Custom Asynchronous Tasks with TaskCompletionSource

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TaskCompletionSource<T>

- **Task property**
  - Returns Task<T>

- **Use TaskCompletionSource<object> for plain Task**

- **Task status initially WaitingForActivation**

- **SetResult transitions to RanToCompletion**

Errors and Cancellation

- **SetException**
  - Single Exception
  - IEnumerable<Exception>

- **TCS provides AggregateException**

- **SetCanceled**

Argument Errors

- **Mid-flow (non-argument) errors**

    vs

- **Immediately apparent errors**

- **Argument errors requiring time to discover**

Non-Throwing Completion Methods

- **TrySetResult**

- **TrySetException**

- **TrySetCanceled**

Summary

- **TaskCompletionSource<T>**

- **SetResult**

- **SetException**

- **SetCanceled**

- **Argument validation timing**

- **Non-throwing completion methods**