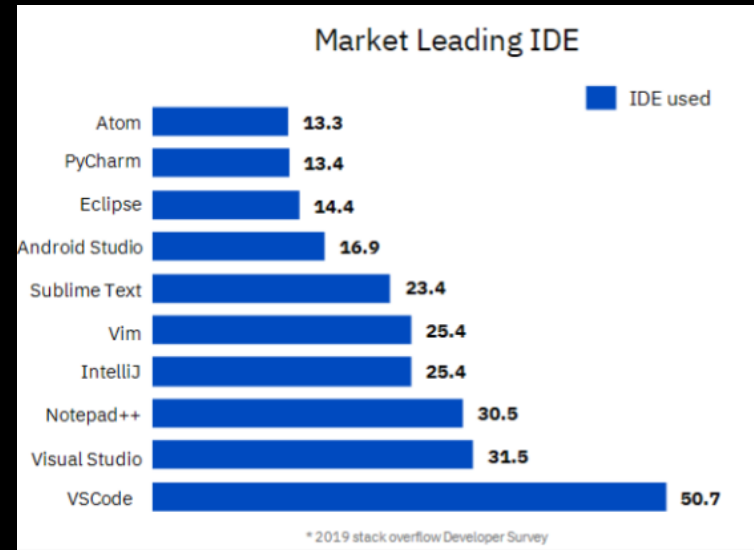


# Agenda

- What's Db2 for z/OS Developer Extension?
- Features before v1.3
- What's new in v1.3?
- Live demo
- What's next?

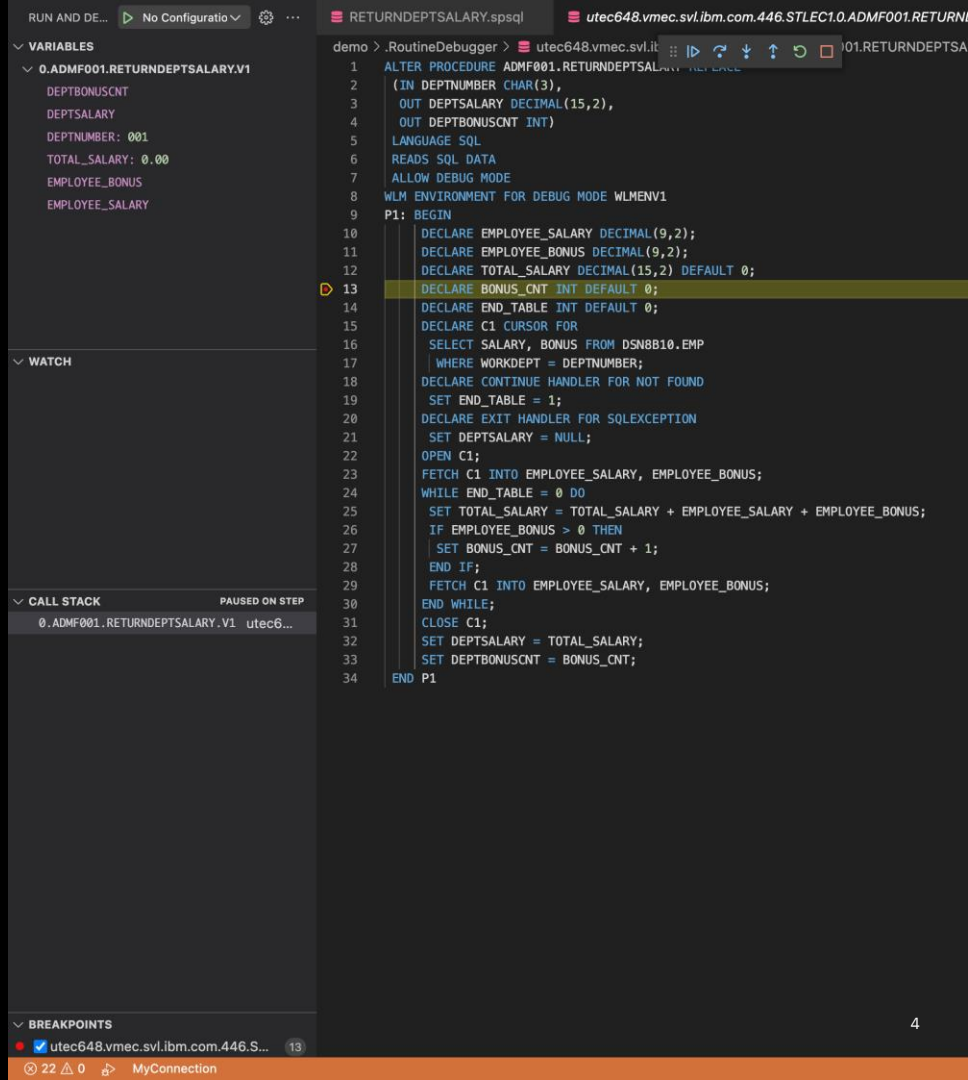
# What's IBM Db2 for z/OS Developer Extension?

- Extension for Visual Studio Code
- Perform key actions with Db2 for z/OS from Development environment against Java, COBOL, Python, Node.js, etc. applications
- Increase developer talent pool by reducing Z domain specific skills and tools required to work with Db2 for z/OS



# Features Before v1.3

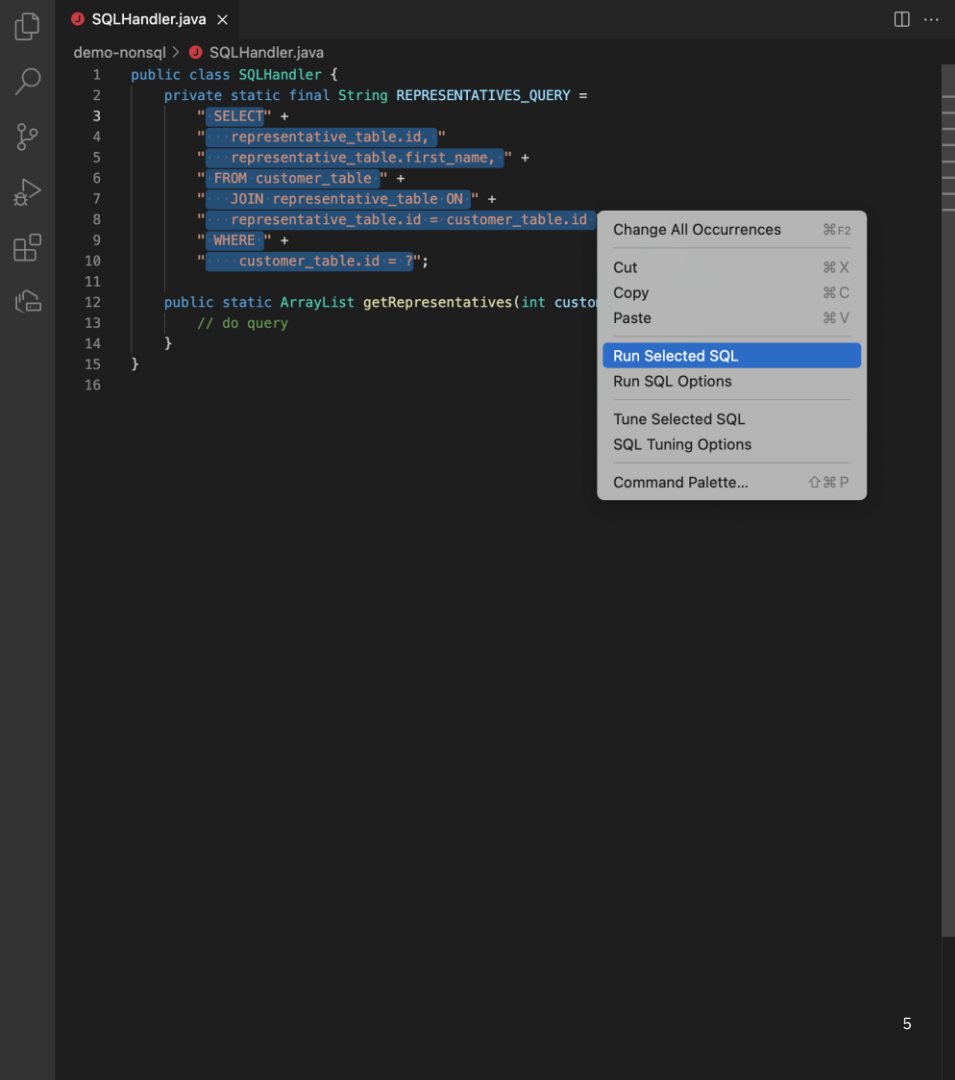
- SQL syntax highlighting and checking
- Code snippets
- Code completion and signature help
- Connect with Db2
- Execute SQL
- Deploy, debug, and run native stored procedures



# Features Before v1.3

## v1.2 Highlights

- Format SQL
- Run SQL with multiple selections
- Run embedded SQL in native stored procedures
- Usability enhancements



# What's New in v1.3?

- Setup tuning environment
  - Register tuning servers
  - Create, edit, and delete tuning profiles
  - Share and revoke tuning profile user privileges
  - Create, migrate, and drop EXPLAIN tables
- Configure tuning options
- Tune SQL
  - Run Visual Explain
  - Run Statistics Advisor
  - Collect query environment information
- View tuning history and summary

# Prerequisites for SQL Tuning Services

- ❑ [IBM DB2 Accessories Suite for z/OS, 4.2](#)
- ❑ [APAR PH39038 \(UI76396\)](#)
- ❑ Tuning Services Documentation:
  - [SQLTuning Services installation docs](#)

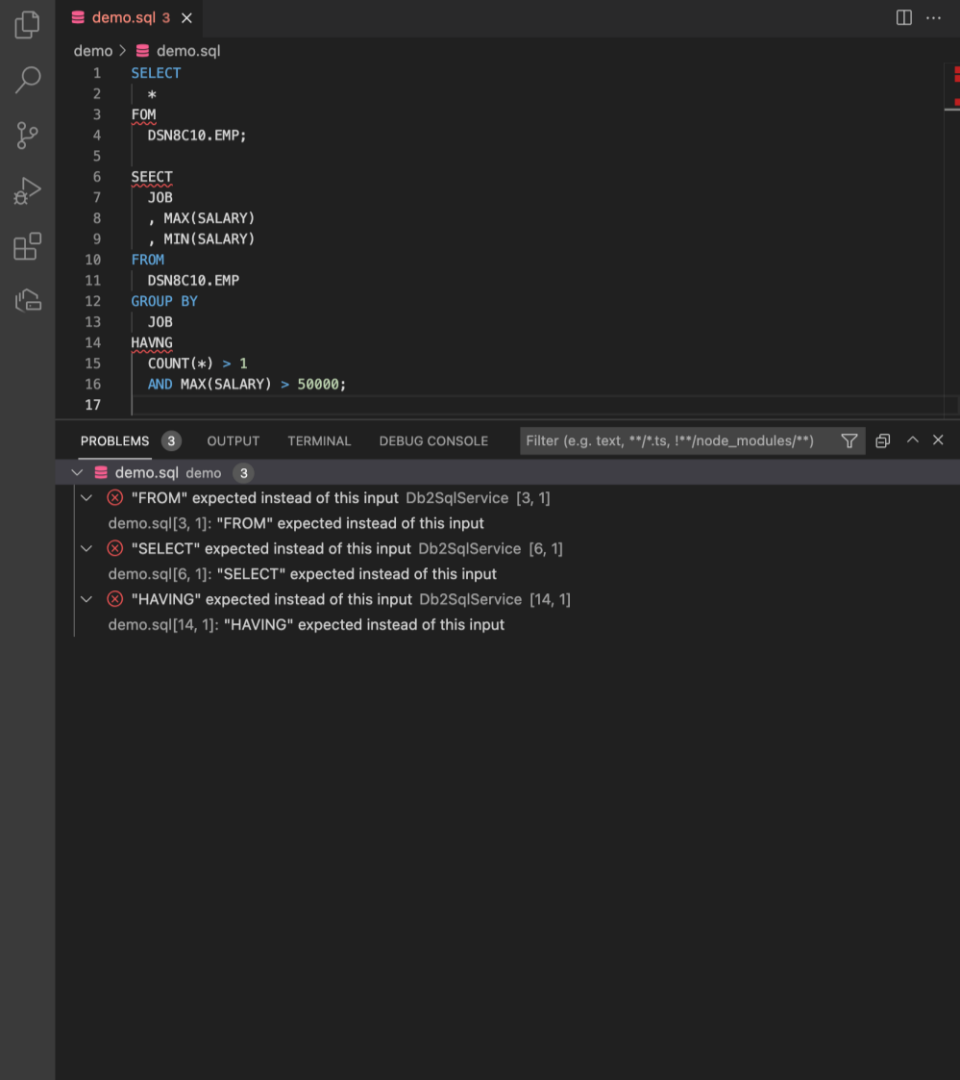
# Live Demo

- Syntax checking
- Code completion and signature help
- Format SQL
- Execute SQL
- Working with native stored procedures
- Tuning SQL queries



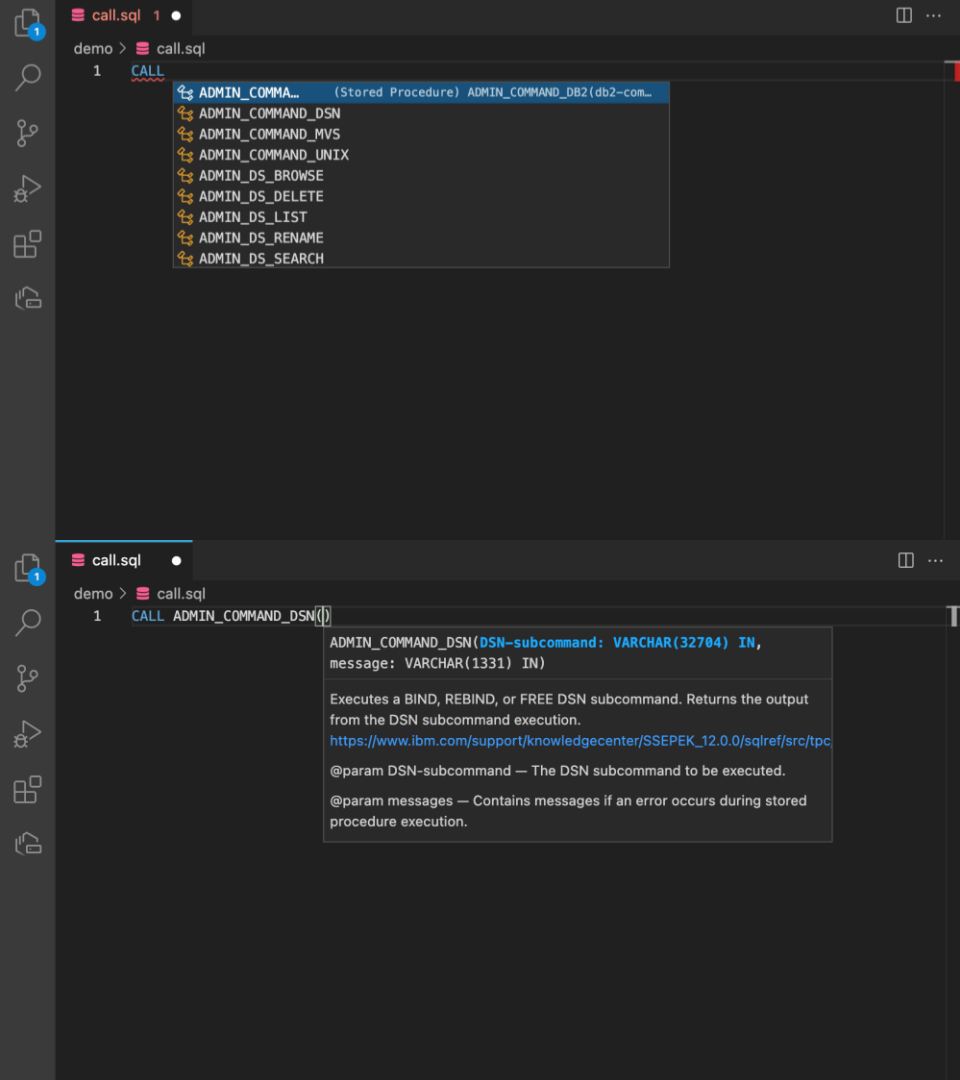
# Features

## Syntax checking



# Features

## Code completion and signature help



# Features

## Format SQL

```
before.sql x
demo > before.sql
1 SELECT * FROM DSN8C10.EMP;
2
3 SELECT JOB, MAX(SALARY), MIN(SALARY)
4 FROM DSN8C10.EMP
5 GROUP BY JOB
6 HAVING COUNT(*) > 1 AND MAX(SALARY) > 50000;
7
8 SELECT EMPNO, ACTNO, CHAR(EMSTDATE,USA), CHAR(EM
9 FROM DSN8C10.EMPPROJACT
10 WHERE EMPNO IN (SELECT EMPNO FROM DSN8C10.EMP
11 WHERE WORKDEPT = 'E11');
12
13 SELECT WORKDEPT, MAX(SALARY)
14 FROM DSN8C10.EMP
15 GROUP BY WORKDEPT
16 HAVING MAX(SALARY) < (SELECT AVG(SALARY)
17 FROM DSN8C10.EMP);
18
19 SELECT WORKDEPT, MAX(SALARY)
20 FROM DSN8C10.EMP Q
21 GROUP BY WORKDEPT
22 HAVING MAX(SALARY) < (SELECT AVG(SALARY)
23 FROM DSN8C10.EMP
24 WHERE NOT WORKDEPT = Q.WORKDEPT);
25
26 SELECT HIREYEAR, AVG(SALARY)
27 FROM (SELECT YEAR(HIREDATE) AS HIREYEAR, SALARY
28 FROM DSN8C10.EMP) AS NEWEMP
29 GROUP BY HIREYEAR;
30
31 SELECT CASE_DEPT,MAX(SALARY),MIN(SALARY),AVG(SAL
32 FROM (SELECT SALARY,CASE WHEN WORKDEPT = 'A00' OR
33 THEN 'A00_E21'
34 WHEN WORKDEPT = 'D11' OR WORKDEPT = 'E11'
35 THEN 'D11_E11'
36 ELSE WORKDEPT
37 END AS CASE_DEPT
38 FROM DSN8C10.EMP) X
39 GROUP BY CASE_DEPT;

after.sql
demo > after.sql
1 SELECT
2 *
3 FROM
4 DSN8C10.EMP;
5
6 SELECT
7 JOB
8 , MAX(SALARY)
9 , MIN(SALARY)
10 FROM
11 DSN8C10.EMP
12 GROUP BY
13 JOB
14 HAVING
15 COUNT(*) > 1
16 AND MAX(SALARY) > 50000;
17
18 SELECT
19 EMPNO
20 , ACTNO
21 , CHAR(EMSTDATE, USA)
22 , CHAR(EMENDATE, USA)
23 FROM
24 DSN8C10.EMPPROJACT
25 WHERE
26 EMPNO IN (
27 SELECT
28 EMPNO
29 FROM
30 DSN8C10.EMP
31 WHERE
32 WORKDEPT = 'E11'
33 );
34
35 SELECT
36 WORKDEPT
37 , MAX(SALARY)
38 FROM
39 DSN8C10.EMP
40 GROUP BY
41 WORKDEPT
42 HAVING
43 MAX(SALARY) < (
44 SELECT
45 AVG(SALARY)
46 FROM
47 DSN8C10.EMP
48 );
49
```

# Features

## Run SQL

select.sql x

demo > select.sql

```
1 SELECT
2   EMPNO
3   , LASTNAME
4   , WORKDEPT
5   , SALARY
6 FROM
7   DSN8C10.EMP
8 WHERE
9   WORKDEPT LIKE 'D%';
10
11 SELECT
12   EMPNO
13   , LASTNAME
14   , WORKDEPT
15   , SALARY
16 FROM
17   DSN8C10.EMP
18 WHERE
19   WORKDEPT = ?;
```

Run SQL: select.sql x

The SQL statement contains host variables, parameter markers, or specify a value for each of the host variables and parameter markers.

For distinct types, select the corresponding built-in data type.

| Name | Data type | Null                     | Value |
|------|-----------|--------------------------|-------|
| ?    | VARCHAR   | <input type="checkbox"/> | A00   |

Run

SQL Results: select.sql x

StatusParametersResult 1

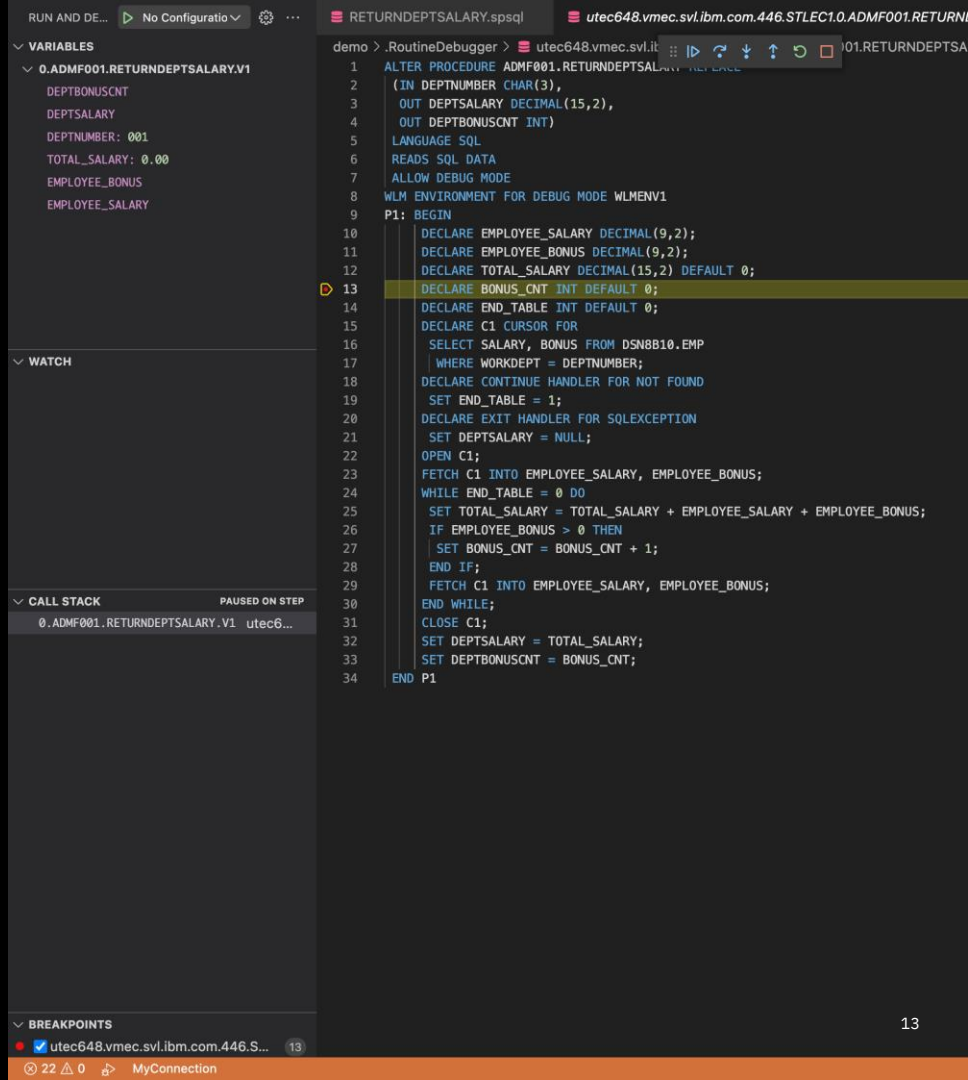
| EMPNO  | LASTNAME  | WORKDEPT | SALARY    |
|--------|-----------|----------|-----------|
| 000010 | HAAS      | A00      | 628683.42 |
| 000110 | LUCCHESI  | A00      | 554194.86 |
| 000120 | O'CONNELL | A00      | 348606.34 |
| 200010 | HEMMINGER | A00      | 554194.86 |
| 200120 | ORLANDO   | A00      | 348606.34 |

Items per page: 25 1-5 of 5 items 1 of 1 page

# Features

## Native stored procedures

- Deploy
- Debug
- Run



# Features

## Tune SQL

- Visual Explain
- Statistics Advisor
- Query Capture Environment

The screenshot displays the 'tune.sql' interface in the Db2 Developer Extension. The main editor shows a SQL query with line numbers 1 through 23. A context menu is open over the query, listing actions such as 'Change All Occurrences', 'Format Document', 'Cut', 'Copy', 'Paste', 'Run Selected SQL', 'Run All', 'Run SQL Options', 'Tune Selected SQL' (highlighted), 'SQL Tuning Options', and 'Command Palette...'. To the right, a 'Tuning Actions: tune.sql' panel lists 'Visual Explain', 'Statistics Advisor' (checked), and 'Capture Query Environment'. Below this, a 'Tuning Result: Statistics Advisor' panel shows 'Recommended RUNSTATS commands' for tables STPDGM.ORDER and STPDGM.SUPPLIER, and an 'Execution results' section stating 'No results are available. The recommended RUNSTATS commands were not run.'

```
demo-sql > tune.sql
1  SELECT
2    S_SUPPKEY
3    , S_NAME
4    , SUM(L_EXTENDEDPRI * (1 - L_DISCOUNT)) AS REVENUE
5  FROM
6    ORDER
7    , LINEITEM
8    , SUPPLIER
9  WHERE
10   L_ORDERKEY = O_ORDERKE
11   AND S_SUPPKEY = L_SUPP
12   AND O_ORDERDATE >= DAT
13   AND O_ORDERDATE < DATE
14   AND L_RETURNFLAG = 'R'
15   AND S_NATIONKEY IN (1,
16   AND S_SUPPKEY < 10000
17 GROUP BY
18   S_SUPPKEY
19   , S_NAME
20 HAVING
21   SUM(L_EXTENDEDPRI *
22 ORDER BY
23   REVENUE DESC;
```

Change All Occurrences ⌘F2  
Format Document ⌘⌘F  
Cut ⌘X  
Copy ⌘C  
Paste ⌘V  
Run Selected SQL  
Run All  
Run SQL Options  
Tune Selected SQL  
SQL Tuning Options  
Command Palette... ⌘⌘P

Select the actions that you want to run against the SQL.

Visual Explain ☐  
Statistics Advisor ☒  
Capture Query Environment ☐

Tune

Recommended RUNSTATS commands

```
RUNSTATS TABLESPACE DTPDGM.TSORDER TABLE(STPDGM.ORDER)
COLUMN(O_ORDERDATE,O_ORDERKEY) COLGROUP(O_ORDERKEY,O_ORDERDATE)
INDEX(STPDGM.PXO@OKODCKSP, STPDGM.UXO@CKOKODSP, STPDGM.UXO@CLOKOD
) SHRLEVEL CHANGE REPORT YES UPDATE ALL HISTORY NONE

RUNSTATS TABLESPACE DTPDGM.TSSUPPLY TABLE(STPDGM.SUPPLIER)
COLUMN(S_SUPPKEY,S_NATIONKEY) COLGROUP(S_SUPPKEY) FREQVAL COUNT 10
COLGROUP(S_NATIONKEY) FREQVAL COUNT 10 INDEX(STPDGM.PXS@SKNK )
```

Execution results

No results are available. The recommended RUNSTATS commands were not run.

0 utec648 Ln 23, Col 16 (474 selected) Spaces: 2 UTF-8 LF SQL

# What's Next?

## 2020 Releases:

- JDBC trace and properties
- Code completion, snippets, connect to Db2, run SQL (BYOL)
- Syntax checking, syntax highlighting

Feb 2021 V1.1 - Stored procedure debug

March 2021 V1.1.1 & V1.1.2 - Patches

June 2021 V1.2 - Format SQL, embedded SQL execution, usability enhancements

Sept. 21, 2021 V1.3 – no charge Tuning Services integration

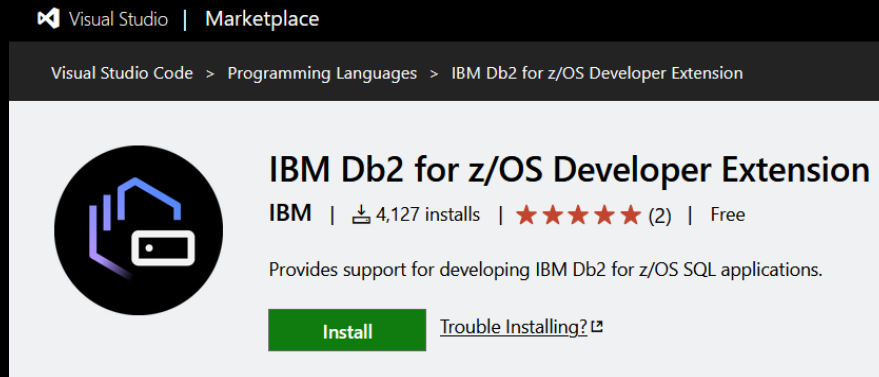
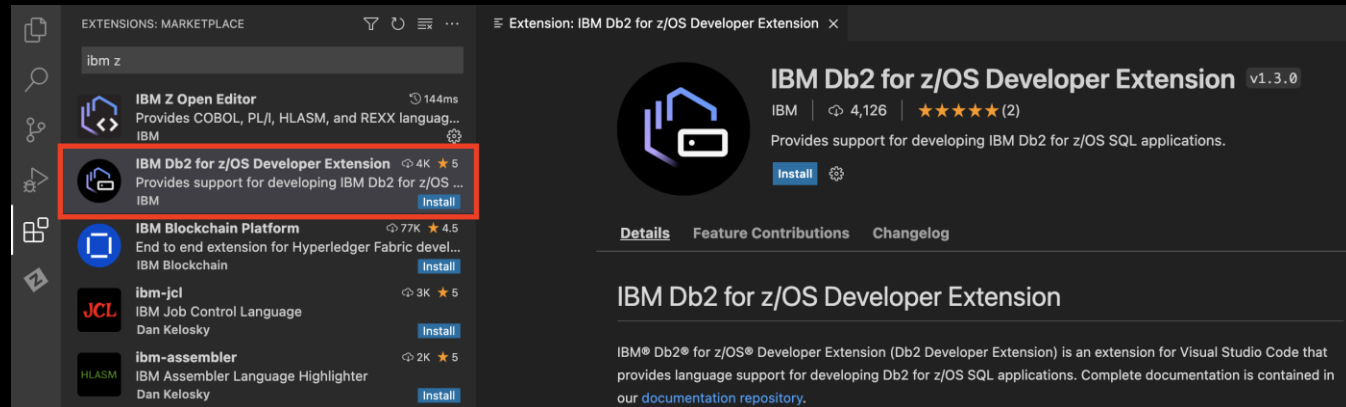
Next ... Advanced Tuning Services integration  
Db2 for z/OS Vnext integration,  
Usability enhancements

... Catalog navigation

... more developer features

# How to Install

1. Open VS Code.
2. Switch to the Extensions view.
3. Search for "ibm z".
4. Click the Install button for IBM Db2 for z/OS Developer Extension.





# Resources

## IBM Db2 for z/OS Developer Extension

- VS Code Marketplace:  
<https://marketplace.visualstudio.com/items?itemName=IBM.db2forzosdeveloperextension>
- Documentation:  
<https://ibm.github.io/db2forzosdeveloperextension-about/>
- Report issues or give suggestions:  
<https://github.com/IBM/db2forzosdeveloperextension-about/issues>

## Other Resources

- Visual Studio Code:  
<https://code.visualstudio.com/>
- IBM Z Open Editor:  
<https://marketplace.visualstudio.com/items?itemName=IBM.zopeneditor>
- Zowe Explorer:  
<https://marketplace.visualstudio.com/items?itemName=Zowe.vscode-extension-for-zowe>

