

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect. The shapes are layered, with some appearing more prominent than others, and they extend towards the corners of the frame.

JavaScript

Async Await

- ▶ Async and Await are extensions of promises.
- ▶ More recent additions to the JavaScript language are async functions and the await keyword, part of the so-called ECMAScript 2017 JavaScript edition
- ▶ async keyword, which you put in front of a function declaration to turn it into an async function.
- ▶ Async functions enable us to write promise based code as if it were synchronous, but without blocking the execution thread. It operates asynchronously via the event-loop. Async functions will always return a value. Using async simply implies that a promise will be returned, and if a promise is not returned, JavaScript automatically wraps it in a resolved promise with its value.
- ▶ Basically async functions will always return a promise and we can use await inside async.

JavaScript Modules

- Split up your code into separate components
- Therefore easier to maintain and organize
- Supported in major browsers (excl. IE)

What is jquery

- ▶ jQuery is a fast, small, and feature-rich JavaScript library. It makes things like HTML document traversal and manipulation, event handling, animation, and Ajax much simpler with an easy-to-use API that works across a multitude of browsers. With a combination of versatility and extensibility, jQuery has changed the way that millions of people write JavaScript.

jQuery selectors

- ▶ `$(this).hide()` - hides the current element.
- ▶ `$("p").hide()` - hides all `<p>` elements.
- ▶ `$(".test").hide()` - hides all elements with `class="test"`.
- ▶ `$("#test").hide()` - hides the element with `id="test"`.

More Selectors

Syntax	Description
<code>\$("*")</code>	Selects all elements
<code>\$(this)</code>	Selects the current HTML element
<code>\$("#p.intro")</code>	Selects all <code><p></code> elements with <code>class="intro"</code>
<code>\$("#p:first")</code>	Selects the first <code><p></code> element
<code>\$("#ul li:first")</code>	Selects the first <code></code> element of the first <code></code>
<code>\$("#ul li:first-child")</code>	Selects the first <code></code> element of every <code></code>
<code>\$("[href]")</code>	Selects all elements with an <code>href</code> attribute
<code>\$("#a[target='_blank']")</code>	Selects all <code><a></code> elements with a <code>target</code> attribute value equal to <code>"_blank"</code>
<code>\$("#a[target!='_blank']")</code>	Selects all <code><a></code> elements with a <code>target</code> attribute value NOT equal to <code>"_blank"</code>
<code>\$(":button")</code>	Selects all <code><button></code> elements and <code><input></code> elements of <code>type="button"</code>
<code>\$("#tr:even")</code>	Selects all even <code><tr></code> elements
<code>\$("#tr:odd")</code>	Selects all odd <code><tr></code> elements

The Document Ready Event

- ▶ `$(document).ready(function(){`

- // jQuery methods go here...*

- `});`

- ▶ This is to prevent any jQuery code from running before the document is finished loading (is ready).

Events

Mouse Events	Keyboard Events	Form Events	Document/Window Events
click	keypress	submit	load
dblclick	keydown	change	resize
mouseenter	keyup	focus	scroll
mouseleave		blur	unload

jQuery Animations

- ▶ The jQuery `animate()` method is used to create custom animations.
- ▶ `$(selector).animate({params},speed,callback);`
- ▶ The required `params` parameter defines the CSS properties to be animated.
- ▶ The optional `speed` parameter specifies the duration of the effect. It can take the following values: "slow", "fast", or milliseconds.
- ▶ The optional `callback` parameter is a function to be executed after the animation completes.

Compile

- ❖ The first step of execution/processing a directive for rendering.
- ❖ Loads and traverses the DOM (of template)
 - › Compiles each of the directives collected thereafter (ex: nested directives)
- ❖ Happens for both existing Angular Directives or Custom Directives

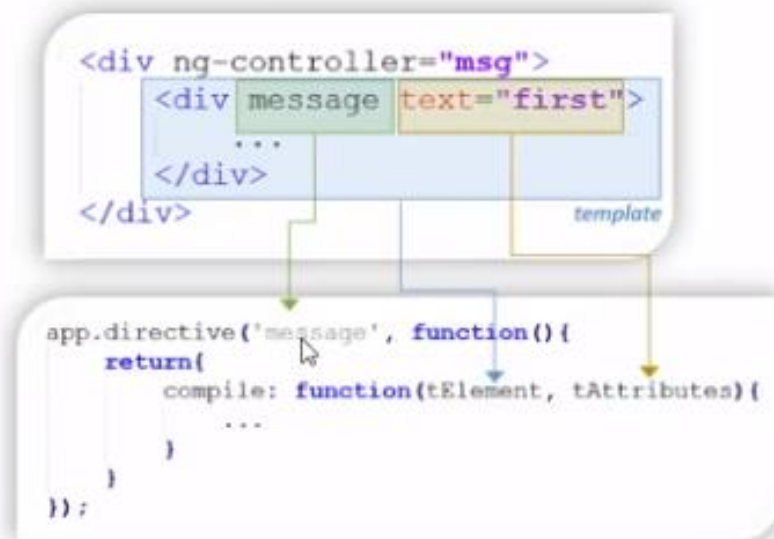
```
<div ng-controller="msg">  
  <div message text="first">  
    ...  
  </div>  
</div>
```

template

- Template loaded from HTML DOM
- Traverses the template for additional directives (if any)
- Compiles (loads & Traverses) each of those additional directives found

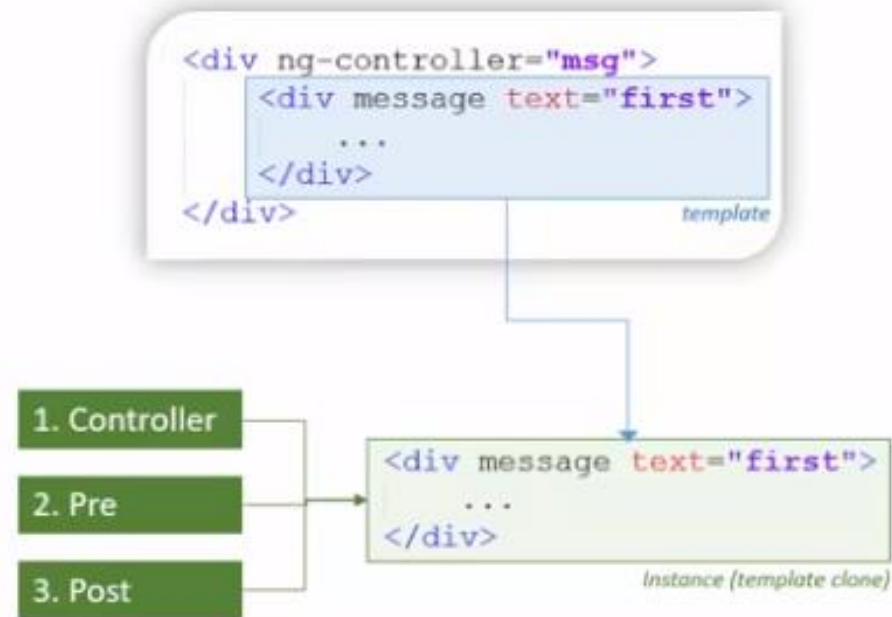
Compile

- ❖ The first step of execution/processing a directive for rendering.
- ❖ Loads and traverses the DOM (of template)
 - › Compiles each of the directives collected thereafter (ex: nested directives)
- ❖ Happens for both existing Angular Directives or Custom Directives
- ❖ "compile" function: executes code during compilation phase of a template

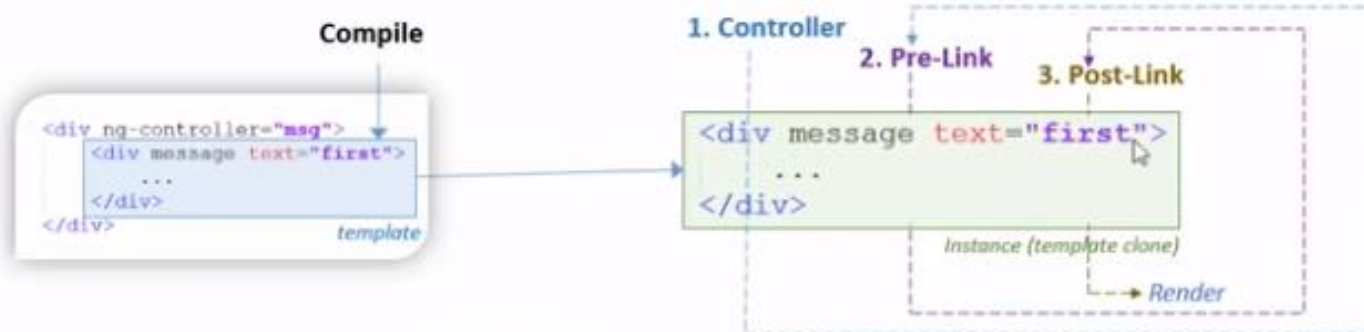


Link

- ❖ The next phase after Compile
 - › Carried out in various steps
- ❖ Works on an instance of a Template (previously "compiled")
- ❖ 3 internal phases of template instance (executed in sequence):
 - › Controller (of directive)
 - › Pre
 - › Post (aka. "Link")
- ❖ Gets rendered after Link phase



Compile & Link



Compile

- Loads & traverses Template DOM
- Executes only once
- Returns link function
 - Or object (containing pre, post (or link) etc.)
- No Scope present
- No instances/clones (of template) created yet
- Do operations which can be shared among all instances/clones of template
- Can manipulate DOM of template
- Cannot play with data/events of clones
- No DOM of clones available

Controller

- The first to execute for every instance/clone of template
- Creates scope (scope initialization) for the template instance
- Can manipulate data for template instance
- **Not recommended to access instance DOM**

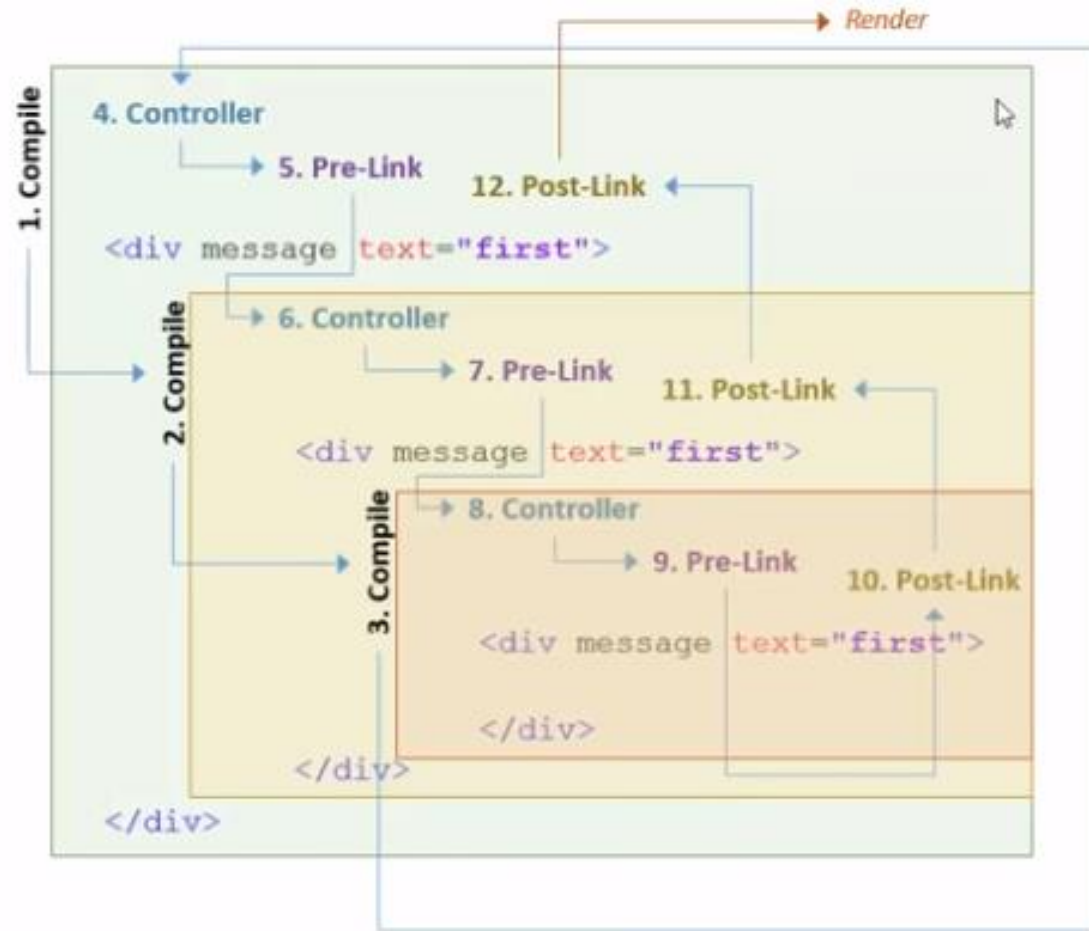
Pre

- Executes immediately after controller phase (for every instance)
- Ref. to DOM template instance is available
- Scope for the instance is ready
- Instance is not linked to scope yet (no bindings are setup)
- Child elements/directives not ready
- Scope can be manipulated
- Safe to set data and even child data
- **Not safe to manipulate DOM template instance**
- No access to child elements

Post

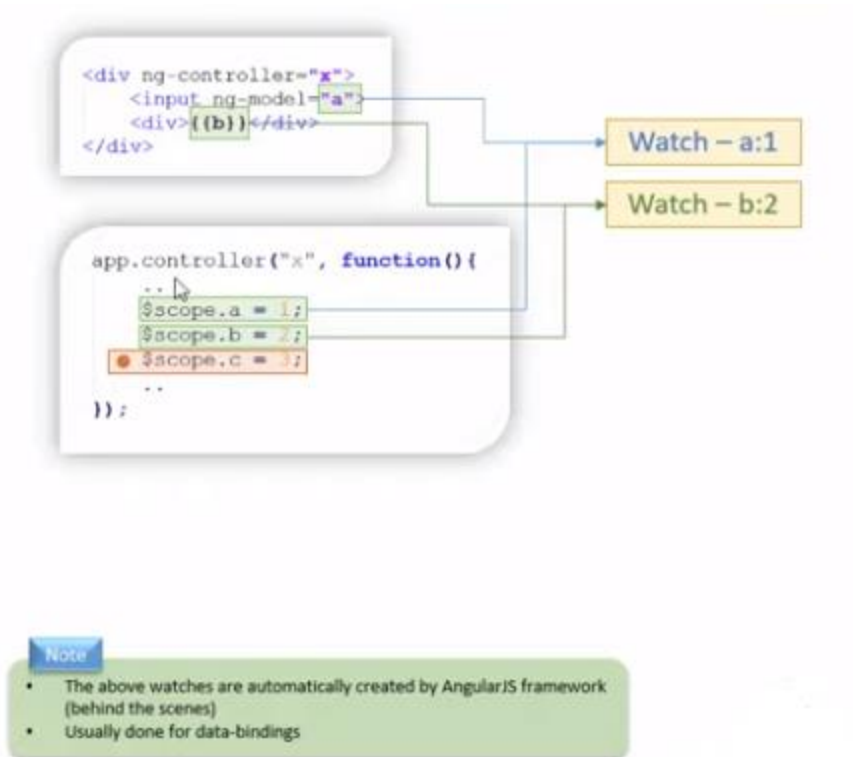
- The last phase (of every instance), usually called "linking" (or link function etc.)
- Ref. to DOM template instance is available
- Scope and instance linked (and data bound)
- Child elements/directives are ready (and already linked)
- Scope can be manipulated
- Safe to attach event handlers, inspect child elements
- Safe to manipulate DOM template instance
- **Not safe to set data for child elements**

Order of execution



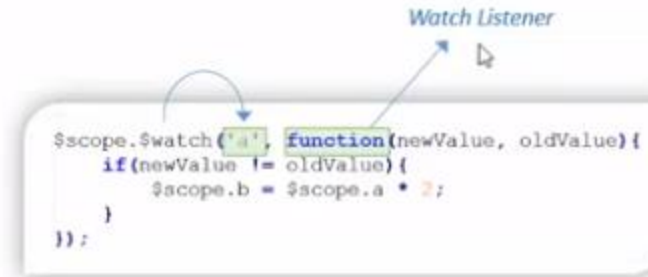
Watchers

- ❖ Nothing but monitoring: keeping track of (or watching) scope variables and the changes of their values.
- ❖ Watch:
 - › keeps track of a variable and its value
 - › Watched by angular framework (specifically, *digest cycle loop*)
 - › Some variables may not be watched
 - › If the value gets changed, angular performs necessary updates (propagations to DOM, UI update etc.)
 - › Angular can execute our custom functions (watch listeners) on value changes
- ❖ Used heavily in data-binding
 - › Bindings are associated with Watches.
 - › Even, internally in AngularJs Framework.



Watch Listener

- ❖ We can add our own "watch" (manually) using "\$watch" function available through "\$scope" object.
 - › Available at \$rootScope as well
- ❖ Used when AngularJS does not consider scope variables for watching
 - › Ex: scope variables not being used in data-binding
- ❖ **Watch Listener:** a function which gets executed when a "watch" detects a value change.



The diagram illustrates the use of the \$watch function. A curved arrow points from the variable 'a' in the code to the \$watch function. A straight arrow points from the function parameter 'function(newValue, oldValue)' to the label 'Watch Listener'.

```
$scope.$watch('a', function(newValue, oldValue){  
  if(newValue !== oldValue){  
    $scope.b = $scope.a * 2;  
  }  
});
```


Reference Listener

- ❖ \$watch - [Reference watch](#)
- ❖ \$watch with "true" - [Equality watch](#)

```
$scope.o = {  
  a: 1,  
  b: 2,  
  c: 4  
};
```

```
$scope.$watch('o', function(newVal, oldVal){  
  if(newVal !== oldVal){  
    $scope.o.c = $scope.o.a * $scope.o.b;  
  }  
});
```

```
$scope.$watch('o', function(newVal, oldVal){  
  if(newVal !== oldVal){  
    $scope.o.c = $scope.o.a * $scope.o.b;  
  }  
}, true);
```

Equality Listener

- ❖ `$watch` - Reference watch
- ❖ `$watch` with `"true"` - Equality watch
- ❖ `$watchGroup` - Reference watch for multiple variables

```
$scope.a = 1;  
$scope.b = 2;  
$scope.c = 4;  
  
$scope.$watchGroup(['a', 'b'], function(newValue, oldValue){  
    if(newValue != oldValue){  
        $scope.c = $scope.a * $scope.b;  
    }  
});
```

Collection Listener

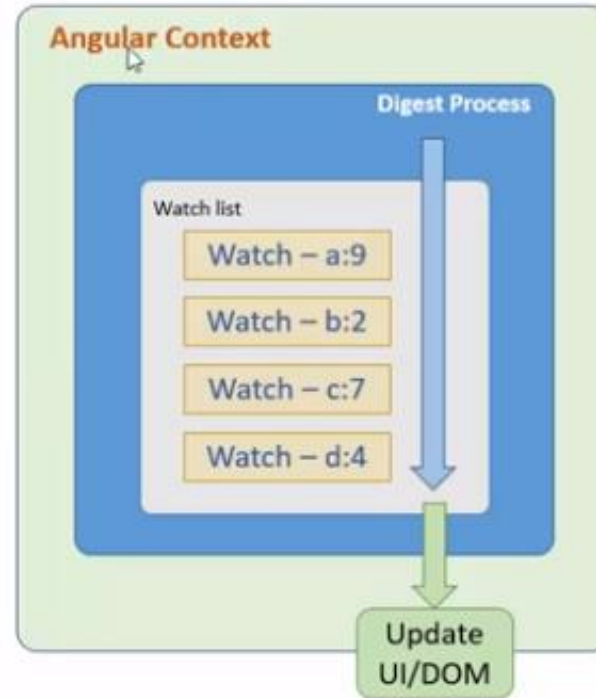
- ❖ `$watch` - [Reference watch](#)
- ❖ `$watch` with `"true"` - [Equality watch](#)
- ❖ `$watchGroup` - Reference watch for multiple variables
- ❖ `$watchCollection` - [Collection watch](#)
 - › Used to watch arrays
 - › Detects modifications to arrays (ex: adding or deleting elements)
 - › Does not detect modifications to array items (ex: modifying an object in an array)
 - » To achieve this, use [Equality watch](#)

```
$scope.emps = [  
  {empno: "1001", ename: "Jag"},  
  {empno: "1002", ename: "Chat"},  
  {empno: "1003", ename: "Win"},  
  {empno: "1004", ename: "Dhan"},  
];
```

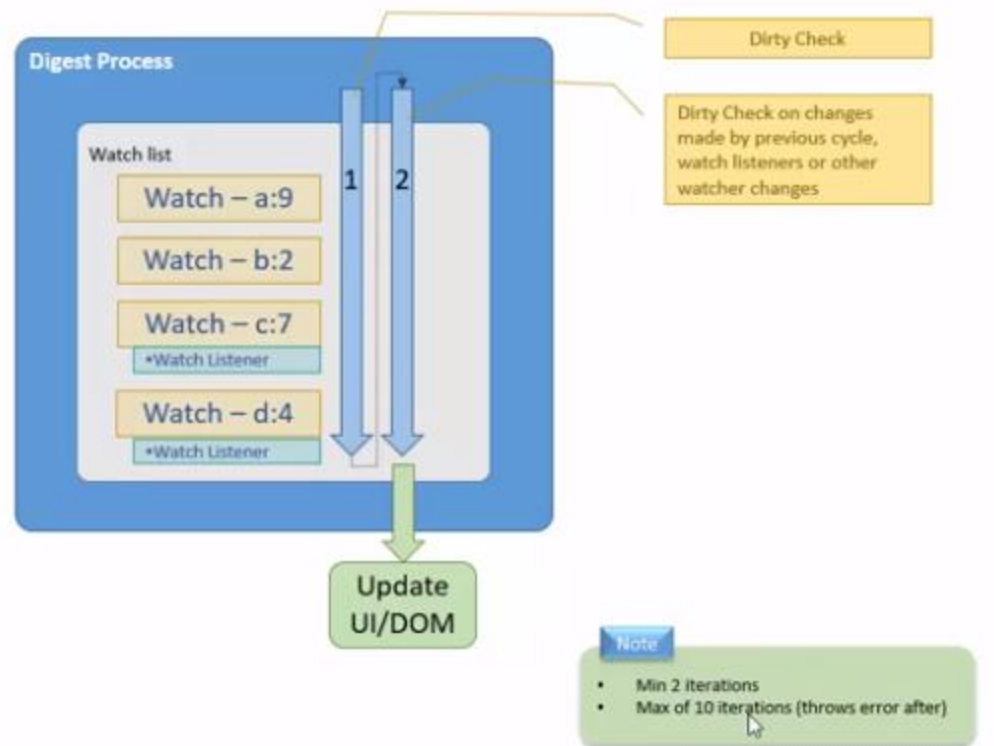
```
$scope.emps.push({empno: "1005", ename: "Test"});  
  
$scope.$watchCollection('emps', function(newValue, oldValue){  
  ...  
});  
  
$scope.emps[2].ename = "Test";  
  
$scope.$watch('emps', function(newValue, oldValue){  
  ...  
}, true);
```

Digest Process

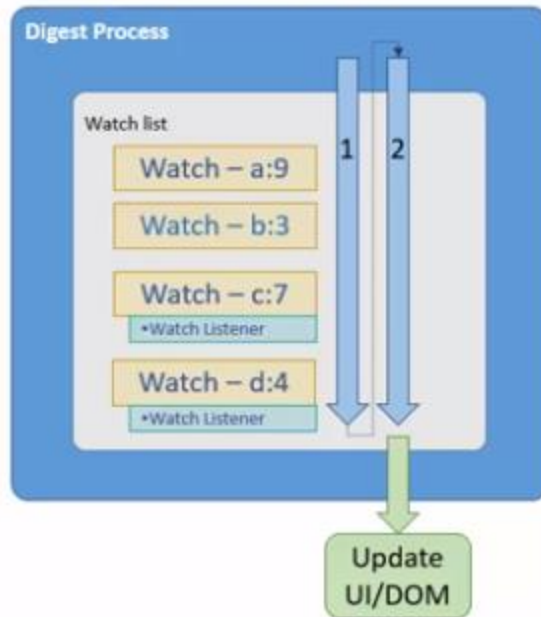
- ❖ Digest Process (in simple words):
 - › Responsible to walk-through entire watch list for modifications
 - » Also called "dirty-checking" (the process of checking the current values of scope variables with their previous values)
 - › Exists modifications? Execute Watch Listeners, if any.
 - › Keeps note of all modifications and notifies Angular JS framework to update DOM
- ❖ In general, DOM gets updated after Digest Process.
- ❖ Digest Process runs as part of Angular Context
 - › **Angular Context**: run-time env. of AngularJS Framework



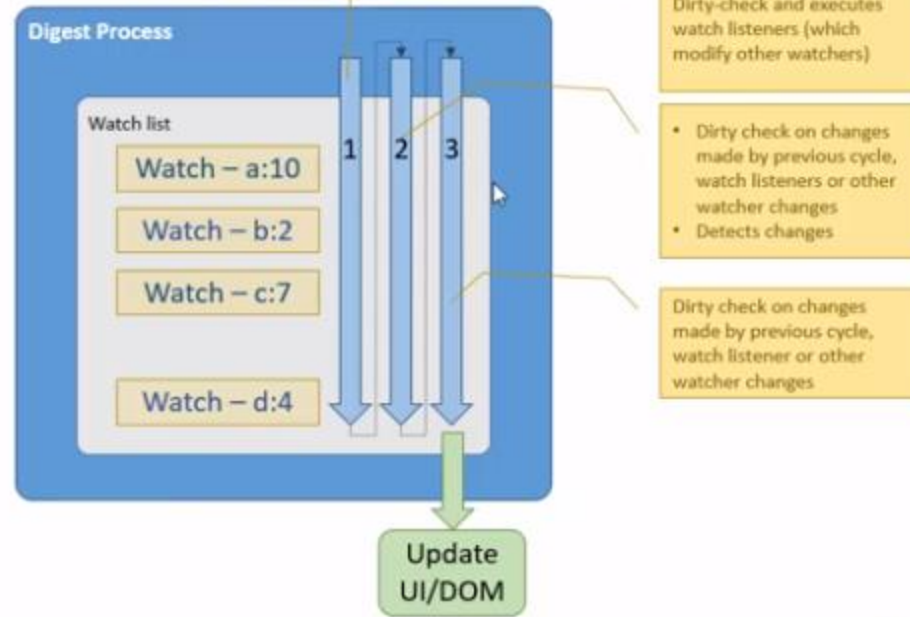
Digest Cycle



First Level Watch Updates and Digest cycle



Second Level Watch Updates and Digest cycle



Angular Context

