

Dictionaries

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Dictionary Syntax and Semantics

A dictionary is a mapping from a key type to a value type.

For example:

Slice

```
struct Employee {
    long    number;
    string  firstName;
    string  lastName;
};

dictionary<long, Employee> EmployeeMap;
```

This definition creates a dictionary named `EmployeeMap` that maps from an employee number to a structure containing the details for an employee. Whether or not the key type (the employee number, of type `long` in this example) is also part of the value type (the `Employee` structure in this example) is up to you — as far as `Slice` is concerned, there is no need to include the key as part of the value.

Dictionaries can be used to implement sparse arrays, or any lookup data structure with non-integral key type. Even though a sequence of structures containing key-value pairs could be used to model the same thing, a dictionary is more appropriate:

- A dictionary clearly signals the intent of the designer, namely, to provide a mapping from a domain of values to a range of values. (A sequence of structures of key-value pairs does not signal that same intent as clearly.)
- At the programming language level, sequences are implemented as vectors (or possibly lists), that is, they are not well suited to model sparsely populated domains and require a linear search to locate an element with a particular value. On the other hand, dictionaries are implemented as a data structure (typically a hash table or red-black tree) that supports efficient searching in $O(\log n)$ average time or better.

Allowable Types for Dictionary Keys and Values

The key type of a dictionary need not be an integral type. For example, we could use the following definition to translate the names of the days of the week:

Slice

```
dictionary<string, string> WeekdaysEnglishToGerman;
```

The server implementation would take care of initializing this map with the key-value pairs Monday-Montag, Tuesday-Dienstag, and so on.

The value type of a dictionary can be any `Slice` type. However, the key type of a dictionary is limited to one of the following types:

- [Integral](#) types (byte, short, int, long, bool)
- [string](#)
- [enum](#)
- [Structures](#) containing only data members of legal key types
- [Sequences](#) whose elements are legal key types

Other complex types, such as dictionaries, and floating-point types (`float` and `double`) cannot be used as the key type. Complex types are disallowed because they complicate the language mappings for dictionaries, and floating-point types are disallowed because representational changes of values as they cross machine boundaries can lead to ill-defined semantics for equality.

[See Also](#)

- [Basic Types](#)
- [Enumerations](#)
- [Structures](#)
- [Sequences](#)
- [Constants and Literals](#)