Component interaction

{@a top}

This cookbook contains recipes for common component communication scenarios in which two or more components share information. {@a toc}

See the .

{@a parent-to-child}

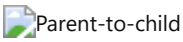
Pass data from parent to child with input binding

`HeroChildComponent` has two ***input properties***, typically adorned with [@Input() decorator](#).

The second `@Input` aliases the child component property name `masterName` as `'master'`.

The `HeroParentComponent` nests the child `HeroChildComponent` inside an `*ngFor` repeater, binding its `master` string property to the child's `master` alias, and each iteration's `hero` instance to the child's `hero` property.

The running application displays three heroes:


Parent-to-child

Test it

E2E test that all children were instantiated and displayed as expected:

[Back to top](#)

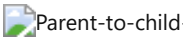
{@a parent-to-child-setter}

Intercept input property changes with a setter

Use an input property setter to intercept and act upon a value from the parent.

The setter of the `name` input property in the child `NameChildComponent` trims the whitespace from a name and replaces an empty value with default text.

Here's the `NameParentComponent` demonstrating name variations including a name with all spaces:


Parent-to-child-setter

Test it

E2E tests of input property setter with empty and non-empty names:

[Back to top](#)

{@a parent-to-child-on-changes}

Intercept input property changes with *ngOnChanges()*

Detect and act upon changes to input property values with the `ngOnChanges()` method of the `OnChanges` lifecycle hook interface.

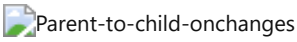
You might prefer this approach to the property setter when watching multiple, interacting input properties.

Learn about `ngOnChanges()` in the Lifecycle Hooks chapter.

This `VersionChildComponent` detects changes to the `major` and `minor` input properties and composes a log message reporting these changes:

The `VersionParentComponent` supplies the `minor` and `major` values and binds buttons to methods that change them.

Here's the output of a button-pushing sequence:

 Parent-to-child-onchanges

Test it

Test that ***both*** input properties are set initially and that button clicks trigger the expected `ngOnChanges` calls and values:

Back to top

{@a child-to-parent}

Parent listens for child event

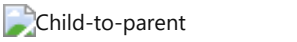
The child component exposes an `EventEmitter` property with which it `emits` events when something happens. The parent binds to that event property and reacts to those events.

The child's `EventEmitter` property is an ***output property***, typically adorned with an @Output() decorator as seen in this `VoterComponent`:

Clicking a button triggers emission of a `true` or `false`, the boolean *payload*.

The parent `VoteTakerComponent` binds an event handler called `onVoted()` that responds to the child event payload `$event` and updates a counter.

The framework passes the event argument—represented by `$event`—to the handler method, and the method processes it:

 Child-to-parent

Test it

Test that clicking the *Agree* and *Disagree* buttons update the appropriate counters:

Back to top

Parent interacts with child using *local variable*

A parent component cannot use data binding to read child properties or invoke child methods. Do both by creating a template reference variable for the child element and then reference that variable *within the parent template* as

seen in the following example.

{@a countdown-timer-example} The following is a child `CountdownTimerComponent` that repeatedly counts down to zero and launches a rocket. The `start` and `stop` methods control the clock and a countdown status message displays in its own template.

The `CountdownLocalVarParentComponent` that hosts the timer component is as follows:

The parent component cannot data bind to the child's `start` and `stop` methods nor to its `seconds` property.

Place a local variable, `#timer`, on the tag `<countdown-timer>` representing the child component. That gives you a reference to the child component and the ability to access *any of its properties or methods* from within the parent template.

This example wires parent buttons to the child's `start` and `stop` and uses interpolation to display the child's `seconds` property.

Here, the parent and child are working together.

 countdown timer

{@a countdown-tests}

Test it

Test that the seconds displayed in the parent template match the seconds displayed in the child's status message. Test also that clicking the *Stop* button pauses the countdown timer:

Back to top

{@a parent-to-view-child}

Parent calls an *@ViewChild()*

The *local variable* approach is straightforward. But it is limited because the parent-child wiring must be done entirely within the parent template. The parent component *itself* has no access to the child.

You can't use the *local variable* technique if the parent component's *class* relies on the child component's *class*. The parent-child relationship of the components is not established within each components respective *class* with the *local variable* technique. Because the *class* instances are not connected to one another, the parent *class* cannot access the child *class* properties and methods.

When the parent component *class* requires that kind of access, ***inject*** the child component into the parent as a *ViewChild*.

The following example illustrates this technique with the same Countdown Timer example. Neither its appearance nor its behavior changes. The child CountdownTimerComponent is the same as well.

The switch from the *local variable* to the *ViewChild* technique is solely for the purpose of demonstration.

Here is the parent, `CountdownViewChildParentComponent`:

It takes a bit more work to get the child view into the parent component *class*.

First, you have to import references to the `ViewChild` decorator and the `AfterViewInit` lifecycle hook.

Next, inject the child `CountdownTimerComponent` into the private `timerComponent` property using the `@ViewChild` property decoration.

The `#timer` local variable is gone from the component metadata. Instead, bind the buttons to the parent component's own `start` and `stop` methods and present the ticking seconds in an interpolation around the parent component's `seconds` method.

These methods access the injected timer component directly.

The `ngAfterViewInit()` lifecycle hook is an important wrinkle. The timer component isn't available until *after* Angular displays the parent view. So it displays `0` seconds initially.

Then Angular calls the `ngAfterViewInit` lifecycle hook at which time it is *too late* to update the parent view's display of the countdown seconds. Angular's unidirectional data flow rule prevents updating the parent view's in the same cycle. The application must *wait one turn* before it can display the seconds.

Use `setTimeout()` to wait one tick and then revise the `seconds()` method so that it takes future values from the timer component.

Test it

Use the same countdown timer tests as before.

Back to top

{@a bidirectional-service}

Parent and children communicate using a service

A parent component and its children share a service whose interface enables bi-directional communication *within the family*.

The scope of the service instance is the parent component and its children. Components outside this component subtree have no access to the service or their communications.

This `MissionService` connects the `MissionControlComponent` to multiple `AstronautComponent` children.

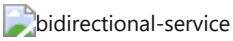
The `MissionControlComponent` both provides the instance of the service that it shares with its children (through the `providers` metadata array) and injects that instance into itself through its constructor:

The `AstronautComponent` also injects the service in its constructor. Each `AstronautComponent` is a child of the `MissionControlComponent` and therefore receives its parent's service instance:

Notice that this example captures the `subscription` and `unsubscribe()` when the `AstronautComponent` is destroyed. This is a memory-leak guard step. There is no actual risk in this application because the lifetime of a `AstronautComponent` is the same as the lifetime of the application itself. That *would not* always be true in a more complex application.

You don't add this guard to the `MissionControlComponent` because, as the parent, it controls the lifetime of the `MissionService`.

The *History* log demonstrates that messages travel in both directions between the parent `MissionControlComponent` and the `AstronautComponent` children, facilitated by the service:



Test it

Tests click buttons of both the parent `MissionControlComponent` and the `AstronautComponent` children and verify that the history meets expectations:

Back to top

@reviewed 2021-09-17