Difference between Future and CompletableFuture

Future is an older interface (Java 5) that represents the result of an asynchronous computation, but it is **limited** because getting the result is a **blocking operation** (`get()` waits until done). You cannot manually complete it or chain actions to it.[1] [2]

CompletableFuture (Java 8) is a powerful upgrade that implements `Future`. It is **non-blocking**, meaning you can attach callbacks (like `.thenApply()`, `.thenAccept()`) that run automatically when the task finishes. It also supports **chaining multiple steps**, **combining multiple tasks**, **exception handling**, and **manual completion**.[3] [1]

Comparison Table

Feature	`Future` (Java 5)	`CompletableFuture` (Java 8)
Blocking	Yes, `get()` blocks the main thread.	No, uses callbacks (`thenApply`, `thenAccept`). [2]
Chaining	Not possible.	Yes, can chain multiple tasks (`step1.thenApply(step2)`). [4]
Exception Handling	Difficult (try-catch around `get()`).	Built-in methods (`exceptionally()`, `handle()`). [5]
Manual Completion	No, cannot manually set result.	Yes, can call `.complete(value)` to finish it early. [6]
Combining Tasks	Hard (must wait for all).	Easy (`allOf()`, `anyOf()`, `thenCombine()`). [5]

Use Case Example:

- **Future:** Submit a task to an Executor, do some other work, then **stop and wait** (`get()`) for the result.
- **CompletableFuture:** "Fetch user data" → *then* "Fetch recent orders" → *then* "Send email", all without blocking the main thread.[4] [3]

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