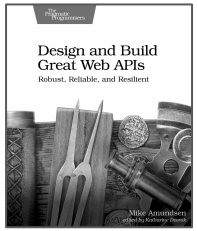
Design and Build Great Web APIs

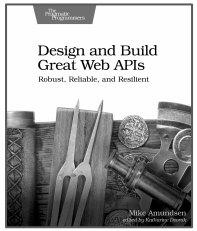
Designing

@mamund
Mike Amundsen
training.amundsen.com



Designing

- Document the Story
  - What is our purpose?
- Diagram the Flow
  - Make it visual
- Describe the API
  - This is not implementation



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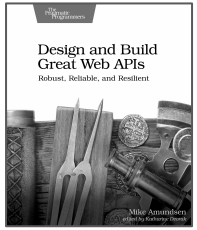
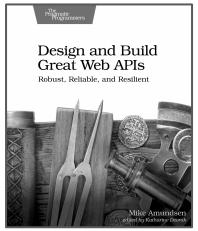


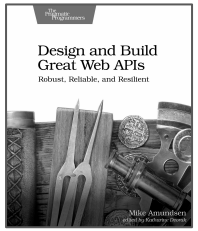
Document the Story

- Every API has a purpose; a story
- Sometimes that story is hard to uncover
  - "We've always done it this way."
- Sometimes that story varies
  - "Well, that's not what WE need it for."
- Before designing and building, get the story straight



Document the Story

- Purpose
- Data
- Actions
- Processing



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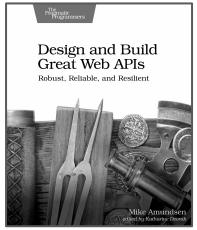
Purpose

We run a simple credit check periodically on companies that are our customers to update their bsaseline spending limit and discount percentages.

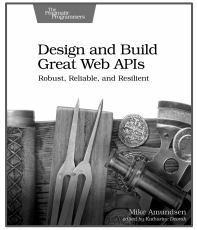


Document the Story

Purpose

Data

Each company record has one or more `account` records. Each `account` record as a `spendingLimit` property and a `discountPercentage` property. By default these two values are set to `5000` and `5%`, respectively. However, we can modify those values by running a simple credit check using the customer name to see if we need to adjust those values up or down.



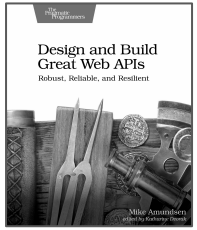
Document the Story

Purpose

Data

Actions

The credit check service has a safe method (`checkCredit`) which accepts a `companyName` and returns a `rating` (a single value between 1 and 10). That `rating` value can then be used to determine BigCo's standard `spendingLimit` and `discountPercentage` for that company's account record.



Document the Story

Purpose

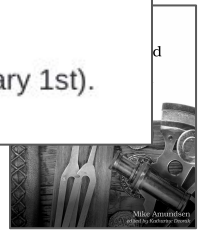
Data

Actions

Processing

Each time the credit-check service is queried, it also writes a history record that can be called up later for review. History is recalled using the same `companyName` that was used when making the initial credit check. History records contain the following properties: `identifier`, `companyName`, `dateRequested`, and `rating`.

We run this credit-check when we first add a company account record and once a year after that (always on January 1st).



Document the Story

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  - Record their references to data, actions, processing, purpose
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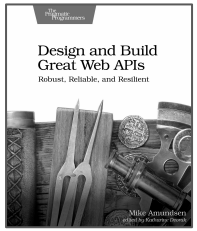


Document the Story

- Publish the agreed story
- Check it into the project repository
- Use it as a guide going forward

19 lines (11 sloc) | 1.48 KB

Raw | Blame | History

Credit Check Story at BigCo, Inc.

Purpose

We run a simple credit check periodically on companies that are our customers to update their bsaseline spending limit and discount percentages.

Data

Each company record has one or more `account` records. Each `account` record as a `spendingLimit` property and a `discountPercentage` property. By default these two values are set to `5000` and `5%`, respectively. However, we can modify those values by running a simple credit check using the customer name to see if we need to adjust those values up or down.

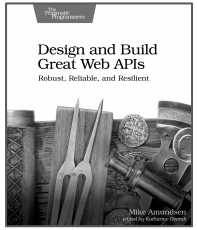


Diagram the Flow

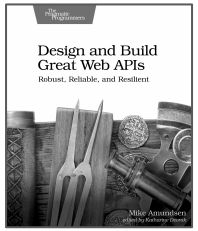


Diagram the Flow

- Always include a visual representation of the API
- Diagram the action flow, not the resources or data
- Sequence diagrams are very easy

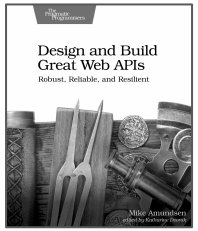


Diagram the Flow

- The Web Sequence Diagram
- Write using the WSD text format
- Export PNG diagrams
- There is a handy API, too.

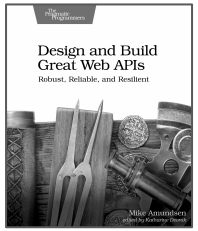


Diagram the Flow : websequencediagrams.com

File Edit View Style Help Account

```
Title Credit-Check Workflow

Home -> CreditList:
CreditList -> CreditItem:
CreditItem --> CreditList:
CreditList -> CreditRequest:
CreditRequest --> CreditItem:
CreditList --> Home:
CreditItem --> Home:
```

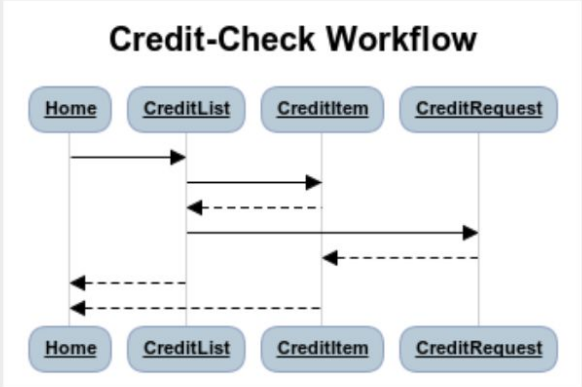
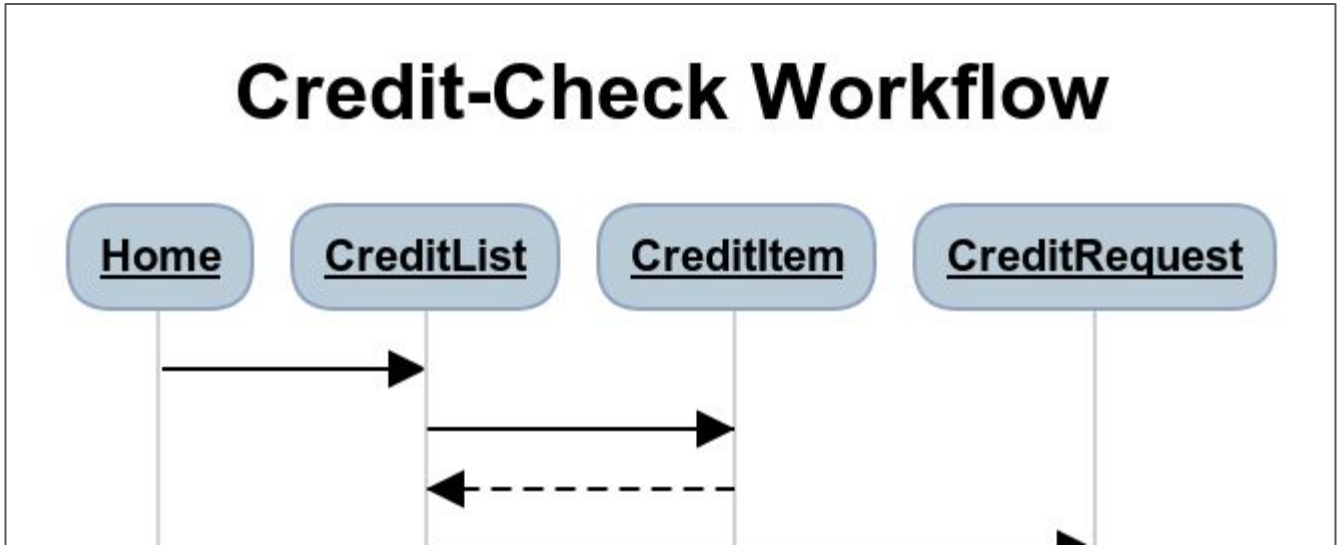
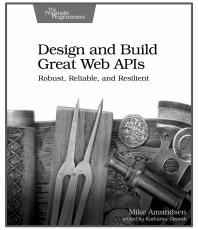


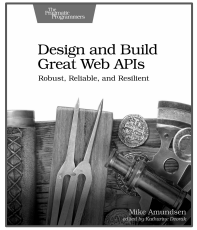
Diagram the Flow

- Publish the final diagram
- Check it into the project repository
- Use it as a guide going forward



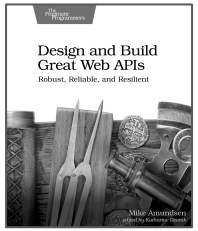


Describe the API



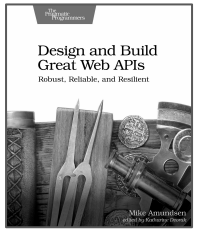
Describe the API

- Design phase is not implementation phase
- API definitions are varied
  - WSDL, WADL, OpenAPI, AsyncAPI, protobuf, SDL
- Use an implementation-agnostic detailed description



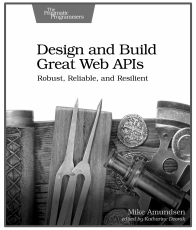
Describe the API : ALPS

- Application-Level Profile Semantics
  - Amundsen-Richardson-Foster (2011)
- Identifies all interface properties
  - Id, familyName, givenName, telephone, etc.
- Identifies all interface actions
  - saveCompany, setStatus, approvePayroll, etc.
- Does not include implementation details
  - URLs, schemas, methods, response codes, etc.



Describe the API : ALPS

```
alps:
  version: '1.0'
  description: ALPS document for BigCo Credit Check API
```

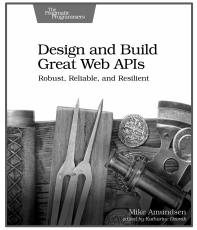


Describe the API : ALPS

```
alps:
  version: '1.0'
  descri                                    gCo Credit Check API
```

```
  - id: creditCheckItem
    type: safe
    returns: '#ratingItem'
    descriptors:
      - href: '#id'

  - id: creditCheckForm
    type: unsafe
    returns: '#ratingItem'
    descriptors:
      - href: '#id'
      - href: '#companyName'
      - href: '#ratingValue'
```



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alps:
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  descri
```

```yaml
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    type: unsafe
    returns: '#ratingItem'
    descriptors:
      - href: '#id'
      - href: '#companyName'
      - href: '#ratingValue'
```
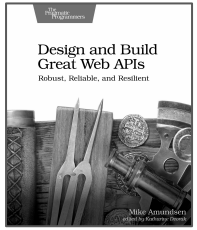

```yaml
  - id: ratingItem
    type: semantic
    descriptors:
      - id: id
        type: semantic
      - id: companyName
        type: semantic
      - id: ratingValue
        type: semantic
      - id: dateCreated
        type: semantic
      - id: dateUpdated
        type: semantic
```



Describe the API : ALPS

- ALPS identifies
  - The state to pass in each message
  - The safety & idempotence of each action
- ALPS is part of Pivotal's Spring frameworks

12.1. Application-Level Profile Semantics (ALPS)

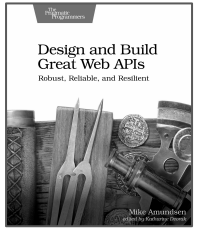
> ALPS is a data format for defining simple descriptions of application-level microformats. An ALPS document can be used as a profile to explain the a application-agnostic media type (such as HTML, HAL, Collection+JSON, Sir documents across media types.
>
> *— M. Admundsen / L. Richardson / M. Foster*
>
> *https://tools.ietf.org/html/draft-amundsen-richardson-foster-alps-00*

Spring Data REST provides an ALPS document for every exported repository. It co transitions and the attributes of each repository.

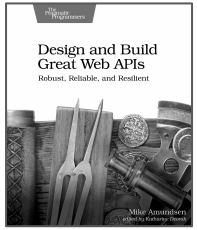
Describe the API : ALPS

- Publish the profile
- Check it into the project repository
- Use it as a guide going forward

```yaml
alps:
  version: '1.0'
  description: ALPS document for BigCo Onboarding API

  descriptors:
    - id: home
      type: safe
      returns: '#onboarding'

```

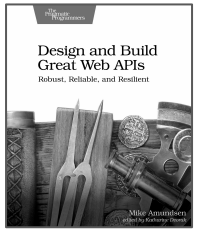


Design Exercise

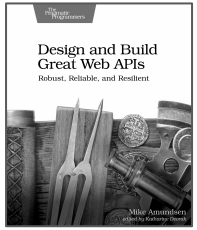


Design Exercise

- Produce an ALPS document
  - Use one of the supplied stories (/stories/ folder)
- Purpose into ALPS description header
  - `"We track customers at BigCo, Inc"`
- Data into ALPS properties
  - `- id: customerId`
    `- type: semantic`
- Actions into ALPS actions
  - `- id: createCustomer`
    `- type: unsafe`

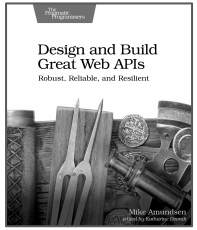


Summary


The Pragmatic Programmers
Design and Build Great Web APIs
Robust, Reliable, and Resilient
Mike Amundsen
edited by Katharine Dvorak

Designing

- Document the Story
  - Purpose, Actions, & Data
- Diagram the Flow
  - Sequence diagrams are not HTTP
- Describe the API
  - Before OpenAPI, AsyncAPI, protobuf and SDL



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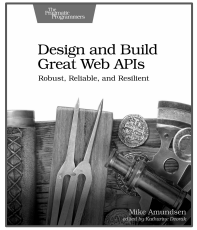

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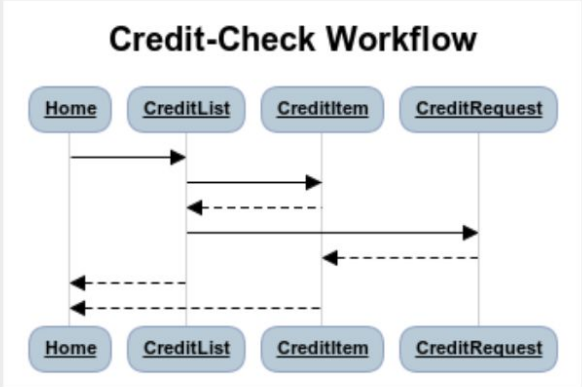

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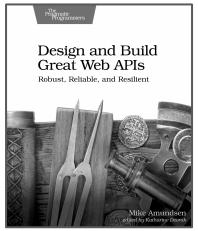

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