The Magic of Rails

exploring the principles & techniques
behind the framework


RAILS
WORLD

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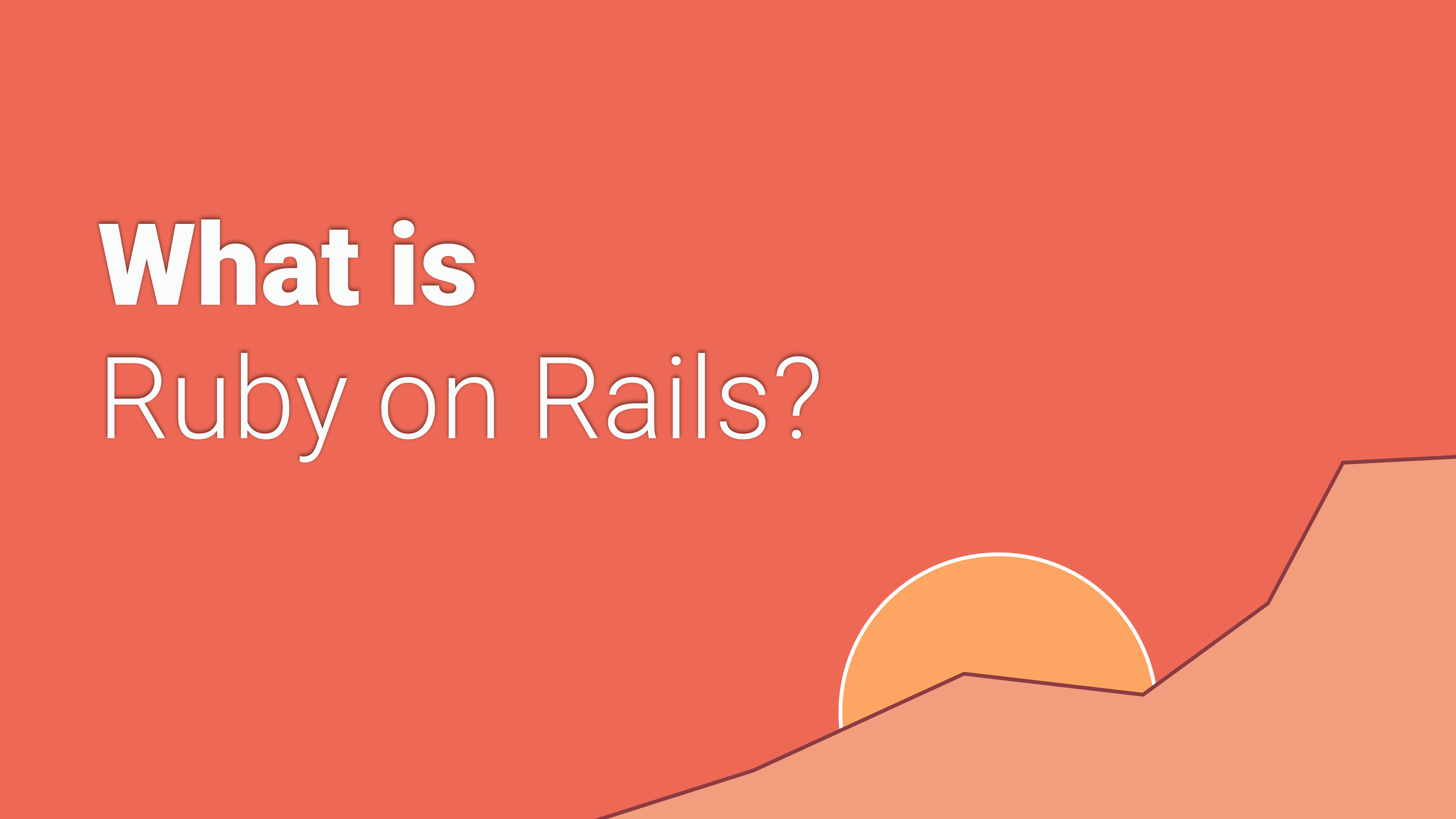
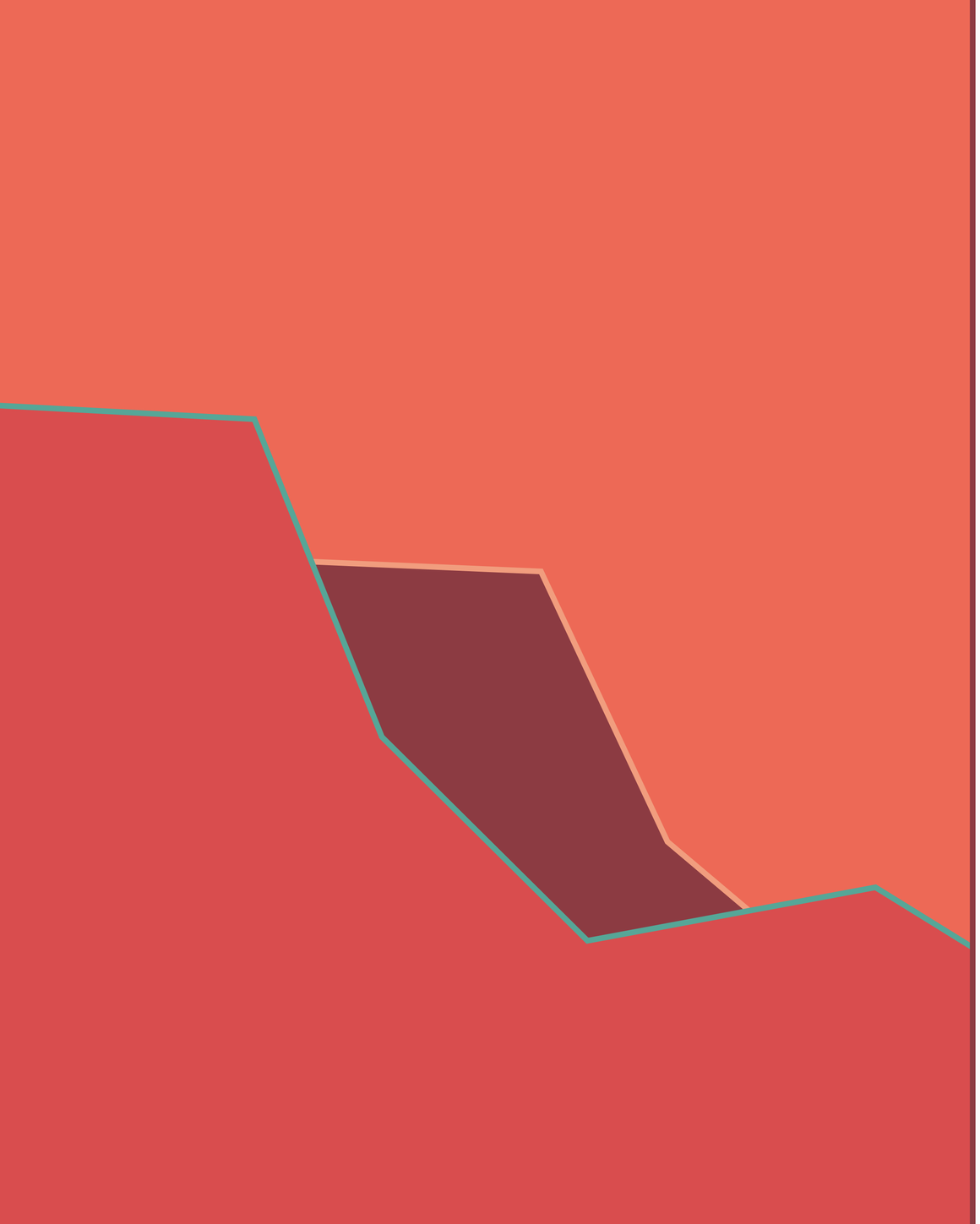
RAILS

The Magic of Rails

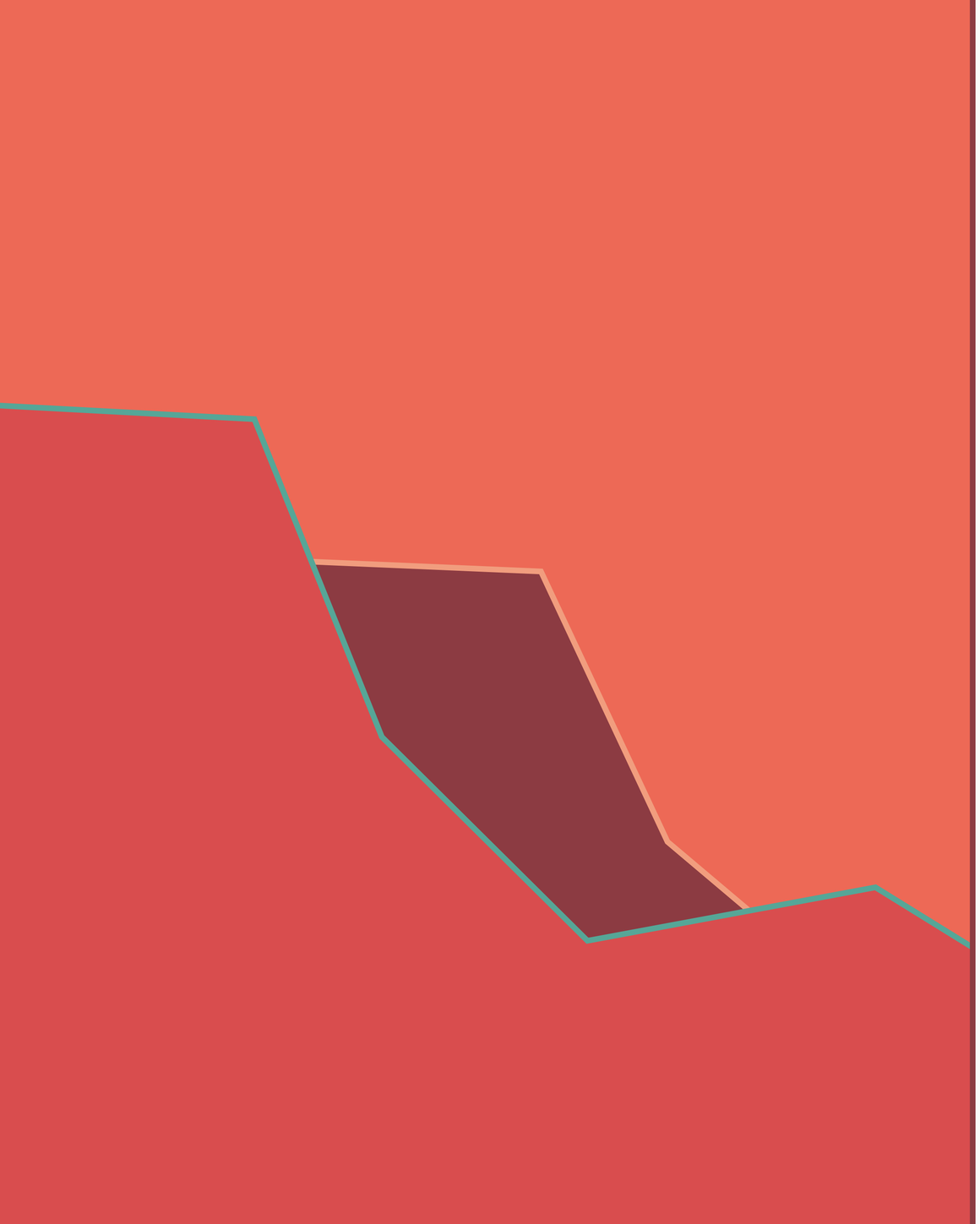
exploring the principles & techniques
behind the framework

What is
Ruby on Rails?

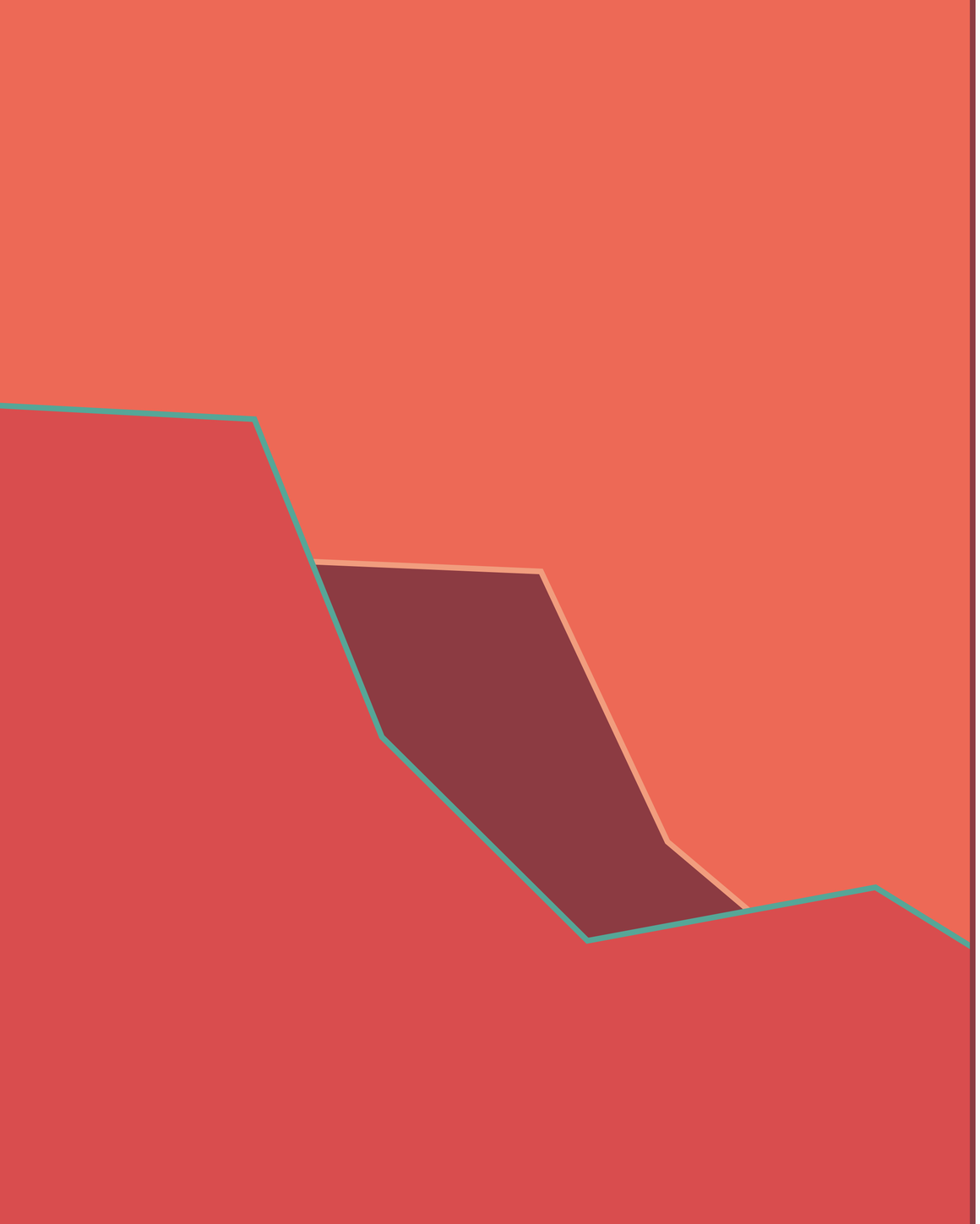




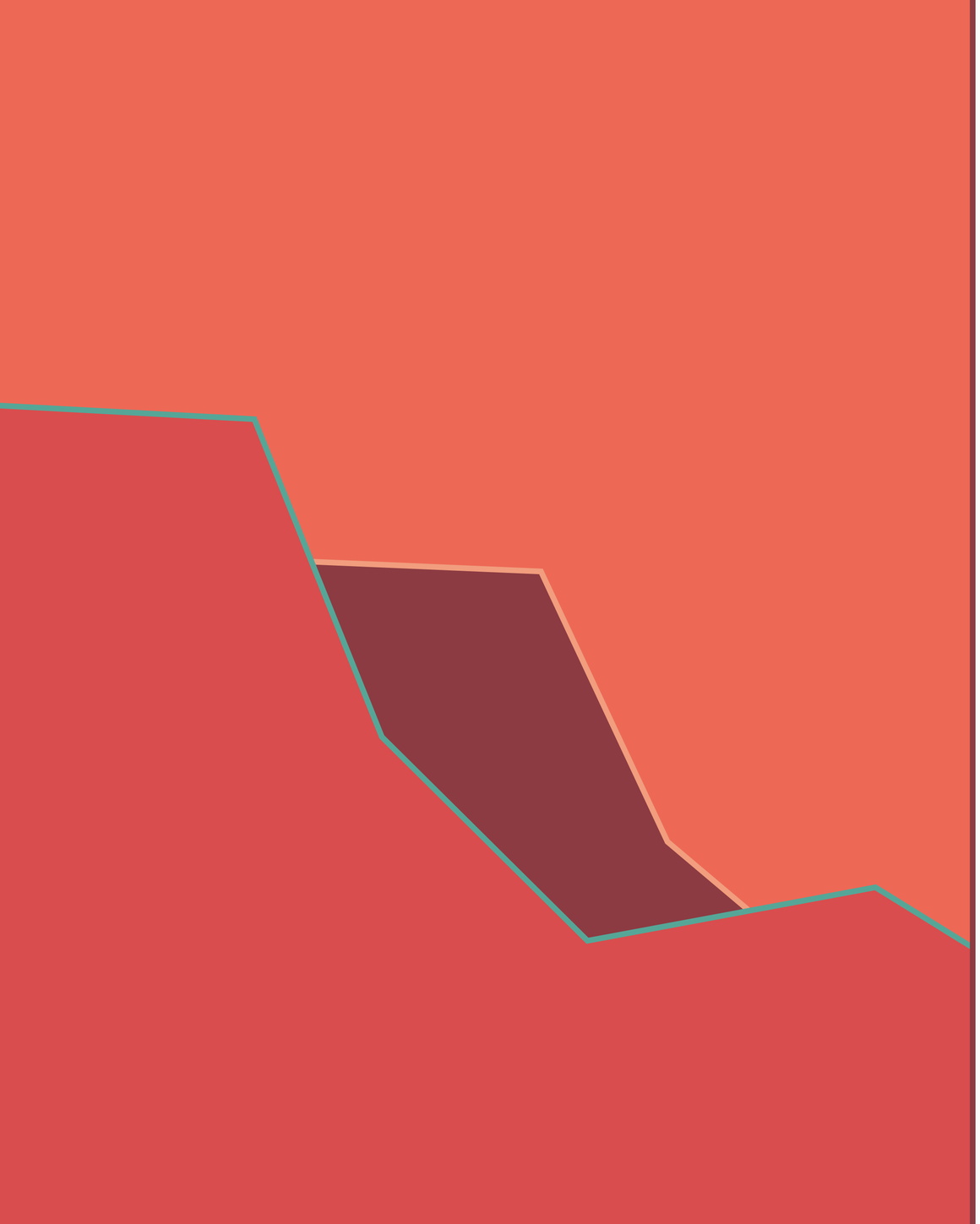
Rails is
modular, but
not fractured



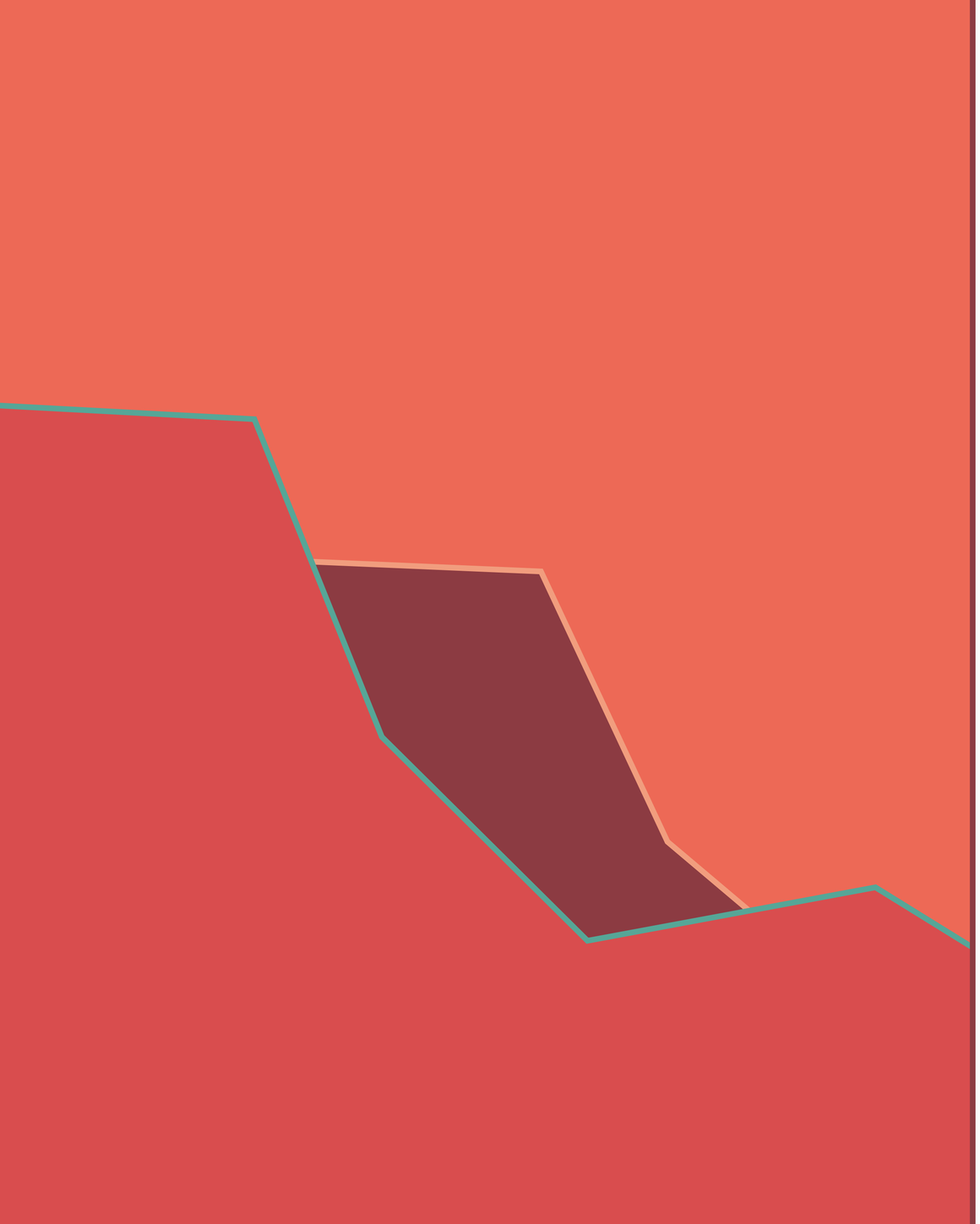
Rails is
designed to
have agnostic
interfaces



Rails is
extracted from
applications



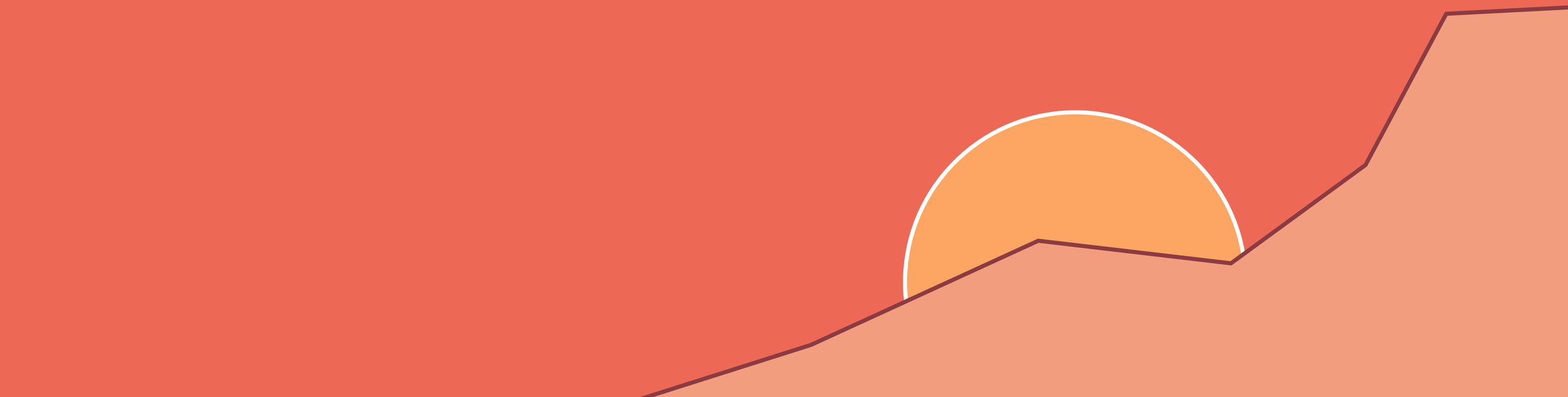
Rails is
made of
simple and
aesthetic APIs



Rails is

a framework that takes on complexity to empower you

How Rails components are structured



RUBY ON RAILS

Action Cable	Action Mailbox	Action Mailer
Action Pack	Action Text	Action View
Active Job	Active Model	Active Record
Active Storage	Active Support	Railties

Naming Convention

Active vs Action

NAMING CONVENTION

BACKEND

Active Record
Active Support
Active Model
Active Job
Active Storage

NAMING CONVENTION

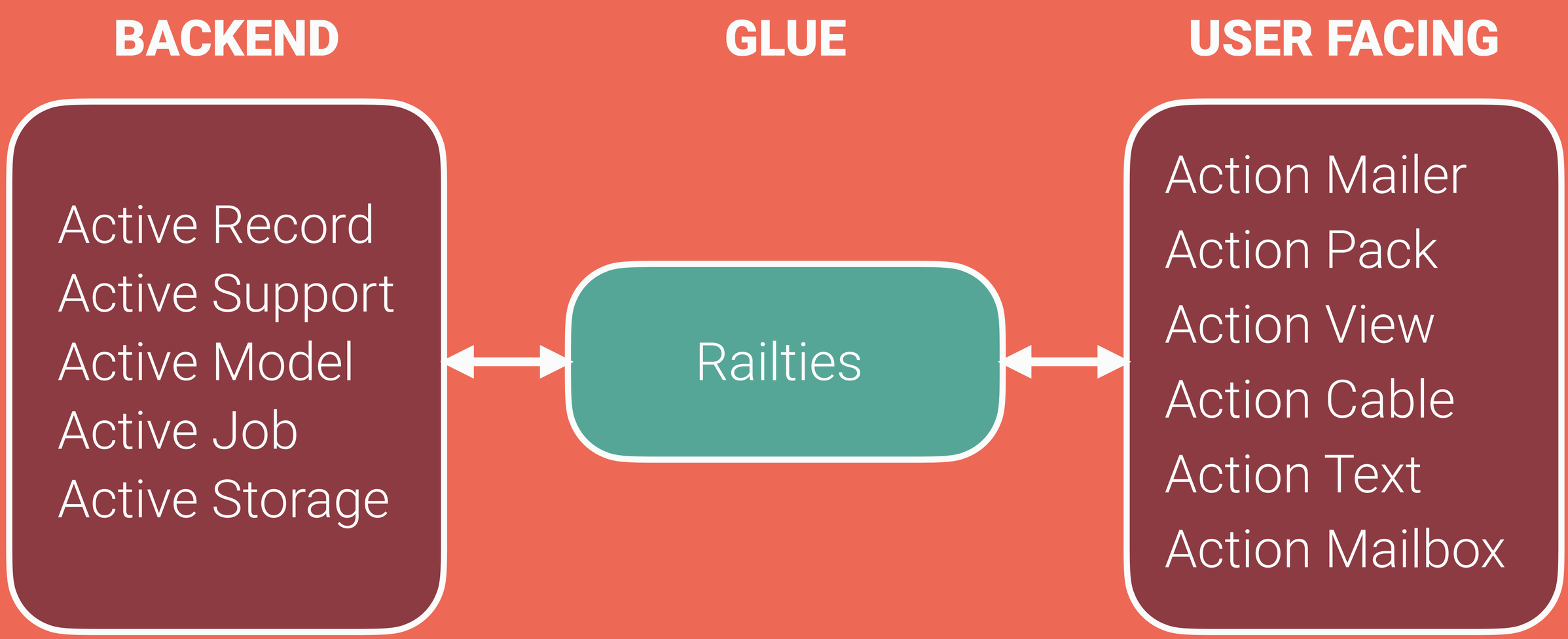
BACKEND

Active Record
Active Support
Active Model
Active Job
Active Storage

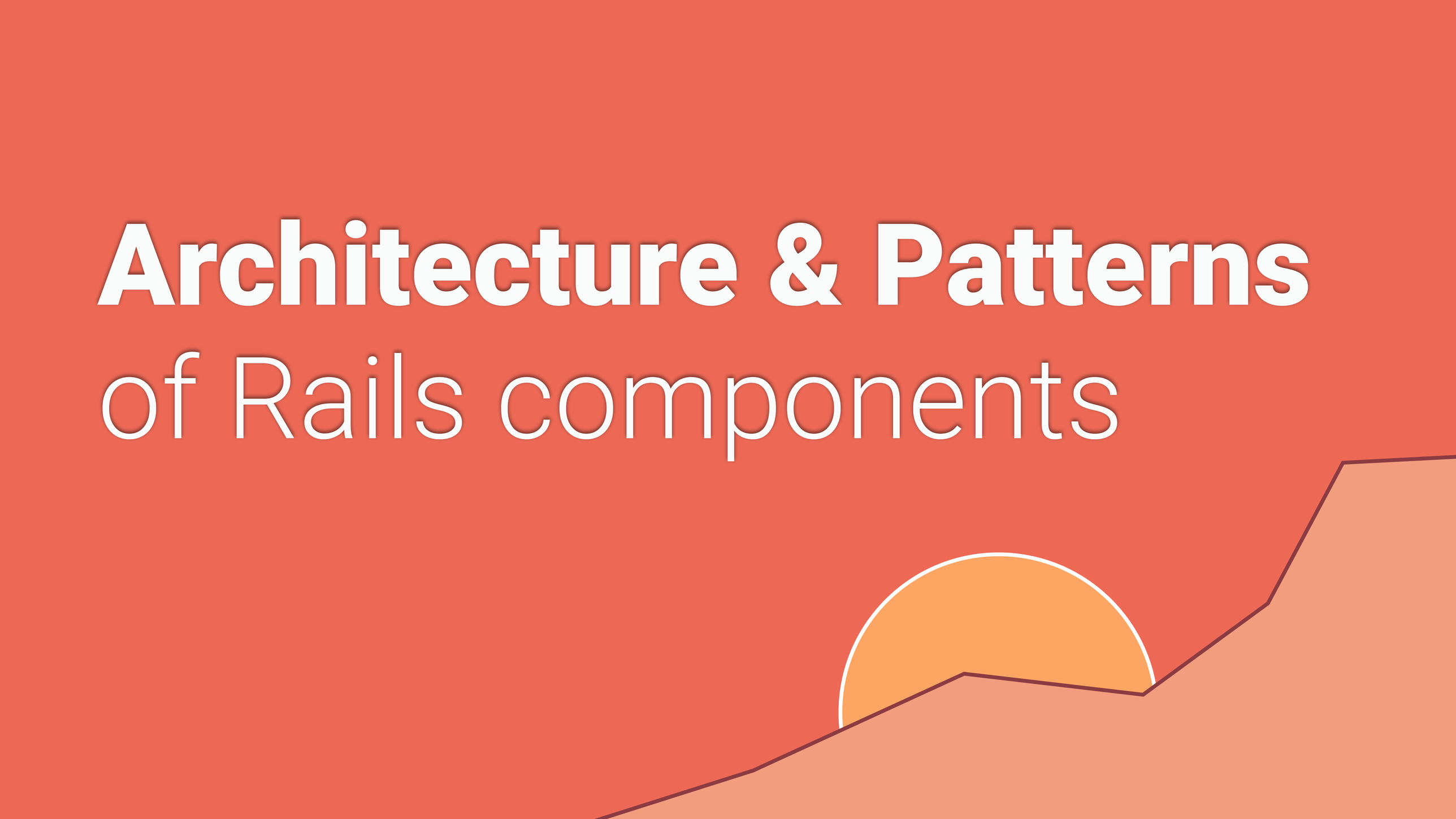
USER FACING

Action Mailer
Action Pack
Action View
Action Cable
Action Text
Action Mailbox

NAMING CONVENTION



Architecture & Patterns
of Rails components



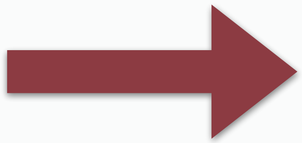
Architecture & Patterns

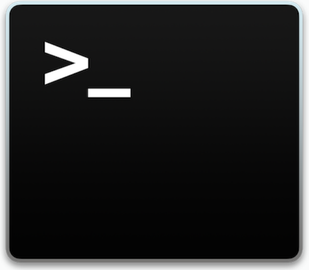
the role of Railties

Application

Application

Register hooks

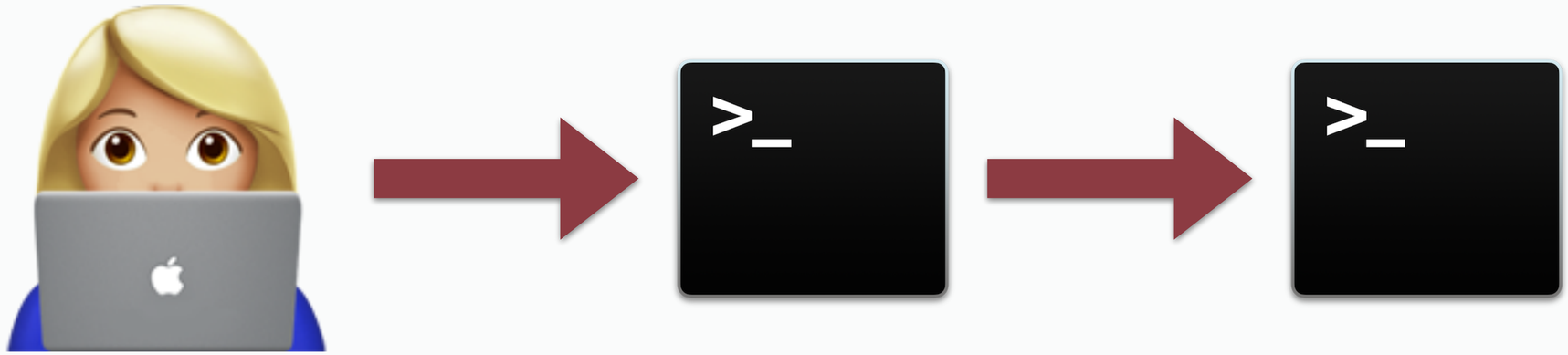




Application

Register hooks

Load components

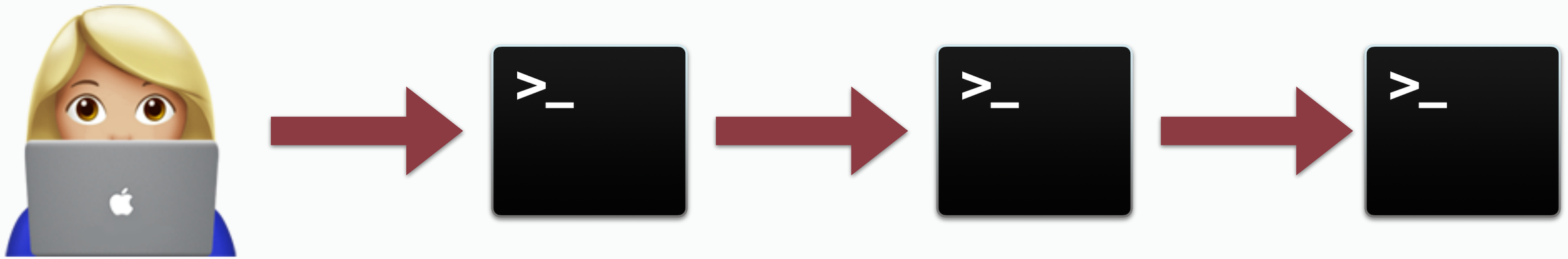


Application

Register hooks

Load components

Run hooks



```
# railtie.rb



initializer "initializer.name" do
  # do something at initialization
end
```

```ruby
# railties/lib/rails/application.rb



def initializer(name, opts = {}, &block)
  self.class.initializer(name, opts, &block)
end
```

```ruby
# railtie.rb



initializer "initializer.name" do |app|
  app.do_something
  app.config.do_something
end
```

```ruby
# railtie.rb


initializer "initializer.name" do
  ActiveSupport.on_load(:active_record) do
    # do something at initialization
  end
end
```

```ruby
# activerecord/lib/active_record/railtie.rb


initializer "active_record.initialize_database" do
  ActiveSupport.on_load(:active_record) do
    self.configurations =
      Rails.application.config.database_configuration

    establish_connection
  end
end
```

```ruby
# activerecord/lib/active_record/railtie.rb


initializer "active_record.initialize_database" do
  ActiveSupport.on_load(:active_record) do
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    self.configurations =
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    establish_connection
  end
end
```

```ruby
# activerecord/lib/active_record/railtie.rb

initializer "active_record.log_runtime" do
  require "active_record/railties/controller_runtime"
  ActiveSupport.on_load(:action_controller) do
    include ActiveRecord::Railties::ControllerRuntime
  end

  require "active_record/railties/job_runtime"
  ActiveSupport.on_load(:active_job) do
    include ActiveRecord::Railties::JobRuntime
  end
end
```

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# activerecord/lib/active_record/railtie.rb

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```

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  ActiveSupport.on_load(:active_job) do
    include ActiveRecord::Railties::JobRuntime
  end
end
```

```ruby
# activejob/lib/active_job/railtie.rb



initializer "active_model.deprecator",
  before: :load_environment_config do |app|

  app.deprecators[:active_model] =
    ActiveModel.deprecator
end
```

```ruby
# activejob/lib/active_job/railtie.rb



initializer "active_model.deprecator",
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  app.deprecators[:active_model] =
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```
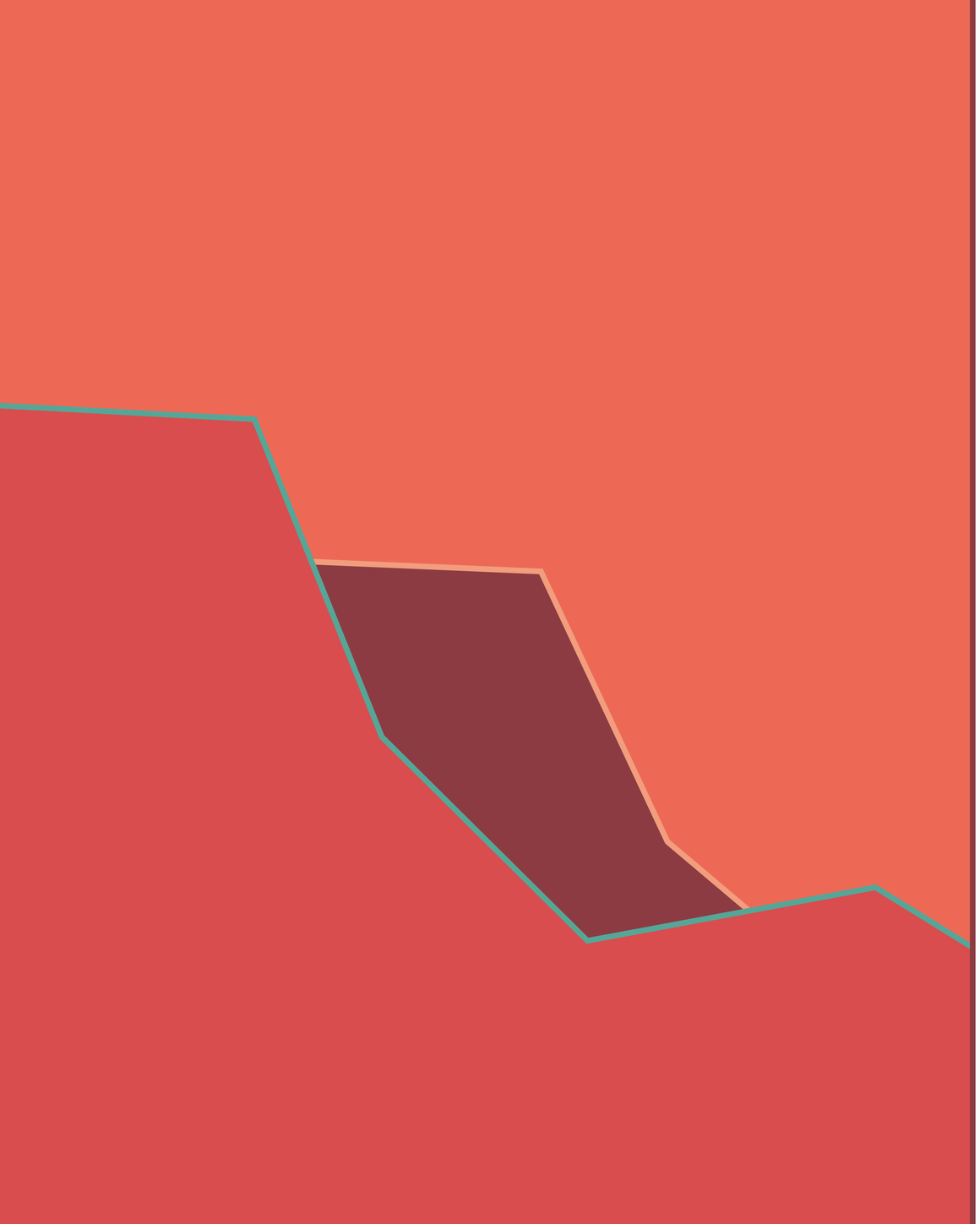
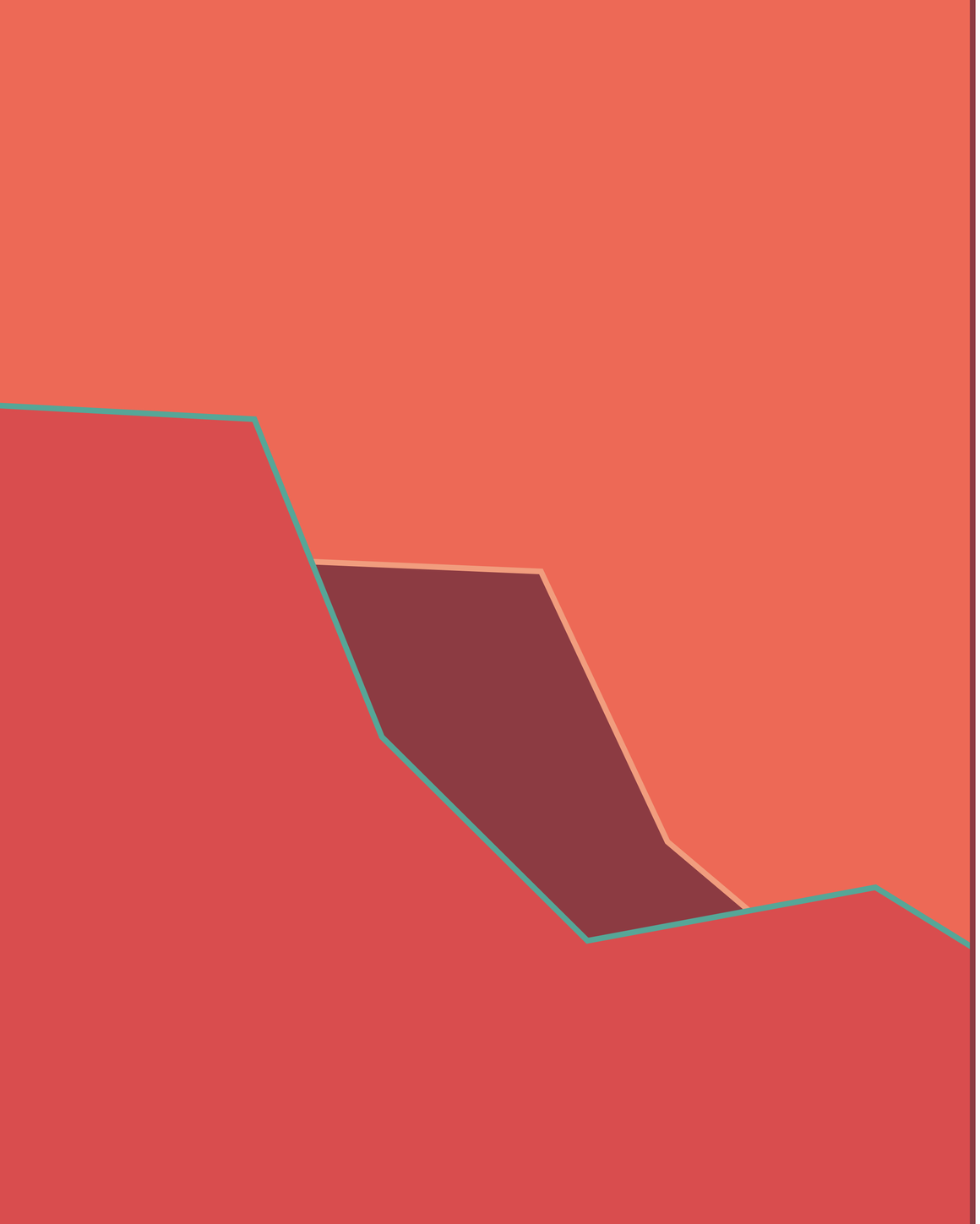
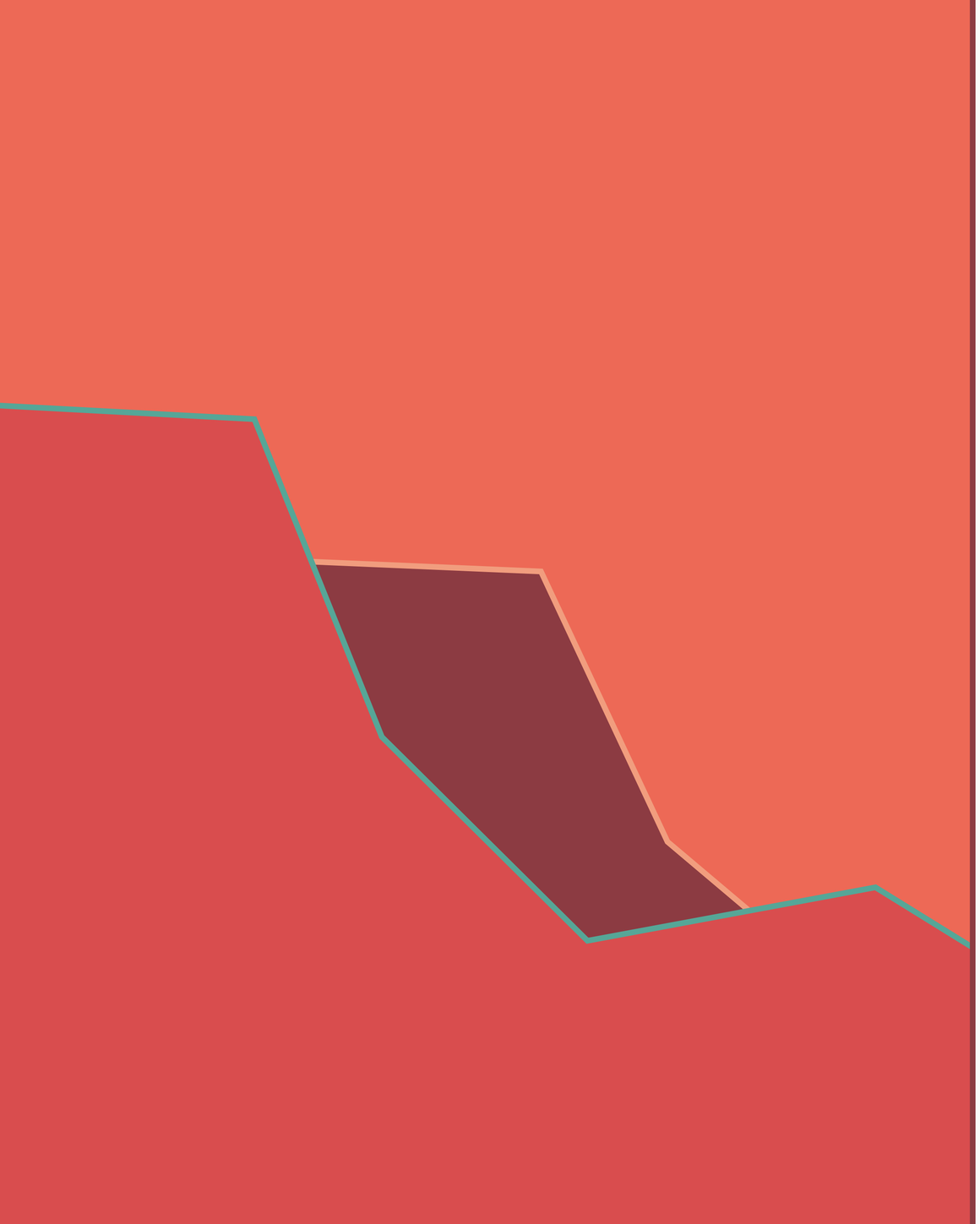



- Railties are the core of the framework



- Railties are the core of the framework
- Railties control load order and when hooks should be run



- Railties are the core of the framework
- Railties control load order and when hooks should be run
- Enables components to work together without adding dependencies

Architecture & Patterns

Agnostic interfaces

```
if connection.is_a?(PostgresqlAdapter)
  # ...
elsif connection.is_a?(Mysql2Adapter)
  # ...
elsif connection.is_a?(TrilogyAdapter)
  # ...
elsif connection.is_?(Sqlite3Adapter)
  # ...
else
  # ...
end
```

```
if connection.is_a?(PostgresqlAdapter)
  # ...
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  # ...
elsif connection.is_a?(Sqlite3Adapter)
  # ...
else
  # ...
end
```

```
module ActiveRecord
  module ConnectionAdapters
    class AbstractAdapter
      # define interface
    end
  end
end
```

```ruby
module ActiveRecord
  module ConnectionAdapters
    class AbstractAdapter
      # define interface
    end
  end
end

module ActiveRecord
  module ConnectionAdapters
    class PostgresqlAdapter < AbstractAdapter
      # inherit or redefine interface
    end
  end
end
```

```
connection.supports_foreign_keys?
=> true
```

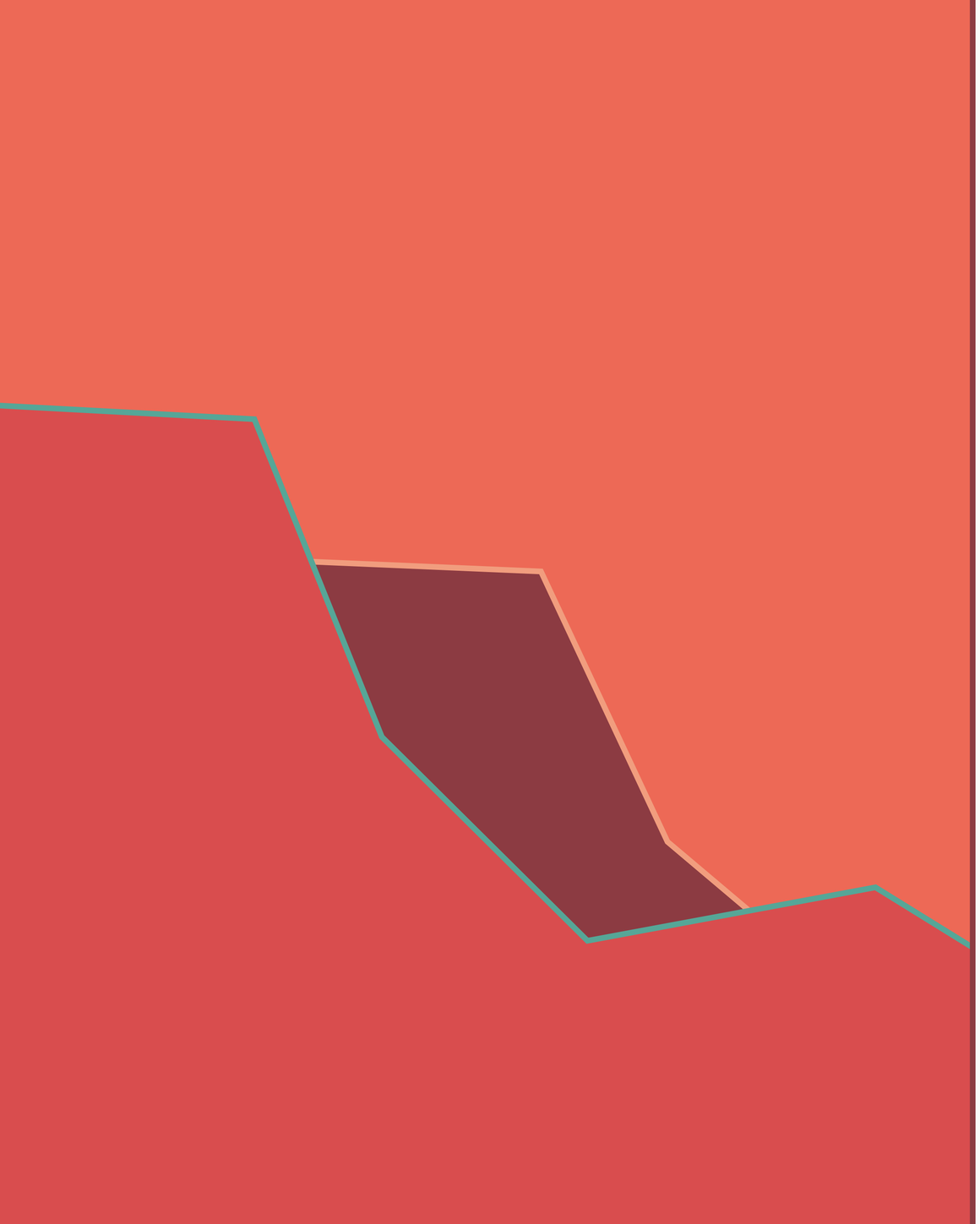
```
class AbstractAdapter
  def supports_foreign_keys?
    false
  end
end
```

```ruby
class AbstractAdapter
  def supports_foreign_keys?
    false
  end
end

class PostgresqlAdapter < AbstractAdapter
  def supports_foreign_keys?
    true
  end
end
```

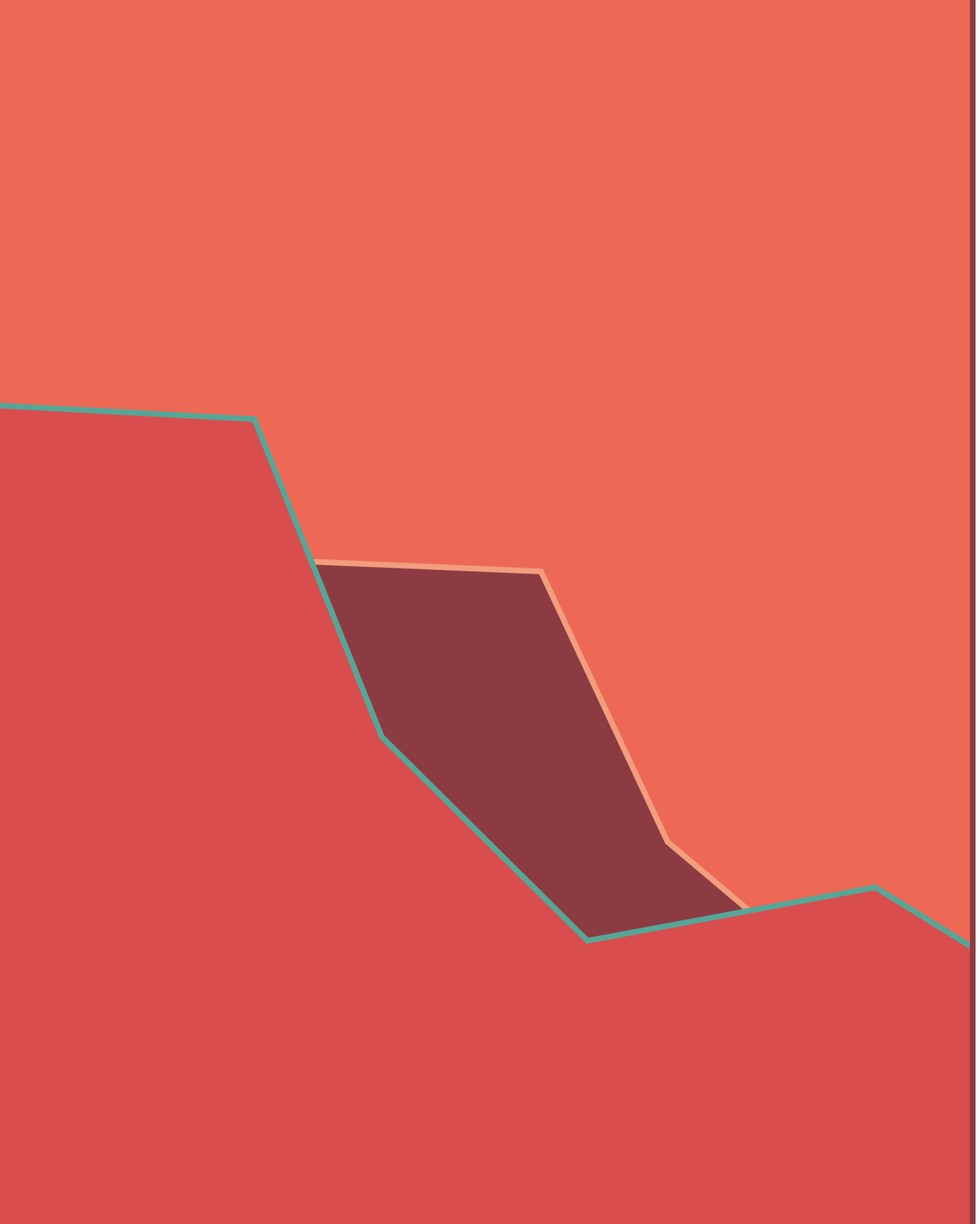
```ruby
# activestorage/lib/active_storage/service.rb



module ActiveStorage
  class Service
    def delete(key)
      raise NotImplementedError
    end
  end
end
```

```ruby
# activestorage/lib/active_storage/service/gcs_service.rb


class ActiveStorage
  class Service::GCSService < Service
    def delete(key)
      instrument :delete, key: key do
        file_for(key).delete
      rescue Google::Cloud::NotFoundError
        # Ignore files already deleted
      end
    end
  end
end
```

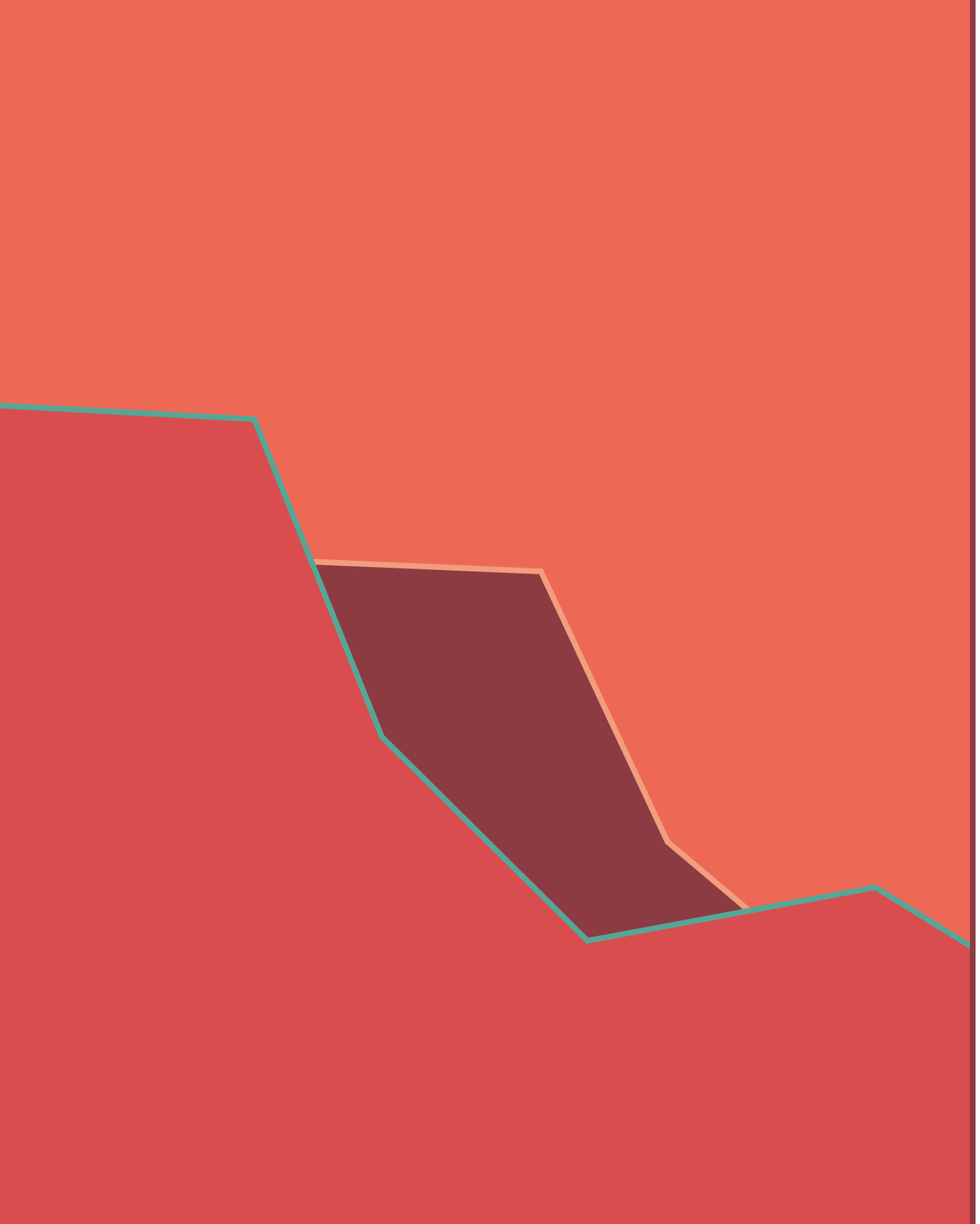
```
@service.delete(key)
```



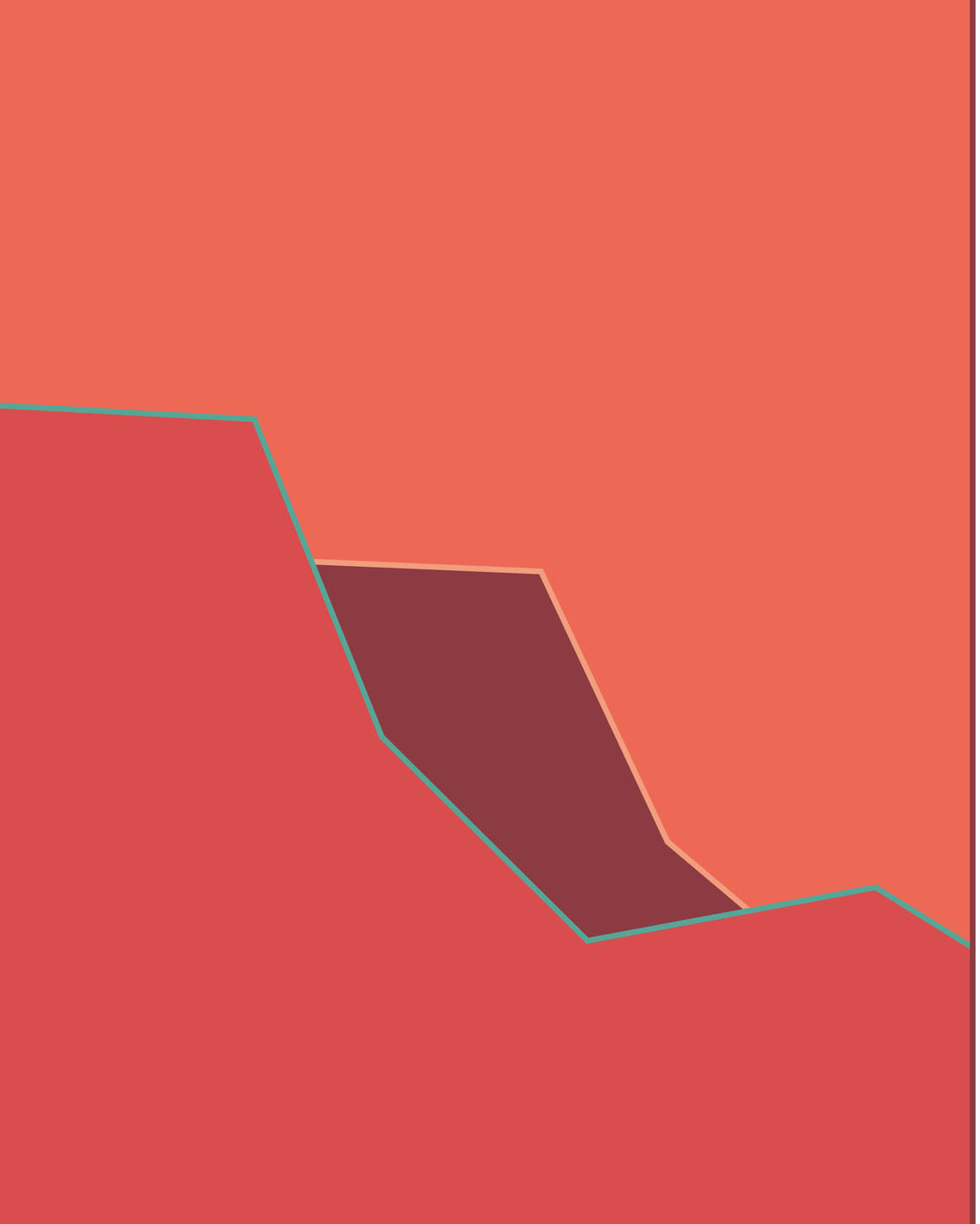
- Consistent interface for all supported libraries



- Consistent interface for all supported libraries
- Simplifies Rails code to avoid using `` `is_a?` ``



- Consistent interface for all supported libraries
- Simplifies Rails code to avoid using `` `is_a?` ``
- Makes it easy for apps to swap out adapters / services



- Consistent interface for all supported libraries
- Simplifies Rails code to avoid using `` `is_a?` ``
- Makes it easy for apps to swap out adapters / services
- Lowers the maintenance burden

Architecture & Patterns

Metaprogramming

```ruby
class Post < ApplicationRecord
  has_many :comments
end

class Comment < ApplicationRecord
  belongs_to :post
end
```

```
post = Post.first
post.comments

=> [#<Comment:0x00000010e353838...>,
    #<Comment:0x00000010e3530e0>]
```

```
post = Post.first
post.method(:comments).source_location
```

```
post = Post.first
post.method(:comments).source_location

=> ["rails/activerecord/lib/
    active_record/associations/builder/
    association.rb", 103]
```

```ruby
# activerecord/lib/active_record/associations/builder/
association.rb

class ActiveRecord::Associations::Builder
  class Association
    def self.define_readers(mixin, name)
      mixin.class_eval <<-CODE, __FILE__, __LINE__ + 1
        def #{name}
          association(:#{name}).reader
        end
      CODE
    end
  end
end
```

```
# activerecord/lib/active_record/associations/builder/
association.rb

class ActiveRecord::Associations::Builder
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    def self.define_readers(mixin, name)
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        end
      CODE
    end
  end
end
```

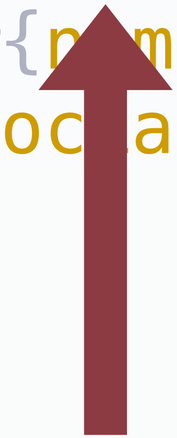

Post::GeneratedAssociationMethods

```
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association.rb

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  class Association
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  end
end
```

```
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association.rb

class ActiveRecord::Associations::Builder
  class Association
    def self.define_writers(mixin, name)
      mixin.class_eval <<-CODE, __FILE__, __LINE__ + 1
        def #{name}=(value)
          association(:#{name}).writer(value)
        end
      CODE
    end
  end
end
```

```
# activerecord/lib/active_record/associations/builder/
association.rb

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  class Association
    def self.define_writers(mixin, name)
      mixin.class_eval <<-CODE, __FILE__, __LINE__ + 1
        def #{name}=(value)
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        end
      CODE
    end
  end
end
```
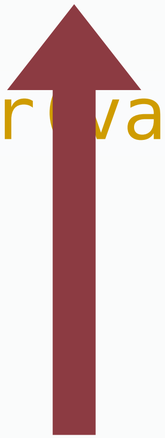
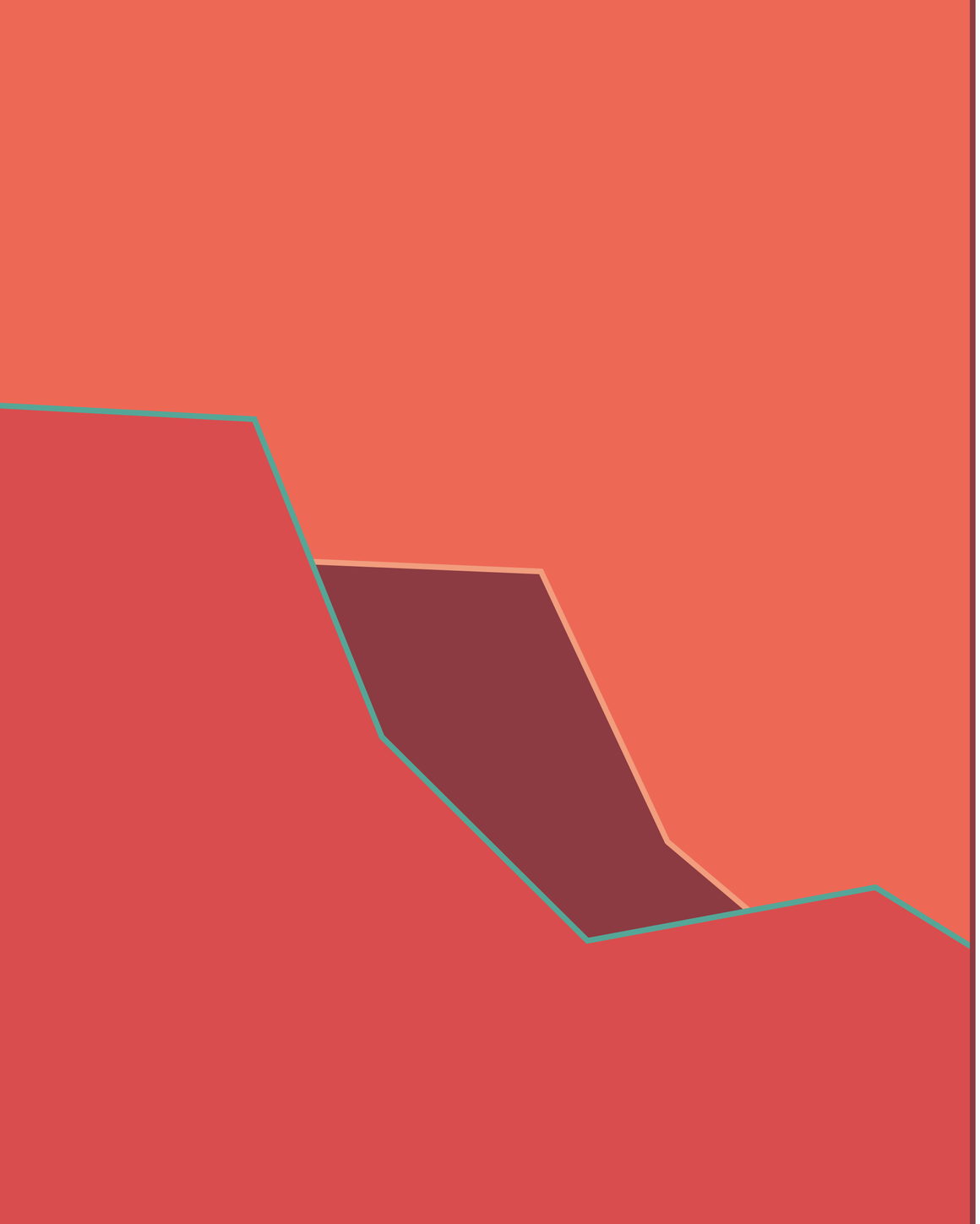
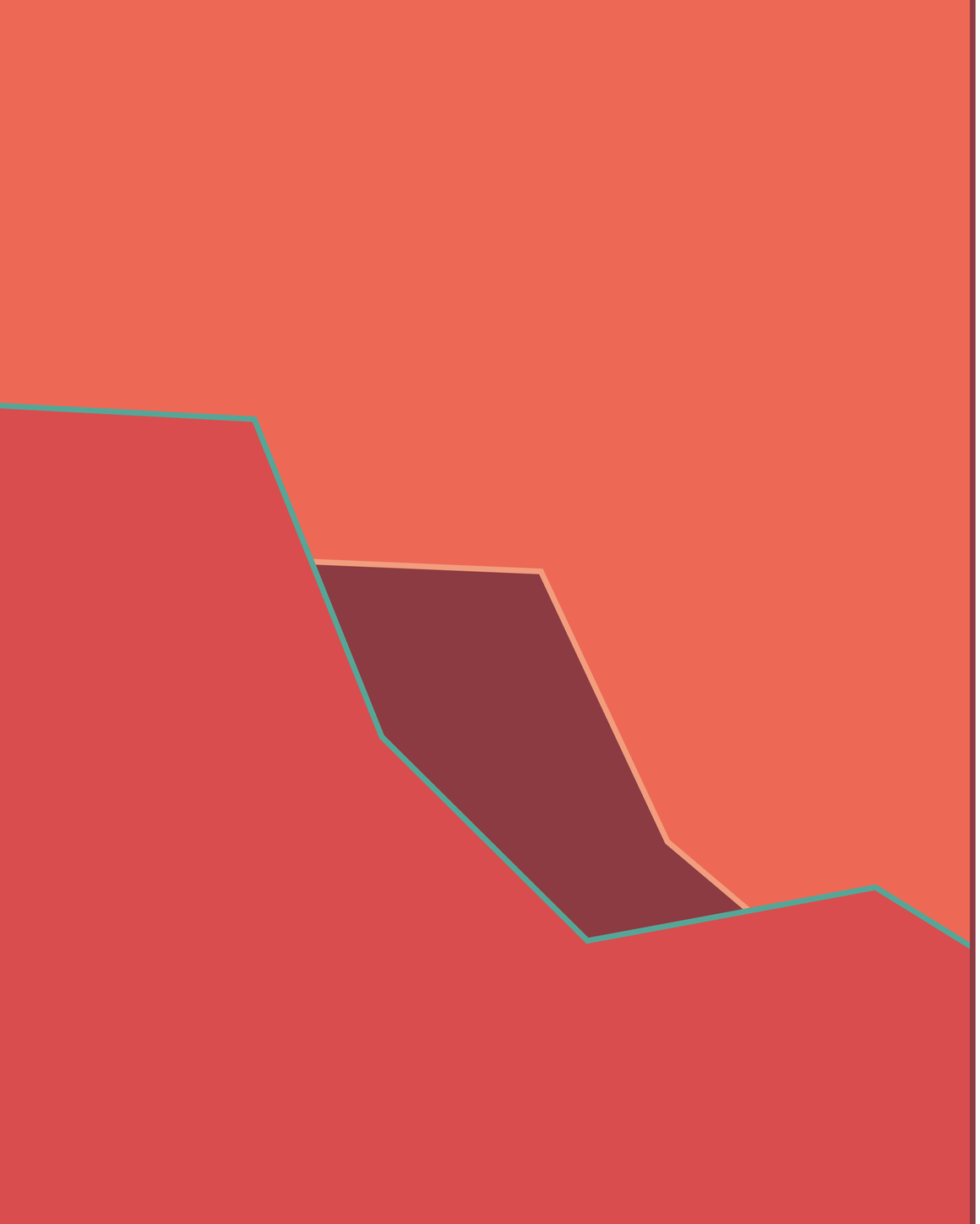
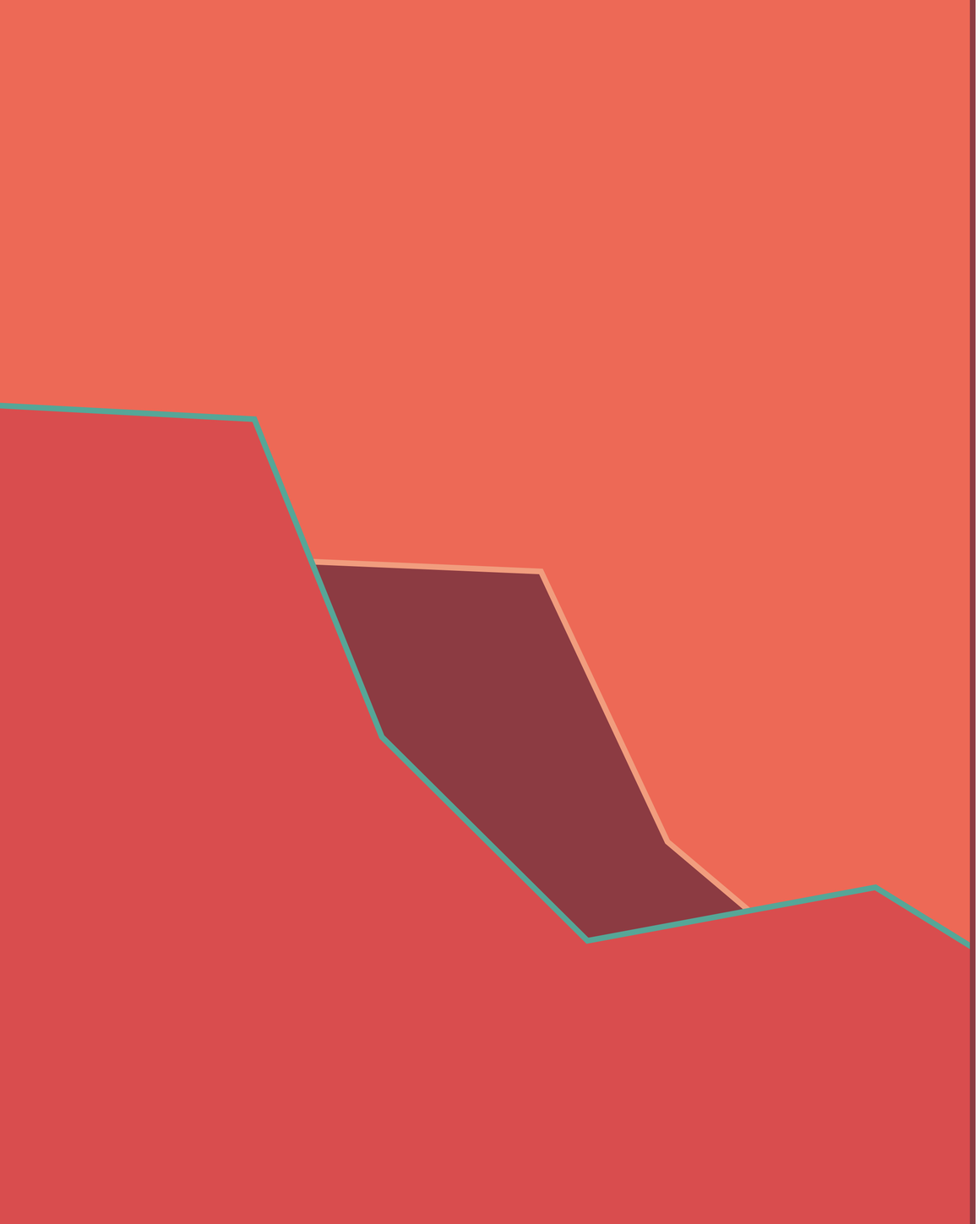





- Powerful tool that enables us to build beautiful, simple APIs



- Powerful tool that enables us to build beautiful, simple APIs
- Hides complexity from your application



- Powerful tool that enables us to build beautiful, simple APIs
- Hides complexity from your application
- Where "Rails Magic" comes from

Maintaining Rails

Why I work on it

2010
Introduced
to Rails

2010
Introduced
to Rails

2011
Big Nerd Ranch

2010
Introduced
to Rails

2011
Big Nerd Ranch

2014
1st conference
1st contribution

2010
Introduced
to Rails

2011
Big Nerd Ranch

2014
1st conference
1st contribution

2015
First RailsConf

2010
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2014
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2015
First RailsConf

2017
Join Rails Core

2010
Introduced
to Rails

2011
Big Nerd Ranch

2014
1st conference
1st contribution

2015
First RailsConf

2017
Join Rails Core

2023
Rails is 20!


I work on Rails to
advance the
framework


I work on Rails to
ensure applications
can stay on Rails


I work on Rails to
build a stronger
community


I work on Rails to
have an impact
on the future

Rails is so much more
than just a framework

Rails is

inspiring

Rails is
empowering

Rails is

imperfect

Rails is

the applications we build

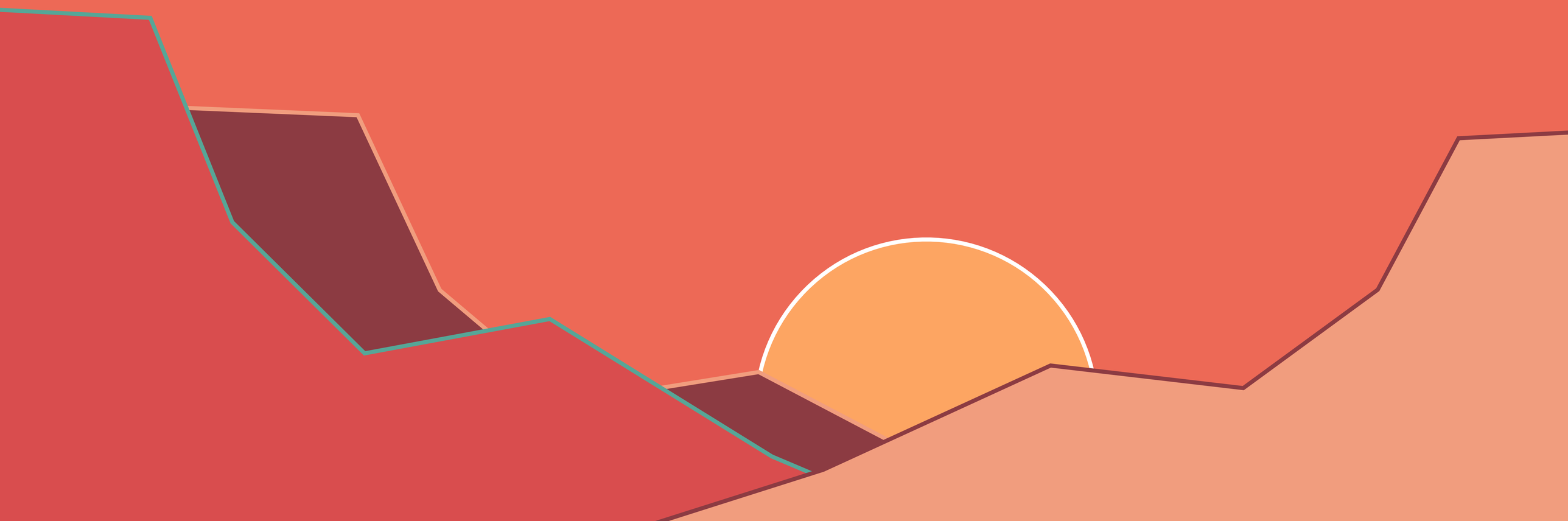
Rails is

the team behind it

Rails is

the community

Rails *is* magic



Thank You!

Eileen M. Uchitelle

eileencodes.com

@eileencodes

Senior Staff Engineer @ Shopify

Rails Core Team