

Expression Parser

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Parser's Syntax Specification

[Jira Workflow Toolbox](#) uses a powerful parser for interpreting expression with **logical**, **mathematical**, **date-time** and **string-text** terms. This parser is a fundamental part of the plugin, and is used by various features in the plugin.

Usage examples:

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There are **five types of expressions** that can be parsed:

- **Mathematical and Time:** returns a **number**. When it represents a Date or Time, it returns the number of **milliseconds elapsed since January 1, 1970, 00:00:00 GMT**
Examples:
 - `(1 * 2) / 3`
 - `(1 + 3 * {10000}) / abs({10001})` : simple arithmetical formula that uses the value of a number field (field code `{10000}`), and a function that returns the absolute value of another field (field code `{1000}`)

`filterByPredicate(linkedIssues`

`1})`.
 - `{00012} + 2 * {HOUR}` : adding 2 hours to **Due Date** (field code `{00012}`).
 - `round(({00012} - {00057}) / {HOUR})` : calculate the number of hours from **Current date and time** (field code `{00057}`) to **Due Date** (field code `{00012}`).
- **Text-String:** returns a string. This kind of expressions is used in **advanced mode** of post-function [Copy parsed text to a field](#) .
Examples:
 - `"Hello" + " " + "world" + "."` : concatenating 4 string literals.
 - `trim({00000})` : removing leading and trailing blanks from **Summary**.
 - `%{00001} + "\nLAST USER: " + toUpperCase({00021})` : adding to **Description** (field code `%{00001}`) a new line with string "LAST USER: " and the **name of current user** (field code `%{00021}`) in upper case.
- **Boolean** (also known as **Logical**): it returns a logical value **true** or **false** .
Examples:
 - `%{10005} = "Yes"` : compares the value stored in a field with literal string "Yes".
 - `datePart({00012}, LOCAL) > datePart({00057}, LOCAL)` : returns **true** only if **Due Date** (field code `{00012}`) is later than **Current date** (field code `{00057}`) in server's local timezone.
 - `%{10020} != null AND %{10021} = null` : returns **true** only if `{10020}` field is initialized and field `{10021}` is not initialized.
 - `timePart({00057}, LOCAL) >= 8:00 AND timePart({00057}, LOCAL) <= 17:30` : **Current time** (field code `{00057}`) is between 8:00 AM and 5:30 PM in server's local timezone.
[Boolean Expressions Examples](#)
- **Issue List:** is used for selecting issues (is much like JQL) within Jira Workflow Toolbox expressions, and returns a list of issues.
Examples:
 - `subtasks()` : returns the list of sub-tasks of current issue.
 - `linkedIssues("is blocked by, is caused by")` : returns the list of issues linked to current one through issue link types "is blocked by" and "is caused by".
 - `filterByIssueType(linkedIssues(), "Bug, Incident")` : returns the list of linked issues with issue type "Bug" or "Incident".

- **filterByPredicate(siblingSubtasks(), %{00028} != null)** : returns the list of sibling sub-tasks (i.e., sub-tasks of same parent as current sub-task) which are not resolved. Note that %{00028} is field code for **Resolution**.
[Examples of Issue List expressions](#)
- **String List**: expression that returns a list of strings.
Examples:
 - **["red", "blue", "green"]** : literal definition of a string list with the names of 3 colors.
 - **fieldValue(%{00000}, subtasks())** : returns the list of summaries of sub-tasks of current issue. Note that %{00000} is field code for **Summary**.
 - **toStringList(%{00094})** : returns a list with the names of the components in current issue. Note that %{00094} is field code for **Components**.
[Examples of String List expressions](#)

The **expected type of expression** depends on the usage of the parser made but the different features of the plugin:

Feature	Expected Expression type
Boolean Condition with math, date-time or text-string terms	Boolean
Boolean Validator with math, date-time or text-string terms	Boolean
Parameter Conditional execution in all the post-functions	Boolean
Mathematical and date-time expression calculator	Mathematical and Time
Log work	Mathematical and Time
Set a custom field "Urgency" depending on a combined value of issue's Priority and "Impact" custom field	Boolean for conditional part of the setting rules. Text-String and Mathematical and Time for the value part of the setting rules.
Copy parsed text to a field	Text-String
Create issues and sub-tasks	Issue List , String List and Mathematical for setting seeds . Text-String for selecting project. Issue list and Text-String for selecting parent issue. Text-String and Mathematical and Time for the setting field values. Issue List for selecting issues to be linked.
Read field from issues returned by JQL query or issue list Update issue fields Read fields from linked issues or sub-tasks Write field on linked issues or sub-tasks	Text-String and Mathematical and Time for setting the source value.

Data types

The parser used in the plugin for mathematical, time-formulas and boolean expressions uses only three types of data:

- **Number**: this type of data represents numeric values, and is also used to store **Date**, **Time** and **Date-Time** values. When storing any of temporal value, the number represents the **milliseconds elapsed since January 1, 1970, 00:00:00 GMT**. Number or Date-Time fields can be referenced as numbers using the following notation: **{nnnnn}**.
- **Text-String**: this type of data represents any kind of text or character string. Any field type or data type is susceptible of being transformed to text, so **any field can be referenced as a text-string value** using the following notation: **%{nnnnn}**, and **%{nnnnn.i}** for Cascading Select or Multi-Cascading Select fields, where **i** is the index that represents the level to be accessed. (**i = 0** is used for base level).
- **Boolean**: comparison operators return a logical value **true** or **false**, as well as some functions may also do, e.g., **isActive(string user_name)** : boolean
- **Issue List**: this data type represents a collection of issues. The size may vary from 0 to any number of issues. It's returned by issue selection or filtering functions like **subtasks()**, **linkedIssues()**, **filterByIssueType()**, **distinct()**, etc.
- **Number List**: this data type represents a collection of numeric values. The size may vary from 0 to any number of numeric values. It's returned by function **fieldValue()**, and is used to read the value of a numeric field in a selection of issues.
- **String List**: this data type represents a collection of string values. The size may vary from 0 to any number of string values. It's returned by function **fieldValue()**, and is used to read the value of a string field in a selection of issues.

Casting values to another type

There are two functions available for transforming types from Text-String to Number and viceversa, and also from other types to Text-String.

Function	Input	Output
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toString (number n) : string	numeric or date-time value	Returns a string with the decimal representation of the numeric value in n . Numeric value of a Date-Time field is number of milliseconds elapsed since January 1, 1970, 00:00:00 GMT. Example: toString(3.141592) returns "3.141592" .
toString (number n , number decimals) : string	numeric value	Returns a string with the decimal representation of the numeric value in n limiting the fractional part to the number of digits in parameter decimals . Example: toString(3.141592, 2) returns "3.14" .
toString (number list l) : string	list of numeric values	Returns a string with a comma separated list of decimal representation of the numeric values in l . Example: toString([1, 2, 3, 4.0]) returns "1, 2, 3, 4" .
toString (number list l , number decimals) : string	list of numeric values	Returns a string with a comma separated list of decimal representations of the numeric values in l , with the number of characters in the decimal part specified by parameter decimals . Example: toString([1.123, 2.452, 3.64612], 2) returns the following string: "1.12, 2.45, 3.65" .
toString (number list l , number decimals , string separator) : string Available since version 2.2.30	list of numeric values	Returns a string with a list of decimal representations of the numeric values in l , with the number of characters in the decimal part specified by parameter decimals and separated by string separator . Example: toString([1.123, 2.452, 3.64612], 2, " : ") returns the following string: "1.12 : 2.45 : 3.65" .
toString (string list l) : string	list of string values	Returns a string with a comma separated list of string values in l . Example: toString(["Hello", " ", "world", "!"]) returns "Hello, , world, !" .
toString (string list l , string separator) : string Available since version 2.2.30	list of string values	Returns a string a list of string values in l separated by string separator . Example: toString(["blue", "red", "green"], "; ") returns "blue; red; green" .
toString (issue list l) : string	list of issues	Returns a string with a comma separated list of issue keys. Example: toString(subtasks()) returns "CRM-5, CRM-6" , being CRM-5 and CRM-6 the keys of current issue's sub-tasks.
toString (issue list l , string separator) : string Available since version 2.2.30	list of issues	Returns a string with a list of issue keys separated by string separator . Example: toString(subtasks(), " ") returns "CRM-5 CRM-6" , being CRM-5 and CRM-6 the keys of current issue's subtasks.
toNumber (string s) : number	string	Returns the numeric value represented by the string s . This function expects a decimal representation of a number. In case it is not possible to parse the s to number, null is returned. Versions previous to 2.2.8 return an error message shown and conditions and validators returned false . Example: toNumber("3.14") returns 3.14 .
toInteger (string s , string radix) : number Available since version 2.2.12	string	returns the numeric value represented by the string s as a signed integer in the radix specified by argument radix . Example: toInteger("ff", 16) returns 255 .
toStringList (string s , string separators) : string list	string with a list of tokens separated by one or more characters	Returns a list of strings with tokens in argument s separated by characters in argument separators . Leading and trailing spaces around each token are automatically removed. Example: toStringList("red, orange, yellow; green; blue; purple", ",;") returns the following string list: ["red", "orange", "yellow", "green", "blue", "purple"] .

toStringList (multi-valued field) : string list	field code for a multi-value field in format %{nnnnn} . Multi-valued fields are Multi Select, Checkboxes, Components, Versions, Multi User Picker, Multi Group Picker, Issue Pickers, s and Labels. Attachment	Returns a list of strings representing each of the values selected in the field. Example: toStringList(%{00094}) returns a list of strings with each of the components selected in current issue.
toNumberList (string s, string separators) : number list	string with a list of numbers in decimal representation separated by one or more characters	This function expects in argument s a string containing numbers in decimal representation separated by characters in argument separators , and returns a list of numbers. Example: toNumberList("1, 3, 5; 7; 11; 13", ",;") returns the following number list: [1, 3, 5, 7, 11, 13] .
issueKeysToIssueList (string issue_keys) : issue list	string with a comma separated list of issue keys	Returns an issue list with all issues with keys in argument issue_keys . Argument issue_keys is a string containing a comma separated list of issue keys . Since version 2.2.36 it also admits issue IDs . Example: issueKeysToIssueList("CRM-12, HT-254") returns an issue list with issues with keys CRM-12 and HT-254 .

Automatic casting from Number to Text-String: Whenever you write a numeric term at the right-hand side of concat operator **+** or a comparison operator like **=**, and the left-hand side is occupied by a text-string term, the parser will automatically transform the right-hand side term into a string

- **+** (string concat): **"His age is " + 30** is equivalent to **"His age is " + toString(30)** .
- **=** (any comparison operator): **"30" = 30** is equivalent to **"30" = toString(30)** .

Comparison operators

The following comparison operators are available for types **Number**, **Text-String**, **Number List**, **String List** and **Issue List**. Operators **=** and **!=** are also available for type **Boolean**..

Operator	Meaning	Examples (all examples return true)
=	equal to	1 = 1 "HELLO" = toUpperCase("Hello") %{00001} = {00068} , auto-casting numeric field {00068} to Text-String. %{00068} = toString({00068}) , explicit casting of numeric field {00068} to Text-String. true = true %{10001} = null , for checking whether field with code %{10001} is not initialized. [1, 2, 3] = [1, 2, 3] , when used with lists elements existence and its order are evaluated. ["blue", "red", "green"] = ["blue", "red", "green"]
!=	not equal to	0 != 1 "HELLO" != "Hello" %{00001} != "Hello" true != false {10010} != null , for checking whether the numeric field with code {10010} is initialized. [1, 2, 3] != [1, 3, 2] , when used with lists elements existence and its order are evaluated. ["blue", "red", "green"] != ["blue", "green", "red"]
<	lower than	1 < 2 "abc" < "bbc" "abc" < "abcd"
>	greater than	2 > 1 "bbc" > "abc" "abcd" > "abc"
<=	less than or equal to	-
>=	greater than or equal to	-
~	contains	"Hello world!" ~ "world" , checks whether a string contains a substring. %{00125} ~ %{00020} , checks whether "Component leaders" contains "Current user" . linkedIssues() ~ subtasks() , checks whether all sub-tasks are also linked to current issue. [1, 2, 3, 2, 2, 4] ~ [2, 1, 2] , when used with lists cardinalities must match. ["blue", "red", "green", "red", "white", "red"] ~ ["red", "green", "red"] (["green", "red"] ~ ["red", "green", "red"]) = false

!~	doesn't contain	"world" !~ "Hello world!" <code>%{00074} !~ %{00077}</code> , checks whether "Fix version/s" doesn't contain all versions in "Affects version/s" . <code>fieldValue(%{00006}, linkedIssues()) !~ fieldValue(%{00006}, subtasks())</code> , checks whether linked issues reporters don't include all sub-tasks reporters (<code>%{00006}</code> is field code for "Reporters"). <code>[1, 2, 3, 2, 2, 4] !~ [2, 1, 1, 4]</code> , when used with lists cardinalities must match. <code>["blue", "red", "green", "red", "red"] !~ ["red", "green", "green", "red"]</code>
in	is contained in	"world" in "Hello world!" , to check whether a substring is contained in a string. <code>%{00020} in %{00125}</code> , checks whether "Current user" is contained in "Component leaders" . <code>subtasks() in linkedIssues()</code> , checks whether all sub-tasks are also linked to current issue. <code>[1, 1, 2] in [2, 1, 1, 1, 4]</code> , cardinality must match. <code>["blue", "red", "red"] in ["red", "green", "blue", "red", "red"]</code> , cardinality must match. <code>2 in [1, 2, 3]</code> "blue" in ["red", "blue", "white"]
not in	isn't contained in	"Hello world!" not in "world" <code>%{00077} not in %{00074}</code> , checks whether not all versions in "Affects version/s" are contained in "Fix version /s" . <code>fieldValue(%{00006}, subtasks()) not in fieldValue(%{00006}, linkedIssues())</code> , checks whether not all sub-tasks reporters are included in linked issues reporters (<code>%{00006}</code> is field code for "Reporters"). <code>[1, 1, 2, 2] not in [2, 1, 1, 1, 4]</code> , cardinality must match. <code>["blue", "red", "red", "red", "blue"] not in ["red", "blue", "red", "red"]</code> , cardinality must match. <code>5 not in [1, 2, 3, 3, 4]</code> "orange" not in ["blue", "red", "white"]
any in	some element is in	<code>%{00077} any in %{00074}</code> , checks whether any version in "Affects version/s" is contained in "Fix version/s" . <code>fieldValue(%{00006}, subtasks()) any in fieldValue(%{00006}, linkedIssues())</code> , checks whether any sub-task's reporter is present among linked issues reporters (<code>%{00006}</code> is field code for "Reporters"). <code>[1, 3] any in [3, 4, 5]</code> "blue", "white" any in ["black", "white", "green"]
none in	no single element is in	<code>%{00077} none in %{00074}</code> , checks whether there isn't a single version "Affects version/s" in "Fix version/s" . <code>fieldValue(%{00006}, subtasks()) none in fieldValue(%{00006}, linkedIssues())</code> , checks whether there isn't a single sub-task reporter among linked issues reporters (<code>%{00006}</code> is field code for "Reporters"). <code>[1, 2] none in [3, 4, 5]</code> "blue", "red" none in ["black", "white", "green"]

Case Ignoring Comparison operators (since version 2.2.42)

The following comparison operators are applicable to **String** and **String List** types. This operators have the peculiarity that ignores the case of the characters.

Operator	Meaning	Examples (all examples return true)
=~	equal to	"HELLO" =~ "Hello" "up" =~ "UP" ["blue", "red", "green"] =~ ["Blue", "RED", "Green"]
! =~	not equal to	" HELLO" ! =~ "Hello" "up" ! =~ "down" ("up" ! =~ "UP") = false ["blue", "red"] ! =~ ["Blue", "green"] ["blue", "red"] ! =~ ["Red", "BLUE"] (["blue", "red", "green"] ! =~ ["Blue", "RED", "Green"]) = false
~~	contains	"Hello World!" ~~ "world" , checks whether a string contains a substring. "A small step for a man" ~~ "STEP" , checks whether a string contains a substring. ["one", "two", "three"] ~~ ["TWO", "One"] , checks whether a string list contains all the elements of another string list.
!~~	doesn't contain	"Hello World!" !~~ "bye" , checks whether a string doesn't contain a substring. "A small step for a man" !~~ "big" , checks whether a string doesn't contain a substring. ["one", "two", "three"] !~~ ["Four"] , checks whether a string list doesn't contain one element of another string list. (["one", "two", "three"] !~~ ["TWO"]) = false
in~	is contained in	"world" in~ "Hello World!" , checks whether a substring is contained in another string. "STEP" in~ "A small step for a man" , checks whether a substring is contained in another string. ["TWO", "One"] in~ ["one", "two", "three"] , checks whether all the elements of a string list are contained in another string list.

not in~	isn't contained in	"bye" not in~ "Hello World!" , checks whether a substring is not contained in another string. "big" not in~ "A small step for a man" , checks whether a substring is not contained in another string. ["Four"] not in~ ["one", "two", "three"] , checks whether any of the elements of a string list are not contained in another string list. (["TWO"] not in~ ["one", "two", "three"]) = false
any in~	some element is in	["blue", "violet"] any in~ ["Blue", "Red", "Green"] ["Five", "One"] any in~ ["FOUR", "FIVE", "SIX"]
none in~	no single element is in	["Orange"] any in~ ["red", "blue", "green"] (["orange"] any in~ ["Red", "Orange"]) = false

Applicable Data Types

Comparison Operator	Boolean	Number	String	Number List	String List	Issue List	Multi-Valued Fields
=	X	X	X	X	X	X	X
!=	X	X	X	X	X	X	X
<	-	X	X	-	-	-	-
>	-	X	X	-	-	-	-
<=	-	X	X	-	-	-	-
>=	-	X	X	-	-	-	-
~	-	-	X	X	X	X	X
!~	-	-	X	X	X	X	X
in	-	-	X	X	X	X	X
not in	-	-	X	X	X	X	X
any in	-	-	-	X	X	X	X
none in	-	-	-	X	X	X	X
=~	-	-	X	-	X	-	-
!=~	-	-	X	-	X	-	-
~~	-	-	X	-	X	-	-
!~~	-	-	X	-	X	-	-
in~	-	-	X	-	X	-	-
not in~	-	-	X	-	X	-	-
any in~	-	-	-	-	X	-	-
none in~	-	-	-	-	X	-	-

Notice that:

- Operators **~, !~, in** and **not in** can be used for checking a single element (**number or string**) against a **number list** or a **string list**.
Example: **1 in [1, 2, 3]** or **["blue", "red"] ~ "blue"**.
- Operators **~, !~, in** and **not in** when used with **string** are useful to look for substrings in another string. Example: **"I love coding" ~ "love"** but **"I don't like Mondays" !~ "Fridays"**, or **"love" in "I love coding"** but **"Fridays" not in "I don't like Mondays"**.
- Operators **~, !~, in** and **not in** respect cardinality, i.e., container list must have at least the same number of elements as contained list.
Example: **[1, 1] in [1, 1, 1]** but **[1, 1] not in [1, 2, 3]**.
- Operators **=** and **!=**, when used for comparing lists, require to have the **same elements**, with the **same cardinality** and the **same order**.
Example: **[1, 2, 3] = [1, 2, 3]** but **[4, 5, 6] != [4, 6, 5]**.
- Operators **<**, **>**, **<=** and **>=** work according to lexicographical order when comparing strings.

About types:

- String**: "Hello world"
- Number**: 1, 1.1, -1.1, .1, -.1
- Multi-valued** fields are Multi Select, Checkboxes, Components, Versions, Multi User Picker, Multi Group Picker, Issue Pickers, Attachments and Labels.
- Issue list**: Returned by functions like `subtasks()`, `linkedIssues()`, `transitionLinkedIssues()`, `filterByFieldValue()`, `filterByStatus()`, `filterByIssueType()`, `filterByResolution()`, `filterByProject()`, `append()`, `union()`, `except()`, `intersect()` and `distinct()`.
- String list**: Returned by functions like `fieldValue()`, `append()`, `union()`, `except()`, `intersect()` and `distinct()`. Can also be written as literals, e.g., **["string_A", "string_B", "string_C"]**
- Number list**: Returned by functions like `fieldValue()`, `append()`, `union()`, `except()`, `intersect()` and `distinct()`. Can also be written as literals, e.g., **[1, 2, 3]**

WARNING:

- Operators `~`, `!~`, `in` and `not in` are available since version **2.1.21**.
- Operators `any in` and `none in` are available since version **2.1.22**.
- Operators `=~`, `!=~`, `~~`, `!~~`, `in~`, `not in~`, `any in~` and `none in~` are available since version **2.2.2**.

Boolean terms

Literals

Only 2 logic literals values are possible: **true** and **false** .

Logical connectives

The following logical connectives can be used for linking logical terms in a expression, i.e., terms that return a boolean value type (**true** or **false**).

Operator	Meaning	Precedence
NOT or !	logical negation	1 (highest)
AND or &	logical conjunction	2
OR or 	logical disjunction	3
XOR	exclusive or, i.e., a XOR b is equivalent to a AND !b OR !a AND b	3
IMPLIES or IMP	logical implication, i.e., a IMPLIES b is equivalent to !a OR b	4
XNOR or EQV	logical equivalence, i.e., a EQV b is equivalent to a IMPLIES b AND b IMPLIES a	4 (lowest)

Logical connectives are case insensitive, i.e., they can also be written in lower case: **or**, **and**, **not**, **xor**, **implies**, **imp**, **eqv** and **xnor** .

Conditional operator ? :

(Available since version 2.1.23)

Operator **? :** is similar to the one available in languages like C, C++ and JAVA.

- **Format:** **<boolean_expression> ? <term_1> : <term_2>**
where **<term_1>** and **<term_2>** are terminus of the same type (boolean, number, string, issue list, string list or number list).
- **Behavior:** Its used to construct conditional expressions. The operator evaluates **boolean_expression**, and if it's true value of **term_1** is returned, otherwise **term_2** is returned. It behaves like: **IF** boolean_expression **THEN** term_1 **ELSE** term_2.

Examples:

- **{00012} != null ? ({00012} - {00057}) / {HOUR} : 0** , if **Due Date** is not **null** , it will return the number of hours from current date-time to **Due Date**, otherwise it will return **0** .
- **timePart({00057}, LOCAL) > 21:00 AND timePart({00057}, LOCAL) < 7:00 ? "Night" : "Day"** , it will return **"Night"** if current time is between 21:00 and 7:00, otherwise it will return **"Day"** .

Numbers and Date-Time terms

Literal values

- Examples of valid **numerical** literal values: 1 , 3.0 , 4.2 , .5, -400 , -1.1 , -11.5 , - .02
- **Date-time** literal formats: **yyyy/MM/dd [hh:mm]** or **yyyy-MM-dd [hh:mm]** , e.g., 2011/03/25 23:15, 2011-03-25 23:15, 2011/03/25 and 2011-03-25
- **Time** literal values format: **hh:mm** , e.g., 08:15 , 23:59 , 00:00

Field values

Numeric value of **Number**, **Date**, **Date-Time** and **Priority** fields can be inserted in expressions with following notation **{nnnnn}**, e.g., use **{00012}** for **Due Date**, and **{00073}** for **Number of attachments**.

For checking if a field is initialized you can use **{nnnnn} = null** or **{nnnnn} != null**

Math Functions

Function	Returned value
abs (number x) : number	Returns the absolute value of x , i.e., if $x > 0$ it returns x , otherwise it returns -x .
acos (number x) : number Available since version 2.2.7	Returns the arc cosine of x ; the returned angle is in the range 0.0 through pi.
asin (number x) : number Available since version 2.2.7	Returns the arc sine of x ; the returned angle is in the range 0.0 through pi.
atan (number x) : number Available since version 2.2.7	Returns the arc tangent of x ; the returned angle is in the range 0.0 through pi.
ceil (number x) : number	Returns the smallest (closest to negative infinity) value that is larger than or equal to x and is equal to a mathematical integer.
cbrt (number x) : number Available since version 2.2.7	Returns the cube root of x .
cos (number x) : number Available since version 2.2.7	Returns the trigonometric cosine of angle x expressed in radians.
cosh (number x) : number Available since version 2.2.7	Returns the hyperbolic cosine of x .
floor (number x) : number	Returns the largest (closest to positive infinity) value that is less than or equal to x and is equal to a mathematical integer.
log (number x) : number Available since version 2.2.7	Returns the natural logarithm (base e) of x .
log10 (number x) : number Available since version 2.2.7	Returns the base 10 logarithm of x .
max (number x , number y) : number	Returns the larger of two numeric values.
min (number x , number y) : number	Returns the smaller of two numeric values.
modulus (number dividend , number divisor) : number Available since version 2.2.7	Returns dividend - (divisor * floor(dividend / divisor)) .
pow (number x , number y) : number	Returns x raised to the power y .
random () : number	Returns a value with a positive sign, greater than or equal to 0.0 and less than 1.0.
remainder (number dividend , number divisor) : number	Returns dividend - divisor * n , where n is the closest integer to dividend / divisor .
round (number x) : number	Returns the closest integer to x .
sin (number x) : number Available since version 2.2.7	Returns the trigonometric sine of angle x expressed in radians.
sinh (number x) : number Available since version 2.2.7	Returns the hyperbolic sine of x .
sqrt (number x) : number	Returns the square root of x .
tan (number x) : number Available since version 2.2.7	Returns the trigonometric tangent of angle x expressed in radians.
tanh (number x) : number Available since version 2.2.7	Returns the hyperbolic tangent of x .
toDegrees (number x) : number Available since version 2.2.7	Converts an angle x measured in radians to an approximately equivalent angle measured in degrees.
toRadians (number x) : number Available since version 2.2.7	Converts an angle x measured in degrees to an approximately equivalent angle measured in radians.

Date-Time Functions

Fields of type **Date** and **Date and Time** contain a **numeric value** with the **milliseconds elapsed since January 1, 1970, 00:00:00 GMT**. We usually need to get significative numbers from this numeric value, like YEAR, MONTH, DAY, HOUR, MINUTE, etc. To do it, [Jira Workflow Toolbox](#) provides a comprehensive set of functions, all of them with TIMEZONE as input argument, since any significative number relative to a timestamp depends on the timezone.

Available time zones	Returned value
LOCAL or SERVER_LOCAL	Returns the time zone configured for the server running Jira.
USER_LOCAL	Returns the time zone of the current user .
RUN_AS_LOCAL	Returns the time zone of the selected Run as user .

Timezone Code	Injector	Timezone
LOCAL or SERVER_LOCAL	Insert	Jira server's timezone.
USER_LOCAL	Insert	timezone of current logged user.
RUN_AS_LOCAL	Insert	timezone of configured Run as user.
ACT ▾	Insert	absolute timezones.

Available languages	Returned value
SERVER_LANG	Returns the default language configured for the server running Jira.
USER_LANG	Returns the language of the current user .
RUN_AS_LANG	Returns the language of the selected Run as user .

Languages		
Language Code	Injector	Language
SERVER_LANG	Insert	default language configured in Jira server.
USER_LANG	Insert	language configured for the current user, i.e., the user executing the transition.
RUN_AS_LANG	Insert	language configured for the user which is selected as the Run as user.

Function	Returned value
timePart (number t , timeZone time_zone) : number	Returns the time part of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15 this function returns a numeric value representing time 23:15 in milliseconds.
datePart (number t , timeZone time_zone) : number	Returns the date part of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15 this function returns a numeric value representing date March , 25th 2011 00:00 in milliseconds.
second (number t , timeZone time_zone) : number	Returns the seconds figure of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15:30 this function returns a numeric value representing 30 seconds in milliseconds.
minute (number t , timeZone time_zone) : number	Returns the minutes figure of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15:30 this function returns a numeric value representing 15 minutes in milliseconds.
hour (number t , timeZone time_zone) : number	Returns the hours figure of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15:30 this function returns a numeric value representing 23 hours in milliseconds.

dayOfTheWeek (number t , timeZone time_zone) : number	Returns the day of the week of timestamp represented by numeric value t in time_zone time zone, with Sunday = 1, Monday = 2, ... Saturday = 7. Example: for timestamp March, 25th 2011 23:15 this function returns 6 for Friday, represented also by macro {FRIDAY} .
dayOfTheMonth (number t , timeZone time_zone) : number	Returns the day of the month of timestamp represented by numeric value t in time_zone time zone. Example: for timestamp March, 25th 2011 23:15 this function returns 25 .
month (number t , timeZone time_zone) : number	Returns the month of a timestamp represented by numeric value t in a certain time zone, with January = 1, February = 2, ... December = 12. Example: for timestamp March, 25th 2011 23:15 this function returns 3 for March, represented also by macro {MARCH} .
year (number t , timeZone time_zone) : number	Returns the year of a timestamp represented by numeric value t in a certain time zone. Example: for timestamp March, 25th 2011 23:15 this function returns 2011 .
addDays (number t , number n , timeZone time_zone) : number Available since version 2.3.3	Returns a timestamp resultant of adding n days to timestamp t . You should use this function instead of simply adding n * {DAY} , since {DAY} is a macro equivalent to 24 * {HOUR} , not taking into account that once in a year we have a day with 25 or 23 hours due to DST transition. Negative values for n are used in order to subtract instead of adding. Example: addDays(2018/03/27 01:00, -2, LOCAL) returns 2018/03/25 01:00 .
addMonths (number t , number n , timeZone time_zone) : number	Returns a timestamp resultant of adding n months to timestamp t . You should use this function instead of simply adding n * {MONTH} , since {MONTH} is a macro equivalent to 30 * {DAY} , not taking into account that some months has more or less than 30 days. Negative values for n are used in order to subtract instead of adding. Example: for timestamp t with value March, 25th 2011 23:15 calling to addMonths(t, 3, LOCAL) will return a timestamp with value June, 25th 2011 23:15 .
addYears (number t , number n , timeZone time_zone) : number	Returns a timestamp resultant of adding n years to timestamp t . You should use this function instead of simply adding 12 * {MONTH} or 365 * {DAY} , since that won't take into account that some years have 366 days. Negative values for n are used in order to subtract instead of adding. Example: for timestamp t with value March, 25th 2011 23:15 calling to addYears(t, 10, LOCAL) will return a timestamp with value March, 25th 2021 23:15 .
addTimeSkippingWeekends (number t , number timeToBeAdded , timeZone time_zone) : number	Adds timeToBeAdded to t with the difference that weekends don't count in the sum, e.g., if t represents a date-time which coincides with a Saturday, adding timeToBeAdded = 2 * {HOUR} will return a date-time for next Monday at 02:00 . Use negative values at timeToBeAdded for subtracting time from t .
addTimeSkippingWeekends (number t , number timeToBeAdded , timeZone time_zone , number beginning_of_weekend , number end_of_weekend) : number Available since version 2.2.7	Same as previous function, but with a custom defined weekend. Arguments beginning_of_weekend and end_of_weekend take values {MONDAY} , {TUESDAY} ... {SUNDAY} . Example of usage for adding 12 hours to Current date and time using Israeli weekend: addTimeSkippingWeekends({00057}, 12 * {HOUR}, LOCAL, {FRIDAY}, {SATURDAY}) , being {00057} field code for Current date and time .
addDaysSkippingWeekends (number t , number n , timeZone time_zone) : number	Returns a timestamp equivalent of t + n*{DAY} with the difference that weekends don't count in the sum, e.g., if t represents a timestamp which coincides with a Friday, adding n = 1 will return a date-time for next Monday. Negative values for n are used in order to subtract days to t . Note: n cannot be higher than 50000. Example: Set "Due date" 6 natural days (or work days) earlier than a "Date Picker" custom field
addDaysSkippingWeekends (number t , number n , timeZone time_zone , number beginning_of_weekend , number end_of_weekend) : number Available since version 2.2.7	Same as previous function, but with a custom defined weekend. Arguments beginning_of_weekend and end_of_weekend take values {MONDAY} , {TUESDAY} ... {SUNDAY} . Note: n cannot be higher than 50000. Example of usage for adding 10 workdays to Due date using Israeli weekend: addDaysSkippingWeekends({00012}, 10, LOCAL, {FRIDAY}, {SATURDAY}) , being {00012} field code for Due date .
subtractDatesSkippingWeekends (number minuend_date , number subtrahend_date , timeZone time_zone) : number	Returns a timestamp equivalent " minuend_date - subtrahend_date " subtracting weekend periods from the result, i.e., you get the elapsed working time from subtrahend_date to minuend_date .
subtractDatesSkippingWeekends (number minuend_date , number subtrahend_date , timeZone time_zone , number beginning_of_weekend , number end_of_weekend) : number Available since version 2.2.7	Same as previous function, but with a custom defined weekend. Arguments beginning_of_weekend and end_of_weekend take values {MONDAY} , {TUESDAY} ... {SUNDAY} . Example of usage calculating the worktime from Creation to Resolution using Israeli weekend: subtractDatesSkippingWeekends({00112}, {00009}, LOCAL, {FRIDAY}, {SATURDAY}) , being {00112} field code for Resolution date and time , and {00009} field code for Creation date and time .

dateToString (number t , timeZone time_zone , language) : string	Returns a string representing the date-time value at t , in a certain time zone , and in a certain language . This function is useful in post-function Copy parsed text to a field to represent as a string the result of a time expression.
dateTime (number year , number month , number dayOfMonth , number hourOfDay , number minute , timeZone time_zone) : number Available since version 2.3.3	This function is used for obtaining a date-time literal value from a set of numeric values representing a date-time timestamp. Example: dateTime(2018, 03, 25, 23, 15, LOCAL) returns 2018/03/25 23:15 .
dateTimeToString (number t , timeZone time_zone , language) : string	Returns a string representing the date-time value at t , in a certain time zone , and in a certain language . This function is useful in post-function Copy parsed text to a field to represent as a string the result of a time expression.
dateTimeToString (number t , string date_time_pattern , language) : string Available since version 2.1.33	Returns a string representing the date-time value at t with a certain custom format defined by date_time_pattern string parameter, using a certain language when using words for months, days of the week, etc. This function is useful in post-function Copy parsed text to a field to represent as a string the result of a time expression. Example: dateTimeToString(2011-03-25 11:30, "yyyy.MM.dd 'at' HH:mm:ss", USER_LANG) returns string "2011.03.25 at 11:30:00" .
dateTimeToString (number t , string date_time_pattern , time zone time_zone , language) : string Available since version 2.4.0	Returns a string representing the date-time value at t with a certain custom format defined by date_time_pattern string parameter, in a certain timezone time_zone , using a certain language when using words for months, days of the week, etc. This function is useful in post-function Copy parsed text to a field to represent as a string the result of a time expression. Example: dateTimeToString(0, "yyyy.MM.dd 'at' HH:mm:ss", GMT, USER_LANG) returns string "1970.01.01 at 00:00:00" . Example: dateTimeToString(0, "yyyy.MM.dd 'at' HH:mm:ss", MST, USER_LANG) returns string "1969.12.31 at 17:00:00" .
daysInTheMonth (number t , timeZone time_zone) : number Available since version 2.3.3	Returns the number of days in the month of timestamp t in timezone time_zone . Example: daysInTheMonth(2016/02/28 00:00, LOCAL) returns 29 , taking into account that 2016 is a leap year.
monthToString (number t , timeZone time_zone , language) : string	Returns a string with the name of the month for a date-time t , in a certain time zone , and in a certain language . This function can be used in post-function Copy parsed text to a field to write the name of the month of a date-time field or expression.
dayOfTheWeekToString (number t , timeZone time_zone , language) : string	Returns a string with the day of the week for a date-time t , in a certain time zone , and in a certain language . This function is useful in post-function Copy parsed text to a field to write the day of the week of a date-time field or expression.
stringToDate (string s , timeZone time_zone) : number Available since version 2.1.26	Returns a numeric value with the date-time represented by string s . The numeric value returned corresponds to the milliseconds elapsed since January 1, 1970, 00:00:00 GMT . Valid input string formats are yyyy/MM/dd HH:mm , yyyy-MM-dd HH:mm , yyyy/MM/dd , yyyy-MM-dd , also formats relative to current time like in JQL queries: "w" (weeks), "d" (days), "h" (hours) or "m" (minutes), or format defined at system property jira.date.timepicker.java.format . Example: Validation based on a Date type Project Property
stringToDate (string s , string date_time_pattern) : number Available since version 2.1.33	Returns a numeric value with the date-time represented by string s . Expected format of value at parameter "s" is defined by date_time_pattern string parameter. The numeric value returned corresponds to the milliseconds elapsed since January 1, 1970, 00:00:00 GMT . Example: stringToDate("2011.03.25 at 11:30:00", "yyyy.MM.dd 'at' HH:mm:ss") returns a date-time numeric value that can be used for setting a Date Time picker custom field.
stringToDate (string s , string date_time_pattern , string language , string country) : number Available since version 2.2.29	Returns a numeric value with the date-time represented by string s . Expected format of value at parameter "s" is defined by date_time_pattern string parameter for a specific language (language code ISO 639-2) and country (country code ISO 3166 alpha-2). The numeric value returned corresponds to the milliseconds elapsed since January 1, 1970, 00:00:00 GMT . Example: stringToDate("Dec 7, 2016 2:10:25 AM PST", "MMM d, yyyy h:mm:ss a z", "eng", "US") returns a date-time numeric value that can be used for setting a Date Time picker custom field.

timeInValue(string field field, boolean expression predicate) : number Available since version 2.6.0	Returns the number of milliseconds a string field with code {nnnnn} of the current issue has had a value satisfying a boolean expression predicate, where the string value of the field with code {nnnnn} is represented by ^. Example: timeInValue({00000}, ^ ~ "ERROR" OR ^ ~ "WARNING") returns the number of milliseconds the field summary (field code {00000}) of the current issue has contained any of the words "ERROR" or "WARNING", ignoring the case. Example: timeInValue({00094}, count(toStringList(^, ",")) > 1) returns the number of milliseconds the field components (field code {00094}) of the current issue has contained more than one selected component. Example: timeInValue({00017}, ^ in ["Critical", "High"]) returns the number of milliseconds the field priority (field code {00017}) of the current issue has had a value of Critical or High.
timeInValue(number field field, boolean expression predicate) : number Available since version 2.6.0	Returns the number of milliseconds a number or date-time field with code {nnnnn} of the current issue has had a value satisfying a boolean expression predicate, where the numeric value of the field with code {nnnnn} is represented by ^. Example: timeInValue({00012}, ^ != null) returns the number of milliseconds the field Due date (field code {00012}) of the current issue has had a value. Example: timeInValue({10001}, ^ >= 5 AND ^ <= 10) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) of the current issue has remained between 5 and 10. Example: timeInValue({10001}, modulus(^, 2) = 0) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) of the current issue has had an even value (2, 4, 6,...).
timeInValue(string field field, issue list issues, boolean expression predicate) : number Available since version 2.6.0	Returns the sum of milliseconds a string field with code {nnnnn} has had a value satisfying a boolean expression predicate in distinct issues, where the string value of the field with code {nnnnn} is represented by ^. Example: timeInValue({00000}, subtasks(), ^ ~ "ERROR" OR ^ ~ "WARNING") returns the sum of milliseconds the field summary (field code {00000}) of all sub-tasks of the current issue have contained any of the words "ERROR" or "WARNING", ignoring the case. Example: timeInValue({00094}, epic(), count(toStringList(^, ",")) > 1) returns the number of milliseconds the field components (field code {00094}) in a linked Epic issue have contained more than one selected component. Example: timeInValue({00017}, filterByIssueType(linkedIssues(), "Bug, New Feature"), ^ in ["Critical", "High"]) returns the sum of milliseconds all linked Bugs and New Features of the current issue have had a priority (field code {00017}) value of Critical or High.
timeInValue(number field field, issue list issues, boolean expression predicate) : number Available since version 2.6.0	Returns the sum of milliseconds a number or date-time field with code {nnnnn} has had a value satisfying a boolean expression predicate in distinct issues, where the numeric value of the field with code {nnnnn} is represented by ^. Example: timeInValue({00012}, subtasks(), ^ != null) returns the number of milliseconds the field Due Date (field code {00012}) of all sub-tasks of the current issue has had a value. Example: timeInValue({10001}, epic(), ^ >= 5 AND ^ <= 10) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) of an Epic issue has had a value between 5 and 10. Example: timeInValue({10001}, filterByIssueType(linkedIssues(), "Bug, New Feature"), modulus(^, 2) = 0) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) has had an even value in any linked Bug or New Feature.

timeInValue(string field field, boolean expression predicate, string schedule_name, timeZone time_zone) : number Available since version 2.6.0	Returns the number of milliseconds a string field with code %{nnnnn} of the current issue has had a value satisfying a boolean expression predicate, where the string value of the field with code %{nnnnn} is represented by ^. The time being calculated by this function is only counted during a defined schedule with name schedule_name for timeZone time_zone. Example: timeInValue(%{00000}, ^% ~~ "ERROR" OR ^% ~~ "WARNING", "my_schedule", LOCAL) returns the number of milliseconds the field summary (field code %{00000}) of the current issue has contained any of the words "ERROR" or "WARNING", ignoring the case, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue(%{00094}, count(toStringList(^%, ", ")) > 1, "my_schedule", LOCAL) returns the number of milliseconds the field components (field code %{00094}) of the current issue has contained more than one selected component, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue(%{00017}, ^% in ["Critical", "High"], "my_schedule", LOCAL) returns the number of milliseconds the current issue has had a priority value of Critical or High (field code %{00017}), within a schedule named my_schedule for the server's default time_zone.
timeInValue(number field field, boolean expression predicate, string schedule_name, timeZone time_zone) : number Available since version 2.6.0	Returns the number of milliseconds of a number or date-time field with code {nnnnn} of the current issue has had a values satisfying a boolean expression predicate, where the numeric value of the field with code {nnnnn} is represented by ^. The time being calculated by this function is only counted during a defined schedule with name schedule_name for timeZone time_zone. Example: timeInValue({00012}, ^ != null, "my_schedule", LOCAL) returns the number of milliseconds the field Due Date (field code {00012}) of the current issue has had a value, ignoring the case, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue({10001}, ^ >= 5 AND ^ <= 10, "my_schedule", LOCAL) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) of the current issue has had a value between 5 and 10, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue({10001}, modulus(^, 2) = 0, "my_schedule", LOCAL) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) in current issue has had an even value, within a schedule named my_schedule for the server's default time_zone.
timeInValue(string field field, issue list issues, boolean expression predicate, string schedule_name, timeZone time_zone) : number Available since version 2.6.0	Returns the sum of milliseconds a string field with code %{nnnnn} has had a value satisfying a boolean expression predicate in distinct issues, where the value of the field with code %{nnnnn} is represented by ^. The time being calculated by this function is only counted during a defined schedule with name schedule_name for timeZone time_zone. Example: timeInValue(%{00000}, subtasks(), ^% ~~ "ERROR" OR ^% ~~ "WARNING", "my_schedule", LOCAL) returns the sum of milliseconds the fields summary (field code %{00000}) of all sub-tasks of the current issue have contained any of the words "ERROR" or "WARNING", ignoring the case, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue(%{00094}, epic(), count(toStringList(^%, ", ")) > 1, "my_schedule", LOCAL) returns the number of milliseconds the field components (field code %{00094}) in the linked Epic issue has contained more than one selected component, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue(%{00017}, filterByIssueType(linkedIssues(), "Bug, New Feature"), ^% in ["Critical", "High"], "my_schedule", LOCAL) returns the sum of milliseconds all linked Bugs and New Features of the current issue have had a priority (field code %{00017}) value of Critical or High, within a schedule named my_schedule for the server's default time_zone.
timeInValue(number field field, issue list issues, boolean expression predicate, string schedule_name, timeZone time_zone) : number Available since version 2.6.0	Returns the sum of milliseconds number or date-time field with code {nnnnn} has had a value satisfying a boolean expression predicate in distinct issues, where the numeric value of the field with code {nnnnn} is represented by ^. The time being calculated by this function is only counted during a defined schedule with name schedule_name for timeZone time_zone. Example: timeInValue({00012}, subtasks(), ^ != null, "my_schedule", LOCAL) returns the number of milliseconds the field Due date (field code {00012}) of all sub-tasks of the current issue have had a value, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue({10001}, epic(), ^ >= 5 AND ^ <= 10, "my_schedule", LOCAL) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) in the linked Epic issue has had a value between 5 and 10, within a schedule named my_schedule for the server's default time_zone. Example: timeInValue({10001}, filterByIssueType(linkedIssues(), "Bug, New Feature"), modulus(^, 2) = 0, "my_schedule", LOCAL) returns the number of milliseconds a hypothetical numeric field called Passengers (field code {10001}) has had an even value in any linked Bug or New Feature, within a schedule named my_schedule for the server's default time_zone.

timeLogged (issue list issues) : number Available since version 2.3.3	Returns the sum of all the time logged in issues in milliseconds. Example: timeLogged(subtasks()) returns the sum of time logged in current issue's sub-tasks in milliseconds.
timeLogged (issue list issues , number datetime_ini , number datetime_end) : number Available since version 2.3.3	Returns the sum of all the time logged in issues in time interval defined by timestamps datetime_ini and datetime_end . If one or both parameters datetime_ini and datetime_end are null , then it's assumed that the time period hasn't low or high time limit respectively. Logged time is returned in milliseconds. Example: timeLogged(issuesUnderEpic(), datePart({00057}, LOCAL), addDays(datePart({00057}, LOCAL), 1, LOCAL)) returns the sum of time logged today in issues under current issue's Epic. Note that {00057} is field code for Current date and time .
timeLogged (issue list issues , string user) : number Available since version 2.3.3	Returns all the time logged in issues by user with username user . Logged time is returned in milliseconds. Argument user can contain a single user name (not be confused with user's full name), or a comma separated list of usernames, group names or project role names. Example: timeLogged(linkedIssues(), %{00003}) returns the sum of time logged by the assignee on linked issues. Note that %{00003} is field code for Assignee .
timeLogged (issue list issues , number datetime_ini , number datetime_end , string user) : number Available since version 2.3.3	Returns the sum of all the time logged in issues by user in time interval defined by timestamps datetime_ini and datetime_end . If one or both parameters datetime_ini and datetime_end are null , then it's assumed that the time interval hasn't low or high time limit respectively. Logged time is returned in milliseconds. Argument user can contain a single username (not be confused with user's full name), or a comma separated list of usernames, group names or project role names. Example: timeLogged(subtasks(), 2018/01/01, 2019/01/01, %{00003}) returns the sum of time logged by the assignee on subtasks during 2018. Note that %{00003} is field code for Assignee .
formatDuration (number duration) : string Available since version 2.2.30	Returns a string with the pretty representation of a time duration, i.e. a subtraction of 2 date-time values, using the language of current user's profile. Example: formatDuration(2017-01-31 11:30 - 2017-01-30 00:00) returns "1 day, 11 hours, 30 minutes" .
lastDayOfMonth (number t , timeZone time_zone) : number Available since version 2.3.3	Returns the timestamp for the last day of the month of timestamp t in timezone time_zone . The timestamp returned is at 00:00 , i.e., just the beginning of the day. Example: lastDayOfMonth(2017/02/05 11:31, LOCAL) returns 2017/02/28 00:00 .
nextDayOfWeek (number t , number dayOfWeek , timeZone time_zone) : number Available since version 2.3.3	Returns the timestamp for the next day of the week represented by dayOfWeek since timestamp t in timezone time_zone . The timestamp returned is at 00:00 , i.e., just the beginning of the day. Example: nextDayOfWeek(2018/03/01 12:31, {SUNDAY}, LOCAL) returns 2018/03/04 00:00 , taking into account that 2018/03/01 is Thursday. Example: nextDayOfWeek(2018/03/01 12:31, {THURSDAY}, LOCAL) returns 2018/03/08 00:00 .
weekOfYear (number t , number firstDayOfWeek , number minimalDaysInFirstWeek , timeZone time_zone) : number Available since version: 2.6.0	Returns the week of the year of the date-time t in a certain time_zone . The parameter firstDayOfWeek represents the first day of the week, e.g.: {SUNDAY} in the U.S., and {MONDAY} in Germany. The parameter minimalDaysInFirstWeek represents the minimal number of days required in the first week of the year, e.g., if the first week is defined as the one that contains the first day of the first month of the year, value 1 should be used. If the minimal number of days required must be a full week (e.g. all days of the week need to be in that year), value 7 should be used. Examples: weekOfYear(2023/01/03, {SUNDAY}, 1, LOCAL) returns 1 weekOfYear(2023/01/03, {MONDAY}, 1, LOCAL) returns 2 weekOfYear(2023/01/03, {MONDAY}, 7, LOCAL) returns 1 - Europe: weekOfYear(2023/01/04, {MONDAY}, 4, LOCAL) - America (South and North), Southern Africa: weekOfYear(2023/01/04, {SUNDAY}, 1, LOCAL) - Australia, New Zealand: weekOfYear(2023/01/04, {MONDAY}, 1, LOCAL) - Algeria: weekOfYear(2023/01/04, {SATURDAY}, 1, LOCAL) More info: https://www.epochconverter.com/weeknumbers
dayOfYear (number t , timeZone time_zone) : number Available since version: 2.6.0	Returns the day of the year of date-time t in a certain time_zone , e.g. for January 1st the value returned will be 1. Example: dayOfYear(2019/02/01, LOCAL) returns 32
shortFormatDuration (number duration) : string Available since version 2.2.30	Returns a string with the most compact representation possible of a time duration, i.e. a subtraction of 2 date-time values, using the language of current user's profile. Example: shortFormatDuration(2017-01-31 11:30 - 2017-01-30 00:00) returns "1d 11h 30m" .

formatWorkDuration (number duration) : string Available since version 2.2.34	Similar to function formatDuration() but using the workday and workweek defined at time tracking configuration , instead of 24 hours per day and 7 days per week. Example: formatWorkDuration(5 * 8 * {HOURLY} + 2 * 8 * {HOURLY} + 3 * {HOURLY}) returns "1 week, 2 days, 3 hours", with 8 hours per workday and 5 days per workweek.
shortFormatWorkDuration (number duration) : string Available since version 2.2.34	Similar to function shortFormatDuration() but using the workday and workweek defined at time tracking configuration , instead of 24 hours per day and 7 days per week. Example: formatWorkDuration(5 * 8 * {HOURLY} + 2 * 8 * {HOURLY} + 3 * {HOURLY}) returns "1w 2d 3h" , with 8 hours per workday and 5 days per workweek.
timeZone (string timeZone_name) : timeZone Available since version 2.2.39	Returns the timeZone whose name is represented by string timeZone_name. This function is useful to obtain a timeZone from a string, like the value of a Project Properties. Example: timeZone("DST") returns DST timeZone.
timeInStatus (string status_name) : number Available since version 2.4.4	Returns the number of milliseconds the current issue has remained in a status with name status_name. If an issue has been in that status more than once, then duration will be summed up and the total time spent in the status will be returned. Example: timeInStatus("Open") returns the number of milliseconds the current issue has stayed in status "Open". In order to display this value in a more readable way, the milliseconds should be transformed into a more readable unit, like in the following example: timeInStatus("Open") / {DAY} - for number of days, or timeInStatus("Open") / {HOURLY} - for number of hours.
timeInStatus (string status_name , string schedule_name , timeZone time_zone) : number Available since version 2.4.4	Returns the number of milliseconds the current issue has remained in a status with name status_name within a schedule named schedule_name for a given time_zone timeZone. If an issue has been in that status more than once, then duration will be summed up and the total time spent in the status will be returned. Example: timeInStatus("Open", "my_schedule", LOCAL) returns the number of milliseconds the current issue has stayed in status "Open" within the schedule called "my_schedule" matching the server's default timeZone.
timeInStatus (string status_name , issue list issues) : number Available since version 2.4.4	Returns the sum of milliseconds issues in an issue list issues have remained in a status with name status_name . If an issue from that list has been in that status more than once, then duration will be summed up and the total time spent in the status will be returned. Example: timeInStatus("Open", subtasks()) returns the number of milliseconds the current issue's sub-tasks have stayed in status "Open".
timeInStatus (string status_name , issue list issues , string schedule_name , timeZone time_zone) : number Available since version 2.4.4	Returns the sum of milliseconds issues in an issue list issues have remained in a status with name status_name within a schedule named schedule_name for a given time_zone timeZone. If an issue from that list has been in that status more than once, then duration will be summed up and the total time spent in the status will be returned. Example: timeInStatus("Open", subtasks(), "my_schedule", LOCAL) returns the number of milliseconds the current issue's sub-tasks have stayed in status "Open" within the schedule called "my_schedule" matching the server's default timeZone.
fieldChangeTimes (string field field , boolean expression predicate) : number list Available since version 2.6.0	Returns the timestamps of when a string value of field with code %{nnnnn} has changed satisfying a certain predicate that depends on the values of the field before and after the value change. The string value before the change is represented by ^0%, and after the change by ^1%. The timestamps are returned as a number list sorted in ascending order. Example: fieldChangeTimes(%{00000}, ^0% !~~ "IMPORTANT" AND ^1% ~~ "IMPORTANT") returns the list of timestamps when the word "IMPORTANT" has been added to the current issue's summary (field code %{00000}) ignoring the case. Example: fieldChangeTimes(%{00017}, ^0% = null AND ^1% != null) returns the list of timestamps of when the issue's priority (field code %{00017}) of the current issue has been set. Example: fieldChangeTimes(%{00017}, ^0% not in ["Critical", "High"] AND ^1% in ["Critical", "High"]) returns the list of timestamps when current issue's priority (field code %{00017}) has become Critical or High.

fieldChangeTimes (number field field , boolean expression predicate) : number list Available since version 2.6.0	Returns the timestamps of when a numeric / date-time value of field with code {nnnnn} has changed satisfying a certain predicate that depends on the values of the field before and after the value change. The numeric value before the change is represented by ^0 , and after the change by ^1 . The timestamps are returned as a number list sorted in ascending order. Example: fieldChangeTimes({00012}, ^0 < ^1) returns the timestamps of when the Due date (field code {00012}) has been edited to a higher value. Example: fieldChangeTimes({10001}, abs(^0 - ^1) / ^0 >= 0.25) returns the timestamps of when a hypothetical numeric field called Passengers (field code {10001}) has been edited with a variation of at least 25% over its previous value.
fieldChangeTimes (string field field , issue list issues , boolean expression predicate) : number list Available since version 2.6.0	Returns the timestamps of when a string value of fields with code %{nnnnn} in distinct parameter issues have changed satisfying certain predicate that depends on the values of the fields before and after the value change. The string value before the change is represented by ^0% , and after the change by ^1% . The timestamps are returned as a number list containing a sequence of sorted numeric values in ascending order for each parameter issue. Example: fieldChangeTimes(%{00000}, subtasks(), ^0% !~~ "IMPORTANT" AND ^1% ~~ "IMPORTANT") returns the list of timestamps of when the word "IMPORTANT" has been added the the summary (field code %{00000}) of all current issue's sub-tasks, ignoring the case. Example: fieldChangeTimes(%{00017}, epic(), ^0% = null AND ^1% != null) returns the list of timestamps of when the issue priority (field code %{00017}) of the current issue's epic has been set. Example: fieldChangeTimes(%{00017}, linkedIssues("is blocked by"), ^0% not in ["Critical", "High"] AND ^1% in ["Critical", "High"]) returns the list of timestamps of when the priority (field code %{00017}) in all blocking linked issues has become Critical or High .
fieldChangeTimes (number field field , issue list issues , boolean expression predicate) : number list Available since version 2.6.0	Returns the timestamps of when a numeric value of fields with code {nnnnn} in distinct parameter issues have changed satisfying a certain predicate that depends on the values of the fields before and after the value change. The numeric value before the change is represented by ^0 , and after the change by ^1 . The timestamps are returned as a number list containing a sequence of sorted numeric values in ascending order for each parameter issue. Example: fieldChangeTimes({00012}, subtasks(), ^0 < ^1) returns the timestamps of when the Due Date (field code {00012}) has been edited to a higher value in any of the current issue's sub-tasks. Example: fieldChangeTimes({10001}, epic(), abs(^0 - ^1) / ^0 >= 0.25) returns the timestamps when a hypothetical numeric field called Passengers (field code {10001}) in the current issue's epic has been edited with a variation of at least 25% over its previous value
lastFieldChangeTime (string field field) : number Available since version 2.6.0	Returns the timestamp of most recent value update of a field with code %{00000} . Example: lastFieldChangeTime(%{00000}) returns the timestamp of the last update of an issue's summary (field code {00000}).

Functions for [Custom Schedules](#) (since version 2.2.39)

Function	Returned value
inSchedule (number time_instant , string schedule_name , timeZone time_zone) : boolean Available since version 2.2.39	Returns true if the time instant time_instant belongs to the schedule with name schedule_name for time_zone timezone. Example: inSchedule(2017/12/01 7:30, "my_schedule", LOCAL) returns false . Example: inSchedule(2017/12/01 8:00, "my_schedule", LOCAL) returns true . Example: inSchedule(2017/12/01 17:00, "my_schedule", LOCAL) returns false . Example: inSchedule(2017/12/04 17:00, "my_schedule", LOCAL) returns true .
inSchedule (number time_instant , string schedule_name , string additional_terms , timeZone time_zone) : boolean Available since version 2.2.39	Similar to previous function, but with extra parameter additional_terms , which is a string containing extra Schedules Definition Grammar clauses that will be attached to schedule with name schedule_name . This function can be used to include personal holidays to an existing schedule. Example without additional terms: inSchedule(2017/12/04 9:00, "my_schedule", LOCAL) returns true . Example with additional terms: inSchedule(2017/12/04 9:00, "my_schedule", "2017/12/04 {;}", LOCAL) returns false .

timeDifference (number higher_instant , number lower_instant , string schedule_name , timeZone time_zone) : number Available since version 2.2.39	Returns the number of milliseconds elapsed from lower_instant to higher_instant within schedule with name schedule_name for time_zone timezone. Example: timeDifference(2017/12/04 10:01, 2017/12/01 01:00, "my_schedule", LOCAL) returns $8 * \{\text{HOUR}\} + 31 * \{\text{MINUTE}\}$. Example: timeDifference(2017/12/04 17:00, 2017/12/04 14:00, "my_schedule", LOCAL) returns $2 * \{\text{HOUR}\} + 30 * \{\text{MINUTE}\}$.
timeDifference (number higher_instant , number lower_instant , string schedule_name , string additional_terms , timeZone time_zone) : number Available since version 2.2.39	Similar to previous function, but with extra parameter additional_terms , which is a string containing extra Schedules Definition Grammar clauses that will be attached to schedule with name schedule_name . This function can be used to include personal holidays to an existing schedule. Example without additional terms: timeDifference(2017/12/05 18:00, 2017/12/01 9:00, "my_schedule", LOCAL) returns $25 * \{\text{HOUR}\}$. Example with additional terms: timeDifference(2017/12/05 18:00, 2017/12/01 9:00, "my_schedule", "2017/12/04 {;}", LOCAL) returns $15 * \{\text{HOUR}\}$.
addTime (number base_instant , number offset , string schedule_name , timeZone time_zone) : number Available since version 2.2.39	Returns the time instant resulting of adding offset milliseconds to base_instant within schedule with name schedule_name for time_zone timezone. Example: addTime(2017/12/01 01:00, 8 * {HOUR} + 31 * {MINUTE}, "my_schedule", LOCAL) returns 2017/12/04 10:01. Example: addTime(2017/12/04 14:00, 2 * {HOUR} + 30 * {MINUTE}, "my_schedule", LOCAL) returns 2017/12/04 17:00. Since version 2.2.41 negative offset values are supported: Example: addTime(2017/04/24 09:00, - 2 * {HOUR}, "my_schedule", LOCAL) returns 2017/04/21 14:00. Example: addTime(2017/04/20 20:30, - 5 * {HOUR}, "my_schedule", LOCAL) returns 2017/04/20 13:00.
addTime (number base_instant , number offset , string schedule_name , string additional_terms , timeZone time_zone) : number Available since version 2.2.39	Similar to previous function, but with extra parameter additional_terms , which is a string containing extra Schedules Definition Grammar clauses that will be attached to schedule with name schedule_name . This function can be used to include personal holidays to an existing schedule. Example without additional terms: addTime(2017/12/01 9:00, 25 * {HOUR}, "my_schedule", LOCAL) returns 2017/12/05 18:00. Example with additional terms: addTime(2017/12/01 9:00, 25 * {HOUR}, "my_schedule", "2017/12/04 {;}", LOCAL) returns 2017/12/06 18:00.
nextTime (number time_instant , string schedule_name , timeZone time_zone) : number Available since version 2.2.40	If time_instant doesn't belong to schedule with name schedule_name , then returns closer time in the future that belongs to the schedule, otherwise returns time_instant . Example: nextTime(2017/12/01 01:00, "my_schedule", LOCAL) returns 2017/12/01 08:00. Example: nextTime(2017/12/01 15:00, "my_schedule", LOCAL) returns 2017/12/04 08:00. Example: nextTime(2017/12/01 08:00, "my_schedule", LOCAL) returns 2017/12/01 08:00. Example: nextTime(2017/11/30 15:00, "my_schedule", LOCAL) returns 2017/11/30 16:00.
nextTime (number time_instant , string schedule_name , string additional_terms , timeZone time_zone) : number Available since version 2.2.40	Similar to previous function, but with extra parameter additional_terms , which is a string containing extra Schedules Definition Grammar clauses that will be attached to schedule with name schedule_name . This function can be used to include personal holidays to an existing schedule. Example without additional terms: nextTime(2017/12/01 15:00, "my_schedule", LOCAL) returns 2017/12/04 08:00. Example with additional terms: nextTime(2017/12/01 15:00, "my_schedule", "2017/12/04 {;}", LOCAL) returns 2017/12/05 8:00.

In the examples above we have used schedule "my_schedule", whose definition in [Schedules Definition Grammar](#) is:

```
MON - THU { 08:00 - 15:30, 16:00 - 19:30; } FRI { 08:00 - 15:00; }
```

```

1  MON-THU {
2      08:30 - 15:30,
3      16:00 - 19:30;
4  }
5
6  FRI {
7      08:00 - 15:00;
8  }

```

Note that **2017/04/21** and **2017/12/01** are Fridays.

Custom schedules are defined at **Administration > Add-ons > JIRA WORKFLOW TOOLBOX > Schedules**.

Available languages:		
SERVER_LANG	INSERT	default language configured in JIRA server.
USER_LANG	INSERT	language configured for the current user, i.e., the user executing the transition.

Time Macros

Date-Time values are numeric values representing the number of **milliseconds** elapsed since **January 1, 1970, 00:00:00 GMT**. Macros are **aliases for literal values**. A comprehensive set of time macros is provided to make your expressions more readable.

Macro	Equivalent value
{SECOND}	1000
{MINUTE}	1000 * 60
{HOUR}	1000 * 60 * 60
{DAY}	1000 * 60 * 60 * 24
{WEEK}	1000 * 60 * 60 * 24 * 7
{MONTH}	1000 * 60 * 60 * 24 * 30
{YEAR}	1000 * 60 * 60 * 24 * 365

The following macros are available to be used with function **dayOfTheWeek(t, time_zone)**:

Macro	Equivalent value
{SUNDAY}	1
{MONDAY}	2
{TUESDAY}	3
{WEDNESDAY}	4
{THURSDAY}	5
{FRIDAY}	6
{SATURDAY}	7

The following macros are available to be used with function **month(t, time_zone)**:

Macro	Equivalent value
{JANUARY}	1
{FEBRUARY}	2
{MARCH}	3
{APRIL}	4
{MAY}	5
{JUNE}	6
{JULY}	7
{AUGUST}	8
{SEPTEMBER}	9
{OCTOBER}	10
{NOVEMBER}	11
{DECEMBER}	12

Text-String terms

Literal values

- String literals are written in **double quotes**, e.g., **"This is a string literal."**
- Operator **+** is used for doing strings **concatenation**. e.g., **"This is" + " a string." = "This is a string."**
- **Escape character** is ****. This character can precede any of the following characters: **", \, n, r, t, f** and **b** in order to invoke an alternative interpretation. For example, if you want to introduce a double quote in a string literal you should precede it with escape character **** as in **"The man said: \"Hello!\"."**, where we are using escape character **** to write string **Hello!** in double quotes.

Field values

Text-String field values can be inserted in expressions using field codes with format **%{nnnnn}**, or **%{nnnnn.i}** for referencing concrete levels in cascading select fields (i = 0 for base level).

For checking if a field is initialized you can use **%{nnnnn} = null** or **%{nnnnn} != null**. For a concrete level in a **Cascading Select** or **Multi-Cascading Select** field, you should use **%{nnnnn.i} = null** or **%{nnnnn.i} != null**.

Any field type has a string value, so you can also use **%{nnnnn}** to insert string values of fields of types **Number**, **Date**, **Date-Time** and **Priority**.

String Functions

Function	Returned value
trim (string s) : string	Returns a copy of s without leading and trailing blanks (space and tab characters). Example: trim(" Hello World! ") returns "Hello World!" .
substring (string s, number beginIndex, number endIndex) : string	Returns a substring of s beginning at index beginIndex and ending at endIndex - 1 . Thus the length of the substring is endIndex-beginIndex . Example: substring("smiles", 1, 5) returns "mile" .
toUpperCase (string s) : string	Returns string s with all its characters converted to upper case. Example: toUpperCase("heLlo WORLD!") returns "HELLO WORLD!" .
toLowerCase (string s) : string	Returns string s with all its characters converted to lower case. Example: toLowerCase("heLlo WORLD!") returns "hello world!" .
capitalizeWords (string s) : string Available since version 2.1.34	Capitalizes all the whitespace separated words in string s . Example: capitalizeWords("heLlo WORLD!") returns "HeLlo WORLD!" .

capitalizeWordsFully (string s) : string Available since version 2.1.34	Converts all the whitespace separated words in string s into capitalized words, that is each word is made up of a titlecase character and then a series of lowercase characters. Example: capitalizeWordsFully ("heLLo WORLD!") returns "Hello World!" .
replaceAll (string s , string regexp , string replacement) : string	Returns a copy of s where each substring matching the given regular expression regexp has been replaced with the given replacement string. Example: replaceAll (" Hello World ", "\\s", "") returns "Helloworld" .
replaceFirst (string s , string regexp , string replacement) : string	Returns a copy of s where the first substring matching the given regular expression regexp has been replaced with the given replacement string. Example: replaceFirst ("Hello World", "l", "_") returns "He_lo World" .
matches (string s , string regexp) : boolean	Returns a boolean value true if string s matches regular expression regexp , otherwise returns false . Example: matches ("readme.txt", ".*\\.txt\$") returns true .
findPattern (string s , string regexp) : string list Available since version 2.1.32	Returns a string list with all substrings in argument s matching regular expression in string argument regexp . Example: findPattern ("Between 1900 and 2000 world population increase from 1.5 to 6.1 billions.", "\\d+(\\.\\d+)?") returns ["1900", "2000", "1.5", "6.1"] .
findPatternIgnoreCase (string s , string regexp) : string list Available since version 2.1.32	Returns a string list with all substrings in argument s matching regular expression in string argument regexp . Evaluation of the regular expression is carried out in ignoring case mode. Example: findPatternIgnoreCase ("Grass is Green and Sky is Blue.", "red green blue") returns ["Green", "Blue"] .
findModify (string s , string regexp , string replacement_expression) : string Available since version 2.2.12	Returns a string like s , but where all substrings matching regexp have been replaced with the result of evaluating replacement_expression against each these substrings. Argument text_expression is an expression that returns a string , where ^% represents each of the matching substrings, and ^ represents the order of appearance beginning with 1. Example: findModify ("The cure for boredom is curiosity.", "[aeiou]", modulus(^, 2) = 1 ? toUpperCase(^%) : ^%) returns "ThE curE for bOredOm is cUriOsity." .
findReplaceAll (string s , string find , string replacement) : string list Available since version 2.1.32	Returns a string with content of argument s where every occurrence of substring find has been replaced with string replacement . Example: findReplaceAll ("Goodbye my love, hello my friend.", "my", "your") returns "Goodbye your love, hello your friend." .
findReplaceAllIgnoreCase (string s , string find , string replacement) : string list Available since version 2.1.32	Returns a string with content of argument s where every occurrence of substring find , ignoring the case, has been replaced with string replacement . Example: findReplaceAllIgnoreCase ("Hello my love, hello my friend.", "hello", "Goodbye") returns "Goodbye my love, Goodbye my friend." .
findReplaceFirst (string s , string find , string replacement) : string list Available since version 2.1.32	Returns a string with content of argument s where first occurrence of substring find has been replaced with string replacement . Example: findReplaceFirst ("Goodbye my love, hello my friend.", "my", "your") returns "Goodbye your love, hello my friend." .
findReplaceFirstIgnoreCase (string s , string find , string replacement) : string list Available since version 2.1.32	Returns a string with content of argument s where first occurrence of substring find , ignoring the case, has been replaced with string replacement . Example: findReplaceFirstIgnoreCase ("Goodbye my love, hello my friend.", "My", "your") returns "Goodbye your love, hello my friend." .
length (string s) : number	Returns a numeric value with the length of s . Example: length ("Star Wars") returns 9 .
getAscii (number code) : string Available since version 2.2.12	Returns a string containing the symbol corresponding to a extended ASCII code (0 <= code <= 255). Example: getAscii (65) returns "A" .

similarity (string s1 , string s2) : number Available since version 2.2.29	Returns a numeric value between 0 and 100 representing the percentage of similarity between two strings based on the Jaro Winkler similarity algorithm . 100 represents full equivalence , and 0 represents zero similarity between both string arguments. Examples: similarity("JIRA Workflow Toolbox", "jira workflow toolbox") returns 100 similarity("JIRA Workflow Toolbox", "Jira WorflowTolbox") returns 97 similarity("My Gym. Childrens Fitness", "My Gym Children's Fitness Center") returns 92 similarity("D N H Enterprises Inc", "D & H Enterprises, Inc.") returns 91 similarity("ABC Corporation", "ABC Corp'") returns 92 similarity("Hello World!", "Bye bye World!") returns 69 similarity("I caught a lizard", "This is my giraffe") returns 51
escapeHTML (string s) : string Available since version 2.2.30	Escapes the characters in a string s using HTML entities. Example: escapeHTML("<Français>") returns "&lt;Fran&ccedil;ais&gt;" .
unescapeHTML (string s) : string Available since version 2.2.30	Unescapes string s containing entity escapes to a string containing the actual Unicode characters corresponding to the escapes. Example: unescapeHTML("&quot;bread&quot; & &quot;butter&quot;") returns "\"bread\" & \"butter\"" .
wikiToHTML (string s) : string Available since version 2.2.32	Renders rich text wiki content into HTML. Example: wikiToHTML("+Hello *world*!+") returns "<p><ins>Hello world!</ins></p>" .
htmlToTxt (string s) : string Available since version 2.4.0	Renders html content into plain text by removing all the html tags. Example: htmlToTxt("<p>Hello world!</p>") returns "Hello world!" .
status (number id) : string Available since version 2.5.0	Returns the name of the status with the id id . Example: status(1) returns the status name with the id 1 .
resolution (number id) : string Available since version 2.5.0	Returns the name of the resolution with the id id . Example: status(10000) returns the resolution name with the id 10000 .
issueType (number id) : string Available since version 2.5.0	Returns the name of the issue type with the id id . Example: issueType(10000) returns the issue type name with the id 10000 .
option (number id) : string Available since version 2.5.0	Returns the name of the option with the id id . Example: option(10000) returns the option name with the id 10000 .
priority (number id) : string Available since version 2.5.0	Returns the name of the priority with the id id . Example: priority(1) returns the priority name with the id 1 .
issueSecurityLevel (number id) : string Available since version 2.5.0	Returns the name of the issue security level with the id id . Example: issueSecurityLevel(10000) returns the issue security level name with the id 10000 .
project (number id) : string Available since version 2.5.0	Returns the key of the project with the id id . Example: project(10000) returns the project key of the project with the id 10000 .

List Management Operators

There are 3 different **list-kind** data types. i.e., types that are based on lists, or ordered collections of elements. These data types are: **issue list**, **number list** and **string list**, and are described below in this page.

There are 4 utility operators available for working on **list-kind** data types:

Operator	Behavior	Examples
I APPEND m	Returns a list with elements in I followed by elements in m , therefore the number of elements is the sum of the number of elements in I and m . Order is respected. It may contain repeated elements.	[1, 2, 3] APPEND [3, 4, 4] = [1, 2, 3, 3, 4, 4] ["blue", "red", "red"] APPEND ["red", "green"] = ["blue", "red", "red", "red", "green"] subtasks() UNION subtasks() returns a list containing twice all the sub-tasks of current issue.
I UNION m	Returns a list with elements in I and elements m without repetitions. Order is respected.	[1, 2, 3] UNION [3, 4, 4] = [1, 2, 3, 4] ["blue", "red", "red"] UNION ["red", "green"] = ["blue", "red", "green"] linkedIssues() UNION subtasks() returns a list with linked issues and sub-tasks of current issue without repetitions.
I INTERSECT m	Returns a list with the elements present in both lists simultaneously. Returned list doesn't contain element repetitions. Order is respected.	[1, 1, 2, 3] INTERSECT [1, 3, 5] = [1, 3] ["red", "blue", "blue"] INTERSECT ["blue", "yellow", "yellow"] = ["blue"] linkedIssues() INTERSECT subtasks() returns a list with those sub-tasks which are also linked to current issue.
I EXCEPT m	Returns a list with elements in I which are not present in list m . Returned list doesn't contain element repetitions. Order is respected.	[1, 2, 2, 3, 3] EXCEPT [2, 5, 6] = [1, 3] ["red", "red", "blue", "blue", "green"] EXCEPT ["blue", "yellow"] = ["red", "green"] linkedIssues() EXCEPT subtasks() returns a list with linked issues which are not sub-tasks of current issue.

Notice that:

- **I** and **m** are both lists of the same data type: **number**, **string** or **issues**.
- These operators are case insensitive, i.e., they can also be written in lower case: **append**, **union**, **intersect** and **except**.
- There are 4 equivalent and homonym functions available for each type of list, and its behavior is exactly equivalent to that of its corresponding operator. This way, you can choose to use operators or functions according to your preference. Although operators yield shorter expressions and with fewer parentheses, the usage of functions produces a more functional consistent syntax.

Precedence Order and Associativity

OPERATORS	PRECEDENCE	ASSOCIATIVITY
I INTERSECT m	1 (highest)	Left-to-Right
I UNION m, I EXCEPT m, I APPEND m	2 (lowest)	Left-to-Right

Issue List terms

Issue list data type is an ordered list of issues. This data type is returned by functions for doing issue a selections of issues (linked issues, sub-tasks, issues in a project, and subsets of them).

Issue List Functions (Issue Selection and Fields Values Retrieval)

The following functions are intended to build expressions that reference linked issues, sub-tasks, or doing any kind of issue selections, and for retrieving their field values. Data types returned by these functions are **Issue List** for doing issue selections, and **String List** or **Number List** for retrieving issue fields.

Function	Returned value
subtasks() : issue list	Returns the list of sub-tasks of current issue.
subtasks(issue list issues) : issue list	Returns the list of sub-tasks of issues in argument issues . Duplicated issues in argument issues are discarded. Example: subtasks(linkedIssues()) returns the list of sub-tasks of linked issues.
subtasks(string issue_keys) : issue list	Returns the list of sub-tasks of issues whose keys are in issue_keys . Argument issue_keys is a comma separated list of issue keys. Duplicated issue keys in argument issue_keys are discarded. Example: subtasks(%{00041}) returns the list of sub-tasks of parent issue, i.e., sibling sub-tasks plus current sub-task.
siblingSubtasks() : issue list Available since version 2.2.1	Returns the list of sibling sub-tasks of current issue, i.e., all sub-tasks with the same parent as current issue, except current issue. In case current issue is not a sub-task, an empty issue list will be returned. Note that siblingSubtasks() is equivalent to subtasks(%{00041}) EXCEPT issueKeysToIssueList(%{00015}) , where %{00041} is Parent's issue key and %{00015} is Issue key .
siblingSubtasks(issue list issues) : issue list Available since version 2.2.1	Returns the list of sibling sub-tasks of issues in argument issues , provided they are sub-tasks. Duplicated issues in argument issues are discarded.
siblingSubtasks(string issue_keys) : issue list Available since version 2.2.1	Returns the list of sibling sub-tasks of issues whose keys are in issue_keys , provided they are sub-tasks. Argument issue_keys is a comma separated list of issue keys. Duplicated issue keys in argument issue_keys are discarded.
linkedIssues() : issue list	Returns the list of issues linked to current issue, including Epic-Task links. An issue appears in the output as many times as is linked to current issue. Function distinct(issue list) can be used to remove duplicated issues. Example: distinct(linkedIssues()) EXCEPT linkedIssues("has Epic, is Epic of") returns all the issues linked to current issue, excluding Epic-Task issue links.
linkedIssues(string issue_link_types) : issue list	Returns the list of issues linked to current one using issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or an empty string ("") for representing all issue link types, i.e., linkedIssues("") is equivalent to linkedIssues() . Example: linkedIssues("blocks, clones") returns all issues linked with to current issue using issue link types blocks or clones .
linkedIssues(string issue_link_types, issue list issues) : issue list	Returns the list of issues linked to those ones in argument issues using issue link types in argument issue_link_types . Duplicated issues in argument issues are discarded. Example: linkedIssues("", subtasks()) returns all issues linked to current issue's sub-tasks using any issue link type.
linkedIssues(string issue_link_types, string issue_keys) : issue list	Returns the list of issues linked to those ones whose keys are in argument issue_keys . Argument issue_keys is a comma separated list of issue keys. Duplicated issue keys in argument issue_keys are discarded. Example: linkedIssues("is blocked by", %{00041}) returns all issues blocking parent issue. Note that %{00041} is field code for Parent's issue key .
transitionLinkedIssues(string issue_link_types) : issue list Available since version 2.1.21	Returns the list of issues linked to current one with links created in current transition screen using issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or an empty string ("") for representing all issue link types, i.e., transitionLinkedIssues("") is equivalent to transitionLinkedIssues() . This function is useful for validating only new issue links created by user in transition screen. Example: transitionLinkedIssues("blocks, clones") returns the list of issues linked in current transition's screen using issue link types blocks and clones .
transitivelyLinkedIssues(string issue_link_types) : issue list Available since version 2.1.22	Returns the list of issues directly or transitively linked to current issue using issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or an empty string ("") for representing all issue link types. Example of transitive link: if ISSUE-1 blocks ISSUE-2 blocks ISSUE 3 , then ISSUE-1 is blocking transitively ISSUE-3 .
transitivelyLinkedIssues(string issue_link_types, issue list issues) : issue list Available since version 2.1.22	Returns the list of issues directly or transitively linked to those ones in argument issues using issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or an empty string ("") for representing all issue link types.

transitivelyLinkedIssues (string issue_link_types , string issue_keys) : issue list Available since version 2.1.22	Returns the list of issues directly or transitively linked to those ones in argument issue_keys using issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or an empty string ("") for representing all issue link types.
epic() : issue list Available since version 2.3.0	Returns an issue list containing current issue's epic, in case current issue is directly under an epic (e.g., a Story). If current issue is a sub-task, then the epic of its parent issue is returned. If current issue is an epic itself, then current issue is returned.
epic (issue list issues) : issue list Available since version 2.3.0	Returns the list of epic issues under which those issues in argument issues are. If some of those issues are sub-tasks, then the epic of their parent is returned. Duplicated issues in argument issues are discarded. Output can contain duplicated issues. Example: epic(linkedIssues("is blocked by")) returns the list of epics of those issues which are blocking current issue.
epic (string issue_keys) : issue list Available since version 2.3.0	Returns the list of epic issues under which those issues with keys in issue_keys are. If some of those issues are sub-tasks, the epic of their parent is returned. Argument issue_keys is a comma separated list of issue keys. Duplicated issue keys in argument issue_keys are discarded. Output can contain duplicated issues. Example: epic("CRM-15, HD-21") returns the list of epics under which issues with keys CRM-15 and HD-21 are.
issuesUnderEpic() : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under current issue's epic (i.e., stories are included in the output, but their sub-tasks are not). Current issue's epic is obtained using the logic of function epic() . Current issue is included in the output, except if current issue is an epic itself.
issuesUnderEpic (issue list issues) : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under the epic of issues in argument issues . Duplicated issues are filtered from output. Example: issuesUnderEpic(linkedIssues("is blocked by")) returns the list of issues directly under epics of issues blocking current issue.
issuesUnderEpic (string issue_keys) : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under the epic of issues with keys in argument issue_keys . Argument issue_keys is a comma separated list of issue keys. Duplicated issues are filtered from output. Example: issuesUnderEpic("CRM-15, HD-21") returns the list of issues directly under epic of issues with keys CRM-15 and HD-21 .
siblingIssuesUnderEpic() : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under epic of current issue (i.e., Stories are included in the output, but their sub-tasks are not), excluding current issue. Current issue should be an issue directly under an epic, (i.e., it can't be a sub-task or an epic).
siblingIssuesUnderEpic (issue list issues) : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under the epic of issues in argument issues , excluding issues in argument issues from the output. Duplicated issues are filtered from output. Example: siblingIssuesUnderEpic(linkedIssues("is blocked by")) returns the list of issues directly under epics of issues blocking current issue, excluding from the output issues blocking current issue.
siblingIssuesUnderEpic (string issue_keys) : issue list Available since version 2.3.0	Returns an issue list containing issues which are directly under the epic of issues with keys in argument issue_keys , excluding from the output issues with keys in argument issue_keys . Argument issue_keys is a comma separated list of issue keys. Duplicated issues are filtered from output. Example: siblingIssuesUnderEpic("CRM-15, HD-21") returns the list of issues directly under epic of issues with keys CRM-15 and HD-21 , excluding from the output issues with keys CRM-15 and HD-21 .
issuesFromJQL (string jql_query) : issue list Available since version 2.1.33	Returns the list of issues resulting of the execution of a JQL query represented by string argument jql_query . Visibility permissions applied are those of current user . We advice to use this function for performance reasons when the number of issues to be retrieved or filtered is very high (all issues in a project or various projects). Typically you will want to use this function for replacing any current expression using getIssuesFromProjects() function.
issuesFromJQL (string jql_query , string user_name) : issue list Available since version 2.1.33	Returns the list of issues resulting of the execution of a JQL query represented by string argument jql_query . Visibility permissions applied are those of user in argument user_name . We advice to use this function for performance reasons when the number of issues to be retrieved or filtered is very high (all issues in a project or various projects). Typically you will want to use this function for replacing any current expression using getIssuesFromProjects() function.
filterByIssueType (issue list issues , string issue_types) : issue list	Filters issue list in argument issues , leaving only those issue types appearing in argument issue_types . Argument issue_types is a comma separated list of issue type names. Example: filterByIssueType(subtasks(), "Bug, Improvement, New Feature") returns the list of sub-tasks with issue types Bug , Improvement or New Feature .
filterByStatus (issue list issues , string statuses) : issue list	Filters issue list in argument issues , leaving only those ones in statuses appearing in argument statuses . Argument statuses is a comma separated list of status names. Example: filterByStatus(linkedIssues("is blocked by"), "Open, Reopened, In Progress") returns the list of blocking issues in statuses Open , Reopened or In Progress .

filterByStatusCategory (issue list issues , string status_categories) : issue list Available since version 2.1.33	Filters issue list in argument issues , leaving only those ones in statuses with categories in status_categories . Argument status_categories is a comma separated list of status category names. Example: filterByStatusCategory(linkedIssues("is blocked by"), "New, In Progress") returns the list of blocking issues in statuses with categories New or In Progress .
filterByResolution (issue list issues , string resolutions) : issue list	Filters issue list in argument issues , leaving only those ones with resolutions appearing in argument resolutions . Argument resolutions is a comma separated list of resolution names. If this argument receives an empty string (""), the function will return issues with unset field Resolution . Example: filterByResolution(subtasks(), "Won't Fix, Cancelled") returns the list of sub-tasks with resolutions Won't Fix or Cancelled .
filterByProject (issue list issues , string projects) : issue list	Filters issue list in argument issues , leaving only those ones in projects present at argument projects . Argument projects is a comma separated list of project keys. Example: filterByProject(linkedIssues(), "CRM, HR") returns the list of linked issues belonging to projects with keys CRM or HR .
filterByProjectCategory (issue list issues , string project_categories) : issue list Available since version 2.1.33	Filters issue list in argument issues , leaving only those ones in projects with category in project_categories . Argument project_categories is a comma separated list of project category names. Example: filterByProjectCategory(linkedIssues(), "Development, Production") returns the list of linked issues belonging to projects in categories keys Development or Production .
filterByFieldValue (issue list issues , numeric field field , comparison operator operator , number n) : issue list Available since version 2.1.21	Filters issue list in argument issues , leaving only those issues where logical predicate formed by arguments field operator n is evaluated as true. Available comparison operators are =, !=, <, <=, > and >= . Argument field has format {nnnnn}. Example: filterByFieldValue(subtasks(), {00079}, >, 1) returns sub-tasks with more than one Affects Version/s . Note that {00079} is field code for Number of affected versions .
filterByFieldValue (issue list issues , string field field , comparison operator operator , string s) : issue list Available since version 2.1.21	Filters issue list in argument issues , leaving only those issues where logical predicate formed by arguments field operator s is evaluated as true. Available comparison operators are =, !=, <, <=, >, >=, ~, !~, in and not in. Since version 2.2.42 case ignoring operators are also available: =~, !=~, =~, !~, in~ and not in~ . Argument field has format %{nnnnn} for string fields, or %{nnnnn.i} for cascading select fields. Example: filterByFieldValue(linkedIssues(), %{00094}, ~, "Web") returns linked issues with component "Web" . Note that %{00094} is field code for Components .
filterByCardinality (issue list l , comparison operator operator , number n) : issue list	Returns a list with issues in l whose cardinality (i.e., the number of times it appears in list l) satisfies the comparison cardinality operator n . Available comparison operators: =, !=, <, <=, > and >= . Example: filterByCardinality(linkedIssues(), >, 1) returns a list with all issues linked to current issue with 2 or more issue links.
filterByPredicate (issue list l , boolean expression predicate) : issue list Available since version 2.1.31	Returns a list with issues in l that validate predicate . Argument predicate is a boolean expression, where references to field values in l are done using prefix ^ for field codes. Examples of field references: ^%{00000} is field code for Summary , and ^{00068} is field code for Original estimate of issues in argument l . Examples of usage: filterByPredicate(subtasks(), ^%{00094} in %{00094}) returns the list of sub-tasks with selected Components in current issue's selected components. filterByPredicate(linkedIssues("blocks"), ^%{00028} = null AND ^{00017} < {00017}) returns the list of unresolved blocked issues with priority higher than current issue's priority.
append (issue list l , issue list m) : issue list	Returns an issue list with all issues in arguments l and m . Duplicated issues may appear in output. Use function union(l, m) instead, if you want to avoid repetitions. Example: append(linkedIssues("is blocked by"), subtasks()) returns the list blocking issues plus sub-tasks. If a sub-task is also linked with issue link type "is blocked by" , it will appear twice in the output list.
union (issue list l , issue list m) : issue list	Returns an issue list with all issues in argument l or in argument m without duplicated issues. Example: union(linkedIssues(), subtasks()) returns the list of linked issues and sub-tasks of current issue, without issue repetitions.
except (issue list l , issue list m) : issue list	Returns an issue list with all issues in argument l which are not in argument m . Duplicated issues in l may appear in output. Use function distinct() to remove them if you need to. Example: except(linkedIssues(), subtasks()) returns the list of linked issues removing those which are also sub-tasks of current issue.
intersect (issue list l , issue list m) : issue list	Returns an issue list with all issues in argument l and m simultaneously. Example: intersect(linkedIssues(), subtasks()) returns the list of linked issues which are also sub-tasks of current issue.

distinct (issue list I) : issue list	Returns a list of issues with all issues in list I without any duplication. Example: distinct(LinkedIssues()) returns the list of linked issues, with only one occurrence per issue, although an issue may be linked with more than one issue link type.
fieldValue (string field f field, issue list issues) : string list	Returns the list of string values stored in argument field in those issues in argument issues . Argument field has format %{nnnnn} , or %{nnnnn.i} for cascading select fields. The number of values in output is the number of issues in argument issues with field set, except for multi-valued fields, for which a value is returned for each selected value in the field. Multi-valued fields are fields of types Multi Select , Checkboxes , Components , Versions , Multi User Picker , Multi Group Picker , Issue Pickers , Attachments and Labels . Example: fieldValue(%{00006}, subtasks()) returns the list of reporter users of sub-tasks. Note that %{00006} is field code for Reporter .
fieldValue (numeric field field , issue list issues) : number list	Returns the list of numeric values stored in argument field in those issues in argument issues . Argument field has format {nnnnn} . The number of values in output is the number of issues in argument issues with field set. Example: fieldValue({00012}, subtasks()) returns the list of Due Dates of sub-tasks. Note that {00012} is code for numeric value of Due date .
textOnIssueList (issue list issues , string text_expression) : string list Available since version 2.2.2	Returns a list of strings resulting of evaluating text_expression against each of the issues in argument issues . Argument text_expression is an expression that returns a string , where references to field values of issues in argument issues are done with prefix ^ before field code, e.g., ^{00000} is field code for Summary in each of the issues in argument issues . Example: textOnIssueList(subtasks(), ^{00003} = ^{00006} ? ^{00015} : null) returns the issue keys of sub-tasks with same user as reporter and as assignee.
mathOnIssueList (issue list issues , number math_time_expression) : number list Available since version 2.2.2	Returns a list of numbers resulting of evaluating math_time_expression against each of the issues in argument issues . Argument math_time_expression is a math/time expression, where references to field values of issues in argument issues are done with prefix ^ before field code, e.g., ^{00012} is field code for Due date in each of the issues in argument issues . Example: mathOnIssueList(linkedIssues("is blocked by"), (^{00012} != null ? ^{00012} - ^{00009} : 0) / {HOUR}) returns a list of numbers with the number of days from issue creation to due date for all issues linked using "is blocked by" issue link type.
numberOfRemoteIssueLinks (string issue_link_types) : number	Returns the number of issue links to other Jira instances using any of the issue link types in argument issue_link_types . Argument issue_link_types is a comma separated list of issue link type names, or empty string ("") for representing all issue link types.
count (issue list I) : number	Returns the number of issues in I . Example: count(filterByResolution(linkedIssues("is blocked by"), "")) returns the number of non-resolved blocking issues.
getIssuesFromProjects (string projects) : issue list Available since version 2.1.21	Returns an issue list with all issues of projects in argument projects . Argument projects is a string containing a comma separated list of project keys or project names . Example: getIssuesFromProjects("CRM, HT") returns all issues in project CRM and HT . This function can make your expression run slowly due to the high number of issues retrieved and needing to be filtered. Using issuesFromJQL() for retrieving and filtering issues will make your expression run much faster.
first (issue list I) : issue list Available since version 2.1.26	Returns a list with the first element in issue list I , or an empty list if I is an empty list.
last (issue list I) : issue list Available since version 2.1.26	Returns a list with the last element in issue list I , or an empty list if I is an empty list.
nthElement (issue list I , number n) : issue list Available since version 2.1.27	Returns an issue list with the element at position n in issue list I , where n >= 1 and n <= count(I) . Since version 2.2.8 returns an empty list if n is greater than the number of elements in I .
sublist (issue list I , number indexFrom , number indexTo) : issue list Available since version 2.1.29	Returns an issue list with elements in I from indexFrom index to indexTo index. Having indexFrom >= 1 and indexFrom <= count(I) and indexTo >= 1 and indexTo <= count(I) and indexFrom <= indexTo .
indexOf (string issue_key , issue list I) : number Available since version 2.1.29	Returns the index in issue list I of issue with key issue_key . Zero is returned when issue is not found in I .

indexOf (issue list element , issue list l) : number Available since version 2.1.29	Returns the index in issue list l of first issue in element . Zero is returned when first issue in element is not found in l .
sort (issue list l , field field , order) : issue list Available since version 2.1.27	Returns an issue list with elements in l ordered according to values of field . Argument field has format {nnnnn} for numeric and date-time fields, %{nnnnn} for string fields, or %{nnnnn.i} for cascading select fields. Available orders are ASC (for ascending order) and DESC (for descending order). Example: sort(linkedIssues("is blocked by"), {00012}, ASC) returns the list of issues blocking current issue, sorted in ascending order by Due date . Note that {00012} is code for numeric value of Due date .

Number List terms

Number list data type is an ordered list of numbers. This data type is returned, among others, by functions that return values of number fields in a selection of issues (linked issues, sub-tasks, and subsets of them).

Literal values

A **number list** can also be written in literal form using the following format: **[number, number, ...]**.

Example of number list literal value with 5 elements: **[1, -2, 3, 3.14, 2.71]**

Number List Functions

Functions for managing values of type **number list**.

Function	Returned value
filterByCardinality (number list l , comparison operator operator, number n) : number list	Returns a list with numbers in l whose cardinality (i.e., the number of times it appears in list l) satisfies the comparison cardinality operator n . Available comparison operators: = , != , < , <= , > and >= . Example: filterByCardinality([1, 1, 2, 3, 4, 4, 4, 5], >, 1) returns the following number list: [1, 4] .
filterByValue (number list l , comparison operator operator, number n) : number list Available since version 2.1.23	Returns a list with numbers in l satisfying the comparison number_in_list operator n . Example: filterByValue([1, 2, 3, 10, 11, 25, 100], >, 10) returns the list of numbers greater than 10 . i.e., [11, 25, 100]
filterByPredicate (number list l , boolean expression predicate) : number list Available since version 2.1.31	Returns a list with numbers in l that validate predicate . Argument predicate is a boolean expression, where ^ is used for referencing numeric values in argument l . Example: filterByPredicate([1, 2, 3, 4], ^ > 2) returns values greater than 2, i.e., [3, 4] . Example: filterByPredicate([1, 2, 3, 4], remainder(^, 2) = 0) returns even values, i.e., [2, 4] .
append (number list l , number list m) : number list Available since version 2.1.21	Returns a number list with all numbers in arguments l and m . Duplicated numbers may appear in output. Use function union (l , m) instead, if you want to avoid repetitions. Example: append([1, 2, 3], [3, 4, 5]) returns [1, 2, 3, 3, 4, 5] . Example: append(fieldValue({00025}, linkedIssues("is blocked by")), fieldValue({00025}, subtasks())) returns a list of numbers with Total Time Spent (in minutes) in blocking issues and sub-tasks. This number list can be summed using function sum() .
union (number list l , number list m) : number list Available since version 2.1.21	Returns a number list with all numbers in argument l or in argument m without duplicated numbers. Example: union([1, 2, 3], [3, 4, 5]) returns [1, 2, 3, 4, 5] .
except (number list l , number list m) : number list Available since version 2.1.21	Returns a number list with all numbers in argument l which are not in argument m . Duplicated numbers in l may appear in output. Use function distinct() to remove them if you need to. Example: except([1, 2, 3, 4, 5], [2, 4]) returns [1, 3, 5] .
intersect (number list l , number list m) : number list Available since version 2.1.21	Returns a number list with all numbers in argument l and m simultaneously. Example: intersect([1, 2, 3, 4, 5], [9, 7, 5, 3, 1]) returns [1, 3, 5] .
invertList (number list l) : number list Available since version 2.5.0	Returns l in inverted order. Example: invertList([1, 2, 3]) returns number list [3, 2, 1] .

distinct (number list l) : number list Available since version 2.1.21	Returns a list of numbers with all numbers in list l without any duplication. Example: distinct ([1, 2, 1, 3, 4, 4, 5]) returns [1, 2, 3, 4, 5]. Example: distinct (fieldValue ({00012}, linkedIssues ("is cloned by")))) returns a list of dates containing due dates of cloning issues, with only one occurrence per due date, although more than one issue may share the same due date.
count (number list l) : number	Returns the number of numeric values in l . Example: count ([1, 1, 2, 2]) returns 4. Example: count (subtasks ()) - count (fieldValue ({00012}, subtasks ())) returns the number of sub-tasks with field "Due Date" unset.
count (number n , number list l) : number Available since version 2.1.32	Returns the number of times n appears in l . Example: count (1, [1, 1, 2, 2, 1, 0]) returns 3.
sum (number list l) : number	Returns the sum of numeric values in l . Example: sum ([1, 2, 3, 4, 5]) returns 15. Example: sum (fieldValue ({00025}, subtasks ())) returns the total time spent in minutes in all sub-tasks of current issue.
avg (number list l) : number	Returns the arithmetic mean of numeric values in l . Example: avg ([1, 2, 3, 4, 5]) returns 3. Example: avg (fieldValue ({00024}, linkedIssues ("is blocked by")))) returns the mean of remaining times in minutes among blocking issues.
max (number list l) : number	Returns the maximum numeric value in l . Example: max ([1, 2, 5, 4, 3]) returns 5. Example: max (fieldValue ({00024}, linkedIssues ("is blocked by")))) returns the maximum remaining times in minutes among blocking issues.
min (number list l) : number	Returns the minimum numeric value in l . Example: min ([2, 1, 5, 4, 3]) returns 1. Example: min (fieldValue ({00024}, linkedIssues ("is blocked by")))) returns the minimum remaining times in minutes among blocking issues.
first (number list l) : number Available since version 2.1.26	Returns the first element in number list l , or (since 2.2.8) null if l is an empty list. Example: first ([3, 2, 1, 0]) returns 3.
last (number list l) : number Available since version 2.1.26	Returns the first element in number list l , or (since 2.2.8) null if l is an empty list. Example: last ([3, 2, 1, 0]) returns 0.
nthElement (number list l , number n) : number Available since version 2.1.27	Returns element at position n in number list l , where n >= 1 and n <= count (l). Since version 2.2.8 returns null if n is greater than the number of elements in l . Example: nthElement ([5, 6, 7, 8], 3) returns 7.
getMatchingValue (string key , string list key_list , number list value_list) : string Available since version 2.2.10	Returns value in value_list that is in the same position as key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count (key_list) + 1. Example: getMatchingValue ("Spain", ["USA", "UK", "France", "Spain", "Germany"], ["Washington", "London", "Paris", "Madrid", "Berlin"]) returns "Madrid".
getMatchingValue (string key , string list key_list , number list value_list) : number Available since version 2.2.10	Returns numeric value in value_list that is in the same position as string key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count (key_list) + 1. Example: getMatchingValue ("Three", ["One", "Two", "Three", "Four", "Five"], [1, 1+1, 3*1, 4, 4+1]) returns 3.
getMatchingValue (string key , number list key_list , string list value_list) : string Available since version 2.2.25	Returns numeric value in value_list that is in the same position as numeric key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count (key_list) + 1. Example: getMatchingValue (5, [1, 3, 5, 7, 9], [1, 1+1, 3*1, 4, 4+1]) returns 3.
getMatchingValue (string key , number list key_list , number list value_list) : number Available since version 2.2.25	Returns numeric value in value_list that is in the same position as numeric key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count (key_list) + 1. Example: getMatchingValue (5, [1, 3, 5, 7, 9], [1, 1+1, 3*1, 4, 4+1]) returns 3.
sublist (number list l , number indexFrom , number indexTo) : number list Available since version 2.1.29	Returns a number list with elements in l from indexFrom index to indexTo index. Having indexFrom >= 1 and indexFrom <= count (l) and indexTo >= 1 and indexTo <= count (l) and indexFrom <= indexTo . Example: sublist ([1, 2, 3, 4, 5], 2, 4) returns [2, 3, 4].
indexOf (number element , number list l) : number Available since version 2.1.29	Returns the index of numeric value element in number list l . Zero is returned when element is not found in l . Example: indexOf (1, [5, 2, 1, 4, 1]) returns 3.

sort (number list l , order) : number list Available since version 2.1.27	Returns a number list with elements in l sorted in specified order. Available orders are ASC (for ascending order) and DESC (for descending order). Example: sort ([2, 4, 3, 1], ASC) returns [1, 2, 3, 4] .
textOnNumberList (number list n umbers , string text_expression) : string list Available since version 2.2.8	Returns a list of strings resulting of evaluating text_expression against each of the numeric values in argument numbers . Argument text_expression is an expression that returns a string, where ^ represents each numeric value in argument numbers . Example: textOnNumberList ([1, 2, 3, 4, 5], substring ("smile", 0, ^)) returns string list ["s", "sm", "smi", "smil", "smile"] .
mathOnNumberList (number list numbers , number math_time_ex pression) : number list Available since version 2.2.8	Returns a list of numbers resulting of evaluating math_time_expression against each of the numeric values in argument numbers . Argument math_time_expression is a math/time expression, where ^ represents each numeric value in argument numbers . Example: mathOnNumberList ([1, 2, 3, 4, 5], ^ * 2) returns number list [2, 4, 6, 8, 10] .

String List terms

String list data type is an ordered list of strings. This data type is returned, among others, by functions that return values of string fields in a selection of issues (linked issues, sub-tasks, and subsets of them).

Literal values

A **string list** can also be written in literal form using the following format: [**string**, **string**, ...].

Example of number list literal value with 5 elements: ["Blue", "Green", "Yellow", "Orange", "Red"]

String List Functions

Functions for managing values of type **string list**.

Function	Returned value
filterByCardinality (string list l , comparison operator operator, number n) : string list	Returns a list with strings in l whose cardinality (i.e., the number of times it appears in list l) satisfies the comparison cardinality operator n . Available comparison operators: =, !=, <, <=, > and >= . Example: filterByCardinality (["tiger", "tiger", "tiger", "tiger", "lion", "lion", "lion", "cat", "cat", "lynx"], <, 3) returns ["cat", "lynx"] . Example: filterByCardinality (fieldValue (%{00094}, subtasks ()), =, count (subtasks ())) returns a list with the Components present in all sub-tasks, i.e., those components common to all sub-tasks of current issue.
filterByValue (string list l , comparison operator operator, string s) : string list Available since version 2.1.23	Returns a list with strings in l satisfying the comparison string_in_list operator s . Example: filterByValue (["John", "Robert", "Kevin", "Mark"], ~, "r") returns the list of string containing substring "r". i.e., ["Robert", "Mark"]
filterByPredicate (string list l , boolean expression predicate) : string list Available since version 2.1.31	Returns a list with strings in l that validate predicate . Argument predicate is a boolean expression, where ^% is used for referencing string values in argument l . Example: filterByPredicate (["book", "rose", "sword"], length (^%) > 4) returns ["sword"] . Example: filterByPredicate (["book", "rose", "sword"], ^% in %{00000} OR ^% in % {00001}) returns a list with those strings in first argument that also appear in issue Summary or Description .
append (string list l , string list m) : string list Available since version 2.1.21	Returns a string list with all strings in arguments l and m . Duplicated string may appear in output. Use function union (l , m) instead, if you want to avoid repetitions. Example: append (["blue", "red", "green"], ["red", "green", "yellow"]) returns ["blue", "red", "green", "red", "green", "yellow"] . Example: append (fieldValue (%{00074}, subtasks ()), fieldValue (%{00074}, linkedIssues ("is blocked by"))) returns a string list with Fix Version/s of sub-tasks and blocking issues.
union (string list l , string list m) : string list Available since version 2.1.21	Returns a string list with all strings in argument l or in argument m without duplicated strings. Example: union (["blue", "red", "green"], ["red", "green", "yellow"]) returns ["blue", "red", "green", "yellow"] . Example: union (fieldValue (%{00074}, subtasks ()), fieldValue (%{00074}, linkedIssues ())) returns the list of Fix Version/s selected among all sub-tasks and linked issues.

except (string list l , string list m) : string list Available since version 2.1.21	Returns a string list with all strings in argument l which are not in argument m . Duplicated strings in l may appear in output. Use function distinct() to remove them if you need to. Example: except (["blue", "red", "green", "black"], ["red", "green", "yellow"]) returns ["blue", "black"] . Example: except (fieldValue(%{00074}, subtasks()), fieldValue(%{00074}, linkedIssues())) returns the list of Fix Version/s in sub-tasks and not in linked issues.
intersect (string list l , string list m) : string list Available since version 2.1.21	Returns a string list with all strings in argument l and m simultaneously. Example: intersect (["blue", "red", "green", "black"], ["red", "green", "yellow"]) returns ["red", "green"] . Example: union (fieldValue(%{00074}, subtasks()), fieldValue(%{00074}, linkedIssues())) returns the list of Fix Version/s common to sub-tasks and linked issues.
invertList (string list l) : string list Available since version 2.5.0	Returns l in inverted order. Example: invertList (["first", "second", "third"]) returns string list ["third", "second", "first"].
distinct (string list l) : string list Available since version 2.1.21	Returns a list of strings with all strings in list l without any duplication. Example: distinct (["blue", "green", "yellow", "blue", "yellow"]) returns ["blue", "green", "yellow"] . Example: distinct (fieldValue(%{00003}, subtasks())) returns the list of assignees to sub-tasks, with only one occurrence per user, although a user may have more than one sub-task assigned.
count (string list l) : number	Returns the number of string values in l . Example: count (["blue", "red", "blue", "black"]) returns 4 . Example: count (distinct(fieldValue(%{00094}, subtasks()))) returns the number of Components selected among all sub-tasks.
count (string s , string list l) : number Available since version 2.1.32	Returns the number of times s appears in l . Example: count ("blue", ["blue", "blue", "red", "red", "blue", "green"]) returns 3 .
first (string list l) : string Available since version 2.1.26	Returns the first element in string list l , or (since 2.2.8) null if l is an empty list. Example: first (["blue", "red", "green"]) returns "blue" .
last (string list l) : string Available since version 2.1.26	Returns the first element in string list l , or (since 2.2.8) null if l is an empty list. Example: last (["blue", "red", "green"]) returns "green" .
nthElement (string list l , number n) : string Available since version 2.1.27	Returns element at position n in string list l , where n >= 1 and n <= count(l). Since version 2.2.8 returns null if n is greater than the number of elements in l . Example: nthElement (["blue", "red", "green"], 2) returns "red" .
getMatchingValue (string key , string list key_list , string list value_list) : string Available since version 2.2.10	Returns string value in value_list that is in the same position as string key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count(key_list) + 1 . Example: getMatchingValue ("Spain", ["USA", "UK", "France", "Spain", "Germany"], ["Washington", "London", "Paris", "Madrid", "Berlin"]) returns "Madrid" .
getMatchingValue (string key , string list key_list , string list value_list) : string Available since version 2.2.25	Returns string value in value_list that is in the same position as numeric key is in key_list , or in case key doesn't exist in key_list and value_list has more elements than key_list , the element of value_list in position count(key_list) + 1. Example: getMatchingValue (8, [2, 4, 6, 8, 10], ["Washington", "London", "Paris", "Madrid", "Berlin"]) returns "Madrid" .
sublist (string list l , number indexFrom , number indexTo) : string list Available since version 2.1.29	Returns a string list with elements in l from indexFrom index to indexTo index. Having indexFrom >= 1 and indexFrom <= count(l) and indexTo >= 1 and indexTo <= count(l) and indexFrom <= indexTo . Example: sublist (["red", "green", "blue", "purple", "white"], 2, 4) returns ["green", "blue", "purple"] .
indexOf (string element , string list l) : number Available since version 2.1.29	Returns the index of string element in string list l . Zero is returned when element is not found in l . Example: indexOf ("blue", ["red", "blue", "green"]) returns 2 .
sort (string list l , order) : string list Available since version 2.1.27	Returns a string list with elements in l lexicographically ordered. Available orders are ASC (for ascending order) and DESC (for descending order). Example: sort (["red", "blue", "green"], ASC) returns ["blue", "green", "red"] .
textOnStringList (string list strings , string text_expression) : string list Available since version 2.2.8	Returns a list of strings resulting of evaluating text_expression against each of the strings in argument strings . Argument text_expression is an expression that returns a string, where ^% represents each string in argument strings . Example: textOnStringList (["albert", "riCHard", "MARY"], capitalizeWordsFully(^%)) returns ["Albert", "Richard", "Mary"] .

mathOnStringList (string list strings , number math_time_expression) : number list Available since version 2.2.8	Returns a list of numbers resulting of evaluating math_time_expression against each of the issues in argument issues . Argument math_time_expression is a math/time expression, where ^% represents each string in argument strings . Example: mathOnStringList (["a", "ab", "abc", "abcd", "abcde"], length(^%)) returns [1, 2, 3, 4, 5] .
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Temporary Value Storage

Available since version 2.6.0

Functions used to retrieve (**get**) values previously stored (**set**) can directly be used in the same expression. The values **can only** be used for the current expression and cannot be reused in another expression.

Function	Returned value
setBoolean (string variable_name , boolean value) : boolean	Creates a variable named variable_name for storing a boolean value, and assigns it a value , which is also returned in order to be used within an expression. Example: setBoolean ("myBoolean", true)
getBoolean (string variable_name) : boolean	Returns the value stored in a boolean variable named variable_name , which was previously created using the setBoolean() function. Example: getBoolean ("myBoolean")
setNumber (string variable_name , number value) : number	Creates a variable named variable_name for storing a number, and assigns it a value , which is also returned in order to be used within an expression. Example: setNumber ("myNumber", 100)
getNumber (string variable_name) : number	Returns the value stored in a numeric variable named variable_name , which was previously created using the setNumber() function. Example: getNumber ("myNumber")
setString (string variable_name , string value) : string	Creates a variable named variable_name for storing a string, and assigns it a value , which is also returned in order to be used within an expression. Example: setString ("myString", "Hello World!")
getString (string variable_name) : string	Returns the value stored in string variable named variable_name , which was previously created using the setString() function. Example: getString ("myString")
setNumberList (string variable_name , number list value) : number list	Creates a variable named variable_name for storing a number list, and assigns it a value , which is also returned in order to be used within an expression. Example: setNumberList ("myNumberList", [1,2,3])
getNumberList (string variable_name) : number list	Returns the value stored in number list variable named variable_name , which was previously created using the setNumberList() function. Example: getNumberList ("myNumberList")
setStringList (string variable_name , string list value) : string list	Creates a variable named variable_name for storing a string list, and assigns it a value , which is also returned in order to be used within an expression. Example: setStringList ("myStringList", ["Hello", "World"])
getStringList (string variable_name) : string list	Returns the value stored in string list variable named variable_name , which was previously created using the setStringList() function. Example: getStringList ("myStringList")
setIssueList (string variable_name , issue list value) : issue list	Creates a variable named variable_name for storing an issue list, and assigns it a value , which is also returned in order to be used within an expression. Example: setIssueList ("myIssueList", ["KEY-1", "KEY-2"])

getIssueList (string variable_name) : issue list	Returns the value stored in issue list variable named variable_name , which was previously created using setIssueList() function. Example: getIssueList("myIssueList")
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Other Functions

Selectable Fields Functions

Functions for working with **selectable fields**, i.e., fields with a limited domain, i.e., a set of options or possible values. This type of fields includes **Select**, **Radio Button**, **Security Level**, **Multi Select**, **Checkboxes**, **Components**, **Versions**, **Multi User Picker**, **Multi Group Picker**, **Issue Pickers**, **Attachments** and **Labels**.

Function	Returned value
numberOfSelectedItems (%{nnnnn}) : number	Returns the number of selected items in select or multiselect field with field code %{nnnnn} .
numberOfAvailableItems (%{nnnnn}) : number	Returns the number of available options in select or multiselect field with field code %{nnnnn} . It's equivalent to count(availableItems(%{nnnnn})) . Since version 2.2.12 disabled options are discarded.
availableItems (%{nnnnn}) : string list	Returns a string list with available options in select or multiselect field with field code %{nnnnn} . Since version 2.2.12 disabled options are discarded. Example: availableItems(%{00103}) returns a string list with all security levels available for the project and current user.
availableItems (%{nnnnn}, string option) : string list Available since version 2.2.10	Returns a string list with the available child options in cascading or multilevel cascading field with ID %{nnnnn} , and for option parent option . In the case of multilevel cascading fields, a comma separated list of options should be entered. Since version 2.2.12 disabled options are discarded.
allAvailableItems (%{nnnnn}) : string list Available since version 2.2.12	Returns a string list with all available options in select or multiselect field with field code %{nnnnn} . Disabled options are included. Example: availableItems(%{00103}) returns a string list with all security levels available for the project and current user.
allAvailableItems (%{nnnnn}, string option) : string list Available since version 2.2.12	Returns a string list with the available child options in cascading or multilevel cascading field with ID %{nnnnn} , and for option parent option . In the case of multilevel cascading fields, a comma separated list of options should be entered. Disabled options are included.

Versions Management (Requires version 2.1.32 or higher.)

Function	Returned value
unreleasedVersions () : string list	Returns a string list with unreleased version names of current issue's project. Returned versions may be archived. Example: toList(%{00077}) any in unreleasedVersions() validates that at least one affected version is unreleased.
unreleasedVersions (string projects) : string list	Returns a string list with unreleased version names of projects in argument projects . Returned versions may be archived. Arguments projects is a comma separated list of project keys or project names .
unreleasedVersionsBySequence () : string list	Returns a string list with the unreleased versions in the current project with the default order. Only non-archived versions are returned. The first version in the list is the lowest version in the version table.
releasedVersions () : string list	Returns a string list with released version names of current issue's project. Returned versions may be archived. Example: toList(%{00074}) in releasedVersions() validates that all fixed versions are released.
releasedVersions (string projects) : string list	Returns a string list with released version names of projects in argument projects . Returned versions may be archived. Arguments projects is a comma separated list of project keys or project names . Example: toList(%{00074}) in releasedVersions(%{00018}) validates that all fixed versions of a foreign issue are released.
releasedVersionsBySequence () : string list	Returns a string list with the released versions in the current project with the default order. Only non-archived versions are returned. The first version in the list is the lowest version in the version table.

releaseDates (string versions) : number list Available since version 2.2.38	Returns a number list with the release dates for versions in string versions for current issues project. Parameter versions is a comma separated list of version names. Example: releaseDates (%{00074}) returns the list of release dates for Fix Version/s . Note that %{00074} is field code for Fix Version/s .
releaseDates (string versions , string projects) : number list Available since version 2.2.38	Returns a number list with the release dates for versions in string versions for projects in parameter projects . Parameter versions is a comma separated list of version names. Parameter projects is a comma separated list of project keys or project names. Example: releaseDates (%{00077}, "CRM") returns the list of release dates for affected versions for project with key "CRM". Note that %{00077} is field code for Affects Version/s .
startDates (string versions) : number list Available since version 2.3.0	Returns a number list with the start dates for versions in string versions for current issues project. Parameter versions is a comma separated list of version names. Example: startDates (%{00074}) returns the list of start dates for fixed versions. Note that %{00074} is field code for Fix version/s .
startDates (string versions , string projects) : number list Available since version 2.3.0	Returns a number list with the start dates for versions in string versions for projects in parameter projects . Parameter versions is a comma separated list of version names. Parameter projects is a comma separated list of project keys or project names. Example: startDates (%{00077}, "CRM") returns the list of start dates for affected versions for project with key "CRM". Note that %{00077} is field code for Affects version/s .
archivedVersions () : string list	Returns a string list with released version names of current issue's project. Returned versions may be archived.
archivedVersions (string projects) : string list	Returns a string list with released version names of projects in argument projects . Returned versions may either released or unreleased. Arguments projects is a comma separated list of project keys or project names .
latestReleasedVersion () : string	Returns string with the name of the latest released version in current issue's project. Example: latestReleasedVersion() in archivedVersions() validates that the latest released version in current issue's project is archived.
latestReleasedVersion (string projects) : string	Returns string with the name of the latest released version among projects in argument projects . Returned versions may either released or unreleased. Arguments projects is a comma separated list of project keys or project names .
latestReleasedUnarchivedVersion (string projects) : string Available since version 2.3.0	Returns string with the name of the latest released version excluding archived ones for projects in argument projects . Returned versions may either released or unreleased. Arguments projects is a comma separated list of project keys or project names .
earliestUnreleasedVersion () : string	Returns string with the name of the earliest unreleased version in current issue's project. Example: earliestUnreleasedVersion() not in archivedVersions() validates that earliest unreleased version in current issue's project is not archived.
earliestUnreleasedVersion (string projects) : string	Returns string with the name of the earliest unreleased version among projects in argument projects . Returned versions may either released or unreleased. Arguments projects is a comma separated list of project keys or project names .
earliestUnreleasedUnarchivedVersion () : string Available since version 2.3.0	Returns string with the name of the earliest unreleased version in current issue's project excluding archived ones.
earliestUnreleasedUnarchivedVersion (string projects) : string Available since version 2.3.0	Returns string with the name of the earliest unreleased version excluding archived ones for projects in argument projects . Returned versions may either released or unreleased. Arguments projects is a comma separated list of project keys or project names .

User, Group and Role related Functions

Function	Returned value
isInGroup (string user_name , string group_name) : boolean	Checks if a user is in a group. Argument user_name can also be a comma separated list of user names , group names or role names . In that case the function will return true only if all users in the list, groups of the list, and in the roles of the list, are in the group in the second argument. Example: isInGroup (%{00003}, "jira-developers") returns true if Assignee in in group jira-developers , where %{00003} is field code for Assignee .

isInRole (string user_name , string role_name) : boolean Available since version 2.1.21	Checks if a user or group of users plays a role in current project. Argument user_name can also be a comma separated list of user names , group names or role names . In that case the function will return true only if all users in the list, groups of the list, and in the roles of the list, are in project role in the second argument, for current project. Example: isInRole (%{00006}, "Testers") returns true in Reporter is in project role Testers , where %{00006} is field code for Reporter .
isInRole (string user_name , string role_name , string project_key) : boolean	Checks if a user or group of users plays a role in a certain project. Argument user_name can also be a comma separated list of user names , group names or role names . In that case the function will return true only if all users in the list, groups of the list, and in the roles of the list, are in role in the second argument, for the project in the third argument. Example: isInRole (%{00020}, "Developers", "CRM") returns true in Current user is in project role Developers in project with key "CRM", where %{00020} is field code for Current user .
isActive (string user_name) : boolean	Checks if a user is active. Argument user_name can also be a comma separated list of user names , group names or role names . In that case the function will return true only if all users in the list, groups of the list, and in the roles of the list, are active. Example: isActive (%{00125}) returns true if all users who are component leaders in current project are active, where %{00125} is field code for Component leaders .
userFullName (string user_name) : string Available since version 2.1.26	Returns a string with the full name of the user in argument user_name . Argument user_name is a string with a user name, not to be confused with user full name. Example: userFullName (%{00020}) returns the user's full name of current user, where %{00020} is field code for Current user . Example: Compose a parsed text including the "full name" or a user selected in a User Picker custom field
userFullName (string list user_names) : string list Available since version 2.2.29	Returns a string list with the full names of the users in argument user_names . Argument user_names is a string list with user names, not to be confused with users full names. Example: userFullName (toStringList(%{00133})) returns a list with the users full names of current issue's watchers, where %{00133} is field code for Watchers .
userEmail (string user_name) : string Available since version 2.1.26	Returns a string with the email of the user in argument user_name . Argument user_name is a string with a user name, not to be confused with user full name. Example: userEmail (%{00020}) returns the email of current user, where %{00020} is field code for Current user .
userEmail (string list user_names) : string list Available since version 2.2.29	Returns a string list with the emails of the users in argument user_names . Argument user_names is a string list with a user names, not to be confused with users full names. Example: userEmail (toStringList(%{00133})) returns a list with the emails of current issue's watchers, where %{00133} is field code for Watchers .
fullNameToUser (string fullName) : string Available since version 2.1.32	Returns a string with the name of a user whose full name is equal to argument fullName . Returned value is a string with a user name .
usersWithEmail (string email) : string list Available since version 2.1.32	Returns a string list with the user names of those users with emails equal to argument email . In case that only one user is expected, function first (string list) can be used to extract a string with its user name.
userProperty (string propertyName , string userName) : string Available since version 2.1.34	Returns the value of the user property with name propertyName which belongs to user with user name userName . If the user doesn't have the property, "" will be returned.
userProperty (string propertyName , string list userNames) : string list Available since version 2.1.34	Returns the list of values of the user property with name propertyName in all the users whose names are contained in userNames . The output will contain as many strings as users have the property set.
usersInRole (string projectRoleName) : string list Available since version 2.2.8	Returns the list of user names (not be confused with full user name) of those active users playing project role with name projectRoleName in current issue's project. Parameter projectRoleName can be a comma separated list of project role names, returning the users that play any of the project roles.

usersInRole (string projectRoleName , string projectKey) : string list Available since version 2.2.8	Equivalent to the previous function but with extra argument projectKey for selecting the project argument projectRoleName refers to.
usersInGroup (string groupName) : string list Available since version 2.2.8	Returns the list of user names of those active users in group with name groupName . Parameter groupName can be a comma separated list of group names, returning the users that belong to any of the groups.
rolesUserPlays (string userName) : string list Available since version 2.2.20	Returns the list of role names of those project roles the user with name userName plays in current project. Parameter userName can also be a comma separated list of user names , group names and project role names , returning the list of project roles for those users represented by input argument.
rolesUserPlays (string userName , string projectKey) : string list Available since version 2.2.20	Returns the list of role names of those project roles the user with name userName plays in project with key projectKey . Parameter userName can also be a comma separated list of user names , group names and project role names , returning the list of project roles for those users represented by input argument.
groupsUserBelongTo (string userName) : string list Available since version 2.2.20	Returns the list of group names of those groups the user with name userName belongs to. Parameter userName can also be a comma separated list of user names , group names and project role names , returning the list of project roles for those users represented by input argument.
defaultUserForRole (string projectRoleName) : string Available since version 2.2.8	Returns the user name of the Assign to project role playing project role with name projectRoleName in current issue's project, or "" if no default user is defined for the project role.
defaultUserForRole (string projectRoleName , string projectKey) : string Available since version 2.2.8	Equivalent to the previous function but with extra argument projectKey for selecting the project argument projectRoleName refers to.
lastAssigneeInRole (string projectRoleName) : string Available since version 2.2.8	Returns the user name of the last user who had current issue assigned, and currently plays project role with name projectRoleName in current issue's project, or "" if current issue was never assigned to a user currently in the project role.
lastAssigneeInRole (string projectRoleName , string issueKey) : string Available since version 2.2.8	Returns the user name of the last user who had issue with key issueKey assigned, and currently plays project role with name projectRoleName in current issue's project, or null if current issue was never assigned to a user currently in the project role.
leastBusyUserInRole (string projectRoleName) : string Available since version 2.2.8	Returns the name of the active user playing project role with name projectRoleName in current issue's project, and has the lower number of issues with resolution empty assigned; or "" if there isn't any user in the project role. Parameter projectRoleName can be a comma separated list of project role names, returning the least busy users among the project roles. Example: leastBusyUserInRole("Developers") returns the user playing role Developers in current project with the least number of unresolved issues in all the Jira instance assigned.
leastBusyUserInRole (string projectRoleName , string projectKey) : string Available since version 2.2.8	Equivalent to the previous function but with extra argument projectKey for selecting the project argument projectRoleName refers to. Example: leastBusyUserInRole("Developers", "CRM") returns the user playing role Developers in project with key CRM with the least number of unresolved issues in all the Jira instance assigned.
leastBusyUserInRole (string projectRoleName , string projectKey , string jqQuery) : string Available since version 2.2.33	Equivalent to the previous function but with extra argument jqQuery , used for restricting the issues to be considered to pick the least busy user. Example: leastBusyUserInRole("Developers", "{00018}", "project = " + "{00018}") returns the user playing role Developers in current project, with the least number of unresolved issues in current project assigned. Note that {00018} is field code for Project key .

nextUserInGroup (string groupName , string queueName) : string Available since version 2.2.33	returns the name of the next active user in group with name groupName , for a round-robin queue with name queueName . The string queueName is an arbitrary name. The queue is automatically created the first time a queue is used in a function call. Each time the function is called on the same pair of arguments (group , queue) , a different user in the group is returned. The queue can be used in different transitions of the same or different workflows within the same Jira instance. null is returned if group is empty. Example: nextUserInGroup("jira-developers", "code-review-queue") returns the username of the next user in group jira-developers for round-robin queue code-review-queue . Each time the function is called with the same pair of arguments, a different username is returned.
projectLeader (string projectKey) : string Available since version 2.5.0	Returns the project lead of the projectKey . Example: projectLeader("SW") returns the project lead key from the project with the key SW .

Field Value History (available since version 2.1.23)

Functions for accessing previous value a field, or the whole value history of fields. Fields whose value history is accessible by these functions are:

- All the **Custom Fields**
- Summary
- Description
- Assignee
- Reporter
- Due date
- Issue status
- Priority
- Resolution
- Environment
- Fix version/s
- Affects version/s
- Labels
- Components
- Security level

Function	Returned value
previousValue (%{nnnnn}) : string	Returns a string with the previous value of a field for current issue. It will return null if field was previously uninitialized.
previousValue (%{nnnnn}) : number	Returns a number with the previous value of a numeric or date field for current issue. It will return null if field was previously uninitialized.
previousValue (%{nnnnn.i}) : string	Returns a string with the previous value of a cascading or multi-cascading select field for current issue at level i (with root level = 0). It will return null if field was previously uninitialized.
fieldHistory (%{nnnnn}) : string list	Returns a list of strings with all the values that a field has ever had in the past for current issue. Values appear in the list in ascending ordered by setting time, i.e., older value has index 1 , and most recent value has index count(string_list) . Uninitialized field statuses are represented by empty strings .
fieldHistory (%{nnnnn}) : number list	Returns a list of numbers with all the values that a numeric or date-time field has ever had in the past for current issue. Values appear in the list in ascending ordered by setting time, i.e., older value has index 1 , and most recent value has index count(number_list) . Uninitialized field statuses are not represented.
fieldHistory (%{nnnnn.i}) : string list	Returns a list of strings with all the values that a cascading or multi-cascading select field has ever had in the past for level i (with root level = 0) in current issue. Values appear in the list in ascending ordered by setting time, i.e., older value has index 1 , and most recent value has index count(string_list) . Uninitialized field statuses are represented by empty strings.

hasChanged(%{nnnnn}) : boolean Available since version 2.1.29	Returns true only if field has changed in current transition. Function hasChanged(field_code) is used when we set a validation that is incompatible with a condition in a same transition, typically when validating a value entered in the transition screen. When Jira evaluates the validations in a transition, it also reevaluates the conditions, and if they are not satisfied an Action X is invalid error message is shown and the transition is not executed. Example: Let's suppose we have a boolean condition like {00012} = null (i.e., Due date = null) in a transition, so that it's only shown when Due date is empty. This transition also has a transition screen containing field Due date , and a boolean validation {00012} != null , in order to make Due date required in the transition. The configuration described above will not work, since both condition and validation are mutually incompatible. We can fix it replacing the boolean condition with {00012} = null OR hasChanged(%{00012}) .
hasChanged({nnnnn}) : boolean Available since version 2.1.29	Returns true only if numeric or date-time field field has changed in current transition.
hasChanged({nnnnn.i}) : boolean Available since version 2.1.29	Returns true only if cascading select field has changed for level i (with root level = 0) in current transition.

Miscellaneous

Function	Returned value
projectProperty(string property_name) : string	Returns a string with the value of project property with name property_name in current issue's project. Since version 2.2.8 null is returned if project property doesn't exist. Example: projectProperty("maxNumberOfReopenings") returns "3" , provided there is a string {maxNumberOfReopenings=3} in the description of current issue's project.
projectProperty(string property_name, string project_key) : string Available since version 2.2	Returns a string with the value of project property with name property_name in project with key project_key . Since version 2.2.8 null is returned if project property doesn't exist. Example: projectProperty("maxNumberOfReopenings", "CRM") returns "3" , provided there is a string {maxNumberOfReopenings=3} in the description of project with key CRM .
projectPropertyExists(string property_name) : boolean Available since version 2.2	Returns true only if there is a project property with name property_name in current issue's project, i.e., if project's description contains a string like {property_name=value} . Example: projectPropertyExists("maxNumberOfReopenings") returns true only if there is a string like {maxNumberOfReopenings=x} in the description of current issue's project.
projectPropertyExists(string property_name, string project_key) : boolean Available since version 2.2	Returns true only if there is a project property with name property_name in project with key project_key . Example: projectPropertyExists("maxNumberOfReopenings", "CRM") returns true only if there is a string like {maxNumberOfReopenings=x} in the description of project with key CRM .
isAClone() : boolean Available since version 2.1.27	Returns true only if current issue is a clone of another issue. An issue is a clone of another issue if it's being created by Jira "Clone" operation , or has issue links of type "clones" . This function is useful for bypassing validations in transition Create Issue when the issue is being created by a clone operation.
isJwtTriggeredTransition() : boolean Available since version 2.1.27	Returns true only if current transition execution is being triggered by a Jira Workflow Toolbox post-function . This function is useful for bypassing validations or post-functions when a transition is being non-interactively executed.
isBulkTriggeredTransition() : boolean Available since version 2.2.12	Returns true only if current transition execution is being triggered by Jira's bulk operation feature . This function is useful for bypassing validations or post-functions when a transition is being executed by a bulk update operation .
allComments() : string list Available since version 2.1.33	Returns a string list with all the comments in current issue in ascension order by creation date.

allComments (string issue_keys) : string list Available since version 2.1.34	Returns a string list with all the comments in issues with keys in issue_keys , in order of appearance in issue_keys , and by creation date in ascension order. Argument issue_keys is a comma separated list of issue keys. Example: allComments(%{00041}) returns parent issue's comments, where %{00041} is field code for parent issue's keys .
allComments (issue list I) : string list Available since version 2.1.33	Returns a string list with all the comments in issues in I , in order of appearance in I , and by creation date in ascension order. Example: allComments(subtasks()) returns all the comments in all the sub-tasks of current issue.
allCommenters () : string list Available since version 2.1.33	Returns a string list with the user names of comment authors and updaters in current issue, in ascension order by commenter's actuation time. Since version 2.2.9 a same user appears in the output as many times as comments has created and updated.
allCommentCreators () : string list Available since version 2.2.30	Returns a string list with the user names of comment creators in current issue, in ascension order by commenter's actuation time. A same user appears in the output as many times as comments has created. For anonymous comments an empty string ("") is returned.
allCommentCreators (string issue_keys) : string list Available since version 2.2.30	Returns a string list with the user names of comment creators in issues with keys in issue_keys , in order of appearance in issue_keys , and in ascension order by commenter's actuation time. A same user appears in the output as many times as comments has created. For anonymous comments an empty string ("") is returned.
allCommentCreators (string list I) : string list Available since version 2.2.30	Returns a string list with the user names of comment creators of issues in I , in order of appearance in I , and in ascension order by commenter's actuation time. A same user appears in the output as many times as comments has created. For anonymous comments an empty string ("") is returned.
allCommenters (string issue_keys) : string list Available since version 2.1.34	Returns a string list with the user names of comment authors and updaters of issues with keys in issue_keys , in order of appearance in issue_keys , and in ascension order by commenter's actuation time. Argument issue_keys is a comma separated list of issue keys. Example: allComments(%{00041}) returns a string list with the user names of comment authors of parent issue, where %{00041} is field code for parent issue's keys .
allCommenters (issue list I) : string list Available since version 2.1.33	Returns a string list with the user names of comment authors and updaters of issues in I in ascension order by actuation time, in order of appearance in I , and in ascension order by commenter's actuation time. Example: allCommenters(linkedIssues("is blocked by")) returns a list with all the commenters and comment updaters for linked issues blocking current issue.
allCommentDates () : number list Available since version 2.5.0	Returns the dates of related comments as a number list.
allCommentDates (string issue_keys) : number list Available since version 2.5.0	Returns the dates of related comments from the entered issue_keys as a number list. Example: allCommentDates(["SW-1", "SW-2"]) returns a list with all the comment dates for issues with the key SW-1 and SW-2 .
allCommentDates (issue list issue_list) : number list Available since version 2.5.0	Returns the dates of related comments in the entered issue_list as a number list. Example: allCommentDates(issuesFromJQL("project = softwareProject")) returns a list with all the comment dates for all issues in project softwareProject .
usersWhoTransitioned (string or origin_status , string destination_status) : string list Available since version 2.2.7	Returns a string list with the names of the users who transitioned current issue from origin_status to destination_status , order ascending by time. An empty string as argument is interpreted as any status . Example: last(usersWhoTransitioned("Open", "In Progress")) returns the name of the user who executed transition "Start Progress" more recently. Example: Assign issue to last user who executed a certain transition in the workflow
usersWhoTransitioned (string or origin_status , string destination_status , string issue_key) : string list Available since version 2.2.7	Returns a string list with the names of the users who transitioned current issue from origin_status to destination_status , order ascending by time. An empty string as argument is interpreted as any status . Example: count(usersWhoTransitioned("Open", "In Progress", %{00041})) returns the number of times transition "Start Progress" has been executed in parent issue.
timesOfTransition (string origin_status , string destination_status) : string list Available since version 2.2.7	Returns a number list with the times when current issue was transitioned from origin_status to destination_status , order ascending by time. An empty string as argument is interpreted as any status . Example: last(timesOfTransition("", "Resolved")) returns the most recent time when the issue was resolved.
timesOfTransition (string origin_status , string destination_status , string issue_key) : string list Available since version 2.2.7	Returns a number list with the times when issue with key issue_key was transitioned from origin_status to destination_status , order ascending by time. An empty string as argument is interpreted as any status . Example: first(usersWhoTransitioned("Closed", "", %{00041})) returns the first time when parent issue was reopened.
filledInTransitionScreen (%{nnnnn}) : boolean Available since version 2.2.7	Returns true only if selected field has an actual value in current transition's screen. Example: filledInTransitionScreen(%{00003}) returns true only if the field Assignee was present in the transition screen and contained a value at the moment of submitting the form.

componentLeader (string component_name) : string Available since version 2.2.36	Returns the user name of the leader of the component with name component_name in current issue's project. This function also admits a comma separated list of components, and returns a comma separated list of user names . Output will contain repeated user names if a same user is leader of more than one component. Example: componentLeader ("%{00094}") returns a comma separated list with the user names of the leaders of current issue's components.
componentLeader (string component_name , string project_key) : string Available since version 2.2.36	Returns the user name of the leader of the component with name component_name in project with key project_key . This function also admits a comma separated list of components, and returns a comma separated list of user names . Output will contain repeated user names if a same user is leader of more than one component. Example: componentLeader ("Web Portal", "CRM") returns the user name of the leader of the component with name Web Portal in project with key CRM .
issueIDFromKey (string issue_key) : string Available since version 2.2.39	Returns the internal ID of issue with key issue_key . This function also admits a comma separated list of issue keys, and returns a comma separated list of internal IDs . Example: issueIDFromKey ("CRM-1") returns "10001" .
issueKeyFromID (string issue_ID) : string Available since version 2.2.39	Returns the issue key of issue with internal ID issue_ID . This function also admits a comma separated list of issue IDs , and returns a comma separated list of issue keys . Example: issueIDFromKey ("10001") returns "CRM-1" .
projectKey (string project_key) : string Available since version 2.4.9	Returns a string with the project key from the project with the project_name .
projectKeys () : string list Available since version 2.4.0	Returns a string list with all the <i>project keys</i> in the JIRA instance.
projectKeys (string category) : string list Available since version 2.4.0	Returns a string list with the <i>project keys</i> of those projects that belong to project category with name category .
projectName (string project_key) : string Available since version 2.4.0	Returns a string with the name of the project with key project_key .
projectCategory (string project_key) : string Available since version 2.4.0	Returns a string with the category of the project with key project_key .
attachmentUrls () : string list Available since version 2.4.8	Returns a string list with the URL of attachments of current issue.
attachmentUrls (issue list issue_list) : string list Available since version 2.4.8	Returns a string list with the URL of attachments of issues in issue_list .
attachmentUrls (string list attachments_regexp) : string list Available since version 2.4.8	Returns a string list with the URL of attachments of the current issue with names matching a regexp in attachments_regexp .
attachmentUrls (issue list issue_list , string list attachments_regexp) : string list Available since version 2.4.8	Returns a string list with the URL of attachments of issues in issue_list with names matching a regexp in attachments_regexp .