



What is String?

`String` is an **immutable** class in Java. Once created, its value cannot be changed. Any modification (like concatenation) actually creates a **new String object** in memory. ^[1] ^[2]

Differences: String vs StringBuffer vs StringBuilder

Feature	String	StringBuffer	StringBuilder
Mutability	Immutable (Cannot change)	Mutable (Can change in-place)	Mutable (Can change in-place)
Thread Safety	Thread-safe (by nature of immutability)	Thread-safe (Synchronized methods)	Not thread-safe
Performance	Slow for heavy modifications (creates many objects)	Slower than <code>StringBuilder</code> (due to sync overhead)	Fastest for modifications
Introduced	JDK 1.0	JDK 1.0	JDK 1.5

Use Cases (When to use which?)

1. Use `String` when:

- The value is **constant** or rarely changes (e.g., config keys, error messages).
- You need to use it as a **Map Key** (immutability guarantees hashCode stability).
- Security is a concern (e.g., database connection URLs, usernames).

2. Use `StringBuilder` when:

- You are manipulating strings in a loop (e.g., building a large CSV or JSON string).
- You are in a **single-threaded** environment (e.g., inside a method).
- *This is the default choice for string manipulation.* ^[3]

3. Use `StringBuffer` when:

- You need to modify a string **shared between multiple threads** concurrently (legacy code or specific concurrency needs).
- *Note:* In modern development, `StringBuffer` is rarely used. Even for concurrency, using `AtomicReference` or locks is often preferred. ^[4] ^[5]

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