**SQL Query Expressions and NULL function**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Oracle 8i~9i | DB2 UDB v7~8 | MS SQL 2000 | Sybase ASE 11~12.5 |
| Comparison expressions | =, <, >, <=, >=, <>, !=, IS NULL, ANY, SOME, ALL | =, <, >, <=, >=, <>, !=, IS NULL, ANY, SOME, ALL | =, <, >, <=, >=, <>, !=, !>, !<, IS NULL, ANY, SOME, ALL | =, <, >, <=, >=, <>, !=, !>, !<, IS NULL, ANY, SOME, ALL |
| Logical expressions | AND, OR, IN, EXISTS, NOT, BETWEEN ~AND  \*Composite IN(subquery)  \*Composite IN(group) | AND, OR, IN, EXISTS, NOT, BETWEEN ~AND  \*Composite IN(subquery) | AND, OR, IN, EXISTS, NOT, BETWEEN ~AND | AND, OR, IN, EXISTS, NOT, BETWEEN ~AND |
| Bit operator | BITAND() | n/a | &, |, ^, ~ | &, |, ^, ~ |
| 16bit expressions | TO\_CHAR(n,'XXXX')  HEXTORW() | HEX(), X’FF’ | 0xFF | 0xFF, HEXTOINT(*hex*),  INTTOHEX(*num*) |
| Pattern expressions | \_, % | \_, % | \_, %, [a-z], [^a-z] | \_, %, [a-z], [^a-z] |
| NULL functions | NVL(exp,ret)  \*\*NULLIF(exp1,exp2)  DECODE(exp,…)  \*\*COALESCE(exp,…) | COALESCE(exp, ret)  NULLIF(exp1,exp2) | ISNULL(exp,ret)  NULLIF(exp1,exp2)  COALESCE(exp,…) | ISNULL(exp,ret)  NULLIF(exp1,exp2)  COALESCE(exp,…) |

\*I.E.) Composite IN(subquery): ... Where (a,b,c) IN (SELECT c1, c2, c3 FROM tab...)...  
Composite IN(group): ... Where (a,b,c) IN ( (1,2,3), (2,3,4), (3,4,5) …)

\*\* COALESCE(), NULLIF() functions added in Oracle since version 9i

**Environmental functions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Oracle 8i~9i | DB2 UDB v7~8 | MS SQL 2000 | Sybase ASE 11~12.5 |
| session ID | UID | - | SUSER\_SID() | SUSER\_ID() |
| session name | USER | USER | SUSER\_SNAME() | SUSER\_NAME() |
| seesion user | USER  \*CURRENT\_USER | USER | USER\_NAME()  CURRENT\_USER | USER\_NAME() |
| date & time | SYSDATE  CURRENT\_DATE | CURRENT DATE,  CURRENT TIME | GETDATE() | GETDATE() |
| time stamp | CURRENT\_TIMESTAMP | CURRENT TIMESTAMP | CURRENT\_TIMESTAMP | GETDATE() |
| host name | \*HOST | CURRENT SERVER | HOST\_NAME() | HOST\_NAME() |

\* CURRENT\_USER and HOST are only available through session context function in Oracle.  
\*\* CURRENT\_TIMESTAMP and GETDATE() are exactly same

**String functions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Oracle 8i~9i | DB2 UDB v7~8 | MS SQL 2000 | Sybase ASE 11~12.5 |
| Concatenate | a||b  or CONCAT(a,b) | a||b or CONCAT(a,b) | a+b | a+b |
| Length | LENGTH(*str*)    [char]  LENGTHB(*str*)   [byte]  LENGTHC(*str*)   [char] | LENGTH(*str*)  [byte] | LEN(*str*)  [char] | char\_length(*str*)  [byte] |
| A character Index (or location) in the string | INSTR(*str,s*[*,p*])   [chars]  INSTRB(*str,s*[*,p*])  [byte] INSTRC(*str,s*[*,p*])  [chars] | LOCATE(*s,str*[*,p*])  [byte] | CHARINDEX(*s,str*[*,p*])  [chars] | CHARINDEX(*s,str*)  [byte] |
| Sub string | SUBSTR(*str***,***s[***,***l]*)  [chars]  SUBSTRB(*str***,***s[***,***l]*)  [byte] SUBSTRC(*str***,***s[***,***l]*) [chars] | SUBSTR(*str***,***s[***,***l]*)  [byte] | substring(*str***,***s***,***l*)  [chars] | substring(*str***,***s***,***l*)  [byte] |
| Replacing | REPLACE(*str***,***a[***,***b]*) | REPLACE(*str***,***a***,***b*) | REPLACE(*str***,***a***,***b*) | - |
| Case | UPPER(*str*)  LOWER(*str*) | UPPER(*str*),UCASE(*str*)  LOWER(*str*),LCASE(*str*) | UPPER(*str*),  LOWER(*str*) | UPPER(*str*),  LOWER(*str*) |
| Repeat | LPAD(*str,l[,a]*)  RPAD(*str,l[,a]*) | REPEAT(*str,n*) | REPLIATE(str,n) | REPLIATE(str,n) |
| Trim | LTRIM(*str,s*) RTRIM(*str,s*) | LTRIM(*str*) RTRIM(*str*) | LTRIM(*str*) RTRIM(*str*) | LTRIM(*str*) RTRIM(*str*) |
| ASCII | ASCII(*str*)  CHR(*code*) | ASCII(*str*)  CHR(*code*) | ASCII(*str*)  CHAR(*code*) | ASCII(*str*)  CHAR(*code*) |

**Conversion functions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Oracle 8i~9i | DB2 UDB v7~8 | MS SQL 2000 | Sybase ASE 11~12.5 |
| Multi type casting | CAST(*exp* AS type) | CAST(*exp* AS type) | CAST(*exp* AS type)  CONVERT(type, *exp[,op]*) | CONVERT(type, *exp[,op]*) |
| Num -> Char | TO\_CHAR(*num[,fmt]*) | CHAR(*num[,fmt]*)  DIGITS(*num*) | STR(*num* [,*len* [,*d*]]) | STR(*num* [,*len* [,*d*]]) |
| Char -> Num | TO\_NUMBER(*str[,fmt]*) | INTEGER(*str*)  DOUBLE(*str*) | CONVERT() | CONVERT() |
| Date -> Char | TO\_CHAR(*date,fmt*) | CHAR(*date[,fmt]*) | CONVERT() | CONVERT() |
| Char -> Date | TO\_DATE(*str[,fmt]*) | TIMESTAMP(*str*)  DATE(*str*) | CONVERT() | CONVERT() |
| conver to hexa | RAWTOHEX(*bin*)  TO\_CHAR(*num*,'XXXX') | HEX(*num*) | CONVERT() | HEXTOINT(*hex*)  INTTOHEX(*num*) |
| translate | TRANSLATE(*str,a,b*) | TRANSLATE(*str,b,a*) | n/a | n/a |

\* ORACLE has CONVERT() function but it's converting character set enconding, not a type conversion.

**Date Format Functions**

|  |  |  |  |
| --- | --- | --- | --- |
| Format | Oracle 8i/9i | MS SQL 2000/ Sybase ASE v12 | DB2 UDB v7 |
| default | yy/mm/dd  (Korean)  dd-mon-yyyy  (US-English) | YYYY/MM/DD HH:MI:SS   (Korean)  MM-DD-YYYY HH:MI:SS    (US-English)  mon dd yyyy hh:miAM(PM) (Sybase only) | (timestamp)YYYY-MM-DD-HH:MI:SS.MMMMMM  (date)YYYYMMDD  (time)HH:MI:SS.MMMMMM |
| YYYY.MM.DD | TO\_CHAR(x,‘YYYY.MM.DD’) | CONVERT(VARCHAR, x, 102) | REPLACE(CHAR(DATE(*x*),ISO), '-', '.') |
| HH:MM:SS | TO\_CHAR(x,‘HH:MI:SS’) | CONVERT(VARCHAR, x, 108) | CHAR(TIME(*x*) , JIS ) |
| YYYY/MM/DD | TO\_CHAR(x,‘YYYY/MM/DD’) | CONVERT(VARCHAR, x, 111) | REPLACE(CHAR(DATE(*x*), ISO), '-', '/') |
| YYYYMMDD | TO\_CHAR(x,‘YYYYMMDD’) | CONVERT(VARCHAR, x, 112) | CHAR(DATE(*x*)) |
| HH24:MI:SS:MMM | TO\_CHAR(x,‘HH24:MI:SS’) | CONVERT(VARCHAR(8), x, 114) | CHAR(TIME(*x*) ) |
| YYYY.MM.DD HH24:MI | TO\_CHAR(x,‘YYYY.MM.DD HH24:MI’) | CONVERT(VARCHAR, x, 102) + ' ' + CONVERT(VARCHAR(5), x, 114) | REPLACE(CHAR(DATE(*x*), ISO), '-', '.') || CAST( TIME(*x*) AS CHAR(5)) |
| 'YYYY/MM/DD HH24:MI:SS' | TO\_CHAR(*date\_exp,* 'YYYY/MM/DD HH24:MI:SS') | CONVERT(VARCHAR, *date\_exp,* 111) +  ' ' + CONVERT(VARCHAR(8), *date\_exp,* 114) | REPLACE(CHAR(DATE(*date\_exp*), ISO), '-', '/') || CAST( TIME(*date\_exp*)) |

In Oracle, Session default can be replaced when the session start:

ALTER SESSION SET nls\_date\_format = 'YYYY.MM.DD';

ALTER SESSION SET nls\_date\_format = 'YYYY/MM/DD HH24:MI:SS';

**Date Functions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | ORACLE 8~9i | DB2 UDB v7~8 | MS SQL 2000 | Sybase 11.x~12.5 |
| Today time | SYSDATE  CURRENT\_DATE CURRRENT\_TIMESTAMP | CURRENT DATE  CURRENT TIME CURRENT TIMESTAMP | GETDATE()  CURRENT\_TIMESTAMP | GETDATE() |
| Date +/- | *date* +- day  ADD\_MONTHS(*date, mo*) MONTHS\_BETWEEN(*date, mo*) | date +- *n* {DAYS|MONTHS|YEARS} | *date* +- day  DATEADD(*fmt,n,date*) DATEDIFF(*fmt,date,date*) | DATEADD(*fmt,n,date*)  DATEDIFF(*fmt,date,date*) |
| Day of week | TO\_CHAR(*date, fmt*)  NEXT\_DAY(*date*, 요일) | DAYNAME(*date*)  DAYOFWEEK(*date*) DAYOFWEEK\_ISO(*date*) | DATENAME(*fmt,date*) | DATENAME(*fmt,date*) |
| Day | TO\_CHAR(*date*, fmt)  \*EXTRACT(fmt FROM *date*) | DAY(*date*)  MONTH(*date*) YEAR(*date*) | DATEPART(*fmt,date*)  DAY(*date*) MONTH(*date*) YEAR(*date*) | DATEPART(*fmt,date*) |
| GMT 시간 | SYS\_EXTRACT\_UTC(timestamp)  TZ\_OFFSET(DBTIMEZONE) | CURRENT TIMESTAMP  CURRENT TIMEZONE | GETUTCDATE() | - |
| etc | ROUND(*date[,fmt]*)  TRUNC(*date[,fmt]*) | DAYOFYEAR(*date*)  WEEK(*date*) |  |  |

\* Extract is not support lower than Oracle 9i

**Math & Group function**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Function | Oracle 8i~9i | DB2 UDB v8 | MS SQL 2000 | Sybase ASE 11~12.5 |
| average | AVG(*exp*) | AVG(*exp*) | AVG(*exp*) | AVG(*exp*) |
| count | COUNT(*exp*|*\**) | COUNT(*exp*|*\**)  COUNT\_BIG(*exp*|*\**) | COUNT(*exp*|*\**)  COUNT\_BIG(*exp*|*\**) | COUNT(*exp*|*\**)  COUNT\_BIG(*exp*|*\**) |
| Max | MAX(*exp*) | MAX(*exp*) | MAX(*exp*) | MAX(*exp*) |
| Min | MIN(*exp*) | MIN(*exp*) | MIN(*exp*) | MIN(*exp*) |
| Standard Dev | STDDEV(*exp*) | STDDEV(*exp*) | STDEV(*exp*) |  |
| Sum | SUM(*exp*) | SUM(*exp*) | SUM(*exp*) | SUM(*exp*) |
| Variance | VARIANCE(*exp*) | VAR(*exp*) | VAR(*exp*) |  |
| Random number | \*DBMS\_RANDOM | RAND(seed) | RAND(seed) | RAND(seed) |
| Absolute value | ABS(n) | ABS(n) | ABS(n) | ABS(n) |
| Arc cosine | ACOS(n) | ACOS(n) | ACOS(n) | ACOS(n) |
| Arc sine | ASIN(n) | ASIN(n) | ASIN(n) | ASIN(n) |
| Arc tangent of n | ATAN(n) | ATAN(n) | ATAN(n) | ATAN(n) |
| Hyperbolic Arc tan | ATANH(n) | ATANH(n) |  |  |
| Min Fine number | CEIL(n) | CEIL(n) | CEILING(n) | CEILING(n) |
| Cosine | COS(n) | COS(n) | COS(n) | COS(n) |
| Hyperbolic cosine | COSH(n) | COSH(n) |  |  |
| CO TANGENT | COT(n) | COT(n) | COT(n) | COT(n) |
| Exponential value | EXP(n) | EXP(n) | EXP(n) | EXP(n) |
| Max Fine number | FLOOR(n) | FLOOR(n) | FLOOR(n) | FLOOR(n) |
| Greatest | GREATEST(n) |  |  |  |
| Least | LEAST(n) |  |  |  |
| Natural logarithm | LN(n) | LOG(n) | LOG(n) | LOG(n) |
| Logarithm, base 10 | LOG(10,n) | LOG10(n) | LOG10(n) | LOG10(n) |
| Logarithm, any base | LOG(n) | LN(n) |  |  |
| Mod | MOD(m,n) | MOD(m,n) | % operator | % operator |
| power | POWER(m,n) | POWER(m,n) | POWER(m,n) | POWER(m,n) |
| round | ROUND(m,n) | ROUND(m,n) | ROUND(m,n) | ROUND(m,n) |
| +/- sign | SIGN(n) | SIGN(n) | SIGN(n) | SIGN(n) |
| Sine | SIN(n) | SIN(n) | SIN(n) | SIN(n) |
| Hyperbolic sine | SINH(n) | SINH(n) |  |  |
| sqrt | SQRT(n) | SQRT(n) | SQRT(n) | SQRT(n) |
| Tangent | TAN(n) | TAN(n) | TAN(n) | TAN(n) |
| Hyperbolic tangent | TANH(n) | TANH(n) |  |  |
| truncate | TRUNC(m,n) | TRUNC(m,n) | ROUND(m,n,<>0) | ROUND(m,n,<>0) |

\* DBMS\_RANDOM is not a function, but a package in Oracle.

**Database structure overview and comparison**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Oracle | SQL Server | DB2 UDB |
| Basic structure | Default one instance per server is installed.  Instance have SGA(System Global Area) and background processes.  Physical database consist of at least 3 system Tablespaces (System, temp, undo) and user tablespace. | Only support Windows server platform.  One server instance consists of 4 default databases (master, model, tempdb, msdb) and with sample & public db. | One server what is called Node is basically consist of 2 default  instances (DB2INST1, DB2DAS)  An instance have multiple database such as Toolsdb and Sample. The database have mandatory table space includes Syscatspace, tempspace, userspace. |
| Default storage space | System tablespace,  Temp tablespace,  undo tablespace,  and etc user TS | Primary data file & Group, Log file | SYSCATSPACE,  TEMPSPACE1,  USERSPACE1  And etc user TS |
| System storage | System tablespace | Master db | DAS instance, and SYSCATSPACE in each DB. |
| Min.  I/O unit | Block. A block size is configurable by TS | Page (8KB) | Page. Default size is 4KB, and configurable by DB. |
| Max. row size | unlimited | 8060 byte | Page size |
| SQL Optimizer | Default Cost-based.  Configurable in init.ini option. | Default Cost-based.  Modifiable by SQL query hint | Rule/cost-based both.  No configurable. |
| Read consistency | By Row level lock by rollback segment. | By Isolation level & log | By Isolation level & log |
| DDL rollback | No DDL rollback | Allowed DDL rollback | Allowed DDL rollback |
| Lock escalation | N/A | Row < Page < table order | Row < Table order |
| DB User Auth. | DB, OS both available | DB, Windows Auth both available | OS authentication |