promises
the tao of angular

AngularJS Portugal
meetup.com/AngularJS-Portugal/
twitter.com/angularjspt
Google+ community

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- 15+ years developer
- CTO with Gotv Media Software since 2002
- Creator of AngularJS Portugal group

Visual Basic 5, Microsoft WebTv ASP/Jscript, .Net Framework 1 through 4.5 desktop apps, Titanium Mobile Javascript Mobile apps, AngularJS last 2 months

promises
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Source code:
github.com/vmlf01/promiseSamples

Preview:
promisesamples.divshot.io

what are promises

What are promises?

A promise is a container that holds or will hold a value

WHAT?!?

It's a trust thing!

**With promises, you are always guaranteed
to get one and only one value back
(even if it's a failure)**

Trust me :)

What do they do?
Promises are a way of thinking synchronously and doing asynchronously.
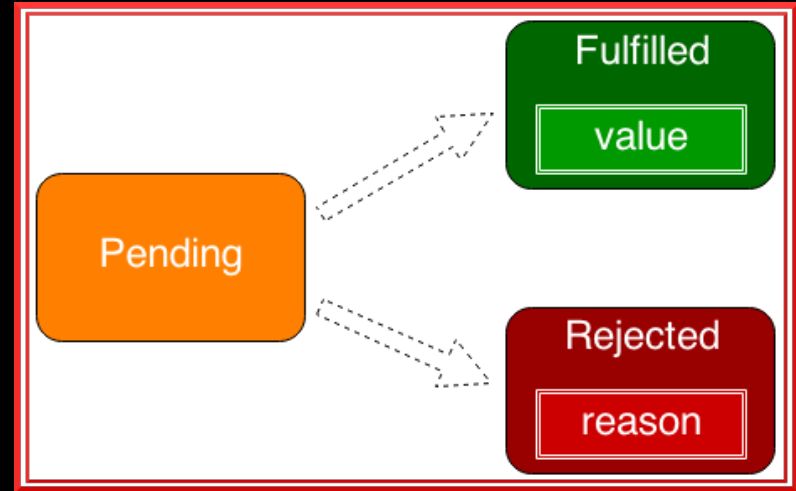
What is it good for?!
Unlike war, absolutely everything.
Say it again!

A promise can be:
- Pending
- Fulfilled
- Rejected

Once a Promise is fulfilled or rejected, it'll remain in that state forever.

promise guarantees

promiseForResult.**then**(onFulfilled, onRejected);

- Only one of **onFulfilled** or **onRejected** will be called.

- **onFulfilled** will be called with a single *fulfillment value* (⇔ return value).

- **onRejected** will be called with a single *rejection reason* (⇔ thrown exception).

- If the promise is already settled, the handlers will still be called once you attach them.

- The handlers will always be called asynchronously.

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programming 101: algorithms

Dinner out:

1. How many people?
2. Which restaurant?
3. Book restaurant
4. Show up on time
5. Eat

programming 101: algorithms

Dinner out:

Well that's all fine and dandy,
but what about the other stuff?

In reality, you cannot block waiting for each step
to complete. You need to go about your life!

(Web) programming is async.

parallel execution

Dinner out:

1. How many people?
2. Which restaurant?

3. Book restaurant
4. Show up on time
5. Eat

Done at same time

handle exceptions

Dinner out:

1. How many people?
2. Which restaurant?

3. Book restaurant

What if not available?

4. Show up on time
5. Eat

!

don't block, give feedback

Dinner out:

1. How many people?
2. Which restaurant?
3. Book restaurant
4. **Show up on time** — Table not ready, wait a bit
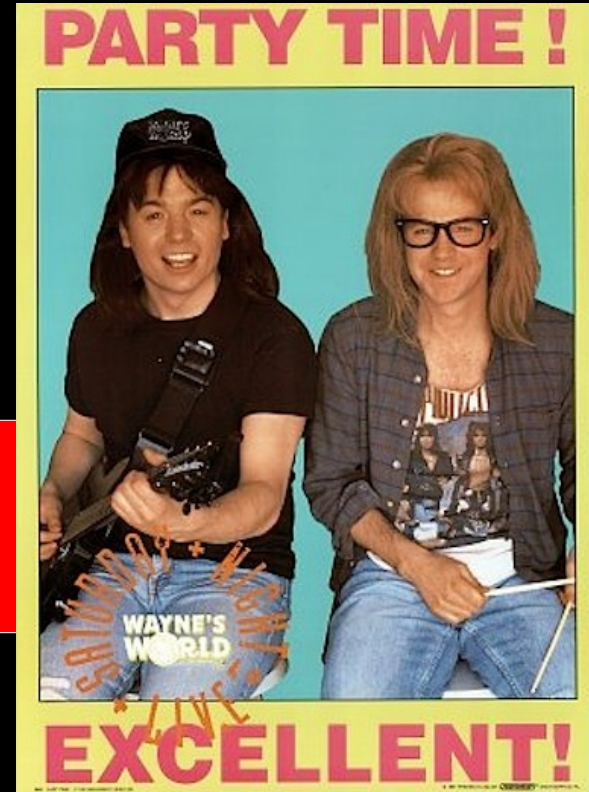5. Eat

please wait ...

finally

Dinner out:

1.How many people?
2.Which restaurant?
3.Book restaurant
4.Show up on time

5.Eat

promises in AngularJS

- Implemented in AngularJS $q service
- Inspired by Kris Kowal's Q library
- Contains only the most important features
- Integrated with AngularJS's digest/event loop

$q

```
function aSimplePromise() {
    var deferredTask = $q.defer();

    deferredTask.resolve(
        'I always keep my promises!'
    );

    return deferredTask.promise;
}
```

$q

The deferred API

var deferred = $q.**defer**()
deferred.**resolve**(value)
deferred.**reject**(reason)
deferred.**notify**(status)
var promise = deferred.**promise**

$q

The promise API

promise.**then**(onFulfilled, onRejected, onNotify)
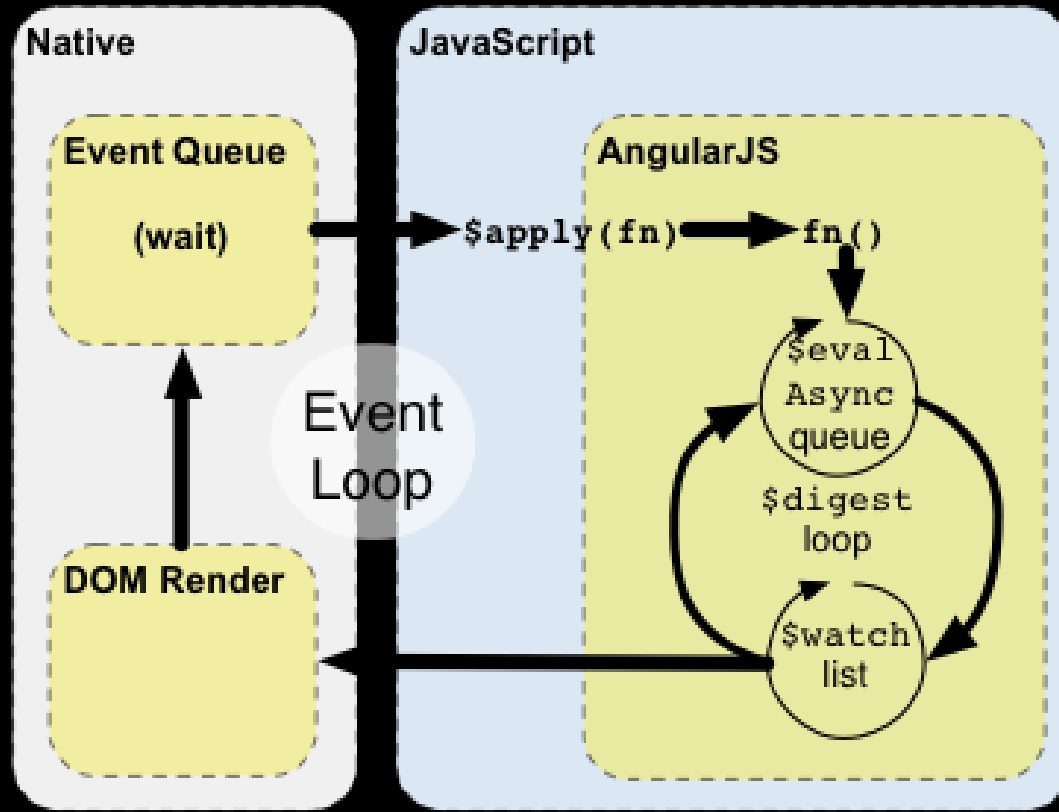promise.**catch**(onRejected)
promise.**finally**(callback)

$q

The Helpers

var promise = $q.**when**(value)
var promise = $q.**all**([arrayOfPromises])

AngularJS digest cycle

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$q resolution inside digest cycle

```
function MyController($scope, $http) {
    $scope.text = "loading";

    $scope.doThing = function () {
        $http.get("somefile.json").then(function (response) {
            $scope.text = response.data;
        });
    };
}
```

// Works! Angular's promises are integrated into the digest cycle

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The Tao of Angular

Promises are all around in AngularJS!

$http
$resource
$route
$timeout

…

- **then**() returns a promise

- Callback return values fulfill their promises

- Callback errors reject their promises

- Value/reason passthru if callback missing

- Callbacks can return promises

promises. the basics, from promises/A+, luke smith

promises problems

Can we live without them?

...

Why would you?

- Wasted promises → Garbage collection

- Silent fails

why promises are awesome

- Cleaner method signatures

- Uniform return/error semantics

- Easy composition

- Easy sequential/parallel join

- Always async

- Exception-style error bubbling

how do promises work?

Wait, wait, wait...

But how does it work?

how do promises work

Well, eh...

Js promises are just

callbacks

in hidding!

Did you think it was magic???

function Promise(fn)

```
var state = 'pending';
var value;
var deferred = null;

function resolve(newValue) {
    value = newValue;
    state = 'resolved';

    if(deferred) {
        handle(deferred);
    }
}
```
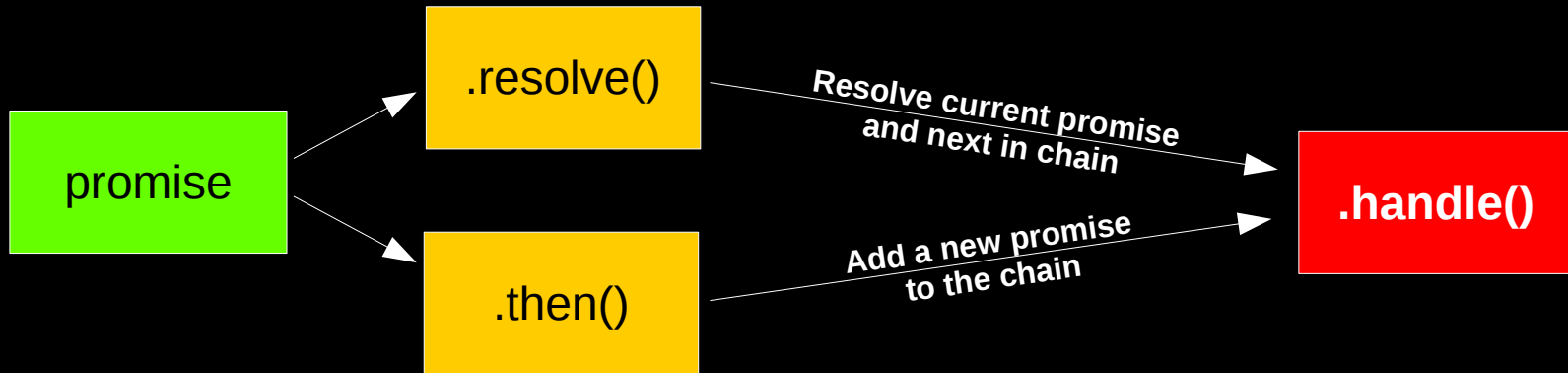
```
function handle(handler) {
    if(state === 'pending') {
        deferred = handler;
        return;
    }
    if(!handler.onResolved) {
        handler.resolve(value);
        return;
    }
    var ret = handler.onResolved(value);
    handler.resolve(ret);
}
```

function Promise(fn)
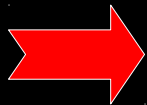
```
this.then = function(onResolved) {
    return new Promise(function(resolve) {
        handle({
            onResolved: onResolved,
            resolve: resolve
        });
    });
};

fn(resolve);
```

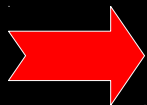# promise call flow

function handle(handler)

```
function handle(handler) {
    if(state === 'pending') {
        deferred = handler;
        return;
    }
    if(!handler.onResolved) {
        handler.resolve(value);
        return;
    }
    var ret = handler.onResolved(value);
    handler.resolve(ret);
}
```

If promise state is pending, store handler to call it back later when promise resolves

If there is no onResolved callback for this promise, then take its value and passthru to next promise in chain
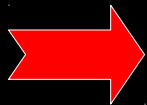
Call this promise onResolved handler

Then, resolve next promise in chain with the return value

references

Promises/A+ Specification
http://promises-aplus.github.io/promises-spec/

Callbacks, Promises, and Coroutines (oh my!), Domenic Denicola
http://www.slideshare.net/domenicdenicola/callbacks-promises-and-coroutines-oh-my-the-evolution-of-asynchronicity-in-javascript

The Promised Land in Angular, Domenic Denicola
http://www.slideshare.net/domenicdenicola/the-promised-land-in-angular

Promises, Luke Smith
http://www.slideshare.net/drprolix/promises-16473115

JavaScript Promises ... In Wicked Detail, Matt Greer
http://www.mattgreer.org/articles/promises-in-wicked-detail/

Thanks

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