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???????InterSystemsIRIS@???????????InterSystems SQL???????????????????

- ???????????
- ???????????
- ???????????
- ???????????????

??

SQL????????????????SQL????????? SQL?????????????????????FunctionName?????????SQL?????????????????????CALL?
??? CALL?????????????

????????????????InterSystems
Iris????SQL?????????????SP?????????????????????????????????????SQL?????????????????????????ODBC?JDBC??

???????????InterSystems Iris?????????????????????????????????????SQL????????????????????????????????????InterSystems?????

- ???
- ???
- ???

?????? \$SYSTEM.SQL.Schema.ProcedureExists()????????????????????????????????????"??function"??"??query"?

???????

?InterSystems SQL?????????????????????????????????????DDL?????????????????????????

??DDL???????

InterSystems SQL?????????????????
- CREATE PROCEDURE?????????????????????????
?????????????????
- CREATE QUERY?????????????????????????????
?????????????????

InterSystems SQL?????????????????:
- CREATE PROCEDURE?????????????????????????
????????????????????????????????????

- CREATE METHOD????????????????????????????????????
????????????????????????????????????
- CREATE FUNCTION????????????????????????????????????
????????????

????????????????????????InterSystems SQL?ObjectScript??
???ObjectScript????????????SQL?

SQL?????

??DDL????????????????????????
????????????????

- ?????????????????FOR?:?? 'func', 'meth', 'proc', or 'query'????????????????SQL??
????????????Store_Name????????User.procStoreName:
????????StoreName()?
- ?????????????????FOR?:?? 'func', 'meth', 'proc', or 'query' ?????????????SQL??
????????????????????????

????????????????FOR?:?FOR??

- SQL????????????????
InterSystems IRIS?SQL??

?????????????????????:
- ???myprocs.myname????myprocs????my_procs.myname????????procs???

????????????????SQL??SQL????????????????????????????

```

Class Sample.ProcTest Extends %RegisteredObject
{
  ClassMethod myfunc(dummy As %String) As %String [ SqlProc ]
  {
    /* method code */
    Quit "abc"
  }
}

```

```

SELECT Sample.ProcTest_myfunc(Name)
FROM Sample.Person

```

????????????

????????????
??
????????????????????????
????????????????????([ClassType = datatype])?
????????????
????????(???)????????????????????

?????????????????????????????????SqlProc???:

```

Class MyApp.Person Extends %Persistent [DdlAllowed]
{
    /// This procedure finds total sales for a territory
    ClassMethod FindTotal(territory As %String) As %Integer [SqlProc]
    {
        // use embedded sql to find total sales
        &sql(SELECT SUM(SalesAmount) INTO :total
            FROM Sales
            WHERE Territory = :territory
        )

        Quit total
    }
}

```

????????FindTotal()????????MyApp.Person_FindTotal()???SQL??
 ????????SqlName?????SQL????????

????????????????????(???ODBC???)????????????
 ?????????????InterSystems IRIS(??%qHandle:%SQLProcContext)??%sqlcontext????????

%sqlcontext?SQLCODE?????SQL?????????????????SQL??????????:

```

SET %sqlcontext.%SQLCode=SQLCODE
SET %sqlcontext.%ROWCOUNT=%ROWCOUNT
SET %sqlcontext.%Message=%msg

```

????????????????????
 ?????????????%sqlcontext???

???????????????

?????????????????2000??

?????????CalcAvgScore()???:

```

ClassMethod CalcAvgScore(firstname As %String,lastname As %String) [sqlproc]
{
    New SQLCODE,%ROWID
    &sql(UPDATE students SET avgscore =
        (SELECT AVG(sc.score)
         FROM scores sc, students st
         WHERE sc.student_id=st.student_id
              AND st.lastname=:lastname
              AND st.firstname=:firstname)
        WHERE students.lastname=:lastname
              AND students.firstname=:firstname)

    IF ($GET(%sqlcontext)!=' ') {
        SET %sqlcontext.%SQLCODE = SQLCODE
        SET %sqlcontext.%ROWCOUNT = %ROWCOUNT
    }
    QUIT
}

```

????????????

????????????????????????????????
?????????SQL????????????????????
?????????????????SQL host???WHERE?????????:

```
Class MyApp.Person Extends %Persistent [DdlAllowed]
{
    /// This procedure result set is the persons in a specified Home_State, ordered b
y Name
    Query ListPersons(state As %String = "") As %SQLQuery [ SqlProc ]
    {
        SELECT ID,Name,Home_State
        FROM Sample.Person
        WHERE Home_State = :state
        ORDER BY Name
    }
}
```

?????????????????Studio Inspector????SQLProc?????????True?????????????????["SQLProc"]????:

```
Query QueryName() As %SQLQuery( ... query definition ... )
[ SqlProc ]
```

?????????ListPersons?????????MyApp.Person_ListPersons???SQL??
?????????SqlName?????SQL???????????

?MyApp?
?SQL??Person_ListPersons?????????????SQL???????????

?????????????????????????????:

```
Class apc.OpiLLS.SpCollectResults1 [ Abstract ]
{
    /// This SP returns a number of rows (pNumRecs) from WebService.LLSResults, and updat
es a property for each record
    Query MyQuery(pNumRecs As %Integer) As %Query(ROWSPEC = "Name:%String,DOB:%Date") [ S
qlProc ]
    {
    }

    /// You put initial code here in the Execute method
    ClassMethod MyQueryExecute(ByRef qHandle As %Binary, pNumRecs As %Integer) As %Status
    {
        SET mysql="SELECT TOP ? Name,DOB FROM Sample.Person"
        SET rset=##class(%SQL.Statement).%ExecDirect(,mysql,pNumRecs)
            IF rset.%SQLCODE'=0 {QUIT rset.%SQLCODE}
        SET qHandle=rset
        QUIT $$$OK
    }
}
```

/// This code is called by the SQL framework for each row, until no more rows are returned

```

ClassMethod MyQueryFetch(ByRef qHandle As %Binary, ByRef Row As %List,
                        ByRef AtEnd As %Integer = 0) As %Status [ PlaceAfter = NewQuery1Execute ]
{
    SET rset=qHandle
    SET tSC=$$$OK

    FOR {
        ///Get next row, quit if end of result set
        IF 'rset.%Next() {
            SET Row = "", AtEnd = 1
            SET tSC=$$$OK
            QUIT
        }

        SET name=rset.Name
        SET dob=rset.DOB
        SET Row = $LISTBUILD(name,dob)
        QUIT
    }
    QUIT tSC
}

```

```

ClassMethod MyQueryClose(ByRef qHandle As %Binary) As %Status [ PlaceAfter = NewQuery1Execute ]
{
    KILL qHandle //probably not necessary as killed by the SQL Call framework
    QUIT $$$OK
}

```

????????????????SQL??

??:

- stored-procedure-nameExecute()
- stored-procedure-nameFetch()
- stored-procedure-nameFetchRows()
- stored-procedure-nameGetInfo()
- stored-procedure-nameClose()

```

????????%SQLQuery????????????????SQL????????????
Execute()?SQL????????????
Fetch()????????????(SET row = "")?
????Fetch()????AtEnd=1????????????????????????????????
????????(row = "")????????????????;
???AtEnd=1????????Row=""?

FetchRows()????????Fetch()?
??GetInfo()????????????
Close()????

```

??ObjectScript????????????

?????Execute()???Fetch()???Fetch()?????????Fetch()????????????????????????????????(oref)?
?????????????qHandle?????????:

```
SET qHandle(1)=oref1,qHandle(2)=oref2
```

????????????????(???SQL??)?????????????

?????????????Query????????200?

???Query

??
?????? %Library.Query?

?????????query (%Library.Query)???%SQLQuery (%Library.SQLQuery)?????????????
?????????5?????????FetchRows()????????Fetch() (%SQLQuery?????????????????????)
GetInfo()????????????????????????????????
????????????????????????????????
????????????????????????????????

?????????????:?????????%Binary?Qhandle(????????)?
????????????????????????????
?????????Execute()?Fetch()?????????Close():

```
ClassMethod SP1Close(qHandle As %Binary) As %Status
{
  // ...
}
```

```
ClassMethod SP1Execute(ByRef qHandle As %Binary,
  p1 As %String) As %Status
{
  // ...
}
```

```
ClassMethod SP1Fetch(ByRef qHandle As %Binary,
  ByRef Row As %List, ByRef AtEnd As %Integer=0) As %Status
{
  // ...
}
```

```
Query SP1(p1 As %String)
  As %Query(CONTAINID=0,ROWSPEC="lastname:%String") [sqlproc ]
{
}
```

???????SQL?????????
??????%SQLQuery?????????????????Q14?????
?????????????????

????????????????????????
???DECLARE??(???Execute?)???Close?Fetch?????MAC????????????????????
?????????Close?Fetch?????????????PLACEAFTER?????????

????????????????????????????
?????Q140?????????Q14

??????

?????????????????:

- ???SQL CALL????????;
- ???SQL????????????????(????????????????)?

?:?????SQL?????????????CALL?????????????:

CALL sp.MyProc(CURRENT_DATE)

SELECT?????????SQL?????????
SELECT?????SQL?????????

xDBC?????SELECT?CALL?????SQL???????????

????

????????????????????????
?????????????????Square??????????:

```

Class MyApp.Utils Extends %Persistent [DdlAllowed]
{
  ClassMethod Square(val As %Integer) As %Integer [SqlProc]
  {
    Quit val * val
  }
}

```

?????????SqlProc?????????

?:?????????ReturnResultsets????????(??)?????not?????

???SQL?????????????????SQL?????
????????(?????“Square”)SQL????????????????(?)????(?????“MyApp”)?

?????????Square??:

SELECT Cost, MyApp.Utils_Square(Cost) As SquareCost FROM Products

????????(??)?????????????????????????SQL???

?????????????Sample???
????????????(??)?????????TimePlus?DTime???:

```
Class Sample.Wages Extends %Persistent [ DdlAllowed ]
{
  Property Name As %String(MAXLEN = 50) [ Required ];
  Property Salary As %Integer;
  ClassMethod TimePlus(val As %Integer) As %Integer [ SqlProc ]
  {
    QUIT val * 1.5
  }
  ClassMethod DTime(val As %Integer) As %Integer [ SqlProc ]
  {
    QUIT val * 2
  }
}
```

????????????????????Sample.Wages??????Salary?time- half?double time???:

```
SELECT Name,Salary,
       Sample.Wages_TimePlus(Salary) AS Overtime,
       Sample.Wages_DTime(Salary) AS DoubleTime FROM Sample.Wages
```

????????????????????Sample.Employee??????Salary?time- half?double time???:

```
SELECT Name,Salary,
       Sample.Wages_TimePlus(Salary) AS Overtime,
       Sample.Wages_DTime(Salary) AS DoubleTime FROM Sample.Employee
```

??

```
????????????????????execute???
??GRANT???$SYSTEM.SQL.Security.GrantPrivilege()????????????????????
????$SYSTEM.SQL.Security.CheckPrivilege()????????????????????
????????EXECUTE????????????????????
????????Security?????Users?Roles?
?????????????Edit?????SQL Procedures?????
????????????????????
```

List ????

INFORMATION.SCHEMA.ROUTINES persistent????????????????????????????

```
?????SQL?????INFORMATION.SCHEMA?
?????#include %occlInclude???????
??SQL?????????
```

????????????????????????????????(?????)?????(SQL=class query with SQL, EXTERNAL=not a class query with SQL)????????????????????"Sample"?????????????:

```
SELECT ROUTINE_NAME, METHOD_OR_QUERY_NAME, ROUTINE_TYPE, ROUTINE_BODY, SQL_DATA_ACCESS, IS
_USER_DEFINED_CAST,
```


???? ???????????

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```

DATA_TYPE || ' ' || CHARACTER_MAXIMUM_LENGTH AS Returns, NUMERIC_PRECISION || ':' || NUMERIC_S
CALE AS PrecisionScale,
ROUTINE_DEFINITION
FROM INFORMATION_SCHEMA.ROUTINES WHERE ROUTINE_SCHEMA='SQLUser'

```

The screenshot shows a query window with the following SQL code:

```

SELECT ROUTINE_NAME, METHOD_OR_QUERY_NAME, ROUTINE_TYPE, ROUTINE_BODY, SQL_DATA_ACCESS, IS_USER_DEFINED, CAST
, DATA_TYPE || ' ' || CHARACTER_MAXIMUM_LENGTH AS Returns, NUMERIC_PRECISION || ':' || NUMERIC_SCALE AS PrecisionScale,
ROUTINE_DEFINITION
FROM INFORMATION_SCHEMA.ROUTINES WHERE ROUTINE_SCHEMA='SQLUser'

```

The results table has the following columns: ROUTINE_NAME, METHOD_OR_QUERY_NAME, ROUTINE_TYPE, ROUTINE_BODY, SQL_DATA_ACCESS, IS_USER_DEFINED, CAST, Returns, PrecisionScale, ROUTINE_DEFINITION.

ROUTINE_NAME	METHOD_OR_QUERY_NAME	ROUTINE_TYPE	ROUTINE_BODY	SQL_DATA_ACCESS	IS_USER_DEFINED	CAST	Returns	PrecisionScale	ROUTINE_DEFINITION
4521 TKBTremBaseExtend_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT ID FROM SQLUser.TKB_TremBaseExtend
4522 TKBTremBaseField_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT ID FROM SQLUser.TKB_TremBaseField
4523 TKBTremBase_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT ID FROM SQLUser.TKB_TremBase
4524 TKBTremCom_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTRC_RowId FROM SQLUser.TKB_TremCom
4525 TKBTremContrast_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTRC_RowId FROM SQLUser.TKB_TremContrast
4526 TKBTremExtendCat_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTEC_RowId FROM SQLUser.TKB_TremExtendCat
4527 TKBTremExtendDetail_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTD_RowId FROM SQLUser.TKB_TremExtendDetail
4528 TKBTremExtendVal_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTEV_RowId FROM SQLUser.TKB_TremExtendVal
4529 TKBTremExtend_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTE_RowId FROM SQLUser.TKB_TremExtend
4530 TKBTremIm_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTRI_RowId FROM SQLUser.TKB_TremIm
4531 TKBTremKey_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTRK_RowId FROM SQLUser.TKB_TremKey
4532 TKBTrem_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT TKBTRB_RowId FROM SQLUser.TKB_Trem
4533 WWWTranslation_Extent	Extent	PROCEDURE	SQL	READS SQL DATA	NULL	NULL	NULL	NULL	SELECT WTRNS_RowId FROM SQLUser.WWW_Translation

INFORMATION_SCHEMA.PARAMETERS persistent??

????????????????????(????????????????)?????????????"Sample"?????????????????:

```

SELECT SPECIFIC_NAME, PARAMETER_NAME, PARAMETER_MODE, ORDINAL_POSITION,
DATA_TYPE, CHARACTER_MAXIMUM_LENGTH AS MaxLen, NUMERIC_PRECISION || ':' || NUMERIC_SCALE AS
PrecisionScale
FROM INFORMATION_SCHEMA.PARAMETERS WHERE SPECIFIC_SCHEMA='SQLUser'

```

The screenshot shows a query window with the following SQL code:

```

SELECT SPECIFIC_NAME, PARAMETER_NAME, PARAMETER_MODE, ORDINAL_POSITION,
DATA_TYPE, CHARACTER_MAXIMUM_LENGTH AS MaxLen, NUMERIC_PRECISION || ':' || NUMERIC_SCALE AS PrecisionScale
FROM INFORMATION_SCHEMA.PARAMETERS WHERE SPECIFIC_SCHEMA='SQLUser'

```

The results table has the following columns: SPECIFIC_NAME, PARAMETER_NAME, PARAMETER_MODE, ORDINAL_POSITION, DATA_TYPE, MaxLen, PrecisionScale.

SPECIFIC_NAME	PARAMETER_NAME	PARAMETER_MODE	ORDINAL_POSITION	DATA_TYPE	MaxLen	PrecisionScale
1 AvgAge	_isc_sp_ret_val	OUT	0	integer	NULL	10:0
2 MyClassYx_Cube	_isc_sp_ret_val	OUT	0	integer	NULL	10:0
3 MyClassYx_Cube	val	IN	1	integer	NULL	10:0

??????SQL????Catalog Details??
 ?????????????????????(?????)??
 ???

[#SQL](#) [#Caché](#) [#InterSystems IRIS](#) [#InterSystems IRIS for Health](#)
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 ????

? URL: <https://cn.community.intersystems.com/post/%E7%AC%AC%E5%8D%81%E5%85%AB%E7%AB%A0-%E5%AE%9A%E4%B9%89%E5%92%8C%E4%BD%BF%E7%94%A8%E5%AD%98%E5%82%A8%E8%BF%87%E7%A8%8B>